

# Student Perceptions of Various Hint Features while Solving Coding Exercises

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## ABSTRACT

Drill and practice systems provide students with an informal learning environment to learn programming languages. In a traditional classroom setting, while feedback is personalized for each individual, it is a time consuming process. These online environments possess the ability to provide instantaneous feedback and can be accessed from any location. However, while these are conveniences, there is still an issue with the quantity and quality of feedback that is provided to each user by the system, and whether it is helpful towards helping them solve the exercise with a large understanding of the concept being tested. In this thesis we investigate how students perceive additional feedback would help them in completing coding exercises in CodeWorkout.

We conducted these investigations through user studies, across two focus groups, with Computer Science students from various years. The study was conducted over one semester with a total of seventeen participants. A discussion based frequently asked questions (FAQ) tool, the ability to request a hint during submissions and the option to provide a hint to other users, to encourage active learning, were all options presented to participants during these focus groups. The information gathered through these group discussions formed the basis of our conclusion and implications.

The overall feedback on all three tools was both positive and constructive. The idea of having a less traditional FAQ tool, complete anonymity in responses, as well as the ability to vote on hints provided were strong emergent themes through the study. The majority of Participants felt that they would utilize all these tools in some fashion, were they provided, and would find them helpful in completing a coding exercise if they were stuck. Lastly, we conclude with suggestions for potential design and feature options for the system.

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## ***Chapter 1—Introduction***

Drill and practice systems provide students with an informal learning environment to practice and increase their proficiency in various programming languages. Within a traditional classroom students are able to approach the professor with questions or concerns, regarding an exercise and are able to receive immediate feedback. This provides students with an active learning environment with personalized feedback for each individual student. While this can be time-consuming and restricted in access, students are able to ask in depth questions for clarification on a concept until they are satisfied with the response. Drill and practice systems have managed to address the issues involved with time consumption by providing immediate feedback, in the form of unit test results. These lists of results indicate different aspects of the coding exercise the student is attempting to achieve through their code snippet. However, the limitation with this online learning environment is that simply displaying automated test results, with incorrect and correct indicators, do not help students improve their response and in turn promote active learning. They require a novel approach to ensure students are achieving the same understanding as in-class learning[10]. CodeWorkout, a computer science drill-and-practice system, attempts to address this problem by providing additional resources for feedback. CodeWorkout attempts to promote active learning by providing students with, a discussion based FAQ tool, hints while completing an exercise and the ability to contribute hints to be reused later.

### **1.1—Research Questions**

Our goals for this thesis is to evaluate how additional resources for feedback would help students get unstuck while completing online coding exercises. We began by investigating the workflow of students when completing coding exercises in CodingBat. In particular, we focused on workflow and what resources students turn to when they get stuck. For the second phase of this research, we asked students how helpful they thought different forms of feedback would be in getting them unstuck during their coding process. We proposed and evaluated three separate options: *a discussion-based Frequently Asked Questions (FAQ) tool, hints provided while completing an exercise and the ability to write hints for other students completing an exercise.*

**Q1** Would students perceive a discussion-based tool to be helpful in completing a coding exercise, while they are practicing alone?

**Q2** Would students find hints, provided upon request, a helpful resource to get unstuck while completing a coding exercise?

**Q3** Given the opportunity, would students be interested in contributing hints, at the end of an exercise, for other students to receive as a resource?



## **1.2—Approach**

In order to investigate how these above methods of feedback could be beneficial, we decided to run a few user studies. These were conducted across two separate rounds of focus groups. All participants were current Computer Science students enrolled at Virginia Tech. The sole requirement for participation in the first round was that each individual had used a drill and practice system in class, preferably CodingBat, prior to the study.

The first round of focus groups was focused on gathering information on the process of how these students had practiced and completed coding exercises in CodingBat. We were also interested in looking at how these students used/ looked for hints while attempting to complete an exercise from start to finish. Additionally, we were curious about how participants utilized the discussion component available to them in their current courses, to receive help to complete an exercise. Throughout and after the completion of this initial study, certain themes emerged across the 3 groups.

Participants discussed in length about their process in completing exercises and their difficulty understanding the unit test responses. They seemed interested in having the opportunity to receive a hint that would aid them through the process of correcting an incorrect solution. Lastly, participants commented that they never contributed towards discussion forums in their own courses. The majority of participants commented that a discussion option could be helpful if responses were fast enough, however a they all felt that a threaded discussion would not be in keeping with the goal of this tool.

Based on these cumulative responses we ran the second round of focus groups, focused specifically on receiving and utilizing feedback during the process of completing an exercise while using the CodeWorkout tool. In order to create a more streamlined discussion, we decided to produce low-fidelity UI mockups. These mockups were created using the current functional UI of CodeWorkout as a base, and reflected specific design recommendations of participants the first round of focus groups including, feedback options for unit testing results, a FAQ tool, and a button to “Ask for a Suggestion”.

Several of the themes that came to light at the end of the second round are listed in the following paragraph. Sentence comprehension remained a hindrance in solving the exercise correctly. Participants commented that the drop down option in the FAQ tool was not intuitive in the UI mockups and that an additional sentence of description beneath the unit test titles would be helpful. The majority of participants said that they would click on the button to ask for a suggestion if they were stuck while trying to complete the exercise. When asked about submitting a suggestion at the end of the exercise, participants assumed moderation, and said that showing a method of “endorsement” by an instructor or professor would encourage them to utilize the tool. The majority of participants also enjoyed the idea of being able to upvote or downvote a given suggestion.

## **1.3—Organization of this Document**

Chapter 2 discusses literature in the areas of drill and practice systems, peer assessment and principles of good feedback. In Chapter 3 we discuss the first round of focus groups and their implications. This round was focused on gathering information on students’ process of practicing and completing coding exercises in CodingBat. Additionally we investigate how students’ used/

looked for hints throughout the exercise completion process, and how they currently utilize discussion components, in their courses, to receive help in completing a coding exercise. Chapter 4 discusses the design considerations of CodeWorkout feedback based on the implications of the first round of focus groups, the second round of focus groups, as well as their respective implications. The second round focused on receiving and utilizing feedback during the process of completing an exercise while using the CodeWorkout tool. Low-fidelity UI mockups were used to allow for a more streamlined discussion. In Chapter 5, we summarize the overall process, design and feedback implications and provide future work ideas towards implementing additional feedback opportunities within CodeWorkout.

## ***Chapter 2—Literature Review***

Drill and Practice systems create online environments to reinforce concepts and information, and to enable users with a flexible practice environment. While these environments provide users the freedom to practice exercises at any time of the day and from any location, they lack the feedback and “collaborative learning” [18] environment available, within a traditional classroom setting.

### **2.1—Forums and Online Learning**

One of the key distinguishing features of online education is the opportunity to for students and instructs to interact via online discussion forums [15]. While visibility of and motivation by instructors on the forum can attempt to motivate a deeper learning than would usually occur in a face-to-face classroom, *Paloff & Pratt* note that instructor participation may decrease student-student participation [16]. Discussion forums are usually intended to support leaning and teaching as well as foster a sense of online community. *Mazzolini & Maddison* discovered that involvement in forum learning the more the instructors posted the shorter the discussions were overall. While this didn’t have a direct relationship they also observed that frequent instructor posting did not lead to more student postings. They discuss how minimal instructor intervention may result in higher contribution by students on these forums [17].

### **2.2—Formative Assessment and Good Feedback Practice**

One of the potential feedback options suggested includes a discussion based FAQ Tool. This tool is intended to allow users to ask as well as receive helpful and useful information to get unstuck during a coding exercise. “In higher education formative assessment and feedback should be used to empower students as self-regulated learners” [1]. This cultivation of self-regulated learning allows students to produce efficient feedback and in turn makes them actively interpret external feedback and become more adept and converting this generated feedback into furthering their goals [2]. When providing feedback to students, we assume that our additional explanation on a topic is relatively straightforward. However, *Nicol & Macfarlane-Dick* discuss how feedback messages can be difficult to decipher and students may require an active understanding of the message before they can use this to regulate their performance. They have identified seven principles for good feedback practice, which allows for formative assessment.

- clarify what good performance is
- facilitates that the development of self-assessment (reflection) in learning
- delivers high quality information to students about their learning
- encourages teacher and peer dialogue around learning
- provides opportunities to close the gap between current and desired performance

- provides information to teachers that can be used to help shape the teaching

Allowing students to provide feedback encourages active learning, and requires students to think critically and analytically about the concepts and questions. The above principles allow students to develop a good method to evaluate topics as well as reflect on their own understanding of concepts and questions [3].

## 2.3—Effect of Hints on Student Work

In order to attempt to provide additional feedback, in CodeWorkout, in the form of hints, the information displayed needs to be helpful and easily understood by the users. While introductory computer science courses can be challenging for many students, web-based programming exercise systems such as Coding Bat and CloudCoder can be useful way for instructors to provide students with additional opportunities to practice basic concepts [4].

However what do students who are working unproductively, and therefore unlikely to make progress look like? Two common assumptions: sometimes a student is unlikely to complete an exercise, even if given an infinite amount of time, and small changes made in rapid succession with little thought are unlikely to represent productive work [4].

In order to further examine how students' work develop with the exposure to hints *Spacco et al.* attempted to analyze this using the data provided by CloudCoder in 5 introductory programming courses and across 2 languages. Students were required to write a small amount of code, and the correctness was judged by running the code against a set of tests. They explored the idea that the amount of time spent on an exercise as well as the frequency of submissions are weakly inverse-correlated with the chance the code compiles. However, they discovered that the time spent and the frequencies of submissions are not consistently correlated with overall success on an exercise. Only three of five datasets showed a statistically significant inverse relationship between minutes of work and the best score [4].

## 2.4—Short Programming Exercises

In order to investigate this notion of how students learn to program by studying how students work on programming exercises *Spacco et al.* developed CloudCoder. After running pilot studies, using CloudCoder, at various institutions, *Papancea et al.* ran data analysis on the results that fueled some interesting questions such as:

- **Should exercises be graded? If they are shared freely is the availability of solutions a concern?**
- **What are appropriate incentives encourages student to attempt the exercise? Is the feedback provided by synchronous grading more effective rather that from asynchronous?**

*Papancea et al.* hypothesized that were exercises publicly available then the solutions would follow suit (similar to CodingBat), presenting cheating as a huge issue, especially if these exercises were completed for grades. While lacking the personalised details available during a manual grading situation automatic grading provides instantaneous feedback, thus increasing the time the student has available to work on the exercise [5].

## 2.5—Peer Assessment

Allowing users to contribute hints and response to questions by other users, encourages them to understand the concept of the coding exercise in order to produce a helpful hint. PeerWise is an online tool that allows students in a course to collaborate and learn by creating sharing, answering and discussing multiple-choice questions [6]. The intention of PeerWise is to engage a higher development of student learning through feedback and peer assessment. PeerWise provides students with the opportunity to complete an unanswered question by selecting a response, after which the correct answer and any additional comments by the author are displayed. Once this feedback is received students have the ability to rate the question on a scale of 0 to 5 and provide open-ended feedback [3].

PeerWise allows students the opportunity to respond to *each other's* questions, in an effort to increase the level of immediate feedback available. This allows for students to develop the lower end of Bloom's taxonomy of educational objectives by reinforcing remembering, understanding and applying procedures to new data [7]. This evaluation and critique process engages a student's higher-level cognitive skills and in turn, increases efficacy.

Surveys conducted on students after they had worked with PeerWise, indicated that they found authoring questions was quite difficult, much more than studying. McGregor et al. devoted class time for students to set up the ground work involved in setting up students with the ability to author and design potential assessment questions [8]. Students reflected that the idea of making submissions of authored questions "mandatory often resulted in question-submissions that had little work or thought put in." [6]

Through the remainder of survey responses Denny et al. summarized that practicing writing code may provide more useful drill-and-practice opportunities than PeerWise could offer. One such tool is CodingBat, which supports both Java and Python and includes a database of exercises expressed as short descriptions of specification for a single method. Similarly, CodeWrite [9] also allows students the ability to create an implementation for the method and receive immediate feedback on the correctness of their code [6].

## **2.6—Computer Science Educational Tools**

### **2.6.1—Online Python / Pythy**

There are several web-based programs utilized in CS Education, for languages other than Java, such as Python. Online Python Tutor allows students to write programs directly into the web-browser and step through their execution process to observe the run-time state of the data-structure. The web-based interface is relatable to novice coders who are not required to install anything additional before beginning. Visualizations are also produced which can be shared on the web [19]. In addition to writing code directly into a browser, Pythy allows students to explore live, interactive code examples written by instructors. Pythy is targeted towards novice or non-Computer Science students to encourage learning through writing, running and debugging code in Python [20].

### **2.6.1—CodingBat**

CodingBat is an online free site, of live coding problems in Java and Python to build. *Parlante's* intention with the creation of CodingBat was to allow users to understand concepts and enhance their coding skill in Java and later, Python. The development of CodingBat began with a theory: to excel in a computer language, you require skills in both large and small – where large represented the strategic sections of programming such as algorithms and data structures, while the small consisted of 10-20 line methods that taught you about loops, logic etc. *Parlante* observed that developed skill within the “small” allowed for more concentration on the larger parts. CodingBat provides such an environment to allow users to focus on coding such problems. It requires no setup or login and the coding problems provided, have short problem statements provide immediate feedback [13]. Feedback is presented in the form of “live” unit test feedback, where automated red/green indicators represent failing versus passing tests [14].

### **2.6.2—CodeWorkout**

CodeWorkout, an eLearning prototype for computer science drill and practice, provides students with a variety of exercises for practice to develop computer science comprehension. Coding problems allow students to program solutions that can be evaluated by a series of test cases, using a JUnit testing framework. The goal of CodeWorkout is to create an online environment for students to help each other. *Buffardi et al.* discusses that CodeWorkout develops this environment by providing hints and suggestions on how to approach problems [10]. Writing hints and providing feedback in this way requires meta cognition and involves Higher Order thinking [11] as the student reflects over the question and problem solving strategy to solve it.

## Chapter 3—Focus Groups, Round 1

### 3.1—Goals

Our goal for the first round of focus groups was to gather more information about the process of how participants practiced and completed coding exercises using CodingBat. We were interested in how these participants looked for feedback while attempting to complete and exercise from start to finish and how they used the feedback provided to help them get unstuck during an exercise. We were also interested in how they utilized the discussion component available to them through their classes, in order to receive help, if and, when they got stuck on an exercise.

### 3.2—CodingBat

CodingBat is a drill and practice site that allows users of different coding skill levels to practice coding problems, shown in Figure 1, in Java and Python, allowing them to increase their proficiency with the language. CodingBat encourages users to practice and learn the larger concepts as well as increase their understanding about smaller and more basic concepts of the language. The problems are categorized by concept and separated by increasing difficulty level; allowing the users to follow a progression of difficult as their skill and understanding improve. The system uses a JUnit style testing system to display feedback indicating users correctness of the questions, where red and green indicate failing and passing tests, respectively, as shown in Figure 2.

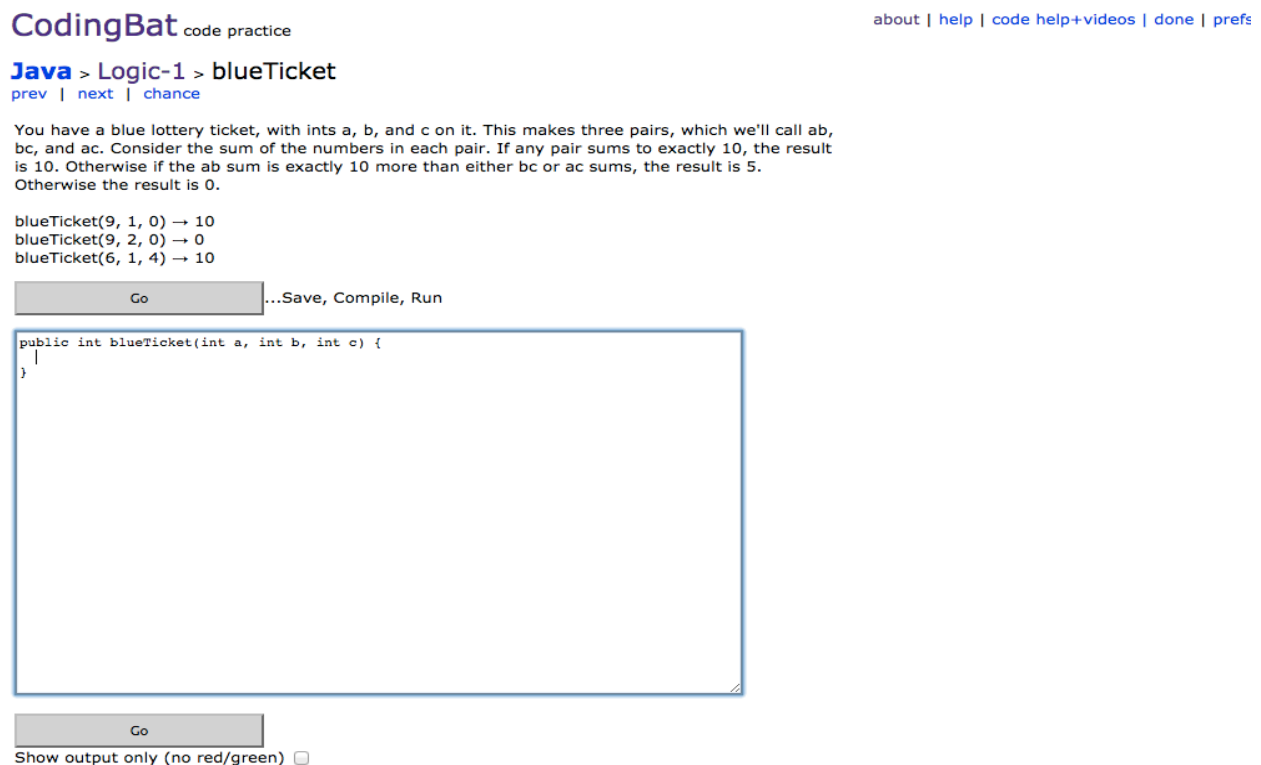


Figure 1: CodingBat Screen for the blueTicket exercise in Java.

CodingBat

code practice

[about](#) | [help](#) | [code help+videos](#) | [done](#) | [prefs](#)

Java

> Logic-1 > blueTicket

[prev](#) | [next](#) | [chance](#)

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of the numbers in each pair. If any pair sums to exactly 10, the result is 10. Otherwise if the ab sum is exactly 10 more than either bc or ac sums, the result is 5. Otherwise the result is 0.

blueTicket(9, 1, 0) → 10  
blueTicket(9, 2, 0) → 0  
blueTicket(6, 1, 4) → 10

Go

...Save, Compile, Run

```

public int blueTicket(int a, int b, int c) {

    int sum1 = a + b;
    int sum2 = b + c;
    int sum3 = a + c;

    if(sum1 ==10 || sum2 ==10 || sum3 == 10)
    {
        return 10;
    }
    else
    {
        return 0;
    }
}

```

Go

Show output only (no red/green) ☐

Expected	Run		
blueTicket(9, 1, 0) → 10	10	OK	
blueTicket(9, 2, 0) → 0	0	OK	
blueTicket(6, 1, 4) → 10	10	OK	
blueTicket(6, 1, 5) → 0	0	OK	
blueTicket(10, 0, 0) → 10	10	OK	
blueTicket(15, 0, 5) → 5	0	X	
blueTicket(5, 15, 5) → 10	10	OK	
blueTicket(4, 11, 1) → 5	0	X	
blueTicket(13, 2, 3) → 5	0	X	
blueTicket(8, 4, 3) → 0	0	OK	
blueTicket(8, 4, 2) → 10	10	OK	
blueTicket(8, 4, 1) → 0	0	OK	
other tests		OK	

Correct for more than half the tests

Your [progress graph](#) for this problem

Figure 2: CodingBat Screen for blueTicket exercise, after one submission.

### 3.3—Focus Group

We conducted our first round of focus groups with a total of 9 participants, all of whom were students at Virginia Tech. Each focus group consisted of 3 participants per group and lasted approximately an hour. The only requirement for participants for this round was that they had to have used a drill-and-practice system before to complete an exercise, similar to CodingBat.

All participants signed consent forms (IRB #15-210) allowing us to anonymously utilize the information, and the focus group sessions were audio recorded. Throughout these sessions group discussion was highly encouraged. Following the completion of these focus groups, the audio recordings were transcribed and the recordings consequently destroyed. The transcriptions were then anonymised and used to analyse the responses.

We presented the following questions to each group and encouraged free-flowing conversation throughout the process. While these questions were asked in the following order, certain groups followed various trains of thought, thus responding to some of these questions indirectly or completely out of the intended order.

- **Question:** Let's talk about your experience completing a coding exercise in CodingBat.



- **Question:** What type of feedback was provided to you during the exercise? Did you use the feedback provided to retry the question?
- **Question:** Did you go through this submission process multiple times if you are stuck?
- **Question:** At what point during this process would you find it useful to be able to receive a hint after your first submission or before? If you could keep getting more feedback throughout the exercise would you use it/ find it helpful?
- **Question:** How do you feel about adding hints into a ‘Hint Bank’ in CodeWorkout?
- **Question:** How do you currently participate on class discussion forums? If there were discussion threads related to individual exercise questions would you find that helpful as feedback?

The remainder of this chapter presents a summary of the responses and concepts learned from conducting these focus groups.

### **3.4—Focus Group Responses**

Through the conversation, several themes emerged from these discussions. The process of how to complete an exercise in CodingBat, the number of attempts at each exercise, the experience with their process, thoughts on feedback provided by CodingBat during the process of an exercise completion, their thoughts on receiving hints and additional feedback throughout the completion process, having the ability to provide hints to other students participating in the course, and lastly their experience with discussion forums and exploring the option of providing this ability as an attempt to provide more feedback to those completing an exercise.

#### **3.4.1—Coding Exercises in CodingBat**

##### **Overall experience using CodingBat to complete Coding Exercises**

The overall experience of completing a homework exercise in CodingBat for some of the participants (4/9) was incredibly confusing due to the phrasing of the question. This caused the majority of difficulty in understanding what was required of them in order to accurately complete the exercise. Some of the participants (2/9) claimed even if they couldn’t correctly interpret the phrasing they would attempt the question, in order to receive some sort of feedback from the unit tests that passed or failed. One participant mentioned that they would immediately look for the example problem provided, if any. However, since the examples were not always helpful, due to issues with coherency in relation to the wording of the question, some participants still needed to use the above mentioned trial and error procedure to obtain more feedback.

### **Process to complete a Coding Exercise in CodingBat**

The focus group members were evenly divided on their approach process for completing an exercise within CodingBat. Most of the participants' process (5/9) to starting the exercise, were roughly divided in half by those who wrote a few lines of code, directly into CodingBat after reading the question, and then submitted their responses, going back and forth until the exercise was complete, following a "solve as they go" method, to then receive feedback.

A few of the participants' (2/9) would work out the logic, coding on paper, to figure out the logic of the problem before submitting the code into CodingBat to receive feedback. They would then rework their logic in sections, once the tests failed. Once feedback was received the some of the participants (4/9) mentioned, reading each failing feedback test one by one and modifying various segments of their code to rectify each failing unit test. A few members (2/9) mentioned, taking a step back reading over the entire code segment and re-working their logic, if necessary – and then resubmitting a reworked segment of code.

### **Implication: *Difficult to complete a Coding Exercise in CodingBat***

Overall the majority of participants claimed that some of their biggest hindrances while completing the question were directly related to question comprehension and clarity of feedback provided. The lack of syntax checking and formatting was a hindrance and contradictory to their learning process since both things were enforced during class projects and tests. Participants also stated that the questions provided were difficult to complete or would be completely wrong after their first submission, due to convoluted wording– leading them to misinterpret the goal of the exercise. This frequently led to failing tests and repetitive submissions that provided no additional feedback – rendering them "stuck" – and turning to Google for help.

### **3.4.2—CodingBat Feedback**

CodingBat gave each participant feedback to their code, in the form of unit tests that passed or failed. All participants through varying approaches utilized the feedback presented through these tests cases. A common consensus among the groups, was that while you were able to clearly identify why certain tests were failing, the majority of unit tests were not descriptive enough indicate what section of logic was failing in the code. Due to this confusion most of the participants (7/9) would tweak the code back and forth trying to adjust for each individual failing test to solve the problem.

All the participants enjoyed the red and green indicators for right and wrong unit tests, respectively, however, the unanimous agreement was that the hidden tests provided were completely non-descriptive. Therefore if the hidden tests was the only section failing – the participants would randomly tweak the code or purposefully submit incorrect code, in order to receive more descriptive feedback or different test failures, as a debugging method, to better pinpoint the section of failing code.

### **Implication: *Not enough helpful feedback in CodingBat***

Participants claimed that the unit testing feedback provided by CodingBat, were unclear or too succinct to explain the relationship of the incorrect line of code to the expected answer. The majority of the participants would attempt to debug their faulty code by sequentially correcting

each failing unit test. Along with insufficient description for the unit test titles, the participants were also at a loss of how to navigate the concept of “Hidden Tests” with no additional description except for its title.

While participants understood that not all the unit tests could be displayed, the lack of description was preventing them from understanding the concept and eventually achieving a correct solution for each of the exercises. This motivated multiple inefficient submissions that then turned to frustration. All participants claimed that after a period of time the need to simply complete the question in an effort to move on superseded the need to understand the reasoning behind the failing test, code and concept.

### **3.4.3—Number of Tries**

The majority of participants (3/9) mentioned that their attempts to complete each exercise at 100% percent varied between 25–50 submissions, over a time period of a few hours. While one participant mentioned they would attempt the exercise across a period of several days, this wasn’t the most common response. The majority of participants (8/9) mentioned that they would adjust their code incrementally based on each individual failing unit test feedback and eventually turn to Google for help. There were a few participants (3/9) who also mentioned intentionally submitting incorrect code, in order to receive additional feedback to guide them in the direction of the expected response.

#### ***Implication: 25–50 submissions before turning to Google to ensure 100% completion***

The majority of participants approached CodingBat exercises in one of two ways. Working out the logic on paper and then submitting sections of code or typing in code and attempting to solve it line by line. The number of tries among all participants spanned anywhere from 25–30 attempts to several days. A few participants chose to submit intentionally incorrect answers, in order to receive additional/ alternative feedback from CodingBat in order to determine a direction or “hint” to solve the exercise. The lack of grade penalties/time restriction for number of attempts per question as well as unlimited submissions allowed participants to feel a little more relaxed when submitting responses.

All participants were in agreement that once they truly were stuck, and chose to give up, they would immediately turn to Google for a response, regardless of how many attempts they had made. StackOverflow was one of the most commonly referred to sites that participants obtained assistance from. Short answers as well as a fully expansive explanation to the exercise provided by StackOverflow was available if they were required—as well as alternate examples for those that wished to explore the concepts further.

### **3.4.4—Hints in CodeWorkout**

#### **Receiving Hints in CodeWorkout**

After discussing feedback options that were given to participants by CodingBat, we asked them a little more information about similar and addition methods they would like to see / would

be helpful in our system. All participants were unanimous in asking for a syntax and format checker for the coding questions, to allow them to submit answers in a conventional way. Over half of the participants (5/9) mentioned providing a coding efficiency indicator, either alongside their code or after they submit the solution would be helpful, providing them with a more efficient way to complete similar exercises for the future.

Participants loved the idea of having hints at their disposal during the process of completing an exercise. A portion of the participants (4/9) suggested the providing the option of having these hints show up on the page after a certain lull in the response process or a certain number of incorrect responses, almost as a reminder to check in and– perhaps provide a hint that would steer the user in the right direction. The remainder (5/9) said they would rather pick and choose when they saw/ received a hint rather than having information pop-up on the page during their process of completing an exercise.

Following along with this train of thought an option for a button or a similar link on the page to “Ask for a Hint” was presented. However, when the option to ask for a hint through the use of a button, was presented the same participants who said hints would be incredibly helpful also said they would never click on a button to *ask* for a hint claiming it made them feel inadequate or even stupid as well as incapable of completing the exercise of their own accord. One participant said “ *I want help, I just want it to know when I need it and to provide it to me in a manner where I don’t have to ask or feel stupid*”.

Participants recognized that there are multiple ways to complete most exercises and a primary concern addressed by most participants, was the fear of being led astray by hints. When asked to elaborate they reflected similarities and differences between automated and in person help. In the case of face-to-face help by TAs, the consistent back and forth, participants are given a chance to explain their individual train of thought and receive further insight through discussion. However an automated hint, while guiding them to a “correct” answer, may completely redirect them from their current solution process that only required a few more steps.

Participants were adamant that the hints would need to find a way to coincide with their thought/ solution process as oppose to travel a whole new path, regardless of efficiency. They recommended providing an alternate concise, efficient solution for the same code once the exercise was complete.

### **Adding Hints to the Hint Bank in CodeWorkout**

Since participants were motivated by the concept of receiving hints through the exercise completion process, we discussed the option of the participants being able to provide a hint that would then be placed into a database, allowing another student who requested a hint for a similar exercise to receive these provided hints. For the most part participants (6/9) thought it would be an interesting idea and promote a high self-efficacy in learning, provided there was a strong method for moderation and maintenance. Several others (2/9) thought the maintenance process would be more trouble than it would be worthwhile others were concerned about correctness of the hint.

When asked to elaborate participants (3/9) mentioned that this latter comment was in relation to “correctness” but also changing trains of thought, as mentioned in the earlier concept of being given hints. One of the participants was unsure how many individuals would actually contribute towards providing a hint. They suggested adding an incentive in the form of extra credit to increase participation and response rate. An alternate direction for the incentive was the ability to provide a “good” hint.

The option to “recommend” a hint or “upvote” a hint was also discussed and several participants (4/9) responded very positively towards this idea. Automated hints and feedback aside, all participants said that there was still no replacement option for the personal feedback and one-to-one contact that a TA was able to provide.

**Implication: *Hints need instructor moderation before being received or submitted.***

The need for additional more specific feedback was apparent throughout participants’ comments. However, when approached about providing hints throughout the submission process, participants had varying opinions about ease and efficiency of the process. When asked about periodic pop-ups versus having a button to ask for a hint, the majority of participants were against the idea of pop-ups throughout the process. The button option had mixed reviews about as well. Participants said they would love additional hints and help throughout the way if they were stuck. However, the majority claimed they would never actually click the button to ask for help since it would be seen as failure.

Additionally, they determined that the button label “Ask for a Hint” made them feel inferior. Since the label seemed to be the primary cause for concern, several participants suggested the button be labeled ask for a “suggestion” instead of a hint, or better yet, just suggestion. This allowed participants to have the option for guidance but not feel like they were “asking” for help, which affected their pride, which in turn made them question their competency and ability to correctly complete the exercise.

Since participants really liked the idea to receive hints throughout the process, the idea to submit hints after the completion of an exercise seemed like the next step. Participants were mostly opposed to this idea for several reasons: moderation issues, lack of efficient hints and lack of contribution, making the amount of hints available sparse. After lengthy group discussion, participants claimed they would be more open to receiving hints if they were highly moderated, either by instructors or TAs, before being displayed.

The option to upvote and downvote a pre-moderated hint when it was received was well received, ensuring that the hints with higher ranking would be more frequently displayed to users. A few participants were concerned that the amount of hints submitted would not be large enough, and suggested providing a grade incentive to encourage higher participation from users. Another common concern was that the required moderation would be come overly complicated and time –consuming, wasting resources.

### **3.4.5—Discussion in CodeWorkout**

#### **Option of a Discussion Tool in CodeWorkout**

As an attempt to provide feedback to the students and still try to incorporate some of the one-to-one aspects provided by a TA during office hours, the idea of providing a discussion option on the page was suggested. We began by asking participants to share their experiences using discussion forums in their current courses and how beneficial the responses and interaction was towards helping them get unstuck. The responses from all participants were incredibly negative. Most said they never used the forums provided, for posting and asking questions, and only read comments very rarely.

All participants mentioned responses were rarely relevant and the responses to questions posted were frequently demoralizing and negative. Further discussion prompted the conversation of variations that would be helpful, and a few participants (3/9) mentioned StackOverflow's model for FAQ's. All participants commented negatively towards the option of a threaded discussion and said they didn't really see how a threaded forum would be in keeping with the goals of CodeWorkout. While a threaded discussion option was never specifically mentioned, the word forum seemed to imply this layout.

Finally we asked them how a potential discussion option would be the most beneficial to them, were it implemented. While more than half of the participants (5/9) still insisted on personal, face-to-face help, they (6/9) also recommended having segregated responses by levels of hardness or depth could be helpful. All participants insisted that moderation would be required for all questions and responses and this would require a large amount of maintenance behind the scenes. After further discussion, a few of participants' (2/9) said in order to maximize participation some sort of incentive would probably be required.

### **Contributing to a Discussion Tool in CodeWorkout**

After hearing their ideas and options for including a discussion option, we asked participants if they would personally contribute to the discussion, by responding to a post or asking a question. Participants were very passionate as they shared their negative experiences using traditional forums during their respective class experience. The majority of participants (6/9) insisted that they would never willingly post a question, since the responses received were demoralizing and negative. In addition, these participants mentioned that they did not have the confidence to respond to an already posted question; for fear that their response would be incorrect, and would be pointed out by the instructor on the forum.

The fear of having incorrect responses, led them to spend more time discovering the answers themselves, or asking a TA during office hours, rather than attempting to pose the question in plain view on the forum. Due to the previous comments, all participants firmly insisted on complete anonymity. While current discussion forum options mention that the participants are anonymous, instructors are still able to see the authors of all posts. Participants also thought incentives would be helpful in encouraging users to contribute towards the discussion.

### **Implication: *Complete anonymity is required for participation in a discussion tool***

As an option to increase the amount of feedback given to users, the concept of incorporating a discussion option to the interface was introduced to the participants. As an effort to get more background information, participants were initially asked about their current experience utilizing discussion based sites or forums in their courses. While the responses regarding their current experiences were wholly negative – once participants were made aware the idea would not be similar to a traditional threaded discussion forum, they were more willing to consider the option.

Similar to the hints, participants were then asked if an option to participate and ask questions was available, if they would utilize the option and find it helpful. The majority of participants claimed that they would require complete anonymity to consider participation. This removed the apprehension to participate, however, participants still felt that face-to-face interaction with a TA during office hours, would be a more direct option.

Some of the recommendations and concerns shared were that the questions and answers would need to be heavily moderated and endorsed ensuring correctness, and response time would not be fast enough for their needs. Due to this, Google would still be the most viable option in terms of searching and finding an answer. The current FAQ model of StackOverflow's website was discussed as a sample design for ease of functionality and simplicity.

### **3.5—Summary of Implications**

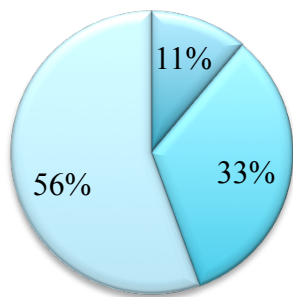
At the start of the focus group, participants were asked about their previous experiences using CodingBat to complete exercises. While participants were divided between working out the logic on paper first or just typing in sections of code in, the majority of participants mentioned that the lack of syntax and formatting were contradictory to their learning process. Additionally, participants stated that the convoluted wording of the questions frequently led them to misinterpret the goal of the exercise, making them difficult to complete.

CodingBat provided unit test feedback after the first submission, and while participants appreciated the red and green indicators, for each unit test, they stated that a single title for each test was insufficient information to allow them to debug the faulty code. The number of tries for each exercise spanned anywhere from 25–30 attempts to several days across all participants, shown in Figure 3. Participants commented that their inability to receive any feedback other than the unit test results had them frequently turning to Google to get unstuck.

As participants began discussing their need for additional feedback, the option of having a button, when clicked, that would provide a hint was presented in Figure 4. While participants said that they would love the additional assistance throughout the debugging process, they claimed that clicking the button would be a difficult process, since the button label, “Ask for a Hint” made them feel inferior. An alternate solution was to replace the label with the word “Suggestion” or an alternate option that gave them confidence to complete the exercise.

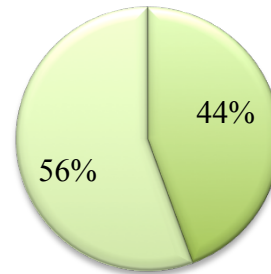
Since participants responded positively to receiving hints, they were also presented with the idea of submitting hints at the completion of an exercise. Participants commented that all submitted hints would have to be moderated by an instructor, as shown in Figure 6. Additionally, they seemed to enjoy the option of having an upvote / downvote system integrated into the received hints, allowing them to be involved in ensuring that the hints with higher ranking would be more frequently displayed to users.

In order to maximize the amount of feedback given during the entire process, the concept of incorporating a discussion option to the interfaced was also presented. While participants had negative feedback about their previous experiences with discussion forums in their classes, they seemed more open to idea of a non-traditional forum based discussion option. The majority of participants claimed that they would require all the posts to be heavily moderated by instructors, as well complete anonymity, to consider participation, as shown in Figure 5.



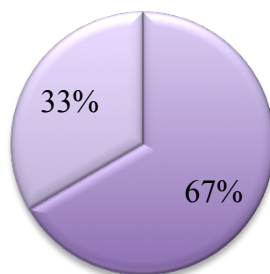
- More than a day
- 25-30 submissions
- 1-3 submissions, before going to Google

**Figure 3: Number of Tries.**



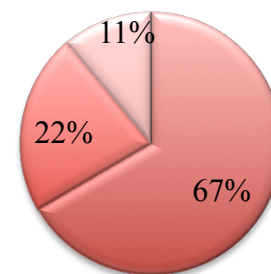
- Preferred to have a hint pop-up
- Preferred to have a button to request a hint

**Figure 4: Receiving Hints.**



- Never
- Maybe

**Figure 5: Posting Questions on the Discussion Tool.**



- Participate
- Not worth the maintenance
- No comment

**Figure 6: Adding Hints.**



## Chapter 4—Focus Groups, Round 2

### 4.1—CodeWorkout Interface

The screenshot displays the CodeWorkout web application interface. The top navigation bar includes the 'CodeWorkout' logo, 'Gym', and 'Course' tabs, along with a search bar and a user profile 'edwards@cs.'. The left sidebar lists three exercises: 'E203: Factorial' (0.2 xp), 'E240: teenSum' (60 xp), and 'E248: blueTicket' (0 xp). The main content area is titled 'E248: blueTicket' and provides a detailed description of the problem: 'You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of the numbers in each pair. If any pair sums to exactly 10, the result is 10. Otherwise if the ab sum is exactly 10 more than either bc or ac sums, the result is 5. Otherwise the result is 0.' Below the description, three example calls are shown: `blueTicket(9, 1, 0) → 10`, `blueTicket(9, 2, 0) → 0`, and `blueTicket(6, 1, 4) → 10`. A code editor displays the following Java code snippet:

```
1 public int blueTicket(int a, int b, int c)
2 {
3     // Write your code here
4
5
6
7
8
9
10
11
12
13 }
```

Below the code editor is a 'Check my answer!' button and a link to 'Practice a different Java exercise'. The footer contains links for 'CodeWorkout', '© Virginia Tech', 'About', 'License', and 'Contact'.

Figure 7: BlueTicket exercise in CodeWorkout (without hints).

## 4.2—Focus Group, Round 1 Results

Based on participants' suggestions after the first round of focus groups, we reexamined our interface design as well as feedback options, and modified our design to integrate a few of their suggestions into our design. Based on their comments, one of the first things that we noticed was that participants' felt that the FAQ tool could be beneficial, but would need to veer in a different direction than a basic threaded forum, that was available to them in their courses. With that idea in mind we began designing the FAQ tool interface, consisting of the header button and a related FAQ statement for the question. Since they were open to the idea of being able to contribute to the FAQ tool, we decided to explore this option further during the second round of focus groups.

The next aspect of feedback we decided to modify was our hint interface. We decided to incorporate a previous suggestion by specifically using a button to provide hints when requested instead of having hints pop-up after a certain amount of inactive time. Additionally, based on participant reflections, we also decided to rename the button label from our original anticipated "Ask for a Hint" to "Ask for a Suggestion". Participants' seemed accepting of the option of having an opportunity to contribute hints to a hint bank after the completion of an exercise. With that in mind we decided to explore this option further through specific questions during the second round of focus groups.

The screen shots for 2 different exercises, shown below, were presented to participants in the order shown during the second round of focus groups. The multiple screenshots provided, were intended to give them the feeling of working through a coding exercise from start to completion, in CodeWorkout, thus allowing them to explore the incorporated feedback options and to provide additional insight on helpful feedback or tools, that were unavailable.

## 4.2.1—CodeWorkout Screenshots with Hint Additions

The screenshot displays the CodeWorkout website interface. The top navigation bar includes the 'CodeWorkout' logo, 'Gym' and 'Course' tabs, a search bar, and a user profile 'edwards@cs.'. On the left sidebar, three exercise cards are visible: 'E203: Factorial' (0.2 xp), 'E240: teenSum' (60 xp), and 'E248: blueTicket' (0 xp). The main content area is titled 'E248: blueTicket' and contains the following text: 'You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of the numbers in each pair. If any pair sums to exactly 10, the result is 10. Otherwise if the ab sum is exactly 10 more than either bc or ac sums, the result is 5. Otherwise the result is 0.' Below this text are three example calls: 'blueTicket(9, 1, 0) → 10', 'blueTicket(9, 2, 0) → 0', and 'blueTicket(6, 1, 4) → 10'. A code editor shows the following Java code: 

```
1 public int blueTicket(int a, int b, int c)
2 {
3     // Hint: if any pair sums to exactly 10, return 10.
4     // Hint: if the ab sum is exactly 10 more than either bc or ac sums, return 5.
5     // Hint: otherwise, return 0.
6
7     // Your code here
8
9
10
11
12 }
13
```

 Below the code editor is a 'Check my answer!' button, a link to 'Practice a different Java exercise', and a 'FAQ >' link. The footer contains 'CodeWorkout © Virginia Tech About License Contact'.

Figure 8: Initial blueTicket exercise screen with Hint Additions.

CodeWorkout
Gym
Course
search exercises...
Search
edwards@cs.

E203: Factorial
Write a function in Java that will take a positive integer as input and returns its factorial as output.
Java
Compiled
0.2

E240: teenSum
Given 2 ints, a and b, return their sum. However, "teen" values in the range 13..19 inclusive, are extra lucky. So if either value is a ...
Java
Compiled
60 xp

E248: blueTicket
You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of ...
Java
Compiled
0

Home / Gym / E248: blueTicket

## E248: blueTicket

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of the numbers in each pair. If any pair sums to exactly 10, the result is 10. Otherwise if the ab sum is exactly 10 more than either bc or ac sums, the result is 5. Otherwise the result is 0.

```
blueTicket(9, 1, 0) → 10
blueTicket(9, 2, 0) → 0
blueTicket(6, 1, 4) → 10
```

```

1 public int blueTicket(int a, int b, int c)
2 {
3
4
5
6
7
8
9
10
11
12
13 }

```

Check my answer!

Practice a different Java exercise

FAQ v

Consider using a local variable to hold your values

CodeWorkout
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License
Contact

Figure 9: BlueTicket exercise with FAQ (expanded).

CodeWorkout

Gym

Course

search exercises...

Q Search

edwards@cs.vt.edu

E203: Factorial

Write a function in Java that will take a positive integer as input and returns its factorial as output.

Java Compiled

0.2

E240: teenSum

Given 2 ints, a and b, return their sum. However, "teen" values in the range 13..19 inclusive, are extra lucky. So if either value is a ...

Java Compiled

60 xp

E248: blueTicket

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of ...

Java Compiled

0

Home / Gym / E248: blueTicket

## E248: blueTicket

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of the numbers in each pair. If any pair sums to exactly 10, the result is 10. Otherwise if the ab sum is exactly 10 more than either bc or ac sums, the result is 5. Otherwise the result is 0.

blueTicket(9, 1, 0) → 10  
blueTicket(9, 2, 0) → 0  
blueTicket(6, 1, 4) → 10

```

1 public int blueTicket( int a, int b, int c)
2 {
3     int sum1 = a+b;
4     int sum2 = b+c;
5     int sum3 = a+c;
6
7     if( sum1 ==10 || sum2 == 10 || sum3 == 10)
8     {
9         return 10;
10    }
11    else
12    {
13        return 0;
14    }
15 }

```

Check my answer!

Practice a different Java exercise

FAQ >

## Feedback

Behavior	Result
blueTicket(10, 0, 0) -> 10	✓
blueTicket(15, 0, 5) -> 5	✗
blueTicket(5, 15, 5) -> 10	✓
blueTicket(4, 11, 1) -> 5	✗
blueTicket(13, 2, 3) -> 5	✗
blueTicket(8, 4, 3) -> 0	✓

Ask for a Suggestion

CodeWorkout

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**Figure 10: BlueTicket exercise after one submission – “Ask for a Suggestion” appears underneath unit test results.**

CodeWorkout

Gym

Course

search exercises...

Search

edwards@cs.

E203: Factorial

Write a function in Java that will take a positive integer as input and returns its factorial as output.

Java

Compiled

0.2

E240: teenSum

Given 2 ints, a and b, return their sum. However, "teen" values in the range 13..19 inclusive, are extra lucky. So if either value is a ...

Java

Compiled

60 xp

E248: blueTicket

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of ...

Java

Compiled

0

Home / Gym / E203: Factorial

## E203: Factorial

Write a function in Java that will take a positive integer as input and returns its factorial as output.

1

2

3

4

5

6

7

8

9

10

11

12

13

Check my answer!

Practice a different Java exercise

FAQ >

CodeWorkout

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Figure 11: Initial Factorial exercise screen with Hint Additions.

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CodeWorkout

GymCourse

search exercises...Search

edwards@cs.

E203: Factorial

Write a function in Java that will take a positive integer as input and returns its factorial as output.

JavaCompiled

0.2

E240: teenSum

Given 2 ints, a and b, return their sum. However, "teen" values in the range 13..19 inclusive, are extra lucky. So if either value is a ...

JavaCompiled

60 xp

E248: blueTicket

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of ...

JavaCompiled

0

Home / Gym / E203: Factorial

## E203: Factorial

Write a function in Java that will take a positive integer as input and returns its factorial as output.

1

2

3

4

5

6

7

8

9

10

11

12

13

Check my answer!

Practice a different Java exercise

### FAQ v

Think about an appropriate base case

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Figure 12: Factorial exercise with FAQ (expanded).

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The screenshot shows the CodeWorkout interface. On the left sidebar, there are three exercise cards: E203: Factorial (0.2 xp), E240: teenSum (60 xp), and E248: blueTicket (0 xp). The main content area is titled 'E203: Factorial' and contains the instruction: 'Write a function in Java that will take a positive integer as input and returns its factorial as output.' Below this is a code editor with the following Java code:

```
1 public int factorial(int n) {
2
3     int num = 0;
4     if ( n==1)
5     {
6         num = 1;
7     }
8
9     num = n * (n-1) * (n-2);
10
11     return num;
12
13 }
```

Below the code editor is a 'Check my answer!' button and a link to 'Practice a different Java exercise'. On the right sidebar, the 'Feedback' section is titled 'Behavior' and shows the following test results:

Test Case	Result
factorial(1) -> 1	Pass
factorial(2) -> 2	Pass
factorial(3) -> 6	Pass
factorial(4) -> 24	Pass
factorial(5) -> 120	Pass
factorial(6) -> 720	Pass

At the bottom right of the feedback section is an 'Ask for e' button. The footer of the page includes 'CodeWorkout © Virginia Tech About License Contact'.

Figure 13: Factorial exercise after one submission – “ask for a suggestion” appears underneath unit test results.

## 4.3—Goals

Our goal for the second round of focus groups was to gather specific information about the helpfulness of feedback throughout the process of solving a coding exercise. We were interested in exploring how participants would use the feedback provided to solve the given coding exercise, especially if they found themselves stuck at a certain point. There were 2 feedback options provided, the FAQ tool and the option to receive suggestions after a submission.

We were interested in looking at how participants utilized the FAQ tool, which was available at the start of the exercise, and what would make them feel comfortable enough



to contribute to the tool, either by asking additional questions or responding. Once participants had started the exercise and submitted a response, they were presented with unit test results as well as a “Ask for a Suggestion” button allowing them to request additional feedback. We were interested in how comfortable participants felt utilizing the button to complete the exercise and how willing they would be to contribute, by submitting their own suggestions at the end of the exercise.

#### 4.4—Focus Group

After analysing our results and responses from our first round of focus groups, we used the participants’ recommendations to make certain alterations to the interface design as well as feedback, in order to incorporate some of their suggestions. We then conducted a second round of focus groups, with a total of 9 participants, across 3 separate groups, where each group lasted approximately an hour. The requirements for this round were that all participants had to be students enrolled in the Computer Science program, at Virginia Tech, who also specifically had prior experience working with CodingBat.

All participants signed consent forms (IRB #15-210) allowing us to anonymously utilize the information, and the focus group sessions were audio recorded. Throughout the focus group, screen shots containing the three potential different forms of feedback, shown in Figures 8 through 13, during process of completing an exercise, were shown to the participants and group discussion was highly encouraged.

Following the completion of these focus groups, the audio recordings of the discussions were transcribed and the recordings consequently destroyed. The transcriptions were then anonymised and used to analyse the responses.

- **Question:** Let’s take a look at an exercise. What is your initial reaction and process to begin completing the exercise?
- **Question:** Given the option of a Frequently Asked Questions (FAQ) tool for this exercise, what kind of information do you think would be useful to see within the FAQ tool?
- **Question:** Would you utilize this FAQ tool to ask additional questions to help you understand and solve the exercise?
- **Question:** While stuck, during a coding exercise in CodeWorkout, would you rather see a suggestion automatically appear on the screen or click on a button to receive additional feedback? What would make you comfortable enough to ask for a suggestion at any point during an exercise?
- **Question:** How would you feel about providing a suggestion at the end of an exercise that would be placed in a ‘suggestion bank’ that other students would receive when requesting a suggestion?

We presented the following questions, and showed screen shots shown in Figures 4 through 9 periodically, to each group and encouraged free-flowing conversation throughout the process. While the questions were asked in the following order, certain groups followed various trains of thought, thus responding to some of these questions indirectly or completely out of the intended order. One of the groups responded to these questions intentionally out of order, providing some interesting insights into their processes for requiring feedback during the completion of an exercise.

The remainder of this chapter presents a summary of the responses and concepts learned from conducting these focus groups.

## **4.5—Focus Group Responses**

Through the conversation, several themes emerged from these discussions. What they observed on the page and their initial impression of the interface, the process on getting started with the exercise, at what point they began to look for feedback, their thoughts and utilization of the frequently asked questions (FAQ) button, their reaction to the FAQ section, thoughts on contributing and participating in the FAQ section, their feedback and reaction to provided unit test results, reactions and thoughts about using hints/suggestions after the first submission, providing hints at the end of the exercise and any general additions that would be helpful for the system.

### **4.5.1—Coding Exercise in CodeWorkout**

#### **Reaction and feedback while looking at a Coding Exercise in CodeWorkout**

The majority of the participants (7/9) began by reading the question and then looking at the examples provided underneath the question. Half of the participants (5/9) commented that while the examples were good to have they could be confusing since there was no explanation provided as to how the inputs were converted to the provided outputs. The thought process most of the participants (7/9) followed after reading the examples was to map out certain cases in their heads and code it in, or to write out these cases and then type in the problem. One of the participants stated that if they couldn't understand the example he would submit anything into the text box provided, regardless of correctness. The reasoning was this method would allow him to receive some sort of additional feedback, in order to receive a clue in how to approach the question and what the system may be expecting as a response.

An indication of what concept or grouping the exercise was in was also a common comment from some participants, (2/9) the idea was that the grouping would help them identify the general approach to solving the question despite the confusing wording of the question. One of the participants mentioned that the design of the text box was intimidating and made them assume that the problem would be unapproachable and incredibly difficult to solve.

**Implication: *CodeWorkout interface could be a little more user friendly.***

The examples provided at the bottom of the question were seen as helpful. However, participants claimed they had no way to following through with a logical process, of how the author got from the input to the output. Providing a link or label to indicate to users the tags or concept involved in this exercise, could also be used as an indicator of what the user could be thinking about.

A solution suggestion was to provide an explanation alongside example provided. The explanation provided could run through the example and demonstrate the step-by-step process from start to finish, showing users the logical process of how to achieve the example output with the given input. The text box design was seen as intimidating, and an alternate design option was to make it smaller or change the colours so it didn't seem as intimidating on the page.

#### **4.5.2—FAQ Tool**

##### **FAQ Tool Button**

After discussing the question and layout of their initial reaction, participants were redirected to the FAQ button at the bottom of the page. The majority of participants (6/9) said that the button was unnoticeable or too far below the fold giving the impression of an advertisement placeholder. Those that noticed the button (4/9) assumed that it would reveal facts and other general information regarding the site.

They also mentioned that they would click it if they were completely desperate and the question statement as well as the examples was not useful. In addition, all of the participants in the second focus group mentioned that they would use the FAQ section after submitting a response to the system at least once, thus looking for additional hints regarding the wrong answer.

**Implication: *FAQ Tool Button needs to be redesigned.***

The majority of participants did not notice the FAQ button present on the lower half of the page. The location and design seemed to be the main sources for the “lack of standing out”. Solution suggestions were to change the design of the button making it look more “clickable”. Participants were evenly split between where the button was located; some thought it was too far below the fold, while other were comfortable with the placement.

The change to the design as well as an option to keep the button expanded with other internal closed drop down menus was an alternate solution. Some of the participants then mentioned the label was misleading. With only FAQ as the label, they assumed the button would give them additional information on the system instead of additional information on the exercise. One suggestion provided was to consider adding the exercise title after the word FAQ for each exercise, as a potential indicator of the link.

## **FAQ Tool Feedback**

After participants were guided towards the FAQ button and explored the menu they were asked about their reactions and responses. When asked some participants (2/9) mentioned that they would only click on the button if they were desperate for more information on the question. While a large number of the participants (7/9) mentioned they were expecting additional examples or definitions, within the FAQ section, they also claimed that the information that was available would have made very little sense to them, were they just starting out as programmers – on the assumption that newer programmer, learning a language, are typically unfamiliar with terms and wouldn't know how to use these terms to solve the question.

***Implication: FAQ Tool Feedback needs to include additional information and explanations.***

Once participants gave us their suggestions on the FAQ button they were asked to explore the FAQ menu. Participants commented that they were expecting more examples and explanations to assist them with the exercise. In addition, they claimed the FAQ statement given, would be unhelpful to new programmers since their comprehension of terms and labels would be very low. After discussing the tool with each other, participants had quite a few alternate solution suggestions.

Some of them commented that the example explanations given could be placed in this section, allowing users to see more information, either through the use of pseudo code or an alternate example with a similar logical process. Another suggestion was to use this section for definitions of the concept or hyperlinks to a glossary, allowing users to look up terms that would allow them to complete the exercise. One participant suggested having an empty section at the start of the exercise and as it remained open for collection, users would be able to view the section fill up with frequent questions that would aid them in solving the exercise.

## **FAQ Tool Participation**

When asked if the option to ask questions was available within the FAQ tool, if they would use it, participants had several answers and concerns. Participants were pretty evenly divided between those who drew on their current in class forum experiences of hardly reading/ participating, and then firmly stated that they wouldn't use the tool since it seems detrimental to the purpose of the system, and those who were interested in participating. These participants were interested in the idea and had various opinions about anonymity, design and interaction.

The first concern that was brought up involved anonymity in posting questions – while some participants mentioned they would post regardless of anonymity, one participant said that it would depend on the question they were asking, some of the remaining participants (4/9) said they would need the posts to be completely anonymous since they didn't want to feel stupid or incompetent to the professor. This feeling was also mimicked in replying to other students' questions. While a few participants (3/9)

were comfortable receiving responses from either students or TAs/instructors, all participants stated that if the replies were not authored by instructors/TAs they would require some form of endorsement.

The concerns in response to this vetting process were that it was time consuming and instructors may not be available to response/endorse immediately. Participants were asked to reflect on current methods of feedback available to them during courses, and to draw parallels for anything that might be helpful towards what they would like to see out of this tool. *Participants were firmly set on one-on-one participation between TAs and student during office hours.* Through discussion they were able to draw several parallels that make office hours potentially irreplaceable.

One of the main comments was depth and immediateness of feedback. Going to office hours essentially allows for a repetitive, cyclical question asking process in order to fully understand the exercise. Some participants (4/9) mentioned that TAs would ask probing question to start, about their understanding level, and then cater the explanation to their understanding level. Explanations could vary between text, examples and drawing images in order to further the understanding of a concept.

In addition, if the TA went over a logical process or concept the participant didn't understand they had the opportunity to immediately stop them and ask for further explanation. These participants had difficulty in seeing how this tool could replace these essential pieces of the feedback process; they currently receive during office hours. They acknowledged that text based explanations were much more difficult to interpret without the assistance of images, additionally, there would be no way to ask a TA to repeat or alter a certain section of a response for more explanation of a similar or the current concept.

A few of the participants (2/9) also mentioned that seeing all these questions or information when they first began the question could be rather distracting and while having the button so low was disconnecting they wanted to be able to request the information if they needed it.

***Implication: Complete anonymity is required for participation. FAQ Tool needs to be able to provide reliable feedback while users are still completing the exercise.***

Following the critique of the current tool, participants were asked if, given the option to ask questions through the FAQ tool, if they would utilize it and if they would consider it a helpful form of feedback. Participants were asked to reflect on their past experiences using discussion based systems in their courses to start. While their reflections were largely negative, further group discussion allowed participants to suggest alternate solutions and methods that would be the most helpful for users during the exercise completion process.

Participants primary concerns were regarding moderation of comments and questions, anonymity, as well as response time and its relationship to immediate feedback. All participants commented requiring total anonymity when posting or responding on the tool. A few of the suggested solutions regarding immediate feedback, was the option of a group chat involving instructors and TAs, or individual anonymous chat options with the instructor.

Another suggestion was to have questions posed and FAQ statements made by instructors or TAs in separate section, therefore a user would be able to locate a question/response with minimal effort. While participants seemed encouraged by these ideas, many of them claimed that Google would still be an easier and quicker option. Their reasoning was that sites like StackOverflow provided the user with the answer and additional expansive explanation if they require it. One participant suggested mimicking the style of the site ProjectOiler, which allowed users to pose questions only if they have already responded correctly to a previous question.

### **4.5.3—Unit Tests**

#### **Unit Test Feedback**

After discussing the FAQ tool participants were shown the second round of screenshots consisting of a half completed exercise and unit test feedback. Participants were asked about the unit test feedback provided and how they would proceed in order to complete the exercise. After looking at the unit tests feedback and reading the partially complete solution all participants stated that providing both expected and their output was essential.

This indication would allow them to step through the code and debug, as well as pinpoint fairly quickly where some of their code was failing. In addition, some of the participants (6/9) stated that having hidden tests weren't always detrimental to them, as it helped them realize that their entire solution probably had a fundamental issue as opposed to just fixing the 4 or 5 failing unit tests that were apparent.

***Implication: Unit Test Feedback needs to show expected versus produced output for failing tests.***

The second round of screenshots shown to participants involved the first round of feedback viewed after a single incorrect submission. Participants were then asked for feedback about the unit test tiles and buttons available. All participants claimed that each unit test needed more information. In addition, they all claimed that being able to view both their output as well as the expected output was essential during the feedback process.

An additional column in the unit test tiles, containing the expected answer, would allow for a side-by-side comparison of the failing tests. Participants also suggested adding an additional sentence or two below the title of each failing test, allowing users to quickly pinpoint any additional information that would point towards the section of code that may be failing.

#### 4.5.4—Suggestions

##### Asking for Suggestions

Once participants had discussed the available unit test feedback they were asked what their continual process would be to solve the exercise. The majority of participants (7/9) stated that they would proceed through the list of failing tests and fix each issue individually. Once they were stuck and out of options to debug they would look for a hint or other option to solve the problem. The “Ask for a Suggestion” button was then pointed out to the participants that hadn’t noticed it at this point. Once participants were aware of the button, and that it was free of penalties towards their grades, half of them were still adamant on attempting to fix the question on their own over several attempts before clicking it to ask for a hint.

Participants were split between clicking the button right away without attempting to debug at all based on the unit test feedback, or based on the difficulty of the question. They were then asked about the button allowing them to request hints and provided several insights about the design and availability. Several participants (6/9) felt that the button should be readily available after multiple tries versus after a single submission had been entered. These participants were concerned that having the button readily available would encourage users to click it just to finish the exercise, learning nothing. While others claimed that having it there wouldn’t stop them from not using it until they felt like they needed it – so timing made no difference.

All participants were firmly against having a hint pop-up after a certain period of time, claiming that it was incredibly discouraging and made them feel incompetent. A few of the participants (2/9) claimed that the button location was unintuitive and made it difficult to use, while the label of “Asking for a Suggestion” could be perceived as demeaning, in turn discouraging users to ask for hints.

***Implication: Suggestions button needs to be relocated. Suggestions provided need instructor endorsement.***

After observing the unit tests, about half of the participants had to be made aware of the “Ask a Suggestion” button that had appeared below the unit test tiles. Participants were then asked about their willingness to request a hint during the exercise process. The responses were evenly divided between participants that were indifferent and those that felt the immediate availability of the button would lead to a lack of trying from users. A solution option was to have the button appear after a few tries, encouraging users to at least attempt to solve for the solution. Alternatively the option to deduct points when hints were used was also discussed.

When asked for suggestions to increase awareness and use of the button, participants commented on the design and location of the button. The recommendation regarding the location was to re-locate the button closer to the “Check my Answer” button, since users were already aware of buttons in that area. A change in the button label was a common suggestion across all focus groups. Participants claimed that when the label asked them to request a hint, it came across as demeaning and demoralizing. Their suggestion was to

have the label be a one-word indicator, leaving it up to user to make a judgment free decision to receive a hint.

Regarding the hints received, participants felt that based on the concept of the exercise pictures could be a helpful way to explain more complicated concepts, over text. Similar to the FAQs, participants said they would like the hints to show a step-by-step process or demonstrate the use of the hint in a similar problem. The option of including links to alternate examples of the same concept was also recommended.

### **Providing Suggestions**

Once participants were used to the idea of being able to utilize a button to request hints they were asked about the possibility of submitting hints at the end of the exercise for each question that would be placed into a question bank and given to other users that requested a hint for a similar question. Most of the participants (8/9) were reflective on their own experiences and wished they had insight before beginning a question of their own during a course, and were willing to submit hints at the end.

While participants (7/9) didn't care whether hints they received were from students or instructors/TAs all participants insisted that all submitted hints had to be vetted by instructors/TAs, which would be really time consuming. There were additional concerns regarding types of hints given for different solutions available, since there are multiple ways to solve one problem. Participants were insistent that hints would need to align on with their individual solution method, regardless of efficiency, until the problem was complete and then receive a more efficient solution at the end for comparison.

***Implication: Contributed suggestions require instructor endorsement and need an integrated upvote/downvote feature.***

Along with the idea of requesting hints, participants were asked their thoughts about submitting hints at the end of the exercise that would be placed into a question bank, and recycled for other users to receive. The majority of participants were willing to receive responses by either students or instructors/TAs, as long they were accurate. One solution to confirm accurateness was to ensure every submitted hint by a student was endorsed by instructors/TAs before being recycled.

Along with the moderation, participants were largely concerned about the helpfulness of the hint provided aligning with their individual solution. As a solution, all participants were in full agreement of the option to have the ability to upvote or downvote a provided hint, to indicate helpfulness.

### **4.5.5—Additional Feedback**

#### **General Feedback about the Interface**

For additional features that could be incorporated that would promote learning and additional feedback, participants mentioned having a syntax checker that would flag your already written code. They also suggested allowing the text box to allow for automatic



nesting and indentation complying with formatting standards utilized and expected during course sessions.

Additional links to various texts explaining concepts were recommended and the addition of a debugger or a way to step through their code after the initial submission was thought to be a helpful additional feature, allowing users to learn to debug early in the process.

Exercise thumbnails on the left could disappear as each question was answered and completed showing incremental progress. Lastly, multiple participants suggested an option of displaying progress throughout the exercise completion progress, both with the number of tests provided (a/b) and some sort of progress bar to show the percentage of correctness of the current solution provided.

#### **4.6—Summary of Implications**

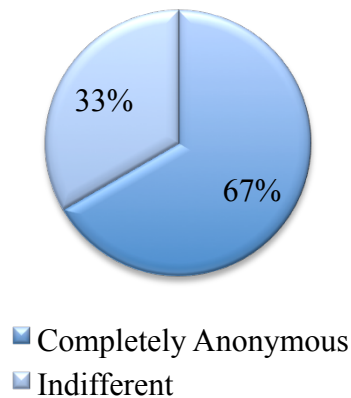
At the start of each focus group participants were shown the first screenshot, containing the starting screen of an exercise in CodeWorkout. The majority read the question, looked at the given examples and search for more information on the page, based on whether they understood the phrasing of the exercise. The starting text box in the design was seen as intimidating and an alternate design option was to alter the size or colour to make it seem more approachable. Participants also commented that while the examples provided were helpful in deciphering the phrasing of the question, they still had no clear depiction of the logical process, of how the author got from input to output. One of the solution suggestions was to provide a step-by-step explanation of the example, from start to finish.

Once participants had had sometime to examine the page, the FAQ tool button was pointed out to the majority, who had overlooked it. Overall comments from a few were that the design didn't seem "clickable" and that the location may be too far below the fold. Participants also suggested considering adding additional information to the FAQ tool button label, such as the question name, in order to provide additional information regarding its contents. Alterations to the design and location, as well as the option to keep the button expanded at all times, were a few of the solutions provided by participants.

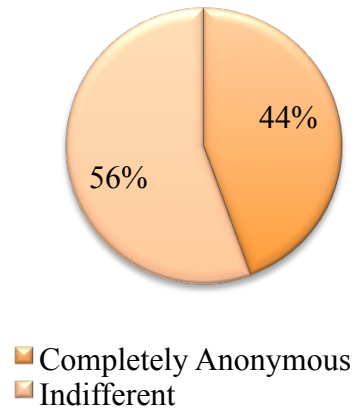
Following the critique of the design of the FAQ tool, participants were asked to comment on utilization of the tool as a form of feedback. Participants unanimously commented on requiring total anonymity when participating on the tool as shown in Figure 14 and 15. Solution options to allow for immediate feedback, included group chats with the instructors. A few participants felt that separating questions posed from the FAQ statements posted could make locating a question/response quicker. At the end of the discussion, some participants still felt that Google would still be a quicker and easier option for them to obtain information.

Participants were then shown the second screenshot, which involved the feedback options presented by the system that were available after one incorrect submission. Participants all required more information than what was provided by the unit test results. Suggestions provided included being able to view both their faulty output as well as the expected output, allowing for a comparison. Additionally, participants commented that a descriptive sentence or two below each of the failing tests would allow users to pinpoint the section of code that was producing incorrect output.

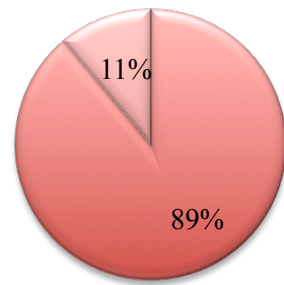
After discussing unit tests, participants, who weren't already aware, were made aware of the "Ask a Suggestion" button below the unit test results. Participants suggested a change in location and design to make the button more visible, as well a change in the button label from a statement to a one-word indicator. Participants were evenly divided between immediate availability of the button provided, to request a hint. An alternate solution to encourage users to attempt the exercise first was to have the button appear after a few attempts. They suggested including a step-by-step explanation of a process or concept, as well as links to more in depth concepts as hint contents. Following the questioning about requesting a hint, participants were asked about their willingness to contribute a hint at the end of the exercise. Most participants said they would be willing to contribute a response, as shown in Figure 16, for others to receive, as long as hints submitted were endorsed by an instructor/TA, shown in Figure 17. In addition, participants were in full agreement, about the option to have the ability to upvote or downvote a received hint, thus addressing the issue of helpfulness of the hint.



**Figure 14: FAQ Tool Responses.**

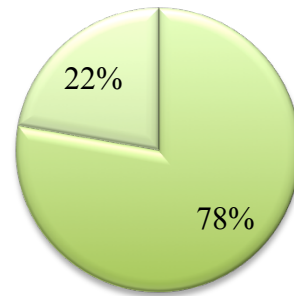


**Figure 15: Posting on the FAQ Tool.**



■ Yes  
■ No

**Figure 16: Submitting Hints.**



■ Instructors Only  
■ No Preference

**Figure 17: Author of Hints.**

## ***Chapter 5—Conclusion***

Our goal for this paper was to evaluate how additional resources for feedback would help students get unstuck while completing online coding exercises. Through 2 separate rounds of focus groups we accomplished this by investigating students' workflow while they completed online exercise in CodingBat and by looking at resources they turn to while stuck on an exercise. We then asked students how helpful they felt different forms of feedback presented were in getting them unstuck. We used the following questions to fuel our investigation:

**Q1** Would students perceive a discussion-based tool to be helpful in completing a coding exercise, while they are practicing alone?

**Q2** Would students find hints, provided upon request, a helpful resource to get unstuck while completing a coding exercise?

**Q3** Given the opportunity, would students be interested in contributing hints, at the end of an exercise, for other students to receive as a resource?

Ultimately, we proposed and evaluated three separate options: *a discussion-based Frequently Asked Questions (FAQ) tool, hints provided while completing an exercise and the ability to write hints for other students completing an exercise.*

### **5.1—Implications**

#### **5.1.1—FAQ Tool**

***Would students perceive a discussion-based tool to be helpful in completing a coding exercise, while they are practicing alone?***

When the initial idea of a discussion option within CodeWorkout was suggested, participants drew on their personal discussion forum experience and consequently had very negative responses. All participants mentioned responses were rarely relevant and the responses to questions posted were frequently demoralizing and negative. Further clarification revealed that that personal help, like that of a TA, was still the best method to get unstuck, since participants were concerned that single sentence responses did not have the depth of explanation that would be available to them during office hours.

Once participants explored the initial design of the FAQ tool for CodeWorkout commented that they expected the tool to contain explanations of the given examples. Participants expressed concern that posting a question on a forum did not address the need for immediate feedback while they were stuck. Additionally, the majority of participants indicated that they would never willingly post/respond to a question. They felt they lacked confidence in their response and feared public correction by the instructors. The option of instructor endorsement on anonymous responses allowed participants *to no longer cared about the author of the responses.*

Based on implications from both focus groups I believe the FAQ Tool should attempt to

address these issues by providing participants with a way to receive quick ,reliable feedback while they are stuck during an exercise. Ideally this tool would partially replace the need for in-person visits to a TA. During discussions, participants talked about how TAs were able to guide them to the correct solution by working backwards and following their process rather than the most efficient method to achieve 100% correctness. TA's were also praised for providing participants with a comfortable environment, for participants to ask questions .at any level of understanding, without feeling inferior or judged. Creating a "safe" environment within the FAQ Tool will allow students to be more forthcoming with queries, thus increasing the use of the tool for their benefit. In addition, participants' confidence in TAs as a source of background knowledge was evident, and second only to Google.

Moving forward, I believe the FAQ Tool can be successful with several alterations to its interface and behavior. Firstly, while complete anonymity can sometimes be difficult when responding, I believe completely anonymous posts will provide users with the "safe" environment they need and allow them to clarify their questions, while they are stuck. Next, users need to trust the peer information provided. Instructor endorsement (through a symbol or marker) on posted responses will allow students to confirm that an individual with a confirmed base knowledge of the concept being tested has approved the response. Lastly, participants were very vocal about TA hours providing participants the ability to receive an instant and personal response regarding their solution issues.

A solution option to address the immediacy of feedback could be a live group chat between students and an instructor. While typing in questions and responses are more time consuming than verbal questioning, I believe the anonymity for the student will allow them to ask more direct and useful questions. While an instructor is online, users will be able to ask questions back and forth over a given period of time. This interaction could mimic the time spent during office hours. I believe, that endorsed responses combined with the ability to ask for immediate clarification of concepts during the exercise process, should allow the FAQ Tool to be very successful.

### **5.1.2—Receiving Hints**

***Would students find hints, provided upon request, a helpful resource to get unstuck while completing a coding exercise?***

Participants loved the idea of having hints at their disposal during the process of completing an exercise. Participants were divided between attempting to solve the question on their own over several attempts before clicking the button. However, when the button label to "Ask for a Hint" was presented to the same participants, they claimed they would never click on a button to "Ask for a Hint". Comments about the verbiage included *inadequate, stupid and incapable* as participants described the feeling of clicking that button to complete the exercise. The label was then redesigned to read "Ask for a Suggestion". Several participants responded to the change by commenting that the label of "Ask for a Suggestion" could be perceived as demeaning and discouraged them from clicking the button. An alternative solution recommended was to a single word moniker for a label, allowing the button to make a statement, instead of requiring a user to perform an action affecting their performance. Participants also commented that the button location was unintuitive.

Another concern shared regarding hints provided, was the fear of being led astray. Participants were adamant that the hints would need to align with their solution process in order

to be useful. They commented that an automated hint had the potential to redirect them towards more “efficient” yet completely different solution method.

It was apparent that while participants enjoyed the idea of being able to receive hints during the exercise process, the *method* to receive them was a cause for concern. Participants displayed emotional reactions to the button label through several iterations and several participants linked this to the action of clicking a button to ask for information. Moving forward, I believe providing student with the option to receive hints through a button is still the most palatable option. While they are required to click it, after various rounds of discussion, it became clear the label moniker had a larger impression on the action. A solution option recommended was to place a single word label, as an indicator of what the button could provide the user. I believe, based on observation, replacing the label to simply read “Hints” will allow the button to just become another feedback opportunity on the page. This will remove the without implication that users *require* the button to correctly complete the exercise, while stuck. Additionally, with users already familiar with one button location, I believe relocating the “Hints” button adjacent to the “Check My Answer” button will make it more available to users.

### ***Potential Stereotype Threat***

While participants were selected at random throughout the study, coincidentally the first round of focus groups were primarily female while the majority of participants in the second round were male. The differences in comments concerning usage and helpfulness became apparent while discussing the option of requesting hints. During the first round while asking participants whether they would find hints helpful, all participants commented that the idea of having hints at their disposal while stuck would be incredibly helpful. Once asked if they would click a button to receive this hint the majority of the participants were adamantly against clicking said button to *ask* for a hint, regardless of no grade penalties.

Further questioning, revealed that this majority felt that the mere action of clicking for a button to compounded with *Asking for a Hint* indicated failure and made them feel incompetent and incapable. Their comments were taken into account before producing potential design mockups and the button was re-labeled as “Ask for a Suggestion”. Throughout the second round the majority of the participants claimed they would consider clicking on the button, especially if there were no grade penalties involved. Further questioning about the hints button-label revealed that a re-labeling of the hints button would make it more useable, however there were no feelings of inadequacy, and the majority commented they would still click on it.

The observed reflection of comments across both rounds indicates the possibility of an apparent *stereotype threat*. The theory begins with an assumption: sustaining school success, one identifies school achievement to which one is accountable [12]. In his paper, *Threat in the Air* Steele defined stereotype threat as “*the event of a negative stereotype about a group to which one belongs becoming self- relevant, usually a plausible interpretation for something one is doing, for an experience one is having or a situation one is in, that has relevance to one’s definition.*”

Stereotype threat is situational and can affect any members of a group for whom a negative stereotype exists. Steele claims that to experience stereotype threat, one need not believe in the stereotype itself. In addition, the effort to overcome the threat by disproving the stereotype – for example by attempting to outperform in the case of academic work – can be daunting [12]. While there is no definite indicator of stereotype threat, the comment indicate such a possibility

exists amongst the participants and may have an affect on certain design choices moving forward.

### **5.1.3—Contributing Hints**

***Given the opportunity, would students be interested in contributing hints, at the end of an exercise, for other students to receive as a resource?***

Participants thought adding hints to a Hint Bank would be an interesting idea and promote a high self-efficacy in learning, provided there was a strong method for moderation and maintenance. Following the initial excitement there were large concerns regarding moderation issues, lack of efficient hints and lack of contribution. Participants requiring provided hints to be endorsed by instructors or TAs before being displayed, to ensure “correctness”. With instructor endorsement the majority of participants commented that the author of the hints became unimportant. After lengthy group discussion, the idea of incorporating user feedback, through an upvote/ downvote system, allowing users to demonstrate *usefulness* of each hint was very well received. Participants commented that this process would then allow for the hints with higher “rankings” to become more frequently displayed.

Participants seemed enthusiastic of being able to provide a hint to another user, with correctness and relevance being the only concerns. I believe instructor endorsement on submitted hints (with a similar marker to endorsements in the FAQ Tool), will allow users to have confidence in the information provided to them. In addition, I believe integrating an up vote/ down vote system into the interface of the displayed hint, will allow users to filter “relevant” hints. The larger the number of up vote by peers could allow for the hint to roll to the top of the list when being picked from the bank. Conversely, when displayed, a down voted hint would “roll-away” to be replaced by the next most “relevant” hint. This peer assessment method will encourage users to write the most “useful” hints that they are able, in turn hopefully, increasing their knowledge in the concept being tested.

## **5.2—Proposed Next-Step Design Solutions for FAQ Tool and Hints Button**

After evaluating the feedback from participants after the second round of focus groups, we redesigned the feedback options to incorporate the suggestions presented by participants. The FAQ Tool section was redesigned to appear more visible on the page, by enhancing the design of the button. Since several participants commented on incorporating the potential of having more in depth explanations of the provided examples within the FAQ Tool, a drop down was specifically created to allow for this. In addition, the information provided, and access to “Post a Response” was redesigned, to incorporate a more nested, non-threaded, solution option. To the right of the drop down discussion, an area for a group chat option was also incorporated. This idea presented itself as an alternative solution among several participants, as a method to encourage immediate feedback within the FAQ Tool. The unit test feedback was modified to include a short description of the failing test, as well as an indicator for the expected versus produced response. Lastly, the “Ask for a Suggestion” button was re-labeled to “Hints” and re-located in-line to the “Check my Answer” button.

CodeWorkout

GymCourse

search exercises...Q Search

edwards@cs.vt.edu

E203: Factorial

Write a function in Java that will take a positive integer as input and returns its factorial as output.

JavaCompiled

0.2

E240: teenSum

Given 2 ints, a and b, return their sum. However, "teen" values in the range 13..19 inclusive, are extra lucky. So if either value is a ...

JavaCompiled

60 xp

E248: blueTicket

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of ...

JavaCompiled

0

Home / Gym / E248: blueTicket

## E248: blueTicket

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of the numbers in each pair. If any pair sums to exactly 10, the result is 10. Otherwise if the ab sum is exactly 10 more than either bc or ac sums, the result is 5. Otherwise the result is 0.

blueTicket(9, 1, 0) → 10  
blueTicket(9, 2, 0) → 0  
blueTicket(6, 1, 4) → 10

```
1 public int blueTicket(int a, int b, int c)
2 {
3
4
5
6
7
8
9
10
11
12
13 }
```

Check my answer!

Practice a different Java exercise

FAQ

CodeWorkout

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**Figure 18:**  
**Initial FAQ button redesigned based on participants feedback**

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E203: Factorial

Write a function in Java that will take a positive integer as input and returns its factorial as output.

Java Compiled

0.2

E240: teenSum

Given 2 ints, a and b, return their sum. However, "teen" values in the range 13..19 inclusive, are extra lucky. So if either value is a ...

Java Compiled

60 xp

E248: blueTicket

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of ...

Java Compiled

0

Home / Gym / E248: blueTicket

```

1 public int blueTicket(int a, int b, int c)
2 {
3
4
5
6
7
8
9
10
11
12
13 }

```

Check my answer!

Practice a different Java exercise

FAQ

Examples Explained ▶

Why do my values keep disappearing? ▶

How do I compare the sums? ▶

Ask a New Question

Online

Talk to an Instructor

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**Figure 19:**  
**Left: Expanded FAQ Tool displaying current discussion questions available for the exercise.**  
**Right: Empty group chat box with an instructor online.**

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search exercises...

Q Search

edwards@cs.vt.edu

E203: Factorial

Write a function in Java that will take a positive integer as input and returns its factorial as output.

Java Compiled

0.2

E240: teenSum

Given 2 ints, a and b, return their sum. However, "teen" values in the range 13..19 inclusive, are extra lucky. So if either value is a ...

Java Compiled

60 xp

E248: blueTicket

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of ...

Java Compiled

0

Home / Gym / E248: blueTicket

```

1 public int blueTicket(int a, int b, int c)
2 {
3
4
5
6
7
8
9
10
11
12
13 }

```

Check my answer!

Practice a different Java exercise

FAQ

Examples Explained ▶

Why do my values keep disappearing? ▼

Try assigning your values to a local variable.

Parameters don't work as variables - you need new ones.

Post a new response

How do I compare the sums? ▶

Ask a New Question

Online

Talk to an Instructor

Using a local variable has not worked?

Instructor is typing....

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**Figure 20:**  
**Left:** Single FAQ discussion question expanded — to show available responses.  
 “Post a New Response” button also appears below the last response.  
**Right:** Group chat indicates an anonymous question by a user and is waiting an instructor’s response.

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search exercises...

Q Search

edwards@cs.vt.edu

E203: Factorial

Write a function in Java that will take a positive integer as input and returns its factorial as output.

Java Compiled

0.2

E240: teenSum

Given 2 ints, a and b, return their sum. However, "teen" values in the range 13..19 inclusive, are extra lucky. So if either value is a ...

Java Compiled

60 xp

E248: blueTicket

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of ...

Java Compiled

0

Home / Gym / E248: blueTicket

E248: blueTicket

You have a blue lottery ticket, with ints a, b, and c on it. This makes three pairs, which we'll call ab, bc, and ac. Consider the sum of the numbers in each pair. If any pair sums to exactly 10, the result is 10. Otherwise if the ab sum is exactly 10 more than either bc or ac sums, the result is 5. Otherwise the result is 0.

blueTicket(9, 1, 0) → 10  
blueTicket(9, 2, 0) → 0  
blueTicket(6, 1, 4) → 10

```

1 public int blueTicket(int a, int b, int c)
2 {
3     int sum1 = a+b;
4     int sum2 = b+c;
5     int sum3 = a+c;
6
7     if( sum1 ==10 || sum2 == 10 || sum3 == 10)
8     {
9         return 10;
10    }
11    else
12    {
13        return 0;
14    }
15 }
```

Check my answer!

Hints

Practice a different Java exercise

FAQ

Feedback

Results

blueTicket(10, 0, 0) -> 10	✓
blueTicket(15, 0, 5) -> 0 Expected: 5 ; Produced: 0 The ab sum is exactly 10 more than bc or ac. Reconsider your logic evaluation	✗
blueTicket(5, 15, 5) -> 10	✓
blueTicket(13, 2, 3) -> 5 Expected: 5 ; Produced: 0 The ab sum is exactly 10 more than bc or ac. Reconsider your logic evaluation	✗

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**Figure 21:**  
Unit Test Feedback now displays the expected /produced output for failing tests, as well as a short description of the cause of error. Hints button renamed and now located on the right of “Check my Answer!”

## 5.3—Future Work

Overall our findings from both focus groups indicate the additional feedback options would be very helpful in assisting them with completing coding exercises in CodeWorkout.

Additional features that were recommended included a syntax checker that would flag your already written code before submission. Participants claimed, that this would minimize compiling errors that may accumulate towards the end. In an effort to integrate the concepts taught in class, participants also suggested providing automatic nesting and indentation capabilities within the submission box, thus complying with formatting standards utilized and expected during course sessions.

In an effort to obtain the maximum amount of information related to the exercise, participants suggested including links to various texts or websites, in the hints provided, to further explain the concepts being tested. In order to promote active learning and develop early debugging skills the addition of a debugger or a tool to step through faulty code was also recommended by a few participants.

Participants were very comfortable with the overall understanding of the interface and had a few recommendations to demonstrate incremental progress through the exercise. One such option was that the exercise thumbnails on the left could disappear as each question was answered and completed showing incremental progress. Lastly, multiple participants suggested including a display option to indicate progress throughout the exercise would be very motivating. One option for such a display would be a numerical comparison between with the number of tests provided (a/b—where a is the number of passing tests and b is the total number of passing tests required). An alternate option to explore, would a graphical representation in the form of a progress bar was to show the percentage of correctness of the current solution provided.

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## *Appendices*

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## Appendix A: VT IRB-15-210 Approval Letter



Office of Research Compliance  
Institutional Review Board  
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Blacksburg, Virginia 24061  
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website <http://www.irb.ut.edu>

### MEMORANDUM

**DATE:** March 13, 2015  
**TO:** Stephen H Edwards, Manuel A Perez-Quinonez, Priyanka Mohan  
**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires April 25, 2018)  
**PROTOCOL TITLE:** Focus group to understand feedback for drill-and practice systems (CodevWorkout)z  
**IRB NUMBER:** 15-210

Effective March 12, 2015, the Virginia Tech Institutional Review Board (IRB) Chair, David M Moore, approved the Amendment request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

<http://www.irb.vt.edu/pages/responsibilities.htm>

(Please review responsibilities before the commencement of your research.)

### PROTOCOL INFORMATION:

Approved As: **Expedited, under 45 CFR 46.110 category(ies) 6,7**  
Protocol Approval Date: **February 27, 2015**  
Protocol Expiration Date: **February 26, 2016**  
Continuing Review Due Date\*: **February 12, 2016**

\*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

### FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

*Invent the Future*

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY  
*An equal opportunity, affirmative action institution*



Date*	OSP Number	Sponsor	Grant Comparison Conducted?
02/26/2015	12259505	National Science Foundation	Compared on 02/27/2015

\* Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

## *Appendix B: Consent Form*

### VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

#### **Informed Consent for Participants in Research Projects Involving Human Subjects**

##### **Title of Project:**

**CodeWorkout**

##### **Investigator(s):**

**Dr. Stephen Edwards, Dr. Manuel Pérez-Quñones, Priyanka Mohan**

##### **I. Purpose of this Research/Project**

Rudimentary programming skills are essential to developing fundamental proficiency in computer science. However, learning programming techniques can be challenging and frustrating for many students. This project focuses on evaluating a new on-line tool called CodeWorkout that allows students to practice programming exercises with the assistance of adaptive, social scaffolding. This drill-and-practice tool includes a rich interface where students program their exercise solutions, run and view results of their code, receive adaptive hints, and review relevant code examples. This research evaluates the technology's impact on students' achievements in this course. All **students at least 18 years old** are eligible to participate.

##### **II. Procedures**

This study relies on examining student responses to the idea of integrating an interactive aspect during online practice exercises. The interactive aspect would involve CodeWorkout providing more related feedback during the completion of an exercise, as well as, the opportunity for a discussion forum for each question. **This consent form is simply your way of giving us permission to use your focus group responses and comments in the research project.**

##### **III. Risks**

Participation in this research will not place you at more than minimal risk of physical or psychological harm.

##### **IV. Benefits**

We expect that this research will lead to improvements in CS education. These improvements are expected to include better strategies for using on-line practice exercises, so that students can achieve their full potential on their assignments. Study participants, including you, may directly benefit from the ongoing improvements to the course that is the subject of investigation.

##### **V. Extent of Anonymity and Confidentiality**

**The data we collect as part of this project will be kept strictly confidential.** All data will have your name removed and only a subject number will identify you during analyses and any written or oral reports of the results. Any personally identifiable information will be stored securely, where only the investigators can access it.

The investigators will use the collected data in publications, and they may make such data available to other researchers outside the project who are investigating the learning of programming. **In no case will personally identifiable information be divulged to any party outside the project team.**

## VI. Compensation

No compensation will be provided to participants.

## VII. Freedom to Withdraw

You are free to withdraw from this study at any time, for any reason, and without penalty.

## VIII. Approval of Research

This research has been approved, as required, by the Institutional Review Board for projects involving human subjects at Virginia Polytechnic Institute and State University, and by the Department of Computer Science.

## IX. Subject's Responsibilities

I voluntarily agree to participate in this study, and am not a minor (am not under 18).

## X. Subject's Permission

I have read the Consent Form and conditions of this project. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for participation in this project. If I participate, I may withdraw at any time without penalty.

---

Subject Signature

---

Date

---

Name (Please Print)

---

Contact (phone/email) Optional

Should I have any pertinent questions about this research project, I may contact:

Dr. Stephen Edwards  
Investigator

Email: [s.edwards@vt.edu](mailto:s.edwards@vt.edu)  
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Phone: 540-231-2646

Priyanka Mohan  
Co-Investigator

Email: [p121286@vt.edu](mailto:p121286@vt.edu)

Should I have any pertinent questions about conduct of this study or my rights as a participant, I may contact:

David M. Moore  
Chair, IRB

Email: [moored@vt.edu](mailto:moored@vt.edu)  
Phone: 540-231-4991

## *Appendix C: Round 1 - Focus Group 1 - Transcript*

[00:01:05.10] Interviewer: Let's go around and do introductions. I'm Priyanka, I'm getting my Masters, and that's what this study is going to be directly related to - my Masters Thesis.

[00:02:13.28] T: I'm ... I'm going to graduate this semester and go work for \*\*\*\*\*.

[00:02:13.28] J: I'm... I'm also a senior this semester and I'll be going to work for F\*\*\*\*\* in May.

[00:02:13.28] E: Hi I'm... I'm a sophomore.

[00:01:47.09] Interviewer: It's okay to disagree, based on your experience working with CodingBat or from your past TA experience. I'll refer mostly to it as drill-and-practice since it's not focused on Coding Bat. Drill and practice systems are typical online tools that help with learning a concept/new material/ (or a new coding language) through practice workouts and exercises. One example of such a system is CodingBat. I'm working on developing a slightly different version of a drill-and-practice system and we're calling it CodeWorkout, so if I switch back and forth about talking about drill-and practice and CodeWorkout they just mean the same thing. Any feedback you guys give me over the next 45 minutes will be pretty fantastic. I'll ask you a couple of questions, you'll respond, feel free to go off on tangents, if you go too far off a tangent I'll bring you back. We'll talk a little bit about going though an exercise in Coding Bat, and then talk about drill-and practice layouts you guys have used, and then I'll talk about features I plan on adding and how that relates to what drill-and practice systems currently don't have.

[00:03:26.25] Interviewer: When was the last time you guys used CodingBat?

[00:03:26.25] J: Last summer.

[00:03:26.25] Interviewer: Ok so relatively recently

[00:03:32.21] T: When I was TAing \*\*\*\*, so that would be Spring 2014...

[00:03:42.19] Interviewer: So a year ago..

[00:03:42.19] T: Yes..

[00:03:55.29] Interviewer: So when you went through what was your experience in terms of completing a coding exercise through CodingBat?

[00:04:05.07] J: I liked CodingBat..

[00:04:05.07] Interviewer: You did? Ok ,Why..

[00:04:05.07] J:A lot of the online tutorials they have don't teach you how to think like a programmer but how to program, and so it was very interesting to see like all the different types of small programs that don't need like a lot of um effort or work to kind of power through. They give you a simple like one sentence or two-sentence statement and then you figure it out.So...

[00:04:29.00] T: I liked it too, but I only did enough to what I was required to., I didn't really like the system so much that I went off and did all of it. But the stuff that I had to do it was...

[00:04:43.12] E: I agree - I never was like oh I really like this I'm going to keep doing exercises. But thought that they were really helpful, when it was on something I wasn't necessarily clear about.

[00:04:53.07] T: the recursion ones were really helpful...

[00:05:02.27] Interviewer: I totally didn't expect this response, this is great....So through your process of working out how did you feel about the actual process of doing a coding exercise, so if someone were to assign it to you , you would get on there and at least in terms of Coding Bat it seems pretty straight forward, it gives you the question and then a text box below the question, and then it goes back and forth. How was the whole process, did it work for you. Did you just keep going back and forth? Talk to me about your process....

[00:05:43.11] Interviewer: Just out of curiosity, did you have previous coding experience before you used CodingBat?

[00:05:43.11] T:I used it for the Python class, I used the python version. I didn't have much coding experience,except this is a basic for loop

[00:05:49.02] Interviewer: Did you feel like it helped you do the exercise since you weren't that familiar?

[00:05:51.26] T: It gave me a lot of practice with syntax and semantics of the language.

[00:05:58.28] E: One thing is at least for CodingBat the feedback they give you is really good. I like how they tell you ok these are the cases that we tested your method on. These are the ones that work, these are the ones that didn't work. And here's what it put out when I ran it. I thought it was really helpful so that I could see where I was messing up.

[00:06:25.01] Interviewer: If at any point you guys disagree with each other please don't feel bad about sharing that.. all feedback is really helpful.

[00:06:25.01] J:I mean I don't disagree, it's just that in a case when all the tests pass they tell you, but not the hidden tests.

[00:06:33.03] T: Yeah!

[00:06:33.03] J: And so your like I don't know how to fix a hidden test if you don't give me any hints to what's going wrong. And so I thought that was the one obnoxious thing, because you thought you passed all the tests but you really didn't and you don't know how to fix it.

[00:06:51.08] Interviewer: This is great since you basically segued me into my next section of questions. So we're going to talk about feedback next. So while you're working through Coding Bat, there were some tests that were hidden that didn't give you any feedback or additional feedback...Were you looking for it when you first started? Did you understand the questions and then go through it? How did you respond to the coding question - was your first instinct to just write code until you get it?

[00:07:32.07] T:I code on paper first, and then I go to CodingBat and then I type it in, and then click run and see the feedback of the test cases. So when you do ail, it tells you , you failed, and there's no description of why you failed hidden tests, like oh your if statement short circuited or give you that insight.

[00:08:06.02] J: Well I noticed something weird because I had to do it in 2000 level classes and I had a lot of trouble because I just went head first and tried to program it. This summer , I went back for fun because I was bored and I've completely changed my approach to code because I had been doing it for so long, so I really thought it through more before I started programming, and I just breezed though the exercises. So it was more that I'm more acquainted with

programming but I think it's also the approach you use definitely does help when you think through it first.

[00:08:35.00] Interviewer: So it's interesting. I'm going to go back to your first example. So you said the first time you went at it , you just went at it.. What language was it in?

[00:08:44.00] J: Java..

[00:08:45.08] Interviewer: So you had never programmed in it before, and you had to do it for a class. So in that instance your saying they gave you a question for homework..

[00:08:56.10] J: Ya it was super frustrating, so we just got upperclassmen to help us

[00:08:58.23] T: Or we just Googled the answers...the answers are definitely very Google-able...

[00:09:04.20] Interviewer: So as you went through it, talk to me a little more about that process. If I were to send someone brand new to the system to complete a coding exercise in Java, with no coding experience.

[00:09:42.16] Interviewer: So you're saying it was frustrating when you went through.. Anything you can describe about the process would be very helpful.

[00:09:43.27] J: Ya they give you no feedback, they just give you some test examples and say oh wait you passed all of them or you don't pass anything. And that was the thing that really frustrated me.

[00:09:59.26] Interviewer: So it would tell you certain things passed and certain things failed based on the question right? Did you ever keep submitting until you figured out what was wrong?

[00:10:08.22] E: Oh yeah - I was like ok, maybe if I change this - this is also because it's really easy to type a few things in , hit run again and then just continually change it.

[00:10:28.27] Interviewer: So did you actively use the feedback they gave you?.. They give you some don't they...

[00:10:29.05] J: If you used hints we got points deducted so I didn't want to lose points...for the class I mean.

[00:10:42.08] Interviewer: So they gave you the opportunity to ask for hints?

[00:10:42.08] J: Ya, but because we got points deducted so no one did that.

[00:10:45.21] Interviewer: What about the feedback CodingBat gave you at the end - was that helpful as a hint?

[00:10:55.18] T: Well they tell what your answer is and what the right one should be so I would do, was this is my wrong answer, lets take that and run it through again and see why I got that instead of the right answer. So usually I'll have some sort of aha moment where I'm like oh I didn't do a plus one here or something...Or my condition was slightly wrong for this case.

[00:11:19.01] Interviewer: How many times do you think you guys did that? Before you figured out the right answer - because if it's a homework assignment, as you mentioned, they're not going to give you the answer. You just have to turn it in with whatever you have. So how did you guys go about that...

[00:11:32.11] E:I think it depended on what the question was necessarily asking...Ones that have to do with Strings I was doing maybe like five or six times. But arrays I would do once, make one

stupid mistake and then trace through it all on paper, go back , fix my mistake and then be done with it.

[00:11:57.22] J: But with how accessible it is , like you said, to be able to run the program, I felt like I didn't spend enough time thinking about it .If I have a problem, Id just spam it and make small tweaks and not go through the entire code and make sure that the design was right enough.

[00:12:08.21] T: Coming from a TA perspective I had to grade CodingBat and I saw how many times people ran things, when they ran them, I saw some students- either they knew it or were naturally gifted had 1 or 2 tries. But , I think the most I saw was 30.So basically someone just spent 30 minutes to an hour just spamming it until small tweaks finally fixed. And most of their problems were tweaked 10 or 30 times and they would do it over and over again.

[00:12:45.03] Interviewer: That's interesting...During the process did you ever give and look for a solution elsewhere?

[00:12:54.19] T:I was afraid of cheating so I didn't

[00:12:54.19] E:I definitely did.. but when I Googled it - I would look at the solution and

figure out why I didn't come up with it that way - and work backwards and compare what I had been doing to what the solution did to see where it was. I wanted to know why I wasn't getting the right answer and I wasn't thinking the right way so I could understand it and do better.

[00:12:54.19] Interviewer: But this goes back to what you were talking about , about thinking about it a different way.

[00:13:39.23] Interviewer: So with what I'm trying to do, is essentially as you go through a coding exercise in this case, would be to provide hints as you go through the process of submitting a coding exercise or a workout problem. If you were to go through CodingBat at this point, at what point would it have been helpful to you to get a hint or get some feedback...would you have wanted a hint to show up? Or to be able to ask for a hint?...Assuming you didn't have points deducted or anything like that...Essentially students not in traditional classrooms would use this as well...

[00:15:12.15] T:I have a pride issue. I wouldn't want.. I would never click on it. But there's a certain part of me that would wish I had an inkling of what's going on....I'm never going to click the hint button - but I dunno If I was on the page for like 10 minutes and the site knew...and it could say ' hey it looks like you're stuck on this portion - have you tried doing maybe something like blah blah blah - ' and then Id be like Ohhhh...

[00:15:37.18] Interviewer: So you wouldn't want the hints to be direct?

[00:15:41.22] J:I think you should always have that visible possibility to click for a hint but I think you should be able to have it at any time because sometimes the questions might not be worded in a way that you can understand. It may not be a coding issue, it might be a grammar issue - so things like that...I also have a pride issue - so I wouldn't use it, but Id appreciate it there, because like you said there might not be people in classrooms.

[00:16:10.27] E:I know with Chem. homework we have to submit and then if you get it wrong it will pop up a hint and you'll be like Ohhhhh... It doesn't really tell you how to do it but it'll ask you

questions - it basically pushes you to how to do the problem. Or how you should be thinking about solving the problem. So I think those are helpful.

[00:16:34.07] Interviewer: So even if it didn't dock points you would never ask for a hint?

[00:16:43.08] T: It makes me feel stupid

[00:16:43.08] Interviewer: So how would you get a hint? You would just need it to show up...

[00:16:55.17] T: Yea... I'm the kind of person you can't berate.. you would just need to secretly guide me to where I'm going without telling me what's going on - if that makes sense. It's almost like leading with a carrot....

[00:17:11.23] Interviewer: So if you had a button that gave you a hint versus going to look for it on Google - what would you do?

[00:17:22.19] J: Well with Google you don't know what you're going to get...you're either going to get the answer right away, you don't understand it, it might be the wrong answer, especially if you're turning it in for homework its definitely cheating.. so - for me hints still make me feel like I can do it myself - but its still the pride thing. I just have to pick the lesser of two evils.

[00:18:00.17] Interviewer: So going off of that as a TA or a student since you guys have been both. How would you feel, if you had gone through and completed the question, how about if you had the opportunity to provide a hint that would essentially be given to someone else to use. So once you provided an appropriate hint, those responses would rollover and then when someone else asked for a hint they would get something you put in/ someone else put in... or that the system generated.

[00:18:03.29] T: That would be cool.

[00:18:33.00] J: That would be so much maintenance from the websites standpoint.

[00:18:35.05] Interviewer: Don't worry about that point right now - talk to me from a user perspective

[00:18:38.08] T:I would enjoy it.

[00:18:44.18] J:I don't think so - because everyone just approaches this differently. If this is a teaching website, you shouldn't be relying on the users as much for feedback on how to complete things. So it makes me feel like the website isn't putting in enough effort to come up with their own solutions or help methods.

[00:19:04.09] E: Ya.. especially from a TA's perspective - seeing how some people approach some problems, I don't necessarily think everyone providing feedback would be helpful.

[00:19:19.27] Interviewer: There is the maintenance issue - so there would be some sort of vetting process when we get closer to implementation. That aside, how would y'all feel about that - seeing as it would provide another level of engagement and self-efficacy.

[00:19:45.09] J:I mean, I see where you're coming from. Stack Overflow - it's answers submitted by users. Problem is you'd have to alter their answers, either grammatically to make it static. I feel like if you didn't have all this vetting and background stuff - that you didn't really want to get into for this , it would just be very confusing for an end point user because maybe the hints you get just aren't useful, and then you get frustrated.

[00:20:09.21] T: What about - you know when you do reviews of something? You can say is this review helpful or not? Maybe if you



got a hint that was like ohh this totally led me in the wrong direction you could somehow be like oh this hint was definitely not helpful - or something.

[00:20:27.23] J: Maybe if you had an approach - if you had an answer similar to the one the person giving a hint is, I mean I just have to think of some way for this to be helpful from my point of view. If you manage to align someone who's completed and given a hint to the way that the person's approaching. It's like you said everyone approaches it completely differently. And so you might get thrown off the track, you were right you just had like a small couple of tweaks versus going on a completely different route.

[00:20:55.11] Interviewer: I understand completely what your saying and that's part of it....

[00:21:11.19] Interviewer: So going off of that since we're talking about providing feedback how do you feel about discussion forums? In your current class or however...do you find it helpful? Do you use it?

[00:21:29.08] T: Out of the four years I've been here I've only posted one question in the forum

[00:21:35.27] Interviewer: Do people actively post in your class?

[00:21:35.27] T: I feel like it's always the same people. The same people are posting questions and I feel like the question just sits there and not enough people are checking it. Piazza its relatively good about people "checking" it but I don't think people are confident sometimes to answer the questions without the instructor going like "Oh you were completely wrong" or something like that.

[00:22:05.04] J: Ya cuz they even say even if you're anonymous the teacher can still see who you are. So I don't care as much about what my co-students think but I post the wrong answer and my teacher called 'em out on it - I think that would be pretty mortifying.

[00:22:19.05] T: Even as a TA I'm afraid to answer a forum post because I'm afraid the teachers gonna be like Whoa whoa you thought this wrong - you're doing it totally wrong - you're leading people astray.

[00:22:27.09] E: Ya - I definitely feel the same way. I don't think I've ever posted a question on a forum board for any of my classes. I would rather go to a person and ask for help.

[00:22:41.00] Interviewer: What if you didn't have a person?

[00:22:42.13] J: I mean that's the problem though - I feel like this program is intended to be more online based and less like real - person-to-person based. So for us its a bit different because people get help from friends or people who are there in office hours - so a lot of the piazza posts are last minute problems or needing to meet up with groups.

[00:23:15.12] Interviewer: I mean I would want this to work the way CodingBat works for us right now. We use it, we're around. But conversely it also helps if you're a stranger and just want to learn java in your basement. But it will teach you as you go through a set of exercises. So you feel like it's incomplete without the human component....

[00:23:45.17] Interviewer: What is you had a discussion post for each question...

[00:23:47.08] T: Like a comment thread sort of?

[00:23:49.07] Interviewer: Yea...

[00:23:52.27] T:I feel like sometimes people would.. I don't know....

[00:23:55.08] J: For computer science discussion forums I don't feel like these kind of educational sites are the best place to do it. Um, unless its very very heavily moderated , since there are already so many places where you can do that and websites have been around for so long, and they've ironed out all the kinks involved in making an online forum so maybe like this wouldn't be as best served having a forum to it.

[00:24:19.03] T: Because I feel like you a very different range of people who maybe are accessing it. J knows Java pretty well but she still would want to do the exercises. She knows a lot of the language but for someone who's brand new and may not know and like she's having a discussion about shallow copy versus deep copy and pass by value versus pass by reference. And then they're discussing it for the question or whatever, that new person is probably like Woahhhh - I have no clue what they're talking about - maybe this is not cut out for me..

[00:25:00.06] Interviewer: So lets use one of your past examples- you talked about recursion earlier. So if you had a recursion question and you had a comment thread based on that specific question - and someone was stuck and solving a problem...

[00:25:07.19] J:I mea one of the best things about CodingBat is that they sort it into like beginning , middle and expert -if I remember correctly? And so like I think you can get around that problem by having the forum sorted in that way - but I still don't think it would be a meaningful contribution sine you would have to have a really high user traffic that contribute and that are helpful and I just don't think a lot of people are interested in doing forum related activities when they're trying to learn. Unless it's one of those dynamic exercises that continues evolves. Like CodingBat just has pre-determined exercises that they update occasionally - it's not like continually evolving.

[00:26:08.26] E: I just don't know that it would be useful, um.. I agree with everything they've said. I think it could cause confusion and I also think it would be a lot of people would post questions and it would just sit there - and not necessarily get answered - unless you have someone who periodically goes in and checks and then by that time this person could have given up or completely forgotten about their question.

[00:26:57.01] Interviewer: This is interesting....So to journey back a little you mentioned CodingBat segregates their exercises into levels -did you find that helpful - first and the second time?

[00:27:02.26] J: Yeah! since I did it second time - obviously I shouldn't be starting at a beginner level since I should be doing this for a couple of years and so I started out just to make sure - it was a waste of time kind of - so I just skipped straight to the higher levels.

[00:27:24.18] Interviewer: And the groupings provided helped?

[00:27:24.18] J: Yes definitely! Especially because if you start out and you get a really hard question -I think I would just shut down the website and go somewhere else(laughing).I would just get way too discouraged and think I can't do it.

[00:27:43.08] T: Ya I agree

[00:27:43.08] E: Me too...

.....

[00:27:44.22] Interviewer: Ok... so you guys have answered the majority of my questions - did y'all have any questions for me about anything? I have enjoyed you're varying perspective on the system...

[00:27:54.17] T: CodingBat was very helpful starting off because it wasn't too harsh with the beginner, medium and the sorting of those. You weren't trying to bite off more than you could chew and you didn't get discouraged.

[00:28:32.26] Interviewer: How intuitive did you find it to use as you were starting off?

[00:28:32.26] J:I mean it was fine cuz you had to do it for school - so it wasn't really an issue - but I think as a user who isn't forced to use it I wouldn't think that they're a good website because if you're doing computer science you should know how to efficiently implement UEs.

[00:28:57.18] T: Code Academy is a lot more glam....

[00:28:57.18] J:But they were really good about their colour feedback - especially suing the red/green schema

[00:29:06.14] T:- and the stars for yellow

[00:29:06.14] J: So they really give you - not sure hat the word is - really good encouragement.

[00:29:17.20] E:I also think it depends. Okay because when I was doing CodingBat for my personal class assignments I just did it on the normal page - but this semester when I was setting it up I did it the way the teacher did it - and it looks nice and clean. So prefer the page I set up

[00:30:27.15] Interviewer: If you hadn't had to use it for class - would you have used it given the tool, and the textbook - to learn the language?

[00:30:38.09] J:I don't think its that good for starting out because it didn't - it's not a good intro to java or a programming language. It

helps more with like thinking. And so if you're just starting out - I think it's not that great - but if you already know what you're doing and you're trying to learning and expand that pool of knowledge you have - it's pretty good.

[00:30:59.11] Interviewer: Interesting.. why?

[00:31:00.16] J: When I learn I like to kind of be spoon-fed and then I do the examples to make sure I understand it - as opposed to doing the examples first and then making sure I learn.

[00:31:11.27] T: Also there's no best practices...or syntax or structure or anything like that. And if you first start - I always really got caught up on that kind of stuff. So when I was like first doing my Java programs for 2114, like 21's pretty good about that stuff but we only did it for three weeks with the professor prior and I was really concerned - because I had no idea what the code structure was supposed to look like.. is there a certain way I was supposed to do this.....Web-cat was pretty good about teaching you styling stuff but CodingBat is just like Oh I don't know if you're using if and else or ternary operators but if it worked it worked, and I don't care what it looked like. So instead of doing like if, and ,or - is this, this and this.. you could essentially have 20 nested if statements and you would never see that in industry/ higher-level classes...Its completely unnecessary and knowing what is.

[00:32:20.23] J: Or even just enforcing white spacing.. one of my first professors in Java would dock an entire point for missing white spaces...so syntax was really drilled in. I think its very important for people to emphasize that when you're learning because I see a lot of code when I'm at work and you just can't understand it and it's all messed up. It's totally inappropriate for a professional environment and people don't realize when they're starting out and it's just really important.

[00:32:47.21] E:I think its better for practicing, making sure you understand certain concepts but not necessarily teaching yourself.

[00:32:59.23] Interviewer: So how would suggest modifying it to teach someone...

[00:33:14.07] T: Kind of how openDSA is...

[00:33:18.10] J: Exactly

[00:33:18.10] T: Its like here's a little bit of knowledge - now here are five, or one or two easy problems that you could test your knowledge on...so maybe you want some harder ones... and maybe another module on something else...

[00:33:31.28] J: Yeah, OpenDSA was great because it had visual components and then it had like visual components and then it had diagrams and then...

[00:33:37.28] T: questions at the end...

[00:33:37.28] J:...questions at the end to test it. So I think that would be a great alternative to CodingBat, where you actually have that test and you have them emphasizing

[00:33:50.03] T: So maybe.. like with recursion instead of like here a bunch of recursion problems - go at it. Here's a little bit about recursion, sort of how people usually go through a recursion.. now here are 20 problems you can test your recursion knowledge on.

[00:34:02.02] Interviewer: So how do you think hints would be helpful in that?

[00:34:06.29] T: Reinforce...

[00:34:14.27] Interviewer: At what point during this track do you think receiving feedback would be beneficial...at some points between the "spoon-fed" and the problems process. Would you see a thing to help you and then take you back to your problem?

[00:34:35.24] J:I think its extremely condescending when I'm trying to do a problem in a program and they're like hey! did you read this? - I mean of course I read that I'm trying to do this program. And so I find it obnoxious when the website reminds you that they have a section on it. Because if they have problems on it then they probably have a section on it.

[00:35:03.13] Interviewer: Ok great.... did you guys have any other questions for me?

[00:35:03.13] Interviewer: Would you recommend something like this for someone who is trying to learn a language?

....

[00:35:10.14] T: Like CodingBat?...

[00:35:10.14] Interviewer: Sure - lets say CodingBat

[00:35:21.05] T: If they already have a background in the language - and syntax.. and they want to practice learning the language then yes. Even if they are starting out with the language and they know a little but how its structured and they're like ya I'm ready to do problems.. then ya.

[00:35:33.00] T: If they're brand new - then no.

[00:35:33.00] J:YA

[00:35:42.23] E: Hahahaha

[00:35:43.24] Interviewer: Well thanks a bunch guys - your responses were really helpful.

## *Appendix D: Round 1 – Focus Group 2 - Transcript*

[00: 00: 12. 09] Interviewer: Y'all can go ahead read and sign the consent forms and we can get started.

. . .  
[00: 03: 07. 14] Interviewer: First of all, thank you guys so much for coming. I'll go ahead and introduce myself first. I'm Priyanka - I'm a Masters student in Computer Science - so this study will help with my thesis. So we can just go around and introduce ourselves and then we'll get started.

[00: 03: 33. 14] L: I'm. . . I'm currently in CPE and I'm a freshman switching into CS.

[00: 03: 54. 26] A: My name is . . . I'm a CS major, sophomore.

[00: 04: 02. 22] N: Hi, I'm. . . , I'm a CS major as well. . .

.  
[00: 06: 10. 04] Interviewer: Great! I'll just talk a little bit about what this focus group is for, and I just want to emphasize, if y'all have differing opinions that's totally great. I'll refer to something called drill-and-practice pretty frequently throughout the group and the little paragraph I'm about to read will explain a little more. Drill and practice systems are typical online tools that help with learning a concept/new material/ (or a new coding language) through practice workouts and exercises. One example of such a system is CodingBat. We're working on developing a slightly different version of a drill-and-practice system, called CodeWorkout. So if I go back and forth between drill-and-practice and CodeWorkout, I'm referring to the same thing. Any feedback you give be will be totally useful.

[00: 07: 38. 04] Interviewer: So have you all had some experience using drill-and-practice tools?

[00: 07: 44. 11] A: Yeah, we used CodingBat in 1114 and 2114.

[00: 07: 48. 24] L: I used it in high school

[00: 07: 59. 21] Interviewer: So we'll start off slow - talk to me about your experience as you go through a coding question with CodingBat. . . was it helpful/accessible?

[00: 08: 13. 21] N: I think it was helpful but I did find that sometimes I don't know how to do it, how to code, but when I was actually trying to do it, there no hints or anything. So if you're gonna do it, you're going to Google it and get the answer, and then its not learning anymore cuz you have the answer in front of you already. And after that there's no, there's limited versions of the same thing. Sometimes I wish there was one or two examples of the same exact thing, not just 3 or 4 but a good solid number.

[00: 08: 50. 17] Interviewer: And in your classes you used CodingBat pretty often? after a certain point?

[00: 09: 00. 09] Interviewer: Did you have anything else you wanted to add to that?

[00: 09: 00. 09] L: I would say I remember when I was first starting off I didn't really know how to code at all. And its just like ok make an if statement, and I had no idea. So there wasn't any intro, it was just like code. . . .

[00: 09: 29. 11] Interviewer: Interesting. My introduction to CodingBat was slightly different. . so please feel free to go into depth. . .

[00: 09: 39. 27] L: I felt like sometimes the questions were a little confusing too. . .

[00: 09: 45. 03] L: I started over the summer, cuz my teacher was like 'ok you didn't take the intro class so kind of do some reading in this book and then start CodingBat. So I guess I had a little bit of an intro but now my friends are like 'Oh, I wanna start learning how to code and I wanna do CS and where do I start? So I know I started in CodingBat and it wasn't that bad . So I say ya go on CodingBat and start to code. . and I forget that there is no nitro's if you don't have any previous knowledge or other resources like the books and things it's really hard to just start off and get coding.

[00: 10: 18. 00] Interviewer: So how did you guys feel about that, because I know it was introduced to you halfway during a class?

[00: 10: 45. 19] A: Well for me , I wasn't exactly sure from what we were learning what I should apply. So the hardest part from that was figuring out how I was going to solve it. - but that's just normal. So it wasn't too bad but we had that class time. . . and we had pretty good professors.

[00: 10: 47. 19] N: Yaaa. . and to be honest we weren't completely new to programming when we started so we already had some kind of idea of programming so even though it said like create an if statement you already knew how to do that. . . but one thing I really liked - I'm sure its meant to be like this - but I really liked that you could keep trying and trying and trying. It's not like some other sites - where you're done. You can keep trying and trying. But sometimes there'd be problems I just didn't know how to do and there was no hint or suggestions. . . which I feel like sometimes I just need like one clue and then I got the rest. But if you didn't have that clue, and then you Google it unfortunately the answer's right there. And then you put that in and like so now what? What did I learn?

[00: 11: 43. 03] Interviewer: So once you finish the exercise, do you ever go back and re-try the question, because you now know how to do it?

[00: 11: 55. 18] N: Ya, I retry it, and mostly coding can be done differently so I - say this was a question, I didn't know and I Googled and I put the answer in and I got it right. Now that I know how tot do it, I would just try to do it a different way. . . But still it was kind of futile because once you know how to do it one way, you're like why would you do it another way?

[00: 12: 15. 16] L: Also, I know I'm probably the least efficient coder ever. You could do it in 3 lines and I'll take 30 you know? So maybe if there was like here - you did it and here's the right answer - but here's a more efficient way or maybe you can try to pare down your code a little bit or. . you know. .

[00: 12: 30. 00] N: Ya - give suggestions after you do it. . .

[00: 12: 35. 19] Interviewer: So give suggestions while you're doing it ? Or you turn it in and you're right or wrong and then it gives you more information?

[00: 12: 41. 03] L: Mmmhmm. . . or it can just say ok you used 30 lines but maybe the minimum ever created on this piece of code or question is 3 lines - so maybe try and beat that. . . or. .

[00: 12: 55. 02] N: Oh and another thing - this is like really simple and just a plus but like sometimes you have IDE's that are

colour-coded, like var and private are all one colour, but then your actual code is in like a different colour. . My eyes have been conditioned to seeing that. CodingBat is all black - and there is no automatic indentation and you have that in EVERY other IDE! So it's like space space space. .

[00: 13: 26. 18] Interviewer: Does it grade you for indentation?

[00: 13: 30. 16] N: Uh - no. But they grade you for how nicely you can read it and readability is all about format. So like indentation, its pretty much there - it's basically grading you on it without telling you it's grading you on it.

[00: 13: 42. 18] A: I'm conditioned to not really understand what I'm writing unless it's formatted correctly.

[00: 13: 44. 27] N: You couldn't even tab! That was the worst. It's literally like one, two, three, four space. . . and then enter ok now bracket, ok now enter again, ok now space again. . . .

[laughing]

[00: 13: 57. 27] N: So it just takes away from the time that you're actually coding.

[00: 14: 01. 25] Interviewer: Ya - I understand that. . .

[00: 14: 05. 10] N: So for your drill and practice - PLEASE indent!

[00: 14: 05. 10] Interviewer: Haha - ya I'll work on that - thanks.

[00: 14: 11. 18] Interviewer: So I know with CodingBat and with most other drill and practice, sometimes they'll have things that tell you how your performance is doing or give you how you're doing at the end. Since you guys already started talking about hints, we'll just mosey on into talking about hints and feedback. Did you guys use any of the stuff that they provided?

[00: 14: 37. 07] N: I for one, if there is hints and suggestions and feedback, I'm not sure what you're talking about

[00: 14: 41. 16] A: All I remember is that they would tell us, this is what the output should be - this is what your output was, this is wrong or right.

[00: 14: 48. 11] N: YA - so I don't know there was much feedback. One that's not a very good thing - or two there is and it's not easy to find.

[00: 14: 57. 10] L: Well on some questions, I know there was hint or here's example code or something. . but it was only like the first 3 or something.

[00: 15: 04. 12] N: I feel like there must have been something that gave me the idea of hints, but it wasn't. . .

[00: 15: 14. 26] L: I know in if statements when I was first starting out, you'd do if, parenthesis this equal equal this or, you know? And then in the hint or here's the solution - it was like if sleeping you know? it wouldn't say if is sleeping or if sleeping equals this, and I didn't understand that. . .

[00: 15: 37. 11] N: Oh that if sleeping is the same as. . .

[00: 15: 37. 11] L: Ya

[00: 15: 37. 11] A: So basically the question

[00: 15: 42. 14] L: Or just an explanation of why this is equal to what I put or why. . if that makes any sense at all - like different ways to write the same piece of code. . .

[00: 15: 50. 25] Interviewer: Ya. . I'm going to backtrack a little bit- we're going to come back to that.



[00: 15: 53. 09] Interviewer: So you guys touched on it a little bit, and I'm going to talk a little more about process as you guys do your CodingBat exercise. . . at what point. . . walk me through your process. So you get a question, and you have to go in and solve it. At what point do you start looking for feedback? Is it if you don't know something? Or do you just start coding and say I'll figure it out later. . .

[00: 16: 23. 27] A: So. . my process is I literally have - if I don't understand the question then I don't know how to start. But if I do understand the question, I'll just code it, as I understand it and then once I submit it and then if I get it wrong or right. So I don't look for feedback assuming I understand until after. . . - but that's just me.

[00: 16: 44. 25] N: Ya - that's also me. I'm going to give it a shot first. If I understand the problem and I can start it that's what I want - and then there are like times when I don't understand it - and at that point I feel like if you just give me like - show me where the line is, I'm sure I can cross it. so as long as the question is understandable I always want to try it first, cuz I actually like to find out things and do them myself.

[00: 17: 10. 01] Interviewer: So then I'm going to follow with your example. . . you type some stuff out - for example if something equals something else do this. . and then typically you would hit submit. since as you mentioned you guys enjoy the unlimited submissions - so you can just keep going - and it gives you some sort of feedback or it essentially tells you, you were supposed to get fifty out of fifty - this is just twenty five. . . What is your first response? What do you typically do when you first get stuck?

[00: 17: 41. 06] A: Like when it first says we're wrong?

[00: 17: 41. 06] N: Ok thanks - now how?

[00: 17: 44. 19] A: I go what did. .

[00: 17: 44. 19] N: . . I do. .

[00: 17: 44. 19] L: . . . wrong?

[00: 17: 52. 05] N: Well some other IDEs they say - well line 35 that's where you have your error. I mean you don't need to have that for a drill and practice, but just where you're getting one wrong. So I know where to focus so I don't try fixing something I already have right. Just because I'm like oh I did something wrong - maybe its this part. . . .

[00: 18: 07. 02] Interviewer: So if it gives you something ad it says 'Ok you're wrong'. . what do you do? Do you try to figure it out or do you just hammer away at the code until you can figure out what's wrong, or

[00: 18: 14. 07] N: I hammer away - I mean I figure it out by hammering away at the code.

[00: 18: 19. 14] A: I go through the code and do it myself.

[00: 18: 25. 27] L: Yaaaa. . . .

[00: 18: 25. 27] N: You know what would be helpful? - If you coded something and it's wrong, . . Oh wait they do that - never mind. Cuz they give you like your code gave you this output but its not it. Sometimes when I know what the answers are supposed to be versus what answers I'm getting I know how to tweak it.

[00: 18: 43. 10] A: Because you didn't quite understand the problem

[00: 18: 48. 24] Interviewer: So y'all never just go to Google. . .

[00: 18: 48. 24] N: Oh no no truth - I totally go. but I've already tried for like - I'm at this for over an hour. I hate Google - that is my last response.

[00: 18: 57. 18] A: And the problem with CodingBat too is every single question on CodingBat. . .

[00: 19: 00. 01] N: . . . is on Google!

[00: 19: 03. 26] N: I mean really that's not a real problem - that's kind of a good thing - because in the end it's my last resort. Like, I don't like using Google - so I'm just like I'm going to figure it out. I'm like why can't I get this? There's somebody out there who knows how to do it -they've doe it, and people are getting this right! I mean it's homework - other students are getting this right - I can get it right!

[00: 19: 22. 01] Interviewer: How do you guys feel bout that?

[00: 19: 22. 27] L: Ummm I never use Google - I don't think. Like I would just sit there for days looking at it - being frustrated

[00: 19: 31. 04] N: Oh I can't do days. . -I use Google - I turn to Google.

[00: 19: 37. 04] A: No - I don't like going to Google either. Because one there's a lot of things that I'm like ok - you're giving me too much information - this is actually going to take longer to ask Google than figure it out myself. and then if I really can't figure it out - I do Google.

[00: 20: 06. 14] Interviewer: No that totally fine - I go to Google too.

[00: 20: 30. 15] N: I really hope I get plausible deniability for this hour. .

[00: 20: 30. 15] Interviewer: Everything in here is completely anonymous - I'll transcribe the recording and then get rid of it - everything will be completely anonymous by the time it makes it into my paper.

[00: 20: 23. 23] N: Unless it does a lot of good and earns you a ton of money in the future- then I'll happily give out my name.

[00: 20: 33. 10] Interviewer: Why thank you for that. . .

[00: 20: 33. 10] Interviewer: So you said Google is your last resort. So for example you get a question - you look at it and you're like well maybe I know how to do it - maybe I don't do you submit whatever you have and hit Enter? Even if you know it's wrong?

[00: 20: 46. 01] N: YES - but CodingBat it hard. .

[00: 20: 54. 22] Interviewer: Well in this type of system in general - even if it's not CodingBat - do you do that though?

[00: 20: 59. 26] N: Yes - just last homework in 2505 - that's exactly what I did. You have like 2 methods to write - one of them wasn't working one of them was. I just made it so that the second one was the same. The second one was kind of based on the first one - so I just kind of made it so that all the second one was just going to be the answer zero. And then I figured out what was wrong with my first one by turning it in - and seeing the results of that.

[00: 21: 24. 08] Interviewer: So you took the results it gave you and then put it back in there. . .

[00: 21: 27. 08] Interviewer: How about you guys?

[00: 21: 28. 25] L: Just like knowing the output -because like just looking at a piece of code - sometimes it's hard to figure out what it does. If your just learning or you're me. But just having it put inputs in and getting outputs - regardless of whether they're right

or wrong or. . . or if they're even the right type. Just so you have something. . . .

[00: 21: 49. 21] A: Ya I like web-cat. Cuz Web-Cat will give you three hints and tell you this is where you're kind of going wrong.

[00: 21: 57. 26] N: Absolutely. I know a lot of people dislike Web-Cat but I liked it.

[00: 22: 00. 12] A: I loved Web-Cat!

[00: 22: 04. 10] N: THAT you can put in your paper.

. . . .

[00: 22: 34. 20] L: and I think there are actually resources on CodingBat that actually tell you 'oh! this is a for loop'. And I never discovered that until after I was done with CodingBat.

[00: 22: 39. 11] N: Oh really? I didn't know that.

[00: 22: 39. 11] A: One thing that can also be helpful is if you submitted it so many times - it could be like - well in case you don't know yet, this would be the direction you want to go in. . . so you would want to write in that. .

[00: 22: 51. 18] N: YA - if you're. . if you turn it in twenty times and all of a sudden you're going backwards twenty five times. . . and you're going back and changing the wrong stuff - it's like please signal me so I'm not wasting time. Because like she said - Google literally has the whole answer - so if you put that I already know how to do it now. . . Ok so copy-paste. . what am I getting out of it you know?

[00: 23: 16. 12] Interviewer: So you're saying you'll submit thing seven if they're wrong - so you can receive feedback to keep going. How long do you let that go on for?

[00: 23: 25. 04] A: I do not go above twenty-five submissions.

[00: 23: 26. 26] N: I'm like really stubborn

[00: 23: 27. 29] L: I've gone fifty plus. . .

[00: 23: 40. 04] N: I'm just like- I really like to know that I can do it. . so I'll let it go for. . I don't do it by submissions but I'll tell myself - no more than 2 hours - but I won't - say it's been 25 minutes, I can't just Google it - I just can't. It's not in my blood to be able to do that right now.

[00: 23: 56. 23] Interviewer: And that's ok - everyone's different.

[00: 24: 03. 17] A: If it takes me that long then. . .

[00: 24: 06. 06] Interviewer: So you get frustrated with the process - I'm going to refer to CodingBat since I feel like that's a drill-and-practice y'all are familiar with. In class - you had homework and you had to use it to do it. Typically - with coding exercises right?

[00: 24: 21. 08] N: Ya - it was all with coding exercises.

[00: 24: 22. 15] Interviewer: So as you go through this process of submitted the answer wrong - to get feedback until it's all right - do you find that helpful?

[00: 24: 34. 28] A: SO the problem with CodingBat is it only gave you the input and output - so you could figure out what you're output was but that didn't really help you - figure out what was right - except if you changed little things and then submitted it over and over again. . .

[00: 24: 49. 22] Interviewer: So at what point during your submission process do you think - it would be helpful to start receiving hints? And to continue to receive them - talk to me a little bit about that. . .

[00: 25: 08. 03] L: I know I'm really stubborn and I don't want you to give me a hint unless I want it so. . .

[00: 25: 13. 04] Interviewer: So you want to be able to ask for a hint?

[00: 25: 14. 22] L: That or like say - 'A hint is available. Here click on this. . . '

[00: 25: 16. 24] N: Ya - that'd be better.

[00: 25: 19. 11] L: Show me!

[00: 25: 19. 11] Interviewer: Interesting - ok.

[00: 25: 22. 02] N: I think that's the best. I was gonna say something similar. I was gonna say I think somebody will only turn in their code after working on it and feeling like something of it works. So I feel like when you do that maybe if you wanted to do a different way other than asking. . say 'ok there's been like six submissions. . like I can see that you're trying - but you're failing. '

[00: 25: 43. 22] L: And sometimes I know that my code is wrong and it's not something in the output - but I'll just keep messing around just to explore - 'Oh what does this do?' Just as a tangent - not even part of the problem. So its like 'Oh you submitted 20 times - here's a hint. . . ' I'm like I wasn't even working on the problem - I was just messing around. . . .

[00: 26: 00. 01] N: And I do think it all relates to how frustrated you are. . . which does go back tot he formatting thing. That does make you frustrated quicker - cuz you're like in the middle of trying to code and you're like - shoot I can't read that.

[00: 26: 14. 02] A: I meann. . I'll do that if I don't understand the problem - or like if I'm looking a the code and I really have no clue why I'm getting it wrong. But generally I'll have some idea of what the question is asking. so generally I just go through my code and go through my logic and find it through there.

[00: 26: 36. 12] Interviewer: SO you'd rather , as you go through, submit something , then get a hint or ask for a hint.

[00: 26: 43. 10] N: I think ask for the hint is the best.

[00: 26: 43. 10] A: Well I think you need to submit so many times and THEN to be given a hint. . . . But then you can ask for one. Does that make sense?

[00: 26: 51. 10] Interviewer: Ya totally. . .

[00: 26: 51. 10] N: That's the best actually since that makes perfect sense - since it's a combination of the two.

[00: 26: 58. 04] L: Because then kids a actually trying - at least they're forced to try to learn. But honestly there are some questions. . . where I just have no clue where to start. And it's like what data structure do I even need to use.

[00: 27: 09. 24] N: In that case - you just go to a TA.

[00: 27: 11. 24] Interviewer: Well so- theoretically if you were to use a drill-and-practice system right - the whole point is that , while it's great you can use it in class - but what if you were to use CodingBat and you didn't belong to a class. Say you're trying to learn Java or Python. . .

[00: 27: 27. 28] A: Oh so the whole point would be to learn it without. . .

[00: 27: 30. 07] Interviewer: I mean ideally if you were to use CodingBat as just a resource. .

[00: 27: 34. 23] N: If there was no regular human - I would give up after CodingBat.

[00: 27: 37. 22] Interviewer: So I want you to think about in that way as well. . .

[00: 27: 42. 00] N: I just though it was just part of class. . . that brings up new issues. .

[00: 27: 47. 01] N: Like if CodingBat was the way I was learning Java - Mmm mm. The interface is terrible.

[00: 27: 47. 01] Interviewer: SO while I'm focusing on hints and feedback is to think about how can I engage you in this process of learning a language while providing you with the maximum information.

[00: 28: 28. 12] A: I feel like it's hard - programming the computer - or the system to be like oh you need these hints. . But it doesn't really know. . . I feel like that would be hard to do. I feel like the easiest thing would be like - we solved it this way, so this would be the easiest way for you to understand it and solve it at this level of where you are in the programming language. So like for this question - you're gonna want to do an array - or something like that. . or a Linked List. . or whatever. and that will be the easiest way to solve it.

[00: 29: 00. 24] N: And you're saying you ask for that or they just tell you that in the beginning?

[00: 29: 06. 20] A: No no no. . you would ask or that.

[00: 29: 06. 20] N: Ok well. . .

[00: 29: 11. 23] A: Well if you've never coded before. .

[00: 29: 11. 23] N: That's true too -

[00: 29: 15. 17] A: How are you going to know how to start?

[00: 29: 19. 27] N: You know how I just said ask a Ta? I realized for like every assignment - fifty. . sixty of them have the same questions. . .

[00: 29: 29. 01] A: How about an 'Ask a TA' button and just like have hints - but have it as like - this is like the general idea.

[00: 29: 38. 00] N: Ya I was going to say

[00: 29: 38. 25] L: Like you wouldn't actually ask a person. . .

[00: 29: 47. 02] N: Ya - there's probably on each assignment the same question and the same problems that most people run into, and just have a general questions and answer about the whatever exercise and besides question and answer about the question and most problems that people run into. . . like maybe not the most problems people run into - so the person working on it -already knows I need to watch out for this, this and this.

[00: 30: 17. 03] Interviewer: Ok - so related tot his - you were talking about earlier - when you went through, when you first started using the system you literally didn't understand. . . talk to me a little bit about that. . . Especially because you didn't have TAs. . .

[00: 30: 25. 07] L: The way our class was set up - there was an intro to programming and then the AP class. And I didn't take the first class but I really wanted to take the CS class so the teacher was like I guess I'll let you do it but you have to do extra work over the summer. So he just gave me a book - the blue pelican book - and he was like ya - you should probably do CodingBat. So I was like ok. . . so between the two of those I kind of figured it out myself - but I really wanted to do CS and so I was really motivated and I

just really wanted to do it and learn it and get it done. And so I mean it wasn't that difficult for me because I feel like my brain is programmed I guess to do Computer Science. . . and it just thinks like that.

[00: 31: 09. 20] N: Mine does not.

[00: 31: 09. 20] L: But I know that my roommate- she struggles with like Matlab -and it doesn't make sense. But for me Java it makes sense.

[00: 31: 35. 04] Interviewer: Ok so this is the point right- talking about engagement. AS you type something into an interface, it's never the same as talking to a human. And thinking about decreasing that space.

[00: 31: 46. 03] Interviewer: So you talked about making a list , and talking to a TA - so that brings me to my next question. How do you guys feel about - if you got a question right. . adding a hint into the system. So this way someone else would get that hint.

[00: 31: 58. 16] A: Ohhhh that would be interesting. Like adding - kind of like a wiki page - but adding to that 'Ask a TA'.

[00: 32: 03. 04] Interviewer: Right so when other people get hints - thy would be getting hits that you turned in - after completing the exercise.

[00: 32: 10. 16] N: That would be cool

[00: 32: 10. 16] A: That would be cool- that actually increases self-efficacy - because it proves that other people have the same problem you do.

[00: 32: 26. 26] Interviewer: Ya - this is great. . .

[00: 32: 26. 26] L: Are you gonna have like videos or something like. . . here's something. . if you've never even touched a computer before here's how you make. . .

[00: 32: 35. 09] Interviewer: No. . . I'm probably not going to focus on that. . .

[00: 32: 40. 07] A: You could have links to websites that teach you too. .

[00: 32: 40. 07] N: Ya I use - CodeAcademy to learn stuff.

[00: 32: 45. 12] L: Ya - the resources of CodingBat it's just like one webpage - here's how an if statement works. It's not like this whole descriptive stuff behind an if statement. But it's like here's how you set it up.

[00: 32: 56. 06] Interviewer: So I'm going to run with that and jump around a little and we'll come back. Do you're talking about the links that say 'here's how you do an if statement. . . 'Do you feel like you had to go back and read those things in order to come back and do the exercise or like working through the exercise helped - and showed you how to build on that. . . .

[00: 33: 16. 04] L: Somehow I just figured it out. And then I would back and read that - and then I was like Oh that made so much more sense. And here's some more stuff to build off of it. But I could still do the problem without looking at that.

[00: 33: 30. 00] A: I feel like in the beginning I did. I'd have to look back and remember what the code was for it. But after I used it enough - and after I had enough practice with it - it was fine.

[00: 33: 41. 21] L: Oh also I know the error whatever in CodingBat is really helpful. I would do the String Overflow or whatever - you know where you're going through a string and I'd always go off the end every single time. Or I know if you miss a bracket - I know

you're starting off - those brackets are just like everywhere. And it's hard to know where they end and stuff - so if you have like a 'Oh you're missing a bracket' or 'Oh you need a bracket' or just like more specific errors. . . .

[00: 34: 09. 03] Interviewer: As you turned in your stuff?

[00: 34: 09. 13] L: Ya - cuz that's like the most frustrating part. Cuz I know the code works , it s just like. .

[00: 34: 16. 08] N: Syntax?

[00: 34: 16. 08] L: YA - like a bracket syntax or . . . .

[00: 34: 22. 23] N: So like after submissions?

[00: 34: 24. 13] L: I mean whenever. . .

[00: 34: 25. 08] A: Ya - cuz you would really be able to do it as you code would ?

[00: 34: 30. 04] L: I don't know if it only looks at like the brackets and things when it compiles or something. . . . but sometimes it doesn't even run if you have . . . .

[00: 34: 39. 02] N: So you said your target audience was for students beginning in CS. .

[00: 34: 43. 21] Interviewer: YA - that's where I went. I mean I'm running studies with some people that have done CS for years. It's all about the engagement with this thing I'm building. I mean you don't have to be in a CS class to use CodingBat - you're just trying to go out there. I mean if you're in my class - I'm making you use CodingBat to turn in homework. But if I'm someone in English and I want to learn to code - I 'm not going to start taking Computer Science classes. . .

[00: 35: 19. 06] A: So it works for everyone. .

[00: 35: 21. 14] Interviewer: That's the goal. . . and obviously if you're using it in a class its a little more specific, since its targeted towards your class and syllabus. But even in general you should still be able to use the system. So even if you're new to coding you should be able to understand it - and be able to engage with it and use it to learn something.

[00: 36: 24. 27] N: SO then in that situation - for that kind of audience - what would also be helpful. . . CodingBat right now just has like - here's an actual coding problem - go code. And I feel like for new people - say you have a thing for this is how a while loop is. So now just use a small while loop to figure it out.

[00: 36: 49. 26] Interviewer: Exactly which brings me to my next question. So as you've worked with CodingBat you know it has things in groups. . . did you guys use that in CodingBat? Did you find it helpful?

[00: 37: 10. 24] N: Well I wasn't really new to coding. .

[00: 37: 10. 24] A: . . and I only did the assignments. . .

[00: 37: 13. 18] Interviewer: Did y'all ever go wandering through CodingBat?

[00: 37: 13. 18] N: I did before class. . .

[00: 37: 20. 12] L: I ended up doing - like there are different sections and there are 20 problems in each section. . . we had to do all of them so I have all the stars. - but I felt like content wise it was nice to be able to practice - for example arrays. We learnt about arrays - so now lets go practice just arrays. But then a lot of the problems were really similar or like they were practicing the same exact thing. I just demonstrated I knew how to do that 10 times. . now I have to do it again? I know that I didn't really

learn the nuances of Arrays or you know the little specific tiny details that actually make a difference - just doing the same problem over and over again.

[00: 38: 06. 24] N: So you would want problems that use different parts?

[00: 38: 10. 28] L: Or harder problems - or ones with an array of difficulty.

[00: 38: 20. 07] N: I know if I was just starting - like I know sometimes we have programs and assignments where a part of the code would be to copy over an array or like . . so I would like a small exercise. . ok show me how to copy an array, just like for that one singular part - cuz those are like the main things. This is how you do this in a Linked List. . this is how you do this in an Array - cuz one of the biggest concepts that come up are what are the difference between a LinkedList and an Array.

[00: 39: 01. 19] L: And like now I know I'm more experienced in coding and I've never had a technical interview and they say they ask questions like the CodingBat ones. So if there was just like a 'Give me a problem. . or like a miscellaneous'. I think that's be cool - just to keep current.

A question that they would ask you in an interview?

[00: 39: 25. 25] L: Or just like a harder question

[00: 39: 29. 07] A: Or just for each section. . the first section would be like Arrays. . . .

[00: 39: 41. 10] L: But I mean not divided just in sections - like you could get random questions - here's the question now solve it. . .

[. . . ]

[00: 40: 13. 12] Interviewer: Great great - so I'm going to back to the whole hints thing. To reiterate - you guys like to receive feedback - you want it to engage you. . what about discussion? Like forums. . things like that. Do you guys use them in your class - do you find them helpful?

[00: 40: 42. 12] A: I used them in 2114 - and I don't use them now - but that's mostly cuz the forum system is different.

[00: 40: 51. 11] N: I think the idea of forums is nice - to be able to talk - but it just gets like convoluted. think about a project assignment and a hundred people writing on it and asking different questions - and they decide to say different things on the same thread.

[00: 41: 13. 29] A: And I feel like the same questions get asked over and over again.

[00: 41: 19. 01] A: Another thing I realized about forums is that they'll ask a question but they won't include the whole error message or like there are certain things like if I don't see your entire block of code. . .

[00: 41: 29. 06] N: . . . I won't understand what you're talking about. . . . So another thing is like if you did do a forum be like ok - so this is forum etiquette. Like with titles and what topics you're discussing. . . . I think the idea is great but the execution is just so bad. If you were to do it - I would literally break it out into different categories - cuz people will talk about one thing in one place.

[00: 42: 16. 22] Interviewer: What about potential discussion forums for each question. So you're talking about there were groups



of questions from 1-10 and you have hints you can ask for - but what if you had a discussion for each question?

[00: 42: 37. 27] A: I feel like that could be helpful. . .

[00: 42: 43. 05] N: that would help if the question weren't like in a-g parts.

[00: 42: 54. 16] A: I mean it may work with smaller questions.

[00: 43: 00. 17] L: And I know on Stack Overflow there are people who know how computers work. And if you just ask how do you declare a variable. . . and they're like "Well technically the circuit board. . ." and it's just like I don't need to know that you know? And then these technical people get in these entry-level forums and it's like don't - keep it out of this area.

[00: 43: 20. 07] A: Well I feel like the only people that would be using this would be more entry level people

[00: 43: 24. 26] L: Well if there was a mediated forum where people could send in questions or hints, like you said, and then you say ok here's a common question. You or someone with your program writes a response that you think incorporates everything into it - instead of. . .

[00: 43: 42. 00] Interviewer: So for example like you talked about "squeeze integer". . . if there was discussion forum in the bottom. . Would that be helpful to you? Would that be too much?

[00: 43: 52. 27] A: I meant the thing is if you don't want to look at it you don't have to.

[00: 44: 03. 06] L: I feel like an FAQ - frequently asked question - would be nice. Just like a brief blurb - a paragraph that incorporates everything you need to know, here's your question - how do you declare a variable. Ok here's how you do it. Not like this whole discussion where people get like. . .

[00: 44: 18. 15] N: Or another thing about forums - you know how each thread can go like 200 or 300 - if there's one like you were reading it and you find one answer, just select it - that's it. Now whoever clicks on that thread - that's what they see.

[00: 44: 35. 01] A: I think there's a way on Yahoo answers where the person who asks the question chooses the right answer. . .

[00: 44: 39. 12] Interviewer: Do you guys use forums in your classes?

[00: 44: 43. 17] N: To be honest - this semester - no. 1114 I kinda looked at it when I really needed help - that's generally not my first go to.

[00: 45: 04. 16] Interviewer: Do think it would be a helpful source if you didn't have a TA?

[00: 45: 03. 18] N: the thought of not having a TA makes me really scared.

[00: 45: 03. 18] Interviewer: That's what I'm trying to gauge a little bit. What if there was just no TA for the class. . . do you think forums would be helpful?

[00: 45: 18. 00] A: At that point ya I guess. . .

[00: 45: 18. 00] L: I know coding practice websites that actually have like here's a question and then there's a forum chat for each question. . .

[00: 45: 34. 15] Interviewer: So I haven't personally used one but I know what you're talking about. . have you used one?

[00: 45: 34. 15] L: I used it once but when I got on the forum - I was like I had a question but I don't even remember it right now. It was just all over the place.

[00: 45: 41. 09] L: I feel like it's a good idea if it was filtered.

. . .

[00: 45: 44. 27] Interviewer: I'm just curious. . .

[00: 45: 51. 11] N: In essence a place where you can ask questions and get answers - I like the idea.

[00: 45: 58. 01] L: But it's also hard - since if I have 25 questions I only have one. . . maybe a Search and Find or something. . .

[00: 46: 03. 03] A: I feel like if you don't have a TA. . . .

[00: 46: 12. 11] Interviewer: So how do you feel about that in relation to a discussion forum - would you still want hints?

[00: 46: 16. 09] N: If I had to choose between the two - definitely hints.

[00: 46: 20. 28] A: I would rather have official feedback I knew was correct versus other people that - I mean they're probably along the same path I am.

[00: 46: 33. 27] N: And some people do have a tendency to give the answer or give something that's not the answer at all. Or just give general advice so like hints would literally point you in the right direction. That's all you need.

[00: 46: 45. 20] Interviewer: So it wouldn't bother you to have both. . .

[00: 46: 58. 10] A: Both

[00: 46: 58. 10] L: Ya. .

[00: 46: 58. 10] Interviewer: Ok great. . . so I just have a few closing questions and then we're done.

[00: 46: 58. 10] Interviewer: So do you guys think you would have used CodingBat in general or any kind of drill-and-practice to learn?

[00: 47: 14. 29] N: TO be honest - yes for me. . .

[00: 47: 14. 29] A: If I was told it was really helpful and that it would help me learn better than say the textbook or something I would do it.

[00: 47: 20. 20] N: I'm the kind of person who is kind of slower than the rest - so I kind of need the extra help - so ya I would.

[00: 47: 28. 25] Interviewer: Did y'all keep using it at all after you were done with class?

[00: 47: 31. 08] A: No

[00: 47: 31. 08] N: No but that's because this semester we're doing Linux so it's not CodingBat related.

[00: 47: 42. 02] A: this is me personally - I would never have looked at CodingBat even like during the class if it was not required.

[00: 47: 48. 20] N: I might have. . .

[00: 47: 48. 20] L: I'm trying to learn C right now and I wish there was a CodingBat for C. I know there's probably something out there.

. . .

[00: 47: 59. 16] Interviewer: Have you tried looking for other drill-and-practice sites for C/

[00: 47: 59. 16] L: I have but I haven't found something I like yet.

.

[00: 48: 05. 01] N: VirtualAcademy is really good. .

[00: 48: 05. 01] L: Ok. . .  
[00: 48: 05. 01] L: I know you guys hate the GUI of CodingBat - and you just think it's ugly and awful but I love it.  
[00: 48: 10. 18] N: Really?  
[00: 48: 10. 18] L: It is like no nonsense - it's just like - code!  
[00: 48: 14. 17] N: Ok I agree with that - I don't need anything but if you could just tab for me. . if you give me tab I'll let go of all my other complaints.  
[00: 48: 30. 24] N: You know when you're coding the biggest thing in the life about syntax and format is the tab button. I feel like they spent time working it out.  
[00: 49: 02. 26] N: And if the code isn't frustrating enough - now I have to copy and paste white spaces.  
[. . ]  
[00: 50: 15. 10] Interviewer: Well ladies thank you so much - I really appreciate your time for working on this.

## ***Appendix E: Round 1 – Focus Group 3 - Transcript***

[00: 00: 30. 23] Interviewer: So - I will go around,. . . As you note all 3 of y'all have consent forms - go ahead read it, sign it. I'll read a little something after you're done signing it. . Um and then we'll go from there. You need to fill out all the other forms too.

[00: 01: 24. 29] Z: No the form's good - I'll pay attention in the study I'll just goof off beforehand.

[00: 01: 23. 28] Interviewer: Just go ahead and put a number in place for the date.

[Laughing]

[00: 01: 44. 02] Interviewer: So is you're game still running?

[00: 01: 43. 17] Z: Nope I finished up its just hearthstone, card game, people drag and drop. . . Just doing one of those. .

[00: 02: 23. 14] Interviewer: Thank for coming guys. .

[00: 02: 30. 07] Z: Well I'm totally gonna get \*\*\*\*\* hours so this can take as long as it needs. .

[00: 02: 30. 07] Interviewer: Well I totally didn't know you did \*\*\*\*\* stuff. . . We can chat about that later.

[00: 02: 51. 16] Interviewer: Ok, so we can get started. . I'm Priyanka, I'm in grad school-I'm getting my Masters and so this whole focus group will help with my research hopefully, where I'll be graduating sometime this summer - so cool! SO if you guys want to go around and introduce yourself, and we will. . .

[00: 03: 08. 14] Z: WE know each other, really well. . .

[00: 03: 08. 14] Interviewer: Well you actually have to do it - I should also mention that I'm audio recording, so just ignore it it'll just sit there, and part of that is I have to have transcriptions of the focus group. SO you actually have to go around and introduce yourself, so I can keep track of everyone.

[00: 03: 25. 22] Z: Hi I'm Z, I'm a senior in CS

[00: 03: 31. 16] C: Hi I'm C, I'm a sophomore. .

[00: 03: 36. 14] Z: In CS

[00: 03: 37. 00] C: In CS. . . .

[00: 03: 37. 00] Interviewer: Yaw that's fine I really just need names. . .

[00: 03: 37. 00] D: Hi I'm D,

[00: 03: 41. 12] Z: A junior in CS

[00: 03: 41. 12] D: A sophomore

[00: 03: 41. 12] Z: A sophomore in CS. . .

[00: 03: 51. 03] Interviewer: Sorry that took me a second - I was like I was definitely your TA how are you a junior. . .

[00: 03: 49. 00] D: YA no. .

[00: 03: 49. 00] Interviewer: So, um we're gonna talk a bunch of different stuff. I'm going to refer to a couple of things and I'm gonna switch back and forth between CodeWorkout and drill-and-practice, those are essentially I'll be referring to the same thing. Um the whole point of the focus group. . And I'll just read from the script. . . The point of the focus groups to gather a variety of different opinions, and I wasn't you guys to be fine with disagreeing, and agreeing to disagree, cuz I value that and I think that's important at least for what I'm trying to do. So drill-and-practice systems are typically online tools that help with learning

a new concept or material, like for classes at Tech they use CodingBat and if you're into graphic design stuff they use Lynda.com there's w3schools, there's a bunch of stuff. Um, so my group is working on developing a slightly different version similar to CodingBat and we're calling it CodeWorkout and this first part of the focus group is really to talk to you guys about. . . All of you have used CodingBat in this group right? Um. . . Yes the goal is not bash CodingBat but its to talk a little bit about your experiences, and Ill ask you questions to sort of guide the conversation in a specific way. . But for the most part I'm gonna kind of let you guys run with it. . . Ok?

[00: 05: 01. 05] Interviewer: Excellent - ok so, um we'll start with. . How long ago has it been since y'all have used CodingBat?

[00: 05: 10. 03] Z: 2 years. .

[00: 05: 24. 16] D: Umm. . We used it over the summer for our own purposes. .

[00: 05: 26. 12] Interviewer: Ok so relatively recently. . So talk to me about your process of completing an exercise in CodingBat. .

[00: 05: 36. 14] Z: Google the question, paste the code you find, hit compile. . .

[00: 05: 42. 06] Interviewer: Ok. . So that's your automatic process? You just go into CodingBat and Google your answer. . .

[00: 05: 44. 24] Z: Yes. . .

[00: 05: 44. 24] Interviewer: Did you try to use it in the beginning - he's laughing in the corner. . That's ok. . . Um. . Has anyone done it without just Googling the question? I mean that's the whole point I'm interested in the process, because my research is all about trying to add engagement in a drill and practice educational tool, um and so as I talk to you about how you complete an exercise, and we'll talk about that, and how easy or difficult or however it was. . And we'll start with CodingBat and we'll branch off a little. . So yeah. . Googling an answer. . 1 way. .

[00: 06: 15. 10] C: I find that most of the problems are extremely similar, so they're are going to like be a set one hardness and then a set two hardness. And honestly if you copy past the code all throughout the first one and all throughout the second one, its literally the exact same like framework and you just have to fill in different variable names.

[00: 06: 38. 01] Interviewer: So you guys started using this for class right? That's why you started using CodingBat?

[00: 06: 38. 01] C: Mmmhmm

[00: 06: 38. 01] Z: Yup

[00: 06: 42. 27] Interviewer: Um. . . So you would start it of. . You'd get a couple of questions. . You're not in charge of writing the questions. . So the question shows up and you're literal process is - do you guys hack away at it, do you. . Talk to me a little bit more about your actual process of completing an exercise using CodingBat - and good, bad. .

[00: 07: 01. 16] D: So I would start it, I would try and solve it, and then since I usually wouldn't start until the day of a deadline for an assignment, I would try my hardest, and if I couldn't, if it was a really hard one and I couldn't get it, then I would Google it, of course. And if. . But then when I was using

it in the summer, for my own purposes of like studying for um, possible interview questions. . . Then I would go through the process of actually solving it on my own. . . And I would avoid doing the same ones in the same set to avoid that whole them all being all similar. .

[00: 07: 41. 04] Interviewer: Ya. . And did you find the way it worked out to be helpful? Cuz I've used CodingBat once or twice other than grading things and um. . I found it interesting to use, based on feedback he gives you and things like that.

[00: 07: 56. 06] C: I really like the feedback to be honest, it um, the certain case that it showed really helped me like pinpoint the problem immediately. . Like oh I forgot about the negative integers or something along those lines. . So I would try maybe like once or twice, maybe 3 times to get it. . . If I didn't get it by the 3rd times, usually those problems are so simple, you either get it or you don't. . . So after the 3rd time you just Google something, and if not you just paste the right answer. . .

.

[00: 08: 28. 09] Z: I'm noticing a common theme

[Laughing]

[00: 08: 28. 09] Interviewer: I've noticed a theme for a while.

.

[00: 08: 28. 09] Interviewer: So, you said you go through it. . . So how long will you work at it before you. . . This is just out of curiosity now, I'm just asking now. .

[00: 08: 38. 11] C: Maximum 4. .

[00: 08: 46. 16] Z: 4 minutes

[00: 08: 46. 20] D: You people. . . I would say maximum like 40 minutes. .

[00: 08: 46. 20] Interviewer: Ok

[00: 08: 46. 20] Interviewer: And do you just um. . and based on the. . And so you said you liked the feedback that CodingBat gave you. . . So you. . . Um I'm trying to think of an example, cuz you get unlimited submissions with CodingBat right?

[00: 09: 02. 08] D: Mmmhmm. . .

[00: 09: 02. 08] Interviewer: So with the feedback, do you use the feedback to keep going at it when it's not the correct answer?

[00: 09: 02. 08] D: Mmmhmmmm

[00: 09: 15. 23] C: I would definitely agree, . I've done probably 100s and 100s of CodingBat problems cuz I also used it in high school,

[00: 09: 19. 19] Interviewer: Ok

[00: 09: 16. 29] C: So I've done most of them, but that I guess is where he process came from, like the noticing the pattern with the similar problems and whatever. And I guess learning how CodingBat formats problems and questions. . and um so that's why I only work 5 minutes max at them cuz you start to like figure out patterns in CodingBat.

[00: 09: 40. 14] Z: I didn't like , in 1114- it was really easy, like I just got them. Like in a minute or 2. . its like hey manipulate this string. . .

[00: 09: 48. 06] D: yeahh

[00: 09: 48. 06] Z: Add 4 to this array index - it was a joke, um. . but I guess in 2114 especially when it started hitting like the recursion problems like -

[00: 09: 57. 22] C: Yup. . .

[00: 09: 57. 22] Z: The descriptions weren't the best, it was like do this - and I was like what's that. . . and I would not even understand what it was asking. . Or if I did understand what it was asking I didn't fully understand it - so I would like miss a lot of what I'm actually going to do , so when I hit run it would just be like red x's all the way down. And after 3 minutes Id just be like f\*\*\* this. . . excuse me

[laughing]. . .

[00: 10: 24. 13] Z: Then I would just Google stuff. f. . but I dunno , but I get it, but I guess even with the simpler ones like C said, like the immediate feedback its like oh yeah print this - randomly selected - well not random but selected test data. This is the ones that pass this is the ones that fail - oh I forgot 0. . or oh I forgot a negative number here. . Oh I forgot these seven tests cases. . .

[00: 10: 47. 15] Interviewer: Ya - so you're saying. . did you have anything extra you wanted to add?

[00: 10: 47. 15] D: Not yet. .

[00: 10: 47. 15] Interviewer: Ya. . not yet. . um, so you're saying you liked the feedback, did you just go back and forth - at any point did you just say ok I don't understand the feedback its giving me I'm done , trying to work at it and solve it, I'm going to Google, or I'm done because I figured it out. .

[00: 11: 11. 19] Z: No. . the feedback was legit. . never was like. . I've always understood the feedback. . . like to a tee. . actually as soon as I got it I would just jimmy the code like, plus 1 , minus 1 here and there. . . especially with a loop and then see how it goes. . .

[00: 11: 25. 01] Interviewer: Ya, , ,

[00: 11: 25. 01] Z: feedback was always pretty clear

[00: 11: 29. 18] D: I mean for the recursion ones sometimes I wouldn't know why certain things were. . .

[00: 11: 34. 23] Z: Oh ya! I would definitely understand like oh these are failing, passing, these are failing - but like I expected with recursion when I was first stating recursion - like I would just mess with the code and I would be like . . I have no idea. . I either completely got it like for. . for. . the factorial recursion problems or the Fibonacci sequence . pretty simple easy to understand. . but especially when it got to like trees and other bigger, less than trees but recursion

[00: 12: 01. 07] D: Ya. .

[00: 12: 00. 21] Z: I would mess with the code a little bit and like not the test feedback but I didn't really understand recursion so I would just change everything and I have no idea why. . .

[00: 12: 12. 02] Interviewer: That's interesting. . ok

[00: 12: 15. 03] Interviewer: So you guys re talking about 2 different things right? As I'm listening to you. . . So you're saying. . you did 1114 it was easy , you're like we just went to Google cuz we couldn't figure it out. . And then you're talking about 2114 or whatever, when you're farther along. . where the

problems become a little more complex and that's hewn you sort of jimmy the code and you're more willing to work with it

[00: 12: 30. 05] Z: Fluid. . .

[00: 12: 32. 26] Z: In 1114 it was easy I would jimmy the code and work with it , and then in 2114 when I felt like I was going up against a brick wall, that's when I Googled after 4 minutes cuz I just was like nope nope absolutely not . .

[00: 12: 45. 01] Interviewer: Interesting. . so you guys. . so ya, when you felt like you hit the brick wall you already had programming experience going into that. . [00: 12: 53. 24] D: Yea. .

[00: 12: 55. 20] Z: Right. .

[00: 12: 58. 06] Interviewer: SO when you guys did 1114 or the first time you worked with CodingBat had you programmed before or was it like the first time you. .

[00: 12: 58. 25] Z: Yes - I had high school - not like AP but I had high school

[00: 13: 02. 16] D: I had no experience. . .

[00: 13: 08. 17] Interviewer: Ok - so then how was that experience using CodingBat like that? Did you find it as helpful?

[00: 13: 09. 24] Interviewer: So you knew what you were coming into when you went into it the second time right?

[00: 13: 09. 16] Z: Ya

[00: 13: 13. 29] Interviewer: So I'm talking about using it for the first time

[00: 13: 12. 27] Z: THE first time. . so the firs time - I didn't use CodingBat the first time - but we did like CS advanced CS so we already did. . . extremely similar exercises. . not on CodingBat but ones that the teacher would assign in class and then - so it was kinda like just a breeze like I felt like I was repeating what I already knew for the most part - until we got near the end. . .

[00: 13: 35. 21] Interviewer: Hmm how about you cuz you said you had never coded before and CodingBat was essentially to help you learn. .

[00: 13: 44. 09] D: Ummm yea - so when I started 1114 I was freaking out, I didn't know if I could do it, like I always felt like I was at a brick wall, like I did not know what was happening - but um I feel like by the time we actually started using CodingBat we already done enough that I got over that mental barrier in my mind over what the heck CS even is , that I was able to do it. .

[00: 14: 00. 03] Interviewer: ya. . . um. . but you're talking about now over the summer you said you guys when back and used CodingBat again to try and figure it out over. .

[00: 14: 13. 02] D: Ya - I did that. .

[00: 14: 11. 18] Interviewer: Ya that's fine - I mean that's' what it's there for to help you learn. .

[00: 14: 19. 29] Interviewer: Um. . . did you find yourself approaching the problems differently or actually doing it differently

[00: 14: 24. 05] Z: What do you mean. . .

[00: 14: 24. 05] D: I mean when I was doing for myself like. . I wouldn't Google anything - if that's your asking -



[00: 14: 33. 24] Interviewer: um. ya - that is kind of what I'm asking because um so either way you'd still get stuck, you either know how to do the stuff or you don't right. .

[00: 14: 40. 06] D: Ya. . so if I got stuck on something then I'd just be like, hope don't get interviewed on this one. .

[00: 14: 46. 05] Z: HAHAHAHAHA

[00: 14: 52. 08] D: But I would definitely spend longer trying to

[00: 14: 52. 10] Interviewer: Ya. .

[00: 14: 52. 10] D: So. .

[00: 14: 52. 10] Interviewer: SO you didn't go back to what you said about when you first started with 1114, and you had some coding experience when you started on CodingBat did you feel like you approached your questions differently? In 1114, versus trying to do it over the summer versus 2114 and as you guys progressed farther in. .

[00: 15: 17. 13] Z: What do you been by approach are you breaking out pseudo code, or like planning or like full out. . . cuz I kinda just read it and jump in back in. . there's no

[00: 15: 20. 15] Interviewer: OK - so that's-that's your process, that's what I'm trying to get at, like how, how do you approach a question - so as you go through it, how you think about a question and the way you try to work out changes as you become more experience in a language or whatever right? . . and that's what I'm getting at - do you just start it, hack away at it when it's broken and you just keep going and going and going, until you can figure out. .

[00: 15: 41. 28] Z: write 3 lines, think about it, write three lines, and think about it. .

[00: 15: 49. 24] Interviewer: And you know people tell me they do that with CodingBat because. .

[00: 15: 50. 08] Z: mmmhmmm

[00: 15: 50. 08] Interviewer: . . it gives them feedback continuously and sometimes it's helpful sometimes it's not and so my work is mainly focused on feedback so like we'll talk - well actually now about that. Which is why I was like talk me, talk me literally through your process - did you use any of the feedback that CodingBat gave you, did it give you feedback, did you find it helpful,

[00: 16: 12. 26] Z: Yeah. . I Ya. . cuz I was one of those kids - I'd get 3 lines, hit compile and be like ok alright got those cases, got those cases, got those cases, done next one. . like I would just focus on small chunks or like. . I would notice like all of the 0 cases and if the first letter was a capital or a dash or 4 spaces instead of 3 for Strings. . I would just like hit that case, hit compile make sure it worked hit another case make sure the first one didn't break, make sure I got that one the same time. . um. . but. . I think I guess the feedbacks too available. . or they should cap the [. . ] cuz as the more experienced programmer it's definitely not something you want to be doing when you start out learning - you don't wanna just use user or provide them test cases the entire way through, you wanna kinda of think about it on your own - otherwise you're not really learning anything your just kind of like guessing and hit compile.

[00: 17: 11. 09] Interviewer: You're shaking your head. - thoughts?

[00: 17: 08. 23] C: So, I would agree with that as an upper level like student, but not for when I was starting out

I[00: 17: 22. 11] Z: I prefaced it as - as an upper level student

[00: 17: 27. 11] Interviewer: . . no that important - so this essentially should work form 1114 for all the way through so. . um not as you were starting out. . continue.

[00: 17: 29. 29] C: So my sort of process was to write the whole thing - like think it all logically out , write it all out, hit compile, if it worked fabulous, move on - like didn't eve think about it ever again. . like didn't even look at the feedback - like all green check move on - but if it was like red in some cases like it was usually my whole logic was wrong or like certain cases were wrong so I would go back and look at that feedback specifically - and see what was up with that. But the number of unlimited submissions as really helpful like for me when I was starting out in high school - cuz it just meant I didn't have to worry about like losing points or anything - I could just experiment do whatever I want, do something that might not even remotely close to what I think is the right answer , and then somehow it worked - look I learned a new skill, - I learned a new function or something.

. . [00: 18: 28. 28] D: One thought that I had from when you were talking is that 1114 really tries to drive testing before you write your code.

[00: 18: 42. 03] Interviewer: Ya. . .

[00: 18: 40. 26] D: and CodingBat is the complete opposite of that

[00: 18: 39. 10] Z: Oh absolutely. . . I still don't see. . .

[00: 18: 50. 05] D: So I don't know what their goal was when using CodingBat to like - if they were really to get that goal as an actual skill for their students. . .

[00: 18: 55. 12] Interviewer: That's interesting - cuz I did not get that goal out of CodingBat either so I. . . I don't know what to say about that. . .

[00: 18: 59. 03] Z: What goal?

[00: 18: 59. 03] D: The goal of having your students be test-driven coders -

[00: 19: 04. 29] Z: Oh yea(scoffs)

[00: 19: 04. 29] Interviewer: Ya I think CodingBat is setup as a tool to teach a language , I don't think they care about testing.

. .

[00: 19: 12. 18] D: Ya. .

[00: 19: 10. 04] Z: Ya. . .

[00: 19: 10. 04] D: So I don't know - if they just stopped caring about the test for a little bit so that they could get like the language down. .

[00: 19: 23. 01] Z: I've never liked test based coding - leek comment driven is fine - you know how \*\*\*\* says it like - comment all your code before you code.

[00: 19: 26. 19] D: That's what I do

[00: 19: 26. 19] Z: Fine that acceptable. .

[00: 19: 26. 19] Interviewer: I mean that's like writing an outline for. .

[00: 19: 30. 16] Z: Ya its like writing an outline - its acceptable - you write your functions out how you think your gonna do it - you make sure you read the ore and post . . that makes sense - that's fine. .

[00: 19: 38. 07] Interviewer: so ya I mean. . ya the testing thing is a little weird. .

[00: 19: 41. 19] Interviewer: Umm. . so I know you guys said - you said you had some experience coming into CodingBat - half way at it- it uses x's and ticks right in the green? In my experience using CodingBat I've not seen tem give you a hint - so you think as you went through it would have been helpful for you guys to have hints. . or

[00: 20: 06. 23] Z: Oh absolutely if they were like hey your , its while true, that its obviously that, don't do that - like that'd be great. Cuz I've actually had a couple friends in 1114 who were like CodingBat is dying - I don' t know why and I was like its because you don't increment the counter. . .

[laughing]

[00: 20: 29. 09] Interviewer: YA that'll do that. .

[00: 20: 31. 10] C: CodingBat's so easy you don't need hints. .

[00: 20: 33. 22] Z: There are a lot of people that I

[00: 20: 31. 17] Interviewer: . . . Ok. . .

[00: 20: 31. 17] Z: I witnessed struggling in 1114 if that would've definitely highly benefited from hints. .

[laughing]

[00: 20: 41. 24] Interviewer: And when it comes to hints - when I code now , if I'm stuck I personally would like a hint. . and I've been coding for years. . so I think its not just 1114 - you used it 2 years in a row , you guys used when. . didn't know how to code. .

[00: 20: 54. 24] Z: Oh my god - if they had - they were - they need more handholding with recursion. . it was a brick wall alert

[00: 20: 59. 24] D: ya. . . .

[00: 20: 59. 24] Z: Once you get it down its fine - but like oh my god - actually its a big hurd. . It's a really big hurdle.

[00: 21: 11. 18] D: I think its really crazy how many students like when I talk to about projects - they don't understand how recursion works - I don't think any of us like fully, really understand it. . I mean. . It's a really big problem

[00: 21: 20. 29] Interviewer: . . Cuz you've done it. . .

[00: 21: 18. 19] Z: I do it now. . I understand it recursion pretty well now. . . .

[00: 21: 29. 28] D: When you ask people - like if you asked 2 different people in CS like how does recursion run on the stack they will give you different answers. .

[00: 21: 34. 17] Z: I ignore the stack - I completely ignore the stack. . I'm just like the tack doesn't exist - don't worry about it

[00: 21: 36. 12] D: I think the stack is super important. .

[00: 21: 36. 12] Interviewer: It is. . .

[00: 21: 38. 17] Z: Do you're. . literally recursion is write your base cases to a tee - think about it and iterate backwards. .

[laughing]

[00: 21: 48. 17] Z: . . and then you hit run - an the its magic - and then it works! Its great

[00: 21: 49. 29] Interviewer: well I'm glad. . .

[laughing]. .

[00: 21: 59. 12] Interviewer: Well I'm going to pull our tangent to one side. . . ya handholding you talked about hence. . a t what process do you think during. . so you're completing an exercise, you guys love recursion -lets talk about recursion. At what point do you think it would have been helpful for you to receive a hint of any sort. . like do you think you would've like to , type something in. .

[00: 22: 21. 20] Z: Honestly it could've been like, this is far fetched cuz I don't know how exactly you would display it , but if there was some type of visual display of the stack, or event he snapshot of like as it went through, oh you can see where the values are changing and as it goes back up, like what's actually happening, cuz recursion I think the reason its so hard is because its so hard to visualize. . . it completely changes. . it requires a vast change of how your looking at things - so if there was a CodingBat recursion stack viewer,

[00: 22: 53. 16] Interviewer: So you would write. . for example not recursion , now I'm talking about - I don't know - . .

[00: 23: 05. 05] Z: If you can make an extremely visual way of like - you know the ability to step through - like in eclipse you'll see step through - if there is some incredibly intuitive, visual, basic way that would let you step through your code - and understand what is happening - that would be great.

[00: 23: 18. 24] D: like you know in Problem Solving how we had to make those tries that were like each step that the things iterating though what are the values? . . if it could print something out like that. .

[00: 23: 21. 27] Interviewer: Ya, , ,

[00: 23: 23. 26] D: That'd be cool. .

[00: 23: 24. 26] Interviewer: Do you guys use. . do you guys ever write or draw as your coding out. . or did you ever do that?

[00: 23: 28. 02] Z: Oh all the time

[00: 23: 28. 02] D: Ya. .

[00: 23: 29. 12] Z: Like all the time.

[00: 23: 29. 12] D: Yup

[00: 23: 34. 06] Interviewer: Um I lost my train of thought cuz now I'm thinking about drawing code. . . umm ya so you said like step through right? , trying to figure out feedback as you step through . Would like that to automatically - so for example you're looking a this thing- an the way CodingBat is set up you have a , if you had a button that said - oh ask for a hint, and it wasn't going to dock you points , cuz I had a couple people say oh its gonna take off points. . and I was like no if it didn't take off points would you use it? Would you wait to use it?

[00: 24: 02. 27] Z: Um - I personally probably wouldn't use it until I like tried it at least once - but I also can see other people using it off the bat - so I mean. .

[00: 24: 13. 14] Interviewer: I mean there's no right or wrong answer either way. . I think it's how you approach a problem. . .

[00: 24: 18. 23] Z: If there was another system like you have 3 lives for this assignment. . like you can step through 3 of these but not all of them. .

[00: 24: 25. 29] Interviewer: It really in your approach the problem - so I'm just curious - cuz I see you guys as very different. . .

[00: 24: 40. 13] C: Um if we're talking about hints like doing like the gdb sort of way wouldn't it only be possible once you've written code so you can step through it Or are we talking about just hints in general

[00: 24: 47. 27] Interviewer: I'm talking about just hints in general, I was really as focused- I don't really wanna focus as much on stepping through it. stepping through it is one way to look at it - but I mean if you look at CodingBat with the interface it has right now it doesn't' . . .

[00: 25: 06. 14] Z: I mean other hints could be like - oh when they're doing integer division and they want float or something they can be like . . . oh ya remember you're using a float - you're number is lie the remainder of, they'd be like are you remembering integer division- that'd probably be nice. .

[00: 25: 15. 26] C: Well in that case you'd still have to have something written before there's anyway to analyze the code to give you feedback on what you've done wrong. . right?

[00: 25: 22. 02] Interviewer: Right - so we could give you something - or you could ask for it. . Um. . .

[00: 25: 27. 18] Z: Arguments, preface, like hit on this problem - refer to use integer division. .

[00: 25: 27. 18] Interviewer: Or if you've been sitting therefore awhile . .

[00: 25: 29. 17] Z: . . or not use integer division. .

[00: 25: 34. 15] Interviewer: like think about in terms of getting help - what would you have liked -like the system to , cuz if you're going to engage someone to learn something, ideally you wanna prompt them or not. . and everyone's different. Like some people don't lie to ask for help at all - like your literally forcing yourself to go to Google so you don't fail your homework assignment. Um. - some people are completely comfortable with getting help no problem, um so I wanted to get your thoughts on that - and that's how I'm talking about hints, just because a hint is a piece of information. . Would you ask for a hint as you go through the process or do you think you'd force yourself to figure it out even though that button was right there?

[00: 26: 08. 05] Z: I think I would just, have them display it - or prefer it , then why not include the button. If its like a hint that like analyzes your code somehow like sure hit the button , but if its like a simple like oh make sure you're remembering this type of base case or. .

[00: 26: 31. 17] Interviewer: So like as you're writing it out kind of something that pops up. .

[00: 26: 33. 02] Z: Remember reject expressions - just like generic things that you're. . that you need to use

[00: 26: 36. 14] D: I have a love hate relationship with hints. . .

[00: 26: 43. 22] Interviewer: OK please expand. .

[00: 26: 40. 29] D: So my thing is that I wouldn't wanna read a hint until I've tried it - but then also if I read a hint and it doesn't actually help me at all, Id feel really bad about myself cuz I'm like , oh even this hint isn't going to save me. .

[laughing]

[00: 27: 02. 16] D: ya - so hints. . I dunno hints aren't good for me , usually, unless they like actually work - and then I'm like oh my god I love this hint - and like save my life. .

[00: 27: 11. 25] Z: AS long as it isn't. . as long as it's not Clippy. . .

[00: 27: 12. 16] D: Like it has to be. .

[00: 27: 12. 16] Z: No Clippy. .

[00: 27: 12. 16] D: . . . useful. . like a really useful hint somehow. . Cuz like I've spent so many times and like in things like for Chemistry where they like, they give you that hint. .

[00: 27: 23. 03] Z: This hint is just like let me Google that for you link. . .

[laughing]. .

[00: 27: 28. 23] Interviewer: Yes - I understand what you're saying. . um. . . did you have any. . you're very quiet so I cant tell if you're thinking or your agreeing or. .

[00: 27: 38. 13] C: I was just thinking about like when you said love hate relationship with hints -I was thinking about all the hints that I've gotten on just in certain little exercises, like this um. . It's either. . um. . I was gonna say most of the time I do the problem out - don't think I need the hint -hit submit - everything's broken. then I'm like alright what's the hint, I click on it and the way I've thought about it is one eighty from the way the hint is trying to help me - so I would have to redo all of my own code to figure it out versus like. . .

[00: 28: 16. 18] Z: Happens all the time. .

[00: 28: 15. 09] C: Instead of like having it fix my code its just confusing me more. . because it's just a different way I'm thinking about it versus somebody else who wrote the comment is thinking about it. . .

[00: 28: 29. 19] Interviewer: So on that flip side - so if you had the ability to get a hint or whatever would you rather ask for one or would rather have one just show up. . .

[00: 28: 40. 28] Z: No NO - don't just show up cuz then its like wow you really need help - then I would just be like oh f\*\*\*I hit the hit limit. . . I've been working on this problem for 30 minutes already the hint just popped up. .

[00: 28: 49. 03] C: I would love for the hint just to pop up. . that would be great. .

[00: 28: 53. 29] Interviewer: ya. . .

[00: 28: 53. 29] C: Yup. . .

[00: 28: 57. 18] D: I want it to know when I m about to throw the computer across the room -

[00: 28: 56. 27] Interviewer: And then just kinda gauge on that. . k ya. . like ya he's past everything

[00: 29: 00. 03] Z: . . . Just gauge of the accelerometer of the computer - how fast its flying through the air. .

[laughing]

. . . [00: 29: 13. 28] Interviewer: That's sad - I've never actually wanted to throw my computer across the room

[00: 29: 17. 19] Z: I've never wanted to hurt my computer - my computer didn't do anything - it just very

[00: 29: 25. 24] Interviewer: you're very rational about that.

.

[00: 29: 23. 01] Z: Plus I'm a gamer so like my computer is also bae. . . I don't hurt bae. . .

[00: 29: 28. 28] Interviewer: I mean I sometimes hurt bae like. . ha-ha. . its ok

[00: 29: 35. 22] Z: I men I've clenched into my chair or like grrrr. . or like hit my hand on the desk - but you don't hurt bae.

.

[laughing]

[00: 29: 50. 10] Interviewer: Well she's very quiet - .

[laughing]

[00: 30: 12. 21] Interviewer: um. . so you talked about 2 different types of hints, , you said show up you were like no don't show up. . . um. . what if you could give hints to people. . so what if it was. . You're nodding. . umm. . I gonna use CodingBat as an example. .

[00: 30: 23. 21] Z: What do you mean give hints to people. .

[00: 30: 23. 21] Interviewer: So if you. .

[00: 30: 28. 23] Z: It actually just sound like people working in a group - and like hey what'd you get for problem 4. . oh its.

.

[00: 30: 33. 28] Interviewer: SO if you were completing an exercise with CodingBat there's - you finish the exercise and it's all green ticks or whatever and you had the option - and it says oh congratulations you're done, um you have the option to add a hint - and so you would add a hint specifically related just for the question you've completed. And then what it would theoretically roll into a bank and then someone else would get the hint that you put in. . thoughts about that?

[00: 31: 01. 24] Z: I feel like I don't trust the students enough to be mature about that. . . especially if there's no filter on that text editor - there's gonna be something's that - its just gonna be bathroom wall graffiti rollin around on CodingBat. . .

[00: 31: 13. 11] Interviewer: Ok. . I assume it gets moderated. . .

[00: 31: 15. 26] Z: Ok assuming its moderated- don't think enough people would drop it in. . I mean could definitely help . there are definitely - I mean StackOverflow is exactly that - it's moderated - people drop hints all the time - um for other people. .

[00: 31: 30. 28] Interviewer: DO you think that would be helpful or that would be like . . so I think there are people that would. . I just don't know how frequent that would be , especially on CodingBat, especially since it s a student base. .

if like the . . I guess professors would drop hints the most. .  
or like TAs. . . wait - TAs would drop it all the time - I take  
that back - they'd be like this is an FAQ, they'd drop all the  
hints. . .

[00: 31: 52. 21] Interviewer: Thoughts?

[00: 31: 52. 21] C: I would love that - I think that would be  
great -

[00: 31: 58. 18] Z: As a Ta I would love that - just drop the  
hint don't ask me a stupid FAQ. .

[00: 32: 04. 27] C: I think it would be even neater if there was  
a certain format like oh you need a double nested for loop to do  
this - have a way to highlight a certain line of code and be like  
with this line of code don't forget to make the iterator go up by 2  
instead of 1 or something along those lines. . I dunno how that  
would play out in analysing other peoples code but having just  
certain steps written out for the um program and just the hints per  
step I guess. . . does that make sense. .

[00: 32: 41. 29] Interviewer: Ya that kinda makes sense. . .  
um. . cuz you're talking about hints per step - you mean per step  
of what? . . their solution?

[00: 32: 49. 20] C: Ok - so for example if you needed to write a  
program that filled in a matrix -you'd need a first for loop, a  
second for loop and then whatever your stuff was . . so there  
would be like the 3 steps that would be predefined for the question  
that you obviously need to do this at all - so there would be the  
option to highlight the first step , be like don't forget to do  
this. . or compile the second step like this really caught me  
off guard doing that. . or highlight the 3rd step and put a  
comment there. . .

[00: 33: 27. 09] Interviewer: Ya. . . you were nodding - I  
said add a hint and you were like ya. . .

[00: 33: 24. 28] D: Yes -but I mean I is there also a way that  
we would be moderating to prevent students from teaching other  
students bad coding practices

[00: 33: 38. 04] Z: Oooh that's a good one. .

[00: 33: 38. 04] Interviewer: So I did not know that. .

[00: 33: 41. 20] Z: Like should you use bubblesort. .

[laughing]. .

[00: 33: 44. 06] Z: Lie slow as ever. . .

[00: 33: 44. 06] Interviewer: I mean there is an option - as  
this is developed and so like the -my personal interest in this is  
sort of like receiving hints . . and giving feedback. . . .  
because I mean as a TA use it and I feel like the tool has to be  
helpful um - and so how best can you use the tool -to teach you're  
trying to learn - and that's the whole point of - if you're stuck  
Google is not -I mean Google is an answer but Google shouldn't be  
the answer. There should be a way within the tool to help you solve  
your problem before you have to go to Google. - um so yea - there  
is ways to moderate. . . I can vaguely think about a thumbs up,  
thumbs down so you guys could like moderate each other . .

[00: 34: 30. 24] D: Right. . .

[00: 34: 30. 24] Interviewer: I've had people talk about. . .



[00: 34: 35. 15] Z: That would be good - the bottom would be unusable and would get pushed down real quick. . and be like no - this one didn't work. .

[00: 34: 40. 13] Interviewer: And so it wouldn't just be in an. . I haven't like who would - like what would qualify . . add a hint. . I mean if it took you 30 tries -people would be like oh maybe that's not. .

[00: 34: 54. 23] Z: If you're hint gets 10 likes. . .

[00: 34: 54. 11] Interviewer: Is it useful. .

[00: 34: 54. 11] Z: You get 1 point extra credit. .

[00: 34: 59. 18] Interviewer: is it not useful. . so I wanted to run that the adding hints by and see how you guys. . .

[00: 35: 03. 00] Z: Ya but you could also like incentives - student sot drop hints- like if there was some type of system - like oh if you get here and you're in the top 5 most popular hints by the end of this assignment , then you get 1 point extra credit for hints assignment - or this problem - or something. . . I guarantee- people would drop hints all the time, ,

[00: 35: 24. 02] D: Something that I've thought about - I've thought about making my own apps for teaching. .

[00: 35: 29. 03] Interviewer: Ya. .

[00: 35: 30. 07] D: so - this is something that I've thought about too. .

[00: 35: 33. 03] Interviewer: No ya - this is like y main focus - my research actually about the whole hints and feedback thing - cuz I think its really important and through my experience working with students , teaching for awhile - I think um - if you were - if you had a textbook and CodingBat - or a textbook and CodeWorkout - without a TA, and without a professor - can you learn Java - can you complete this . .

[00: 36: 01. 22] Z: I am not self-driven early enough to do that. .

[00: 36: 06. 23] Interviewer: And so right - and if you were - for example if this tool's gonna help you pass an interview. . how can you use it. . to the best of its capability get everything you need to get out of it - . like I'm leaving, . .

[00: 36: 20. 29] Interviewer: And m like ok. . what if there was no TA for your class. . and you had to use CodingBat. . . um. . . thinking about it like that. .

[00: 36: 31. 15] D: Another thing I had thought about for like when you're stuck on something. . like if the problem is on a certain subject in CS then you would have some kind of like an online textbook - if you're like having a lot of trouble try reading this and seeing to see if it would help - just in case they don't have a text book. .

[00: 36: 47. 26] Interviewer: And how would you define . . in a lot of trouble. .

[00: 36: 52. 05] D: I mean just like they would define it themselves. .

[00: 36: 57. 10] Interviewer: Ok. .

[00: 36: 57. 10] D: Is what my guess would be. like if they don't have a textbook at all then they probably would need to read that anyways. . .

[00: 37: 09. 15] Interviewer: ya. . . . I'm trying really hard to not -everyone always wants to talk about CodingBat and the

things that it does and doesn't do. . that helpful but then I also , vie had conversations with people for 20 minutes about tabbing and how they don't work in CodingBat. . . you can't format your code in CodingBat. . . um. . .

[00: 37: 30. 14] Z: That's a big issue. . .

[00: 37: 29. 20] .

[00: 37: 34. 16] C: I think I was the kid that wrote as many , like one lined like an if statement and all of its contents on 1 line, like no brackets, as many like as condensed as possible, just because of that fact. . but I digress. . .

[00: 37: 50. 00] Interviewer: No that's totally fine - I know that readability is an issue that people tell me , um the way they learnt the language was based on. . a lot of it was base don formatting so they think incorporating that into the program is important. . which I have thought about. .

[00: 38: 10. 27] Z: Ya format. . formatting is helpful. .

[00: 38: 15. 28] Interviewer: Ya - cu Ideally its a tool - its not gonna teach you the concept - its should teach you how to use the information. . .

[00: 38: 24. 19] Z: It gets like the oh my god wall of text - I m scared - this need to burn feeling away. . .

[00: 38: 31. 03] Interviewer: But to go back to your thing - about ya bathroom wall graffiti as you referred to it. . do you guys. . you guys are all in CS classes right now. .

[00: 38: 45. 12] Z: Were all in the same. .

[00: 38: 43. 16] D: Ya the same one. . .

[00: 38: 43. 16] Interviewer: Ok. . 3114? Ok do you guys use discussion forums at all? someone threw this idea at me do I wanna see. .

[00: 38: 48. 14] D: I'm way too terrified. .

[00: 38: 48. 14] Z: Kind of its - I've never touched piazza - 2 of my classes have had to use piazza and I kinda get like really bumpin threads. . then I'm like oh I should kinda look at that one - but I don't get the motivation to like go look at them - unless I'm desperately searching for answers and like in a panic - stress mode - . . however, in our \*\*\*\* and \*\*\*\* classes \*\*\*\*\* has his own little forum where he posts like updates and like really vague and unhelpful hints that I look at for some reason and still wonder why I keep going back - but I use that one more than like. .

[00: 39: 32. 15] Interviewer: Like piazza. .

[00: 39: 32. 15] Z: like a 3rd party thing. .

[00: 39: 32. 15] Interviewer: DO you find it helpful -I mean Mc\*\*\* thing is helpful?

[00: 39: 40. 02] Z: Mc\*\*\*\* post not so much, um other students kind of -cuz they post like working test code or Ill see like a vague issues that they did for something and I'm like maybe I've been missing one. . its. I don't like. . 100% effective - I think its maybe a fourth percent. .

[00: 40: 01. 17] Z: And its weird enough that sometimes fourth percent sometimes comes through, ,

[00: 40: 05. 21] D: You go on there praying that someone has you problem. .

[00: 40: 05. 21] Z: YA basically

[00: 40: 10. 01] D: That's all you can do. ,

[00: 40: 08. 04] Interviewer: Ok do you guys - so you were shaking your head - I said Id come back to you. . . I said do you use piazza do you find it helpful - not piazza specifically - like if Mc\*\* has his own thing , like if your class has its own individual forum. .

[00: 40: 21. 28] Z: StackOverflow's great. . post a question there - people respond - they give hints comments, suggestions - stack overflow. . . 10 10 review. . .

[00: 40: 34. 16] Interviewer: but you were saying. .

[00: 40: 37. 24] D: My problem with that is that the professors there to see it and I don't wanna look dumb and I don't want especially since \*\*\*\*, every time I've ever posted anything there \*\*\*\* just found some ay to make me feel incredibly stupid. So I'm like ok - ok I'm done. .

[00: 40: 46. 14] Z: Oh yea - \*\*\*\*, \*\*\*\* is just. . . its not helpful to this, , , \*\*\*\* gives like demoralizing hints comments and feedback - \*\*\*\* like wow aren't you in \*\*\*\*? You've been coding for like 4 years - you don't know this by now - damn you like stupid. . I mean to a much more or less degree. . but its basically the same thing that comes of - and then you're just like oh I'm ever gonna ask for help again. .

[00: 41: 17. 17] Interviewer: that's awful. .

[00: 41: 19. 24] Z: But it's after it. . .

[00: 41: 21. 11] Interviewer: Like he does that or you feel the same way

[00: 41: 21. 11] Z: No \*\*\* like does that - not to like those exact words but like . . haha you have this problem you should figure it out . . done. .

[00: 41: 35. 26] Interviewer: so that's the only kind of response you get from your discussion forums?

[00: 41: 39. 00] Z: It's not great. .

[00: 41: 36. 06] D: so. .

[00: 41: 39. 09] Z: The only ones we kinda look for are like the TA responses. . . \*\*\*\* not so great with being helpful on the forum

[00: 41: 46. 26] Interviewer: You're like crushing . . I have all these questions about discussion and lemme ask them and you're like - it sucks. . .

[00: 41: 53. 19] C: Ya forums -just no. .

[00: 41: 51. 19] Z: That's because people like there's like . . demoralizing comments- so then there's people like oh my god - I'm done I finished 4 weeks ago - and that's also demoralizing. .

[00: 42: 10. 20] D: Right. . .

[00: 42: 09. 24] Interviewer: Do you guys use your forums to get help?

[00: 42: 09. 24] Z: Ya - you'll post like what you have like an issue and you pray that the TAs see it before \*\*\*\*\* gets to it --

[00: 42: 18. 17] D: Right. .

[00: 42: 15. 26] Z: Cuz the TAs are pretty helpful

[00: 42: 15. 26] D: Cuz if \*\*\*\* says something no one else will respond

[00: 42: 19. 11] Z: Ya - t basically counts as a closed thread. . .

[00: 42: 24. 13] Interviewer: But do you get an answer?

[00: 42: 22. 03] Z: Not at all

[00: 42: 22. 03] D: I mean -

[00: 42: 25. 13] Z: No he just makes fun of you. .

[00: 42: 25. 13] D: I had a problem with [code] where it was working fine on my machine and where it was getting the values I needed but on curator it wouldn't get the fourth value that I was scanning in and so I asked \*\*\*\* and \*\*\*\* response was you're [code] is like really \*\*\*\* up. That's like all he said -

[00: 42: 40. 21] Z: Or yea - it'll throw a compiler issue - on curator and not on my machine - and \*\*\*\* like you shouldn't use the Math library. .

[00: 42: 53. 16] D: \*\*\*\* was like I don't even know what you're doing

[00: 42: 51. 10] Z: Ya \*\*\*\* like your code's illogical and there's nothing I can do you're SOL.

[00: 43: 00. 18] D: I was literally just commenting from \*\*\*\* which is a different class. . but I dunno. .

[00: 43: 05. 08] Z: Or if you have a null pointer or something - \*\*\*\* basically repeat that - or it looks like you have a seg fault or oh it looks like you have a null pointer. . you should fix it and it's like the automated curator feedback said exactly the same thing. .

[00: 43: 22. 05] Interviewer: So do you guy post these for \*\*\*\* to respond to them or do you guys all respond to each other. .

[00: 43: 27. 14] D: I rarely respond

[00: 43: 27. 14] Z: We don't necessarily respond to each other cuz like \*\*\*\*\*~is a hard ass about the honor code - so like can kinda help you - that's like the CS lounge -

[00: 43: 42. 21] Interviewer: wait now I confused. . .

[00: 43: 42. 21] Z: The TAs are also moderating the forums - so they post helpful things while \*\*\*\* doesn't. . .

[00: 43: 46. 10] Interviewer: SO if you're stuck on problem and I type doesn't anyone seem to be having an issue - blah blah blah. .

.  
Ideally the content of a discussion forum - s to use it to get help.  
.

[00: 43: 54. 14] Z: Oh I see what you're saying . . . no no.  
.

[00: 44: 01. 20] Interviewer: Is that not how your forum works? Cuz piazza works like that - like everyone in the class including the professor - anyone can post as a response - and if the professor thinks its inappropriate they can close the thread or whatever. .

[00: 44: 10. 07] Z: Right. . .

[00: 44: 09. 27] Z: Well we have that option but for whatever reason I guess our forum culture just doesn't do it in those courses.  
.

[00: 44: 13. 25] D: I - I mean some people do it. . Some students get to other students before \*\*\*\* does - but I mean once \*\*\*\* responds with something then like . . .

[00: 44: 22. 27] Z: Ya it s closed. . .

[00: 44: 22. 27] D: . . YA no one will say anything. . . that's like. . .

[00: 44: 28. 14] Z: I dunno if that's a forum thing - I think it's a \*\*\*\* thing. .

[00: 44: 30. 28] Interviewer: DO you guys use forums in any of your other classes other than this class you seem to . .

[00: 44: 32. 24] D: I use Piazza. .

[00: 44: 32. 24] Interviewer: You use piazza - do you find it helpful/

[00: 44: 37. 09] Z: Um. . I like when it send me push notification of things cuz I know its rally important. . .

[00: 44: 37. 24] D: Yes, ,

[00: 44: 43. 04] Z: I'm not being sarcastic - If I get an email form piazza its like something that's like 4000 views and like eight hundred dikes so its something that's important

[00: 44: 55. 05] D: There were quite a few times that someone had an issue and they found a solution - and I could then like use that solution cuz I was also having that problem in 1114. . but not since then. . .

[00: 45: 03. 13] Interviewer: Have you used forums or Piazza. .

[00: 45: 08. 10] C: Yup - I've used both of those that they've been talking about and I've never found them helpful for any sort of logic thing. . .

[00: 45: 14. 02] Z: It's mostly like when's our test? Next Wednesday -ok thanks. .

[00: 45: 19. 15] C: Its mostly like my sdk is not working what's wrong with it - when's the test - what's the test gonna be on. . so type of general questions. . . versus

[00: 45: 24. 00] Z: How big is the cheat sheet?

[00: 45: 24. 00] C: . . logic questions - cuz all of the logic that we do is on Google you can do it without having to wait for somebody to respond - you can do it where they have like a big description versus somebody responding just to a post like he was saying. . . the honor code is so you cant post your code on there you can just post like general descriptions . . whereas you Google something they'll have code on there it wont be exactly what you want but it'll be aversion of somebody's done it - its already working - you don't have to bother anyone else about oh can you clarify about that- because it's a whole page an a half on how this thing works versus a 2 sentence response somebody's trying to help you trying to figure out what you're trying to do . . . etc. so I've never found forums helpful for any sort of logic. .

[00: 46: 11. 06] Interviewer: And hints are throughout like. .

[00: 46: 15. 29] Z: Ya - consistently - forums are not for logic. . that s good for StackOverflow - Cs lounge - Ta office hours. .

[00: 46: 20. 07] D: For mw its more like researching how the language works though than logic - like I'm trying to figure out this. .

[00: 46: 28. 21] Z: you obviously didn't do data lab

[00: 46: 35. 25] Interviewer: I think that's an interesting point - when I went though that's what I did

[laughing]

[00: 46: 36. 18] Interviewer: I would Google the questions to figure out what are they asking me - what else does this thing do so how can I do it in my own way. . so I understand what you're doing. .

[00: 46: 53. 15] Interviewer: SO feel like I'm gonna ask my next question and it's gonna be unanimous answer one way or another - so the thought was thrown around to have a potential discussion - not necessarily in threaded way - but for example if you had each of these question in CodingBat - you're talking about recursion , you had issue s- what if you had some sort of way to have a discussion - you could either look at it or choose not to look at it - um and it would be based individually on each question - thoughts?

[00: 47: 16. 16] Interviewer: He's shaking his head in the corner - you're shaking your head. . you haven't said anything yet.

.

[00: 47: 23. 28] Z: Well actually maybe - . . would it be like a class wide forum board? Or like a global wide for this problem. .

[00: 47: 27. 22] Interviewer: it would probably be restricted to your class. .

[00: 47: 33. 12] Z: Then no -

[00: 47: 36. 04] Interviewer: Because then you'll get into honor code issues. .

[00: 47: 35. 18] Z: No not necessarily -not honor code issues but just because like the scope is so much smaller - its just so much less likely to be helpful -and even if it is just gonna wait forever for a response cuz there's not guarantee a sample size that someone's gonna need - trying to response to questions that time - but if you had a larger scale of like maybe like the entire school - not just your class - or maybe like - I dunno. .

[00: 48: 07. 22] D: But what if you had incentives or something.

.

[00: 48: 06. 11] Z: Then ya cuz then you have a lot more people to it - its more poppin - you post questions probably get a response - hopefully under 5 minutes - if you're really luck y- but like - it would definitely more of a yes if it was a much larger scale forum. . . than a smaller. .

[00: 48: 29. 25] Interviewer: But again this would be just based on each question - do every question would have it own -

[00: 48: 36. 19] Z: Ya that'd be fine - if it was like oh - this happened - just a large sample size. . .

[00: 48: 43. 23] Interviewer: Interesting. . .

[00: 48: 46. 00] Z: And cumulative. .

[00: 48: 49. 20] Interviewer: Ya - and essentially that'd be the goal - it may or may not be threaded - it'd be different than how it was laid out. .

[00: 48: 58. 14] Interviewer: I'm gonna go back to your comment that you made like a little while ago - about how you got a hint- and you were like 13 steps and you just needed 14 - but it gave you a solution that took in the complete opposite direction. So something I think I struggle with as an educator, just trying to show someone how to do their problem in their way. And that I kinda wanna loop in the potential of having discussions or asking for a hint - um - do you guys have thoughts or suggestions bout that?

[00: 49: 35. 07] Z: Um I think at least for me - When I'm doing something - and it may not be the most efficient but when I'm doing something and I'm understanding it - as long as I'm not completely in like - absolute wrong direction -like if my way might suck but can still reach the working solution is so much better for me conceptually to just finish the way I thought of it than to be like

no scrap your code do it this way its way better. Like if I can understand bubblesort - maybe down the line can learn quicksort. . but like I wouldn't start here. Um so ya - if people help me learn my way first and then show me ok so now how can we improve on this ad then show like the better way to do it - that's exceedingly much more helpful - but like if I'm working toward a direction that even has a chance of being right and I'm shot down entirely - or I'm told o do something entirely differently that wouldn't be helpful at all. Actually - it would be detrimental. .

[00: 50: 36. 28] C: And I think when it comes to a forum discussion board - providing those helpful hints from other students usually the kids in the class are not all knowing TAs that know everything about these questions and they know how to do it their one way and they're gonna teach you they're one way that they know. And as soon as they see you're code is different - they're gonna be like - I cant help you this is weird . . .

[00: 50: 56. 01] Z: Also valid. . . .

[00: 50: 56. 01] C: This is not hw I did it. . .

[00: 50: 58. 13] Z: I wouldn't say that TAs are all knowing though. There are lot of times I get students I'm just like. . Google is. .

[00: 51: 00. 23] C: Comparatively. .

[00: 51: 05. 19] Interviewer: Thoughts?

[00: 51: 05. 19] D: I mean ya that's another really big issue. .

[00: 51: 10. 26] Z: Which is why I think the larger scale helps more

[00: 51: 12. 08] D: but no. . I don't think that changes anything

[00: 51: 14. 06] Z: Well you have a much higher probability of someone thinking. .

[00: 51: 17. 00] D: Of someone telling you that you should do it this way. . . and other ways a re wrong. . either way. .

[00: 51: 27. 15] Interviewer: So - we're talking about taking - any kinda of programming problem right? Majority like especially lower level stuff multiple ways to do it, the more knowledge you have - the shorter the more efficient. I can write a 15 piece if statement or I can write a for loop. Um- so in talking about sending things in different directions. . How would you think about hints - like if I were to give someone a hint? How would you think about that - and also keep them guided in the same direction. . cuz I know you're talking about giving hints things like that like that's an important question to ask. . Are you a TA right now?

[00: 52: 04. 15] Z: Ya

[00: 52: 05. 25] Interviewer: So thinking about that in helping your students - like if you're students had to use this tool - . .

[00: 52: 14. 03] Z: I don't know how you would be able to tell automatically. .

[00: 52: 21. 26] Interviewer: what would have liked to receive as you were doing this - cuz did you get a hint that took you in the wrong direction?

[00: 52: 28. 19] Z: YES

[00: 52: 33. 23] C: Or it would just be super unhelpful and I would stare at my code and be like I don't even understand where this hint is trying got lead me because I just started off in some place

that was completely different than the hint. . . but we re both gonna end up in the same way - I was just half way there. . .

[00: 52: 47. 21] D: I've had hints that lead you in the wrong way. . . like be a test-driven programmer - write your tests first - all of them

[00: 53: 01. 17] Interviewer: Ok that's not a hint. . .

[00: 53: 03. 03] Z: That's really bad advice. . . It's the same thing. . . They're bad hints . . . they're bad advice. . .

[00: 53: 06. 25] Interviewer: Ok. . . so you're talking about hints versus advice right? SO what if you go suggestions versus hints. . .

[00: 53: 15. 03] Z: What's the difference?

[00: 53: 19. 25] Interviewer: you tell me

[00: 53: 18. 09] Z: There's none. . . one just uses more letters. . .

[00: 53: 25. 18] Interviewer: I'm gonna let that go. . . um so for example if I tell you - . . . So a suggestion first is a hint right you get multiple types of hints someone could pop something up at you -like you've been on the page for like 10 minutes - . . .

[00: 53: 39. 25] Z: YA a hint is like hey you should try this- but a suggestion is kike maybe you should try this. . . I don't know. . .

[00: 53: 45. 27] Interviewer: Right but those 2 things say different things to you. . . if you don't know what you're doing. . .

[00: 53: 52. 03] Interviewer: No.

[00: 53: 52. 03] Z: No they both say you should try this. . . and I'm like well I'm completely lost why not?

[00: 53: 58. 25] D: to me hint says that this is some secret to get to the answer - whereas suggestion says maybe this would work for you u, it worked for me. . .

[00: 54: 06. 20] Z: Maybe like - a hint is like. . . a strong nudge?

[00: 54: 14. 16] D: So when I see hint I think , someone had some dark magic secret - . . . to the answer. . .

[00: 54: 20. 05] C: If you're just talking about the word hint versus suggestion?

[00: 54: 22. 17] Z: I think that interchangeable. . .

[00: 54: 22. 17] C: Is that what were discussing - just the. . .

[00: 54: 31. 05] Interviewer: I mean I'm talking about the concept of ya - just the word itself is a big . . . to physically just using the word itself. . . because it leads people to. . .

[00: 54: 39. 20] Z: Well technically suggestions is something you would get before you start but a hint . . .

[00: 54: 40. 20] Interviewer: Right. . .

[00: 54: 40. 20] Z: . . . is something you get while you're coding it. . .

[00: 54: 49. 18] Interviewer: So you could either get a suggestion before - so like I start a program, or a problem and it says hey do this, in this way - I've got people who are like I don't - what are they asking me? So you have multiple different ways of being stuck on problem. . .

[00: 55: 00. 28] Z: Ya - I think in that case a suggestion would be better than a . . .



[00: 55: 03. 17] Interviewer: You can get help before you start - you can get help. . during your work with it whether you ask for help or hey you haven't written anything in a long time. . .

[laughing]

[00: 55: 13. 21] Z: Are you still there?

[00: 55: 19. 03] Z: Pandora's been playing for like 15 minutes are you still listening?

[00: 55: 19. 23] Interviewer: But kinda like that right? Pandora's paying attention to what you're doing. . .

[00: 55: 26. 21] Z: I feel like you run the risk of running Clippy. You're just gonna hit Clippy - and everyone's gonna be like hey go away - stop it. .

[00: 55: 36. 17] Z: um - so I guess ya -

[00: 55: 37. 01] Interviewer: So do you get where I'm going with this. .

[00: 55: 37. 01] Z: Ya - so I guess relating to the whole hints leading you in the way you're going versus the way you're not going - its trying to get around - I guess suggestion/ hints - start at the beginning - I guess suggestion when you're planning this problem but think about this way it might help if you try to do x y and z. . versus like I'm already in the middle of it, I hit compile it snot working and a hint pops up - and its like maybe you should switch everything - not so helpful. . .

[00: 56: 07. 08] C: I wanna figure it out on my own first I don't wanna a hint first

[00: 56: 05. 02] Z: I think suggestion s are fine. . . I like that . .

[00: 56: 09. 04] C: I'm sorry - I don't want a suggestion first because I just wanna figure it out - and then having a problem. . .

[00: 56: 12. 22] D: But you can use the suggestions after. . . . right?

[00: 56: 19. 18] Z: No that's a hint. .

[00: 56: 22. 13] Interviewer: Well it doesn't matter - you don't want any information you want the question , you wanna see where you can go with it- if it works it works - if not. .

[00: 56: 28. 14] Z: I'm like 10 out of 10 strongly opposed about them. .

[00: 56: 33. 15] Z: Cuz like if its there. . . otherwise ignore it. . .

[00: 56: 42. 17] D: I mean I'm still like there's just there's a really big hurdle where you're having someone design a question and so like they're like obviously had an answer that they designed it for - so you have that whole entire problem of like when you're getting suggestions and hints of like you don't know - there is someone that like had like one way of doing it -so unless you like , when you made a question you'd have to think about multiple different ways that you could do it yourself. . or like have a team of people pick questions and every single person has to do it differently. .

[00: 57: 12. 23] Z: I feel like suggestions are more of. .

[00: 57: 15. 01] Z: Suggestions re like oh. .

[00: 57: 18. 20] Interviewer: would you - ok so say . .

[00: 57: 18. 19] Z: they're still helpful. .

[00: 57: 18. 19] Interviewer: Forget hint versus suggestion - you have a hint, would you rather be incredibly specific. .

[00: 57: 23. 09] Z: No. . .

[00: 57: 23. 09] Interviewer: . . or would you rather it be almost vaguer, more conceptual, like what you're doing. .

[00: 57: 27. 00] Z: Ya. . .

[00: 57: 37. 03] Z: more like - separate your code into functions -it makes it easy to read. boom - great suggestions - would recommend it to everyone. Like. . . stuff that's more of like broad and is still helpful and can give you like a nudge in the right direction versus . . something that pops up in the middle of when I'm working . . . cuz I thin its better . . SO if I'm working it he wrong direction then I'm wrong - I feel that. . um I don't like that. . so if I have a suggestion in the beginning that at least puts me toward the right direction - that's better cuz then I'm happy - I feel like I got it in on shot - I don't feel like this suggestion took away any of my victory points. . I just feel like I got it done in one shot - and I feel awesome e about it. But if I like go completely in the wrong way. like C would have loved a suggestion that the time when your PRQuad tree 0 0 is in the bottom left corner not the top left. . that suggestion would have saved C a lot of time. .

[laughing]

[00: 58: 40. 10] Z: Like so much time - like a lot a lot of time. . .

[00: 58: 42. 26] D: Well if you're not following CS convention. .

[00: 58: 44. 02] C: Well that's very specific you see - like that what you guys were talking about when she said do you want specific versus broad help. . like broad help would be. . .

[00: 58: 55. 22] Interviewer: this is great - I'm just gonna let ya; talk. .

[00: 58: 54. 20] C: I think for me would like very specific help. .

[00: 59: 03. 12] Z: I think that is like broad its like. . . the origin look this you're used to seeing it like this. . maybe you should do your PRQuad tree like his. . that's pretty broad. .

[00: 59: 12. 17] C: Well when you say it like that then yes. .

[00: 59: 12. 17] Z: Cuz you don't have to - you don't have to separate your code into functions- you can write it all in one that fine - I don't suggest it but you can go ahead and do it. . .

[00: 59: 23. 13] Interviewer: Right but that's framed differently than what you said where you're like, 0, 0 that ins the left - that's very specific. .

[00: 59: 33. 29] Z: Suggestion you should turn you're PR quad tree as you would a origin - I mea its in the phrasing but its I think its still -

[00: 59: 37. 11] D: With has something in. .

[00: 59: 36. 22] Z: It's a starting point. . .

[00: 59: 46. 07] D: I mean I still think I dunno -

[00: 59: 50. 27] Interviewer: No - you should say it. .

[00: 59: 51. 26] Z: I think being pointed in the right direction is great in the beginning. . . instead of having to a complete overhaul everything in the middle of everything. .

[01: 00: 00. 08] D: The problem with the PRQuad tree is that it doesn't follow CS convention. . .

[01: 00: 16. 13] Interviewer: Umm ok. . so did you guys have any other questions for me. .

[01: 00: 24. 14] Z: Like can we keep this going for another hour I want 2 UT Prosim hours. .

[01: 00: 24. 14] Interviewer: No. . I'm not. . wow thanks you. . . no I don't have anything to talk to you about - unless you're going to talk to me about getting hints, giving hint and feedback. .

[01: 00: 36. 20] Z: This one time I got hints some hint at this one place. .

[01: 00: 38. 13] Interviewer: Oh speaking of which - at any point did you guys ever hit show solution - cuz I've recently discovered CodingBat has this option. . .

[01: 00: 47. 20] Z: NO you lose points don't EVER touch that~

[01: 00: 47. 20] D: What ? No you don't . . .

[01: 00: 52. 14] Z: You can literally get a 0. . . you hit show solution its like oh you failed this one. .

[01: 00: 52. 10] Interviewer: but you can still turn it in. . and . .

[01: 00: 54. 00] Z: good luck on the next one. .

[01: 00: 57. 26] Interviewer: Cant you still turn it in?

[01: 00: 56. 17] Z: The only way to that's helpful is when you have another account and then you can show solution over there -

[01: 01: 01. 11] Interviewer: Oh my god. . [laughing]

[01: 01: 01. 11] Z: You copy the solution and you paste it in your account you're being graded on. .

[01: 01: 04. 09] Interviewer: how long does it take you to do your homework problems? You have this very long convoluted way. .

[laughing]

[01: 01: 10. 29] C: Well I had 2 accounts one from highs cool one form college. So I would just copy paste like all over. .

[01: 01: 19. 02] Z: It's a pretty common thing. .

[01: 01: 16. 13] Interviewer: this is interesting. . . I never when I learned we didn't use CodingBat at all so. . .

[01: 01: 27. 10] Z: and its not that these took me so long that I was getting frustrated and giving up - it was usually like I have an hour to do this - its due in an hour I'm starting now - lets get this done now.

[01: 01: 37. 24] Interviewer: Ok so see - it's not judgment one way or another - but I think it's interesting. . .

[01: 01: 48. 20] Z: And that's why a suggestion in the beginning is great.

[01: 01: 54. 17] Interviewer: and they started not - oh I have an hour to do it. the homework was given to them on Wednesday - they stated it on Wednesday. . . they had seven days to complete the homework and they were stuck so it took that long. I'm talking about people, learning to code you know so - like when you were back in high school - like learning to code. And there was - so it not like hey I'm gonna run out of time. . you're not. You've got three whole days to turn this in. . . three's no way you're gonna run outta time. because then you can go to the TA for whatever. . starting out they were similar.

[01: 02: 30. 05] Z: In the context of receiving a grade - I think show solution is not ok but I think in the context of self learning show solution is great - especially if the whole point is because hey- we did this here because - we did this here because . . on this line we decide to use this because. . that's awesome.

[01: 02: 50. 23] C: Don't put a show solution there I will go hit that button every single time before I even start the problem. Every single time. And I am like. . .

[01: 02: 57. 04] Z: Put it on a timer of 30 minutes. .

[01: 02: 57. 04] C: Pure laziness because of that. .

[01: 03: 00. 10] Z: I think most coders are inherently lazy

[01: 02: 59. 10] C: Maybe o a timer - but Id cheat on that too. I m a good coder , I like dong work - but if there's that easy way out Ill take . .

[01: 03: 11. 14] Z: Every time yea. .

[01: 03: 09. 11] D: That's the problem , we just need to take the grade out of it so there no need to cheat.

[01: 03: 17. 21] C: well I would even do it if I was coding it one my own. .

[01: 03: 17. 20] D: SO then what would was your point of doing it?

[01: 03: 29. 17] C: Exactly - I would use something else that didn't have me - like give me the solution. Cuz I wanna figure it out - cuz if there's that easy way out I will take it. . .

[01: 03: 34. 12] Z: Like it's if there's an easy way out. . . why would you do something your own if you. .

[01: 03: 38. 09] C: Exactly , I wouldn't do it. . so I would do something.

[01: 03: 39. 20] Z: The you wouldn't use CodingBat at all then. .

[01: 03: 39. 20] D: Wait what. .

[01: 03: 46. 10] Interviewer: so how would you use CodingBat to earn something then?

[01: 03: 46. 10] C: If I was gonna do it like and there was as show solution button -I would just take every time - but if it didn't have a show solution button

[01: 03: 53. 26] Z: I just need to step back - one step- why re you gonna use CodingBat at all if you're going to use show solution? If you're not there for a grade? If you're doing this for your own willpower isn't the easier way out not to go at all?

[01: 04: 03. 19] C: Yes - that's the point - I wouldn't even use it at all. . if there was show solution button. . .

[01: 04: 13. 05] D: Because you would want to go and pres the show solution button and see what the answer is?

[01: 04: 14. 22] Z: You're literally that incapable. . . you're like oh my god I wake up in the mooring and I have to go CodingBat and hit the show solution button right now~

[01: 04: 19. 20] C: No no no. . like if I needed to study for my interview - and I was doing this all on my own just to earn . .

[01: 04: 25. 27] Interviewer: Right. .

[01: 04: 25. 27] C: Just to do stuff - I wouldn't use CodingBat cuz I know that there is just that easy way out I would go to something like the coding interview book - that just gives - here's

the problem and here the general solution and here's how you - like a solution not the solution so you kind of figure it out on your own but there's frameworks there as a solution at the bottom.

[01: 04: 49. 05] Z: Ummm. . I, , , ,

[01: 04: 52. 00] C: If there's code there. .

[01: 04: 48. 21] Z: I strongly disagree. . I think your willpower problems are between you and god

[all talking]

[01: 04: 59. 11] Interviewer: I am going to disregard that last comment. . . but I think this is interesting so t no point. . . so what is the longest any of you guys have gotten stuck using CodingBat? How long. . . ?

[01: 05: 09. 17] Z: I cap out every 15 minutes on a problem. . If I have a problem and like I'm stuck for 15 minutes and a segment of code this big and cant figure out after 15 minutes and I'm like pssh I'm done.

[01: 05: 20. 27] C: I think my attention span is seven minutes and then I'm gonna do something else for like 4 and then Ill come back and mmm. . about 30 minutes later if I haven't gotten anything with the intervals of like going to watch a Youtube video or going to read a Buzzfeed thing - and I come back, and it snot in that 30 minutes I'm done I've given up , like go home.

[01: 05: 34. 03] Interviewer: So if it was for a grade do you wait until 30 minutes is done to Google it or do you Google it way before?

[01: 05: 39. 04] Z: Oh instantly - like if its for a grade I just Google as it goes I'm just like I want the easy A. . .

[01: 05: 47. 02] Interviewer: So it's like the Show Solution button - . .

[01: 05: 44. 18] Z: It absolutely is. .

[01: 05: 50. 09] Interviewer: So it's really no different. .

[01: 05: 47. 21] C: Not necessarily because the things

[01: 05: 49. 29] Z: If I'm doing it on my own though I m not gonna hit the Show Solution button - cuz I wanna be there like drawing a parallel - if you're playing video game like sure maybe cheating and being the best every single. . winning every single time without any competition whatsoever is fun for like the first 3 times you do - but you're like hey I won 3 times in a row - but immediately after that you're like why am I playing this - there's no challenge I'm not having fun anymore. . . so on CodingBat if you're on your own doing it . . you hit Show Solution 3 times , you're like why am I hitting the Show Solution button - I'm not learning anything , I'm here to learn - why am I even here. . . Cuz I'm not being challenged, you're not learning - you're getting nothing form it - but if you're doing it for a grade you have like a thing that you need to do. . like I was[. . ] I'm just gonna do - cuz now I have purpose to be here - and I also have purpose to get it done in the minimal amount of time possible.

[01: 06: 43. 13] Interviewer: Ya

[01: 06: 43. 13] Z: But if I'm doing it o my own I'm not gonna hit the Show Solution button until I feel like I need it cuz - my purpose is I want to learn - its because I'm forced and need a grade.

[01: 06: 56. 10] D: The longest that I ever spent. these people, I don't know how they would survive in life. .

[laughing]

[01: 06: 58. 13] D: Umm. .

[01: 07: 00. 19] Z: I look both ways before I cross the street.  
.

[01: 07: 00. 19] D: the longest I've ever tried I'd probably say  
is between 2 or 3 hours - which is because. .

[01: 07: 08. 28] Z: Oh My God! - I dunno how you're gonna  
survive in life

[01: 07: 16. 09] D: . . . Which is because an hour and a half  
of that is me trying to figure it out - and the other hour was  
working with my friend - who is very very against any possible way,  
any way of breaking honor code what so ever and I wanted to work  
with her. And so that's why it went on for 2 and a half hours -

[01: 07: 36. 05] Z: Is this you?

[01: 07: 36. 05] C: No. . . this isn't me. . . no!

[01: 07: 35. 25] D: No. . .

[01: 07: 38. 29] Z: Like wow you changed. .

[01: 07: 38. 29] Interviewer: Ok. . so there's that right - so  
you're talking about 2 hours. . . is this like continuous  
submission and its always wrong for 2 hours? Because you get  
unlimited submission - or is it you can't figure it out for 2 hours?

[01: 07: 55. 22] D: Um. . . I. .

[01: 07: 57. 21] Interviewer: Mmmhmm. .

[01: 07: 57. 09] D: I would code something I would be wrong and  
then I would be trying to figure out why I was wrong for like an  
hour and a half -

[01: 08: 03. 10] Interviewer: Ok. . and basically - cuz I  
cant remember what CodingBat tells you - it just tells you hey this  
test failed right?

[01: 08: 09. 01] D: Ya it just tells you this test failed - and  
I'd be trying to do things to make that 1 test work. . . if it  
wasn't one of the cases that you also. .

[01: 08: 21. 04] Z: Oh my god - there were so many cases where I  
would get all of them except 1 and I would just - hard code that 1  
case. . I'd be like screw this. .

[01: 08: 21. 22] C: No. . Oh my god. . yes

[01: 08: 24. 02] D: But then you get that 1 that you can't hard  
code - then you're like oh

[01: 08: 27. 27] Z: There's no such thing as something you can't  
hard code - . . .

[01: 08: 31. 23] Interviewer: But I've heard there's also hidden  
- there's hidden test

[01: 08: 36. 05] D: Ya there's the hidden test. . .

[01: 08: 33. 21] Z: Oh ya - if you hit one of the hidden test  
that you don't know the given inputs then you're SOL but if its like  
you're passing all those - and then like you have the other nine  
you're missing 1 - then you can be like if my inputs aren't this. .

[01: 08: 48. 07] C: If you cant figure out that one tests case  
then its probably just like you forgot to make your for-loop run  
form 0 to 10 instead of 1 to 10. . like its 1

[01: 08: 58. 25] Z: I'm pretty sure that would me up more than 1  
tests case. .

[01: 08: 57. 18] C: If its 1 test case that you can see is  
wrong. .

[01: 09: 00. 18] Z: And this is where the hint comes in!

[01: 09: 03. 11] Interviewer: See - it's all coming together.  
.

[01: 09: 06. 23] Z: I need to get this 1 tests case done - hint don't hard code it try to . . . .

[01: 09: 10. 04] Interviewer: That would probably be an excellent hint cuz I've given out multiple of those on my talk this morning - but ya and that's where I was going in terms of timing. Like how long are you going to sit there - you know do you. .

[01: 09: 25. 09] D: I don't wanna sit there for that long

[01: 09: 22. 16] Z: 15 minutes tops. .

[01: 09: 35. 10] C: Ohh - take this with a grain of salt - but that's where you cheat. .

[01: 09: 41. 01] Z: Oh absolutely

[01: 09: 48. 08] Interviewer: Oh I've gotten that - and also how many times do you submit it? Not before you basically Google it/. . so for example you're not working on that for 2 hours but do you just submit - its wrong - you turn it in -you turn it in. .

[01: 09: 58. 09] Z: Its not really a submission cap limit - its mostly a time limit if I'm trying to understand it - cuz like I said - I 3 code hint compile - write 3 code hit compile. Well that's how I did used to do it. . I don't do that anymore obviously -

[01: 10: 07. 24] Interviewer: Right. .

[01: 10: 07. 24] Z: But like ya - when I was first starting to cod e- Id be like did I make a syntax error? Did these things work? Is this all working as I expected it to? And I would just like hit it a million times so Id probably be at like - Id probably hit that button a 100 times in 15 minutes.

[01: 10: 25. 13] Interviewer: You didn't have submission cap either?

[01: 10: 25. 13] C: I mean - I didn't have a submission cap but if I hit that submit button more than six times I was like uhh uh. I meant he time wouldn't like matter to me cuz like I said before I'd write it all - instead of doing the 3 lines at a time - Id write all 20 - check it - wrong. . rewrite all 20 - check it - wrong - rewrite all 20 - check it - wrong - after that I'm like alright I did all this work - I'm done. - nope.

[01: 10: 45. 22] D: If I don't have submission cap I'd just keep working at it forever. Ill just keep trying things even they don't make sense - so. . .

[01: 10: 52. 23] Interviewer: Interesting. . .

[01: 10: 52. 23] Z: Relentless - I like it

[01: 10: 57. 21] Interviewer: I mean. .

[01: 10: 57. 21] D: Well for other classes like 2505 and 250six and stuff - where you have a submission cap then its like

[01: 11: 00. 17] C: oh then you do. . .

[01: 11: 03. 16] D: I try super hard to get it right the first time and then when I don't - I'm like oh god I need to be terrified now.

[01: 11: 12. 08] Z: Ya. . . .

[01: 11: 13. 26] Interviewer: I feel like in all of these - there's a lot of fear in all of you guys. .

[01: 11: 14. 18] Z: CS is like non-stop stress, fear and like panics. .

[01: 11: 17. 27] D: Tears. .

[01: 11: 17. 27] Z: And anxiety. . tears and ya - that's all CS is.

[01: 11: 25. 04] Interviewer: Oh my god. .

[laughing]

[01: 11: 26. 29] C: I think - I think. . . the number of times. .

[01: 11: 26. 26] Z: CS is not for the weak hearted. . .

[01: 11: 29. 15] C: . . like we should just drop out now and work the corner e- just like . .

[01: 11: 32. 00] Z: Oh my go d- I've said that so many times this year - I'm like I give up just be my sugar mama. . . I m gonna be a stripper. .

[01: 11: 41. 26] Interviewer: Umm. . y

a so I think it's interesting you guys - you get a submission cap - look at time -. . and so you're a TA - do you guys use CodingBat in your class? [01: 11: 48. 12] Z: Noo

[01: 11: 49. 13] Interviewer: Ok - did you TA for a class that use d that. . . I TAd for 1044 all the times.

[01: 11: 55. 05] Interviewer: Ok cuz I had someone tell me um - she doesn't care bout the submission cap - and another person has said they do and the largest submission has been 30 -. . . .

[01: 12: 09. 29] C: Uh no.

[01: 12: 09. 29] Z: I. .

[01: 12: 11. 15] Interviewer: At which point they give up and go - but I've has students do that too.

[01: 12: 14. 29] Z: But we have like really small assignments so in a way you can. . we'll have people use web-cat as their debugger until they hit they hit their - they have like 10 submission caps - so they'll like fled to seven and then they'll slow down dramatically - an then they'll actually think about it but like for the first seven - they'll be like type a couple lines - submit - type a couple lines - submit

[01: 12: 43. 23] Interviewer: I'm essentially thinking about I mean most of use Web-Cat for a good period of time - and I'm thinking of CodingBat like that - like submit like back and forth back and forth -like using it as a debugger - its broken. .

[01: 12: 52. 01] Z: Ya what I get a lot is a lot of students wont even hit they're own compile button on their computer - or like even send it to Web-Cat. They'll literally be like type in their code - like flag me down - ask me about their code and say will this work - and I'm like - figure it out. .

[01: 13: 21. 05] Interviewer: Yes - ya if you don't hit compile I can't help you. But ya that's why I just wanted to take back really quick - I was done a litter while ago but ya - we talked about submissions and drifted off on a tangent. . I didn't get a chance to comeback so that's why I came back. . um. . . .

[01: 13: 39. 04] Interviewer: Thank you for all of your honest comments - it's anonymous and I destroy the recording after the transcription. .

[01: 13: 44. 02] Z: So what's the point of recording it?

[01: 13: 48. 01] Interviewer: Because I'm not gonna remember everything you said - and I have to write it all down. . .

[01: 13: 48. 25] Z: Touché. . that makes sense. .

[01: 13: 48. 25] Interviewer: Yup its part of my IRB. . .



[01: 13: 52. 21] Z: It's anonymous - but we had to say our names?  
[01: 13: 52. 21] Interviewer: That's for me - when I divide it up I can differentiate. . .  
[01: 14: 01. 26] Interviewer: Umm. . would guys have used CodingBat if it hadn't been part of the class?  
[01: 14: 06. 19] Z: I have not used CodingBat ever. . .  
[01: 14: 07. 14] D: I wouldn't even have known about it. .  
[01: 14: 07. 14] Z: I have used CodeAcademy when I wanted to learn CSS - which didn't take very long but I used it to learn CSS. . .  
[01: 14: 19. 20] Interviewer: DO you ever go back and do questions you did ?  
[01: 14: 21. 02] Z: But CSS was visual which was a very strong thing - its be like - type this CSS and html - hit compile and it'd popup in a box right next to it - this is what it looks like so it was.  
[01: 14: 38. 02] Interviewer: It's just a little more difficult when you're doing like structures. . . but interesting.  
[01: 14: 40. 00] Interviewer: Alright guys thank you so much !

## Appendix F: VT IRB – 15 – 210 Amendment Approval Letter



Office of Research Compliance  
Institutional Review Board  
North Hall Center, Suite 4120, Virginia Tech  
300 Thierer Street NW  
Blacksburg, Virginia 24061  
540/231-4606 Fax 540/231-0959  
email [irb@ut.edu](mailto:irb@ut.edu)  
website <http://www.irb.ut.edu>

### MEMORANDUM

**DATE:** April 29, 2015  
**TO:** Stephen H Edwards, Manuel A P Perez-Quinonez, Priyanka Mohan  
**FROM:** Virginia Tech Institutional Review Board (FWA00000572, expires April 25, 2018)  
**PROTOCOL TITLE:** Focus group to understand feedback for drill-and practice systems (CodeWorkout)z  
**IRB NUMBER:** 15-210

Effective April 29, 2015, the Virginia Tech Institutional Review Board (IRB) Chair, David M Moore, approved the Amendment request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report within 5 business days to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at:

<http://www.irb.vt.edu/pages/responsibilities.htm>

(Please review responsibilities before the commencement of your research.)

### PROTOCOL INFORMATION:

Approved As: **Expedited, under 45 CFR 46.110 category(ies) 6,7**  
Protocol Approval Date: **February 27, 2015**  
Protocol Expiration Date: **February 26, 2016**  
Continuing Review Due Date\*: **February 12, 2016**

\*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

### FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals/work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

*Invent the Future*

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY  
*An equal opportunity, affirmative action institution*

Date*	OSP Number	Sponsor	Grant Comparison Conducted?
02/26/2015	12259505	National Science Foundation	Compared on 02/27/2015

\* Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

## ***Appendix G: Round 2 – Focus Group 1 - Transcript***

[00: 00: 16. 16] Interviewer: As we get started I just want to emphasize if you have conflicting opinions that's totally fine, that's the reason we do these things – so you guys can just can tell me how you feel or your opinion about questions or stuff I may show you. So we're going to talk about drill-and-practice systems. I'm assuming you guys have used drill-and-practice systems, they are online told that help with learning – and one of the examples Tech uses is called CodingBat, which you guys have used at some point during the program. My research group s working on developing a slightly different version of a drill-and-practice system called CodeWorkout. So if I go back and forth between drill-and-practice and CodeWorkout, I'm referring to the same thing. The goal of this focus group is to explore the role of feedback within CodeWorkout and how to best provide while you are completing an exercise. So we'll talk a little bit about feedback through the process and we'll look at a sample exercise to walk through and talk about.

[00: 01: 43. 00] Interviewer: So we'll start with this – it's blank, but tell me it's too small to read. Please go ahead and read it and then we'll talk about it. As you guys have done CodingBat the exercise looks pretty similar – so what's your first reaction once you read that?

[00: 02: 12. 21] F: Oh the problems?

[00: 02: 12. 21] Interviewer: Yes, how would you go about doing it? This is what you see when you start the exercise. Assume you have to take it for class or something . . .

[Reading exercise]

[00: 02: 26. 22] F: Lets see, I read the problem, and I look at the example. And if I don't clearly understand the problem . . . so . . .

[Reading the question]

[00: 03: 13. 05] Interviewer: So you're first reaction was to look at the question and then to read the sample problem . . . don't worry about trying to solve the question correctly.

[00: 03: 16. 00] J: Yup . . .

[00: 03: 18. 24] Interviewer: So at what point when you first read the question do you start to look for feedback? Is it right away or do you read the question all the way through? . . Maybe you're looking for help at any point?

[00: 03: 32. 24] F: Um . . . by feedback do you mean information provided or?

[00: 03: 35. 11] Interviewer: Anything . . .

[00: 03: 39. 17] Interviewer: Do you want a prompt? Are you looking for information provided . . . just in general when you first come up to a blank exercise . . .

[00: 03: 40. 12] F: Ok. . For me, I read the prompt, and then I guess I read the example, I just go incrementally. .

[00: 03: 50. 24] Interviewer: In chronological order . . .

[00: 03: 50. 24] F: Ya. . .

[00: 03: 54. 15] Interviewer: So do you think it would be helpful at any point before you start? And then what would be you're next

process? . . Like after your done reading the thing, you read the question and then . . .

[00: 04: 07. 27] F: Look for the method stub I guess, see the arguments. . .

[00: 04: 07. 27] J: Ya, look at what kind of return type they want, make sure it's the same. . . . as what they asked form the prompt. Um, . . I guess for this what I notice is that it doesn't give a . . like it show the example for when the result is 10 , when it's 0, but its doesn't show the result when it's 5. . .

[00: 04: 28. 22] Interviewer: Mmmhmm. . .

[00: 04: 30. 06] J: I think that's interesting to think about. I'm not sure if that's necessarily good or bad though. . . . I think it's partially good because it's not like feeding you another example. . .

[00: 04: 49. 00] Interviewer: Right. . .

[00: 04: 50. 14] Interviewer: What is that was there at all? What if this part wasn't there at all, if it was just the question?

[00: 04: 53. 25] J: If it was just the question?

[00: 04: 56. 13] J: I think for this problem I'd be fine with that because, the difficulty is easy enough where I think I should be able to figure it out. Where it's just. . if statement logic. . .

[00: 05: 14. 23] Interviewer: Right, I realize it's very simple logic, and you guys can solve it. . . and that's why I wanted to give it to you, because I don't want to spend your time trying to solve the problem. For example, if you're going through and trying to teach someone who hasn't done it. Um. . . so if - is your automatic instinct to read the example?

[00: 05: 39. 27] Interviewer: If I take the example out do you think it would it be almost easier to understand? Or would you look for extra information on the page, if those examples weren't there.

[00: 05: 50. 04] J: I think. . . um yeah. . . I'll look for more

[00: 05: 52. 04] F: Ya. . .

[00: 05: 52. 04] J: If not I'll just start writing the examples. . like test cases.

[00: 05: 54. 18] Interviewer: You mean you'd start writing the code?

[00: 05: 56. 00] J: Well it's just like . . . . I think id just like basically write this down, just kind of on the side, to just understand it. . . like if a , b. . . .

[00: 06: 05. 01] F: Ya, I would write test cases before I write code. . . .

[00: 06: 05. 01] F: I do that like out of habit. .

[00: 06: 05. 01] Interviewer: Ya,

[00: 06: 04. 11] F: Like before I'd just try to write code straight and that didn't always work out for me. . . um I felt that writing test cases has helped me out in interviews and . . um. . it helped me um. . . confirm like how much I understood the problem. . . .

[00: 06: 28. 23] Interviewer: So you're thinking about it in a different way. .

[00: 06: 28. 23] F: Ya.

[00: 06: 29. 08] Interviewer: Cool. .

[00: 06: 31. 23] Interviewer: Alright, we'll jump to another question and then journey back a little bit. So- I noticed you guys talked about that, you talked about this but you didn't really talk about anything below the code screen. . right? So there's a thing

that says Check my Answer - but there's no code in the box - so that's makes no sense. And then there's a thing that says 'Practice a different Java exercise'. . if you're basically like I don't wanna do you. . and then there's something titled FAQ. . .

[00: 07: 02. 12] Interviewer: Lets say you had noticed it and clicked the FAQ. . . and this had come up. . .

[00: 07: 07. 19] Interviewer: Can you read that?

[00: 07: 07. 19] F: Yup I can read it. .

[00: 07: 07. 19] J: Ya. .

[00: 07: 07. 19] Interviewer: Ok

[Reading next printout]

[00: 07: 18. 04] Interviewer: If you didn't have that example or if you had the example and couldn't understand the problem. . . Um - would you utilize that option at any point?

[00: 07: 28. 06] Interviewer: It doesn't show up unless you click on it. . I opted for a low fidelity prototype so I wouldn't have to shove a computer in your face. It's also so there isn't a screen between us where you can't look at me.

[00: 07: 41. 09] Interviewer: So the one on the left is first and then if you click on it. . .

[00: 07: 43. 13] J: If I was stumped then ya. . .

[00: 07: 45. 29] J: Id just keep looking at it and then Id say ohh what is this?

[00: 07: 48. 18] F: Ya if I didn't have the example. . I would've clicked it. . .

[00: 07: 54. 26] Interviewer: So for example, it's hidden. It's there if you need it if not. . Would you it just be there on the page altogether?

[00: 08: 03. 09] Interviewer: How would you feel about that? . . Would you actually use the option to solve the exercise or do you think it would be. . .

[00: 08: 15. 13] J: Ok. . . um. . . if I needed it, if I was stumped Id use it - otherwise I might click it out of curiosity. Just be like what would happen - what would be some alternate solutions or possible methods or. . .

[00: 08: 24. 29] Interviewer: And given this question it says. . what does it say?

[00: 08: 28. 00] Interviewer: Consider using a local variable to hold your values. . . um. . which is a little bit more conceptual than giving the answer. . have either of you TAd before?

[00: 08: 34. 08] F: No. .

[00: 08: 34. 08] J: . . Nope

[00: 08: 34. 08] Interviewer: That's totally fine - um. . so if this were for you and you had to solve a problem, say it was like a recursion problem or something. . . what kind of stuff would you be looking for that to provide you? . . . Say you had that question and it's a little bit more complicated than that - you had an example, and then you started wandering through the page and you clicked on that, and you're like I don't know what I'm supposed to do with this question. What would you expect to see underneath the FAQ that you think would be helpful? . . Would you rather have the answers just show up. . ?

[00: 09: 19. 21] J: Um. . . .

[00: 09: 21. 27] Interviewer: This isn't really for grades. . it's just about solving the question. . . .

[00: 09: 35. 00] F: I can't really think of anything. . .

[00: 09: 36. 04] J: Um. . nah. .

[00: 09: 36. 04] Interviewer: It's a free space - say whatever you'd like. .

[00: 09: 36. 04] J: Id just want stuff to help me get started. . . like. . consider thinking about it this way or that way. . . . see if that could help like get somewhere. . . Cuz a lot of times its like I just don't know how to start a problem. . . so it's like, how do I approach this. . like or . . I don't know. . . .

[00: 09: 55. 00] Interviewer: Ok - so you bring up a very good point. Not knowing how to start the problem can often be the problem. . right? So all of this shows up before you type any code. . You've got no code in there so you've got no feedback, or test cases that are failing or passing or whatever. . . so lets say this is like Eclipse or whatever you code in. You want something to help you . . start. . So what kind of things do you think would help you start? Would it be an example problem. . . or do you think concept driven. . . .

[00: 10: 18. 11] Interviewer: Cuz ideally like would you want to see the answer, or would you want to figure it out?

[00: 10: 24. 23] F: Define figure it out? . . I guess - ok this thing. . . . cuz sometimes. . . [laughing]

[00: 10: 31. 26] Interviewer: Nope it's totally fine. Cuz it has to span, across classes so questions about recursion or whatever. . Recursion is a little bit more complicated to talk about without giving the answer. . . right?

[00: 10: 48. 16] Interviewer: So if this was a recursion problem and you didn't know how to go about it. . what are something that would help you get started. . .

[00: 11: 00. 02] F: Hmmm. . .

[00: 11: 00. 02] Interviewer: Or would you use it at all? Would you just come up with test cases on your own?

[00: 11: 05. 16] J: I would usually just code tests cases on my own - like I would like hand write test cases. Like if I had a linked list problem, Id probably, Id definitely have to write that.

[00: 11: 19. 05] Interviewer: So what if that was on the page? would you use it or would you rather out something on your own first?

[00: 11: 25. 10] J: I would use what's given first. . and then. . .

[00: 11: 31. 23] Interviewer: You're quiet. . thoughts?

[00: 11: 32. 07] F: Oh. . um. . . no it's just. . . uh. . . .

[00: 11: 37. 06] Interviewer: There is literally no wrong answer. . . we do these cuz all of us think really differently.

[00: 11: 41. 16] F: I know back when I took 1114, I was like holy crap I just need to get this done. .

[00: 11: 50. 06] Interviewer: Right. . .

[00: 11: 53. 15] Interviewer: But if this was a more complicated problem. . like the node at the bottom of a crazy tree. . .

[00: 12: 03. 02] F: So when you say help without giving the answer like for recursion, do you mean like they'll give the code? Or the logic? or?

[00: 12: 10. 26] Interviewer: What so you think would be the most helpful?

[00: 12: 13. 28] F: Ummm. . . I guess I would like to . . if I'm like you know completely stumped, I would like to know the logical process. . . like how I should be thinking about it instead of just seeing code. Cuz at the same time Id still to be able to solve it I guess. Because I feel like if they gave code I'm not really learning it -

[00: 12: 43. 13] J: Ya exactly. . I'm just copying it and

[00: 12: 47. 07] F: If I were to just copy code. . It's just not as satisfying. . .

[00: 12: 49. 26] F: So I guess an example would help. . . so a short example that would help me just like think about like - or how to like solve the problem using the recursive process I guess. . . or using recursion. Id just like , I can't really think of an example I guess. . but. . .

[00: 13: 12. 06] Interviewer: So what if instead of that question, I asked you about a factorial? Like solving a factorial. . . .

[sows new question]

[00: 13: 28. 03] Interviewer: So with factorials they don't tell you. . . you can do technically so factorials without recursion. . . right?

[00: 13: 30. 27] F: Hmmm

[00: 13: 30. 27] J: Ya. .

[00: 13: 30. 27] Interviewer: Um. . it would probably not be the best thing to do. . . . But lets say we look at this problem instead?

[Reading question]

[00: 14: 10. 16] F: Well the obvious difference is they don't give you the method stub. .

[00: 14: 13. 14] J: Ya the method structure. . or anything. . .

[00: 14: 16. 27] Interviewer: OK. . don't worry about that. . .

[00: 14: 20. 16] F: Factorial is just like 5 times 4 times 3 times 2 times 1 . . right?

[00: 14: 20. 16] J: Ya. .

[00: 14: 20. 16] F: Ok. . just making sure. . . I was like wait. . . .

[reading question]

[00: 14: 37. 29] Interviewer: So this is what it looks like when you show up. . . right. . read the question. . . what your first reaction. . .

[00: 14: 45. 02] F: Honestly, I'm really lazy, so I'd probably just pick the FAQ. . .

[00: 15: 07. 01] Interviewer: Hahah. . . ok so no example problem. . no method stub. . all you read is that. . . so your first reaction is to click that?

[00: 15: 14. 04] Interviewer: What about you? . . .

. . . .

[00: 15: 15. 01] Interviewer: Its ok to say no. . .

[00: 15: 15. 01] J: For me. . . if it was factorial. . I think I've seen factorial enough I would try to attempt it before clicking FAQ - but if it wasn't factorial, it was like a harder tree problem, Id definitely click FAW.

[00: 15: 27. 14] Interviewer: Just like right away?

[00: 15: 27. 14] J: Ya. .

[00: 15: 29. 14] Interviewer: Ok. . . . Let me ask you this. . . what are you expecting to show up?



[00: 15: 37. 19] J: Expecting to show up?  
 [00: 15: 37. 19] Interviewer: Like when you click on it?  
 [00: 15: 40. 02] Interviewer: Is it a desperation thing? . . . or  
 is it a lazy thing? . . . .  
 [00: 15: 42. 09] J: Hahaha  
 [00: 15: 42. 09] F: Hahahah  
 [00: 15: 43. 00] Interviewer: Even if its the lazy thing. . that  
 is fine. . I mean you click on it for a reason right? At the end  
 of the day you're trying to solve a problem. .  
 [00: 15: 51. 25] Interviewer: So what are you expecting to see?  
 [00: 16: 02. 13] J: Well I'm expecting some kind of help. . . um. .  
 . not sure. . . trying to think of something more specific than  
 that. . .  
 [00: 16: 09. 13] Interviewer: Some kid of help. . . ok. . . what  
 kind of help?  
  
 [00: 16: 16. 29] F: I don't know if this helps. . but it just feels  
 so bland. . I just want something more. . anything. . . just. . .  
 Hahah  
 [00: 16: 23. 08] J: Hahah  
 [00: 16: 23. 08] Interviewer: Like. . . .  
 [00: 16: 28. 26] F: It's just . like anything. . so then whatever.  
 . just t fill up the page. . . .  
 [00: 16: 29. 14] Interviewer: You want me to fill up the page for  
 you. . . ha-ha?  
 [00: 16: 32. 08] F: Too much white space. . . .  
 ]laughing]  
 [00: 16: 38. 18] Interviewer: So you click on the FAQ what kind of  
 help would you need? - Click on FAQ that shows up. . .  
 [show new screen]  
 [00: 16: 50. 26] Interviewer: and that's all you've got. . .  
 [00: 17: 00. 02] F: Uhhh. . I read it and. . like. . .  
 [00: 17: 06. 04] J: I dunno I feel like I'd have to have a harder  
 example where I didn't know what to expect. . . [laughing]  
 [00: 17: 14. 08] J: If they ask me a tree problem right. . . .  
 [00: 17: 14. 29] Interviewer: Ok, if I ask you , for example, to  
 find the lowest node in like a bee tree. . .  
 [00: 17: 21. 14] F: uhhhhhh  
 [00: 17: 23. 06] J: ohhhhhh  
 [00: 17: 25. 23] Interviewer: Even I can't do that on my own. . .  
 [00: 17: 25. 23] J: I guess if it's a bee tree. . Id be like what  
 do the nodes look like?  
 [00: 17: 33. 20] Interviewer: But this is all you've got. .  
 [00: 17: 33. 20] J: YA if this is all I've got then . . . . Id just  
 start drawing the circles. . .  
 [00: 17: 35. 04] F: Ya -. . . .  
 [00: 17: 37. 09] Interviewer: So what kind of help are you looking  
 for if you click on this FAW. . if I tell you find the lowest node  
 in this bee tree. . . .  
 [00: 17: 48. 01] Interviewer: And you don't have a method stub. .  
 or examples. . . .  
 [00: 17: 57. 02] Interviewer: So it's the same with factorial  
 right? Factorial is a little bit easier for you now. . . its rally  
 just to get you in the mindset. It's easier in this situation  
 because your first instinct is to solve the problem. . because I put

a question in front of you. But I'm saying if you didn't know how to complete a factorial?

[00: 18: 19. 27] Interviewer: I mean you mentioned. . 1. you're lazy. .

[00: 18: 21. 05] F: Haaa

[00: 18: 21. 05] J: Haahah

[00: 18: 21. 05] Interviewer: Which is completely fine. . . . 2. you said that it's a blank screen

[00: 18: 24. 12] Interviewer: Whereas with the earlier problem is showed you there was an example. So. . you're first reaction to click. . that is it because you're trying to look for something to give you more information about the problem? Are you trying to figure out how to solve the problem. . . that's what I meant by what are you looking for?

[00: 18: 44. 01] J: Ya . . I'm just looking for more information. . . . Id probably hoping for an example. .

[00: 18: 52. 10] Interviewer: Ok. . well that's help though. . . so what if, . . . so when you see these, you're expecting them to come from. . . . who do you think wrote these. . would you be expecting to come from someone who wrote the question?

[00: 19: 06. 23] J: Ya someone who wrote the question. .

[00: 19: 07. 06] Interviewer: Ok so what if you have the option to ask a question in the FAQ. . so you go to modify it a little bit. . . then instead of it just being solution provided by whoever wrote the question it was someone could ask a question. . and that response could also show up as an FAQ. . what are you're thoughts on that? . . You're smiling. . you're quiet. . . .

[00: 19: 32. 20] Interviewer: You have something, you want to say. . . . . go for it. . .

[00: 19: 32. 13] F: This goes back to like what J said before , like where do I get started. . like um. . . really broad questions. . . like where do I get started, how should I think about the problem. . . um. . . I feel like I should have more things. . but I can't think of anything. . . .

[00: 20: 17. 00] J: But um. . when it comes to like TA's, like if I were to ask them a question, I think I spend way too much time trying to think of a good question, because like I usually when I ask help from a TA, usually they say like what have you tried? So I usually spend a lot of time to think of a good question. .

[00: 20: 37. 13] Interviewer: You spend a lot time trying to think of a good question to ask your TA. . .

[00: 20: 47. 25] J: Um. . ya . . to show them. . . well I usually don't want to ask a TA. . where do I start? Like I dunno why. . . I think out of habit. . I just don't want to ask a TA that. . .

[00: 20: 54. 11] Interviewer: Fair enough um/. . but. . ok so lets say the TAs were the ones responding to this. . not the person that wrote the question, it's not like the generically set up responses. It's the TA responding to this. . . would you prefer that? AS opposed to. . if you had the option to ask a question. . .

[00: 21: 24. 10] Interviewer: In that blank if there was a button that said ask a TA. . . Probably where do I start. . . ?

[00: 21: 30. 28] J: YA!

[00: 21: 30. 28] Interviewer: And a TA responds. . . Typical TA response are usually, hey - hat have you already done? . . How are you thinking about this. . .

[00: 21: 37. 27] Interviewer: What kind of information do you find helpful when you ask a TA? Essentially that's what this part is supposed to do, if you don't have a TA for the class ideally, if you can ask a question, and also have response show up. . essentially it's almost like having a TA. And that's what I would like this section of the interface to basically replace- if you didn't have a TA for the class and you had to find a way to get help. .

[00: 22: 08. 13] J: Ya

[00: 22: 09. 20] Interviewer: So what kind of step. . . so you're saying you come up with a question to ask your TA. . So if you have to ask. . if there was a button that said 'Ask your Ta'. . what would you ask?

[00: 22: 17. 29] J: Other than where would I get started anyway?

[00: 22: 15. 09] Interviewer: Right. . . So if you say where would I get started. . . what kind of information are you looking for. . . like for them to give you the answer? Like so for example, you went up to your TA and said hey! I don't know where to start. And they say ok - maybe you should think about an appropriate base case. . . .

[00: 22: 38. 17] J: Um. . I think I'd want. . . ya. . . I think I'd want the TA to clarify the question. . and then I'd tell the TA if I thought of some examples. . . and then I'd tell him is that what the question is like asking about? Like to see if I'm even thinking about the right thing?

[00: 23: 12. 16] F: . . Um I know when I'm asking a TA I really like when they draw a picture. . especially when it's something like recursion right? I want them to like , draw a picture, to show like their thought process, as they're going through it? Maybe not the exact problem, but like a similar problem, that would show just like a small. . that incorporates a small part of what you'd be doing, in the actual problem to get it started I guess?

[00: 23: 33. 27] Interviewer: Ya. .

[00: 23: 43. 05] F: Ya so for truth type of questions I would just like if it could show me a simple. . just like a simple way to navigate through like a tree. . so that way I can find the largest / second largest. . however many largest. .

[00: 24: 00. 28] Interviewer: Whatever you need. . .

[00: 24: 00. 28] F: Ya how would I use recursion to move around a tree. . . . I guess. . . . that would be kinda hard to do. . if it just text based examples. . . . or I guess. . . .

[00: 24: 18. 13] Interviewer: Its ok. . I mean when I started doing this. . . it was difficult for me to think about too. . . It's like 2 plus 2 is 4. . why?

[00: 24: 25. 19] J: Ya. .

[00: 24: 25. 19] F: Ya. . .

[00: 24: 26. 09] Interviewer: So that why when you mentioned these were really broad. . It's just a different level of thinking. . . It's interesting

[00: 24: 36. 16] Interviewer: Um. . ok so I'm going to try a different approach - you have the option to ask a question. . . so you guys are doing this in a class right. . . so everyone is going to do the same problem or a different iteration of it. . what if every single person in the class could see that FAQ question. . . would you feel comfortable enough to ask a question?

[00: 24: 53. 25] F: If it was anonymous , yes.

[00: 24: 59. 25] Interviewer: Ok. . if it's completely anonymous you'd be fine with it. . .

[00: 24: 59. 25] F: Ya

[00: 24: 59. 25] J: Mmmhmm. .

[00: 24: 59. 25] Interviewer: Would you want the response to be anonymous too? Like you ask a question - Hey where do we start? Or I don't know what a base case it. . or whatever. . . Like would you want to know who the response came from? . . Like a professor or a TA or whomever. . . or would you be fine with it coming from someone else in the class?

[00: 25: 19. 17] J: Or Piazza, you know how they have that thing where oh TA endorsed this question. . . .

[00: 25: 29. 02] F: Ya. . . .

[00: 25: 29. 02] J: If that's something like that then fine. . . so if they answer and the TA's like ya that's actually right then I wouldn't mind that. . .

[00: 25: 37. 01] Interviewer: What if you're question was not anonymous. . would you still feel comfortable typing it in? Or asking?

[00: 25: 40. 15] F: Worst case scenario then yes -if I was really desperate then ya. .

[00: 25: 45. 03] J: Ya. . .

[00: 25: 46. 16] F: But. . .

[00: 25: 47. 24] Interviewer: Do you guys do it . . like do you use Piazza, or do it in your class?

[00: 25: 51. 03] F: No. . . . I normally go anonymous. .

[00: 25: 50. 03] J: Yeah, I always go anonymous

[00: 25: 54. 25] F: Well sometimes I feel really stupid asking it - so I'm like uhhhh

[00: 25: 55. 16] J: Ya. . .

[00: 25: 58. 21] Interviewer: Do they get answered?

[00: 26: 01. 13] F: YA. .

[00: 26: 02. 13] J: Yes. . they're not always helpful. . but for the most part. . .

[00: 26: 06. 12] Interviewer: Well that's good. . I'm glad you're actually using it. .

[00: 26: 10. 24] Interviewer: Ok so we'll move this along a little bit. . . we'll move out of the bee node thing. . but keep that in mind if you need to be in a more complicated headspace. . .

[00: 26: 21. 13] Interviewer: So lets say you hammer away at it, you get over the laziness, now you could check my answer. . and then that shows up

[new screen]

[00: 26: 32. 24] Interviewer: Sorry its very small

[00: 26: 34. 15] F: No I can read it

[reading question]

[00: 27: 12. 14] F: . . . . Wait factorial is. . if you put in 2. . its 2 times 1 right?

[00: 27: 15. 11] J: Yes. . .

[00: 27: 16. 23] F: OK. . just making sure . . . .

[00: 27: 20. 19] F: And 1 should just return one. . . .

[00: 27: 21. 18] J: Apparently not. . .

[00: 27: 21. 18] F: So this is what they input and this is what the program spit back out?

[00: 27: 25. 06] Interviewer: YA, you input 1 in the place of the parameter right? . . . n was 1, and it returned num, which was 1, and the feedback was like no. . . .

[00: 27: 42. 10] J: I would think. . .

[00: 27: 44. 01] Interviewer: You would think it was what?

[00: 27: 44. 01] J: I would think that was odd. . . like

[00: 27: 49. 17] F: But isn't. . .

[00: 27: 47. 13] J: So is it supposed to expect it. .

[00: 27: 53. 07] Interviewer: that's what it produced. . . not what its expecting. . that's what it produced. So you gave it this in the parameter space and it came back with this. And the greens and the reds mean right and wrong. .

[00: 28: 13. 18] F: Is it really wrong for 1 though?

[00: 28: 20. 29] J: I thought factorial of 1 would be 1. . .

[reading question]

[00: 28: 34. 14] J: If n equals one then n times n minus 1 which is 0 times negative 1, which is . .

[00: 28: 43. 05] F: Zero. .

[00: 28: 45. 29] J: Which is 0 right. . .

[00: 28: 46. 19] Interviewer: Ok. . this is good. . excellent. .

.

[00: 28: 48. 13] J: Am I just reading the code wrong? ?

[00: 28: 52. 02] Interviewer: It took me an hour to write that. . so we're good. .

[00: 28: 56. 05] J: Because I thought that if statement is kind of strange. . honestly. . like

[00: 28: 58. 07] Interviewer: Good! you're ready to graduate. .

[00: 28: 58. 07] J: I didn't understand . . I'm like why would you do that. . if you're just gonna immediately change num again. . is.

.

[00: 29: 10. 20] Interviewer: Yup. . why would you do that?

[00: 29: 09. 04] J: That's the first thing I saw. . . and I'm like ok. . . the first thing you do is set num to 0. . If n is equal to 1 you set num to 1, and then you're gonna change it again? . . that if statement and the num is equal s 1 felt really unnecessary. .

[00: 29: 26. 26] Interviewer: Ok great! - Yes you are right. . factorial is the number minus 1 until you hit 0. It took me a while to come up with a broken solution. . it was very hard. . .

[00: 29: 57. 09] Interviewer: So. . . no more too much white space. . right?

&[00: 29: 58. 22] F: Ya. .

[00: 30: 01. 06] Interviewer: So lets talk about first the location/ area of feedback. . FAQs are still there's. . . right? So this is what your screen looks like. . so lets go back to the question I asked you way in the beginning. . . So what's your first reaction? . . so this shows up right after you hit check my answer. So talk to me about your reaction and your response.

[00: 30: 23. 04] Interviewer: Cuz I saw it. . . but I don't have a camera. . .

[00: 30: 30. 29] J: First I just check the input and the output. I'm like ok, so is it actually wrong from the Math I was doing. . .

[00: 30: 36. 15] Interviewer: Mmmhmmm. .

[00: 30: 38. 11] J: Then. . .

[00: 30: 40. 01] F: Ya it made us question what a factorial is. . .

[00: 30: 40. 04] J: Ya I'm like wait. . . I think that's supposed to be the right answer. . . so like. . . Because red that usually means something's wrong compared to green - jut like on CodingBat . You have a green check or a red x right? SO here we have a check and a minus. .

[00: 31: 01. 05] Interviewer: Ya. . .

[00: 31: 02. 09] J: That's about the same. . .

[00: 31: 05. 02] Interviewer: What about where it's at on the page. . are you good with that. . like do you expect it to be somewhere else. . It's where you're looking for?

[00: 31: 08. 06] J: YA Id expect it to be. . .

[00: 31: 08. 06] F: I think CodingBat is similar right?

[00: 31: 08. 06] J: Ya. .

[00: 31: 12. 00] Interviewer: Ya. .

[00: 31: 13. 08] J: CodingBat shows it on the right. . .

[00: 31: 16. 14] Interviewer: Ok. . .

[00: 31: 20. 00] Interviewer: So lets say you're looking at that and. . . you're still trying to solve the problem. . its ok. .

[00: 31: 22. 29] F: YA - ok. . .

[00: 31: 25. 21] Interviewer: So you saw that. . so obviously your goal is greens - you want the answer right? What's your next step

[00: 31: 38. 20] J: My next step would be why factorial of 1 outputs 1 is wrong. . . um. . 1. because I think that if you put 1 in a factorial I expect 1 to come out. So maybe its not just checking the answer. . . same with factorial of 2. . I expect factorial of 2 to also be 2. So Id run through . . Id step through my code as if n were equal to 1. .

[00: 32: 09. 22] Interviewer: Ok. .

[00: 32: 08. 18] J: And see what comes out. . . and Id do that also for 2

[00: 32: 13. 17] Interviewer: So. . . roughly. . . how long do you think you would do that for. . like step through your code. .

[00: 32: 24. 29] J: Before changing it?

[00: 32: 27. 17] J: Id probably only do 1 or 2 examples. . . umm. .

[00: 32: 31. 20] Interviewer: What about you. .

[00: 32: 34. 11] F: I'm still like completely lost on the fact. . like cuz like these seem like all the correct. . its like. . aren't these the correct answers?

[00: 32: 39. 01] J: Ya, , they look like the correct answers. . um. . . .

[00: 32: 43. 28] F: So is it more of telling you what the right answer is and then . .

[00: 32: 46. 10] Interviewer: No. . . It's telling you ya. . .

[00: 32: 47. 17] F: Ok so it's telling you that your output didn't match this then. .

[00: 32: 47. 17] Interviewer: Correct. .

[00: 32: 51. 26] F: Ohhhhhh

[00: 32: 49. 21] J: Okkk okk. . ya ya

[00: 32: 49. 21] F: Oh god. . . cuz we thought

[00: 32: 51. 03] J: Ok ya

[00: 32: 57. 19] F: We thought. . was I doing that?

[00: 32: 54. 28] Interviewer: No!

[00: 32: 59. 21] J: I was like wait- these are right! What? ? ?

[00: 33: 02. 16] Interviewer: No! The factorial of 5 is a 120 - that's correct. . .

[00: 33: 05. 11] Interviewer: Ok. . . .

[00: 33: 04. 01] J: Now we got that out of the way

[00: 33: 04. 01] J: Ya. . .

[00: 33: 04. 01] Interviewer: I was like why are you so confused. . . 5 times 4 times 3 times 2 is 120.

[laughing]

[00: 33: 12. 18] F: Ok! So I'm expecting in my feedback - or in this space, to be like, what I did.

[00: 33: 16. 08] Interviewer: Ok. .

[00: 33: 16. 08] F: Ya! Not what the correct answers are. . .

[00: 33: 22. 18] Interviewer: Thank you! It took like 20 minutes. . I was like I don't understand why you're so confused. . . .

[00: 33: 26. 23] Interviewer: Ok so now that that's out of the way.

.

[00: 33: 32. 03] Interviewer: So would you expect to see what you're stuff returned or would you just expect to see the expected output

[00: 33: 36. 09] J: Both

[00: 33: 37. 16] F: Both - so I can compare and be like where was I wrong where was I right. . . like. . .

[00: 33: 41. 15] J: why was I right. .

[00: 33: 38. 26] F: Both, ,

[00: 33: 38. 26] J: Both would be most helpful if it was just my output and seeing that it's wrong - that would force me to step through the code. Um. . . but if it was both. . . ya - Id probably, Id definitely rely on what their. what the correct answer is. Like compare them. . .

[00: 34: 01. 05] Interviewer: I cold tell you weren't listening to anything I was saying cuz you were literally multiplying numbers

[00: 34: 06. 19] F: I'm like what is this? !?

[00: 34: 09. 23] Interviewer: That's why said don't solve it. .

[00: 34: 13. 22] Interviewer: But that's important right. . Cuz what I'm showing you isn't an interface I made up just for the study - its where the interface is at right now. . . and it's still in development. And this is the way they're looking at feedback, so its important for me to kind of take hat back and be like well - obviously you guys looked at it and you were like why doesn't 1 produced 1. . Right?

[00: 34: 27. 12] F: YA. . .

[00: 34: 30. 19] J: YA. . .

[00: 34: 28. 26] Interviewer: As opposed to 1 should produce 1. . . you're stuff is making it fail. .

[00: 34: 37. 19] Interviewer: Ok. . so we're gonna go back. . you talked about stepping through you're code right?

[00: 34: 38. 15] J: Ya. . .

[00: 34: 40. 01] Interviewer: So. . would you rather. . so for example if there was. . so there 2 options. . so there's no option to ask for any additional anything in this situation. . would you like an option at any point? Like even when you use CodingBat or whatever to submit. . would like the option to ask fro more help? Or do you just want to power through it until you figure it out? . . . Like how far do you go with that. . .

[00: 35: 16. 29] J: Like more hints or. .

[00: 35: 16. 29] Interviewer: Ok I feel like I asked you too many questions. . .

[00: 35: 21. 13] Interviewer: Would you like to get feedback periodically though? . . Like you look at the first one and your like hey - 1 does not return 1 why? You step through your code, you fix it. . more stuff is wrong. . would you like feedback throughout your process? Like as your trying to um. . solve it. . like would you like feedback to just show up? Like you've on a page for 10 minutes. . you've done nothing. . . .

[laughing]

[00: 35: 46. 28] Interviewer: Here is an option to maybe think about traveling in this direction. . or do you feel like that would get in your way. .

[00: 35: 52. 06] F: Ummm. . I think Id like that

[00: 35: 57. 26] J: I think Id like that more feedback periodically. . um, not that I've had something like that really. I usually, ya usually the way I get feedback is after I submit something, maybe I'll like, in Code Academy, . .

[00: 36: 19. 04] Interviewer: Ya, CodeAcademy does a decent job of that. .

[00: 36: 16. 12] J: Uh huh. . ya um ya. . . I think I . . just like specific feedback on what I did

[00: 36: 28. 12] Interviewer: Specific feedback like what?

[00: 36: 29. 10] J: Well, that was just me thinking about like CodeAcademy, cuz like they might tell you like the kind of error your getting or um, and CodingBat does that too. . . um.

[00: 36: 40. 15] Interviewer: Would you want it to catch that before you hit check? Cuz you referred to compile. . .

[00: 36: 44. 23] J: Like at compile time? Um. . . ya I would cuz I've also seen that kind of behavior in like HackerRank and um LeetCode. .

[00: 37: 01. 21] Interviewer: Ya I know LeetCode does that. . .

[00: 37: 06. 22] Interviewer: Thoughts?

[00: 37: 09. 11] F: Ok so would I catch the error before I hit compile?

[00: 37: 08. 24] Interviewer: Well not, not an error, like for obviously, this code compiles and runs

[00: 37: 13. 20] F: Hmmm. .

[00: 37: 18. 04] Interviewer: He's talking about like, you talked about seeing error messages in LeetCode

[00: 37: 20. 27] J: Ya. . .

[00: 37: 20. 27] Interviewer: Do you wanna talk about that a little bit?

[00: 37: 22. 00] J: I mean I don't really know what to say. .

[00: 37: 26. 12] Interviewer: Well what kind of error messages do you typically get when you run your code? Like is it just basic ones that stop things form compiling or is it. . . ?

[00: 37: 32. 12] J: Ya. . usually just basic ones. .

[00: 37: 39. 03] Interviewer: Ok. . So you're o the screen for 10 minutes, this option, you're kind of pounding away at it until check answer my answer, and going back and forth. What is there was a button there that said Ask for a Suggestion. . . . or basically it's a button . Would you click it?

[00: 38: 01. 23] J: Ya. At this point YES. . .

[00: 38: 01. 28] Interviewer: Well what if it showed up right away?

[00: 38: 06. 20] J: Um. . .



[00: 38: 06. 20] Interviewer: So it was right there underneath- you see this little thing. .

[00: 38: 08. 16] J: Mmmmmhmmmm. . .

[00: 38: 08. 16] Interviewer: The button showed up right there. . . it showed up with your table of passing and failing tests. . .

[00: 38: 19. 13] J: Id probably do that before stepping through my code. . ya. . .

[00: 38: 31. 24] F: Id just see that and be like oh. . there's x's on my thing, ill click it , what's wrong.

[00: 38: 40. 19] Interviewer: That's interesting cuz most people are like I don't want help. . .

[00: 38: 45. 22] F: Really?

[00: 38: 43. 22] Interviewer: YUp, I can't make this stuff up if I try. . . um. . . So how about - so the suggestion tells you , hey you know maybe you should think about actually implementing recursion blah blah blah. Would you rather that just show up on the screen? Like we talked about feedback periodically showing up, as in you've been here for 10 minutes - here's some help. How about if that showed up and then it gave you a message that said hey! think about using recursion. Would you want that? Or would you want to be able to figure that out yourself?

[00: 39: 28. 09] Interviewer: Or would you rather see suggestions show up after at least one submission? So there's the option of it showing up with the feedback right?

[00: 39: 33. 18] J: Mmmhmmmm.

[00: 39: 34. 11] Interviewer: So what if it was there right away? Like you had this blank screen. . .

[00: 39: 37. 24] Interviewer: So you have 2 options -and it literally said ask for a suggestion right there. . . versus showing up with the feedback. .

[00: 39: 50. 04] J: I feel like that would be tempting to click like before I even attempted the problem. .

[00: 39: 52. 19] Interviewer: Would you do it? It's not going to take off points or anything . . its literally jus there. .

[00: 40: 01. 18] J: I think if the question was hard enough I would do it. . .

[00: 40: 01. 18] Interviewer: What about you?

[00: 40: 05. 20] F: Like I dunno - when I took 3114 and we had like the - what is it - online[mumbling/ tests? ? ] I remember those had hints ad stuff but like I would at least try at least once or twice by myself first. . . .

[00: 40: 17. 00] Interviewer: So . . ok so you try it first before you ask? ok. . um. . . so you'd rather. . so what if it just showed up. If you hadn't typed in any code. . . and a suggestion showed up anyway - Would it bother you?

[00: 40: 41. 02] F: Um. . . .

[00: 40: 40. 13] Interviewer: Or would you wanna be able to ask for it when you need it. . same with the FAQ's right. . .

[00: 40: 46. 05] F: Ya. . . . I think Id. . hmmm. .

[00: 40: 46. 23] Interviewer: The could just be a [. . mumbling. . ]. . . . basically I'm circling the drain of asking for help versus just having it. . .

[00: 41: 01. 29] F: Hmmm. . . I think Id wanna try it first. . .

[00: 41: 13. 04] J: Um. . . I wouldn't mind if it was jut there in the first place. . .

[00: 41: 18. 16] Interviewer: If the button was there to ask for it or. . . .

[00: 41: 21. 01] J: If it just showed up, , ,

[00: 41: 23. 03] Interviewer: If it just showed up.

[00: 41: 23. 03] J: I don't really have a preference , like I'm probably going to click on it eventually, but yeah, I wouldn't care it was there in the first place or. . if it came later as a result of me clicking. .

[00: 41: 34. 24] Interviewer: As a result. . . ok

[00: 41: 36. 05] Interviewer: Ok. . so let me see how you feel about this. . . So what if you complete that , fix that broken code, so factorial actually works correctly, its all green. . and then. . . so, before I ask you this question can I just point like do you guys know why this is all wacked out?

[00: 41: 52. 18] F: Is it cuz it only does it 2. .

[00: 41: 53. 28] Interviewer: Ya, so its not actually recursion. .

[00: 41: 56. 23] J: ya, and it doesn't call itself

[00: 41: 57. 22] Interviewer: Ya, it doesn't call itself. . I was waiting for you to be like oh this is just wrong. . . instead he spent 20 minutes trying to figure out how to multiply 5, 4, 3, 2, 1.

[00: 42: 06. 02] F: No[laughing]. . . cuz its just like. . nah. . and then I was like wait - this doesn't print out 1? . . Why is it 1 here. . I was like oh god. .

[00: 42: 12. 12] J: Ya. . I was like that's 0. .

[laughing]

[00: 42: 17. 07] Interviewer: Ok. . I guess.

[00: 42: 17. 07] J: Ya I noticed that it didn't say factorial there. . .

[00: 42: 21. 26] Interviewer: Ok. . ya I just want to point that out. . . like it's actually a recursion problem

[00: 42: 27. 03] J: YA. .

[00: 42: 27. 03] F: Ya. . .

[00: 42: 27. 03] Interviewer: Probably don't do it with if statements. . .

[00: 42: 32. 04] Interviewer: Um so, lets say you realize this as you're solving it - and you're like hey! that should call itself. .

[00: 42: 39. 04] F: Ya. .

[00: 42: 36. 21] Interviewer: And all this should have green - because factorial of 1 is 1. . .

[laughing]

[00: 42: 42. 10] Interviewer: Just clarifying. . .

[laughing]

[00: 42: 48. 28] Interviewer: Um. . . how would you feel about being able to provide a suggestion, that would potentially go into the bank and someone else like if they hit ask for suggestion , like you did it. . you got it right - something like a pop-up shows up that says hey - congratulations on completing this exercise, um would you like to provide a suggestion for him to take it? . . and you don't know its him that's gonna get it but. . .

[00: 43: 13. 05] J: Ya. . .

[00: 43: 13. 05] Interviewer: And then when he comes in and he's like oh my god ask for a suggestion, cool, I don't wanna do this

problem, he can ask for a suggestion, and your suggestion shows up. . . .

[laughing]

[00: 43: 25. 00] Interviewer: How would you feel about that?

[00: 43: 41. 09] F: Ya a lot of the times, I come across that thing, like uh if I had known at the beginning, its like, if I could've like help someone else with it then. . .

[00: 43: 41. 09] J: Yeah. . like I always feel like in hindsight, after I finish something that took me longer than I wanted, I always wish that someone told me what I thought of like last, in order to figure out the problem like earlier. .

[00: 43: 55. 20] F: It would be cool if you could have a like an is this helpful? or not?

[00: 43: 54. 04] Interviewer: Ya, like an up vote /down vote thing?

[00: 43: 59. 10] F: yup,

[00: 44: 01. 17] J: Ya. . .

[00: 44: 03. 18] Interviewer: Would you , when you ask for a suggestion - so then it would be other students giving advice as well as like a professor or a TA, anyone can give you a suggestion. . um. . would you want it to be just like someone teaching the class? Or would you not care. . . like it could be him. .

[00: 44: 21. 13] F: I don't think I would care. . because I think that anyone who finished the problem, or a teacher or a TA would be helpful. . better than like none at all. .

[00: 44: 36. 05] Interviewer: Ya. .

[00: 44: 38. 19] J: Um. . I know when I try to help people sometimes, I just end up confusing them.

[00: 44: 45. 22] Interviewer: No but that's like. . this is like really good. . that's the reason I'm asking this question right ? so - there's multiple ways to do every coding problem , except for like a equals b, there's different ways to think about it? . . so what are you're thoughts on that. .

[00: 44: 54. 14] Interviewer: Id ask you a slightly different question if you guys were TA's but I'm gonna phrase it very plainly. . because you're not in that [mumbling] would be. . . um. . . cuz you don't . . cuz there are different ways to solve that problem right? . . so how do you approach that when you go to your TA. . .

[00: 45: 13. 17] Interviewer: Are they usually pretty good about giving you hints that don't change your solution? . . or. . cuz you're gonna give him. . your gonna put a suggestion in the box. .

[00: 45: 22. 29] Interviewer: Do you understand where I'm going with hits?

[00: 45: 21. 15] J: Umm. . wait so does the TA help me like continue with the way I'm trying to solve it or do they like supply the code?

[00: 45: 28. 01] Interviewer: But what do you think would be the most helpful. .

[00: 45: 32. 17] F: Um. . .

[00: 45: 32. 17] Interviewer: Cuz like ok. . factorial of 5, if its just factorial of 5. . I could use factorial 1 until. . or I can do n-1, times 2 times 3. . I mea the answer is the same. . right? I mean that's not how you should do it. . but the answer is the same. . . so, for example if you type that in. . you got 120 and you're like hey! this is right. .

[00: 46: 03. 07] F: Ya. .

[00: 46: 06. 22] J: So I prefer for it to help me solve my way first. . and then after that explain to me why that's a crappy solution. and then be like here's like a better way to do it and like. . and then get me started on that.

[00: 46: 15. 19] Interviewer: So like if you had to write a suggestion for that. . . so lets say stuff showed up in your FAQ. They're like hey think about this for better code efficiency. But you started off writing it by 5, 4, 3, 2, 1. . and it works. . . Its wrong. . but it works. . . what would your suggestion be? Would you leave a suggestion that related to that - or would you just be like hey use something. . . I'm trying to get you in the mindset of giving someone else feedback that you don't know. It's solely based on your response to the question, do you understand where I'm going with this?

[00: 46: 52. 08] J: So. . ok so FAQ says something. .

[00: 46: 57. 03] Interviewer: The FAQs can be. . right so we're talking about multiple levels of feedback on a page. . . and they can be from multiple sources. . or they can be from TAs or just the instructor level. . . and I kinda wanted to get your feedback on what you think about that? . .

[00: 47: 14. 16] Interviewer: So initially you guys were like. . ok I'm not trying to get you to change your opinion. . . I just want to be sure that you're sure about your opinion. . m. . initially you're like I don't care where the answer comes from they solve the problem, they solve the problem. . . so I'm telling you if FAQs could be open I could also ask for a suggestion. . the feedbacks gonna throw that stuff at me. what kind of information would you expect to see when you asked for suggestions knowing that anyone in the class can give you a suggestion.

[00: 47: 40. 12] J: umm. .

[00: 47: 41. 22] F: um. . . .

[00: 47: 45. 04] J: Like . . I'm definitely looking for the credible source I guess. . like I said like the Piazza thing. IF there was a professor endorsing or an instructor like I would trust it. . otherwise Id probably, Id probably look at what they suggested, and think about it . . and if it still doesn't make sense , Id be like nope. . they're probably like . . its not that useful or something. . . whereas if it's a TA then. . ya. . . I would. .

[00: 48: 11. 24] Interviewer: So you'd want something endorsed even if you get a suggestion?

[00: 48: 14. 25] J: Ya. . .

[00: 48: 16. 07] F: Ya. . same. .

[00: 48: 19. 02] F: Um. . For like a student answer, saying that's like endorsed by an instructor or TA that like, to me that's just like, its like you cant be wrong. .

[00: 48: 31. 19] J: Or. . . ya ya ya. . or like I hope that whatever a TA or an instructor says like that just cant be wrong , that has to be right. Um. . .

[00: 48: 42. 25] F: Cuz normally on piazza, there's multiple occasions where someone asks a question, there's so many answers, and the professors like no. . hahah. . that is not actually like the right answer. . and they get corrected. So it's like. . guess I can't trust anybody anymore. . so it's like. .

[00: 48: 52. 09] Interviewer: That's so sad. .

[00: 48: 56. 08] F: Ya. . they're trying to be helpful, but sometimes like what they think is the right answer isn't like. .

[00: 48: 58. 03] Interviewer: Its not the right answer. .

[00: 48: 58. 03] F: Ya, it just happens to be maybe like the 5 times . . maybe it was right for that case. . .

[00: 49: 02. 13] Interviewer: Ya. .

[00: 49: 02. 13] F: And it doesn't work. .

[00: 49: 05. 26] Interviewer: Right. . ya. . and that's where I'm going with it. . maybe it was right and this right for 120, but if I shove six in there. . its probably not gonna work. .

[00: 49: 09. 15] F: Ya. . .

[00: 49: 17. 17] Interviewer: Thoughts. . .

[00: 49: 20. 25] J: Maybe that seems like a waste of time. . but the professor just have to go through all the questions. .

[00: 49: 21. 29] Interviewer: Which is fine I mean. . if the professors fine with it then they're fine with it. . .

[00: 49: 28. 01] F: Mmhmm. .

[00: 49: 25. 14] J: Hmmm. . But then you'd also have to wait for the instructor to um. . respond to like every students . feedback. . . I dunno some teachers take longer than others. .

[00: 49: 42. 28] Interviewer: Would you. . if that pop-up showed up though? Would you put a suggestion in there, or would you ignore it?

[00: 49: 44. 11] J: Depends on how confident I am with the problem. .

[00: 49: 46. 17] F: Ya. . .

[00: 49: 51. 08] J: If its like ok I got the right answer but its like my code's really messy I feel like I didn't really provide the most efficient way to do it , but I probably wouldn't like suggest my method. .

[00: 50: 00. 18] F: YA. . I. . Ya. . . .

[00: 49: 59. 28] J: Cuz sometimes you look at it and you're like ah! that's really clean - but sometimes you're just like I just kinda like, try fixing this, try fixing that. . oh. . eventually it'll work. .

[00: 50: 08. 05] Interviewer: Ya. .

[00: 50: 08. 05] J: YA - and I don't wanna give that solution to someone, so it's depend on how well I did on the problem I guess. .

[00: 50: 12. 09] F: Ya I feel the same way. . . .

[00: 50: 20. 27] Interviewer: Hmm that's interesting, I actually didn't think about it like that. . . cool. . . is there anything else on the page like for example when you start. . or anything that's missing that you think you'd like to see if you didn't know how to solve the factorial? . .

[00: 50: 33. 23] J: Oh in the feedback. . . I think if I only saw these cases, like 1 through six. .

[00: 50: 39. 24] Interviewer: Hmmm

[00: 50: 41. 19] J: I might come up with a bad solution that takes care of every case and like if it didn't say like other tests. .

[00: 50: 47. 10] Interviewer: Right. .

[00: 50: 48. 18] J: Or. . ya. . or. . .

[00: 50: 49. 02] J: Like if it said other tests and it was wrong. . Id be like oh ok. . then I'm. . the way I'm doing it is definitely wrong. .

[00: 50: 55. 25] Interviewer: Interesting. . so that the. . I literally skipped over that question but that's brilliant. . so the hidden tests thing, or the other test, do help you. .

[00: 51: 03. 13] J: Mmmhmm.

[00: 51: 03. 13] Interviewer: Ok. . ok. . Ill take that under advisement. . what else?

[00: 51: 07. 14] F: Um. . maybe , possibly like , if like the general theme is like recursion you could like provide like a link maybe to like some quick like tutorial type thing or something , I guess. . or like. .

[00: 51: 22. 07] Interviewer: Do you think that would be helpful?

[00: 51: 19. 14] F: Um. .

[00: 51: 21. 12] Interviewer: That was a question not a judgment. . .

[00: 51: 24. 23] F: ok um. . like cuz like I the theme is like recursion then I mean OI guess Id probably like Google it anyways. .

[00: 51: 30. 01] Interviewer: But do you think its helpful for m to tell you, lets say you didn't know how to solve a factorial. . lie you're doing this for class. . w uld it be helpful for me to tell you that its recursion or do you think you'd wanna . . . like the purpose of this question is to figure out that, how to use recursion. Does that question make sense?

[00: 51: 47. 17] F: Um. . ya ok. . .

[00: 51: 51. 08] Interviewer: Do you understand what I'm asking. . like so you can solve factorial technically in a step-by-step method without recursion. . right? . .

[00: 51: 59. 14] F: mmhmmmm. .

[00: 51: 59. 10] Interviewer: I mean its awful cuz like if you have factorial of like 20, like that's just ridiculous. . .

[laughing]

[00: 52: 02. 10] Interviewer: Which is the whole purpose of recursion.

[00: 52: 06. 08] F: Ya. .

[00: 52: 08. 05] Interviewer: But do you think you'd' want. . if you're trying to learn factorial. . or trying to teach someone factorial. . do you think you'd wanna tell them to use recursion or do you think you'd want them to try and figure out recursion. . .

[00: 52: 18. 27] F: hmmmm

[00: 52: 18. 27] Interviewer: Or do you think the link would help them do that?

[00: 52: 19. 12] F: hmmm

[00: 52: 19. 12] Interviewer: That s what I need more information on - its not judgment. . It's like I. .

[00: 52: 24. 13] F: Ya. .

[00: 52: 24. 13] Interviewer: don't know how the link would on the page. . like I need more information. .

[00: 52: 31. 15] F: Cuz also when I first started doing recursion, if I didn't have help from someone, like I would just, I just wouldn't be able to like, I don't think I would have been able to like comprehend what the hell recursion is . . .

[00: 52: 41. 25] Interviewer: Oh ok. .

[00: 52: 41. 25] F: Oh sorry. .

[00: 52: 41. 25] Interviewer: No you're totally fine. . Its anonymous you're fine. .

[00: 52: 45. 29] F: Ya if I was like first learning - I don't think I would like understand the concept in the first place, , , so just like, better, , , if that makes sense?

[00: 52: 56. 15] Interviewer: Ok. . no that makes perfect sense. .

[00: 52: 57. 18] Interviewer: So what if it was like a simpler problem, like what if it was the first problem. . It's not as simple when you've never done conditional statements. . right because ors and ands do different things and you have to understand how that process works. So back when you were in CS 1114. . .

[00: 53: 19. 13] F: hmmm. .

[00: 53: 19. 13] Interviewer: If I showed you that blue ticket thing like for one of your first comments was hey I just need to get this done, so I'm just gonna hit a bunch of things until I get the right answer. So if you have that question how. . do you think you'd want more information than like failing test, or FAQs or? like do you feel like this is enough information for you. .

[00: 53: 42. 08] F: Ok. . so . . ok so is that like. . is that back to like where um. . conditionals are new to me?

[00: 53: 46. 15] Interviewer: Ya, like lets say you're solving this problem like it's a homework problem. . you went to class, you learned something and then you have homework. .

[00: 54: 01. 16] F: Well hopefully in that case Id hope that, you know in CodingBat there's like string1, String2, String 3, it's like, it shows like , the most simplest like , I guess out of like, I would hope that before this I've done something like a like a one or 2 if cases I guess. . versus like. .

[00: 54: 16. 05] Interviewer: So would you still want a link there that would take you back to that?

[00: 54: 16. 20] F: Ok. . well maybe not on something that simple I guess. . but ya I feel like ya. .

[00: 54: 23. 25] Interviewer: You had many many expressions go across your face. .

[00: 54: 21. 19] F: Oh no no . . .

[00: 54: 24. 05] Interviewer: Ill come to you I promise. . .

[00: 54: 27. 25] J: I dunno I feel like ya I feel like I can't treat that as the same. . like if the concept was learning if statements, I feel like well in hindsight , like I picked that up faster than I would pick up recursion. . I felt like recursion is a lot harder to pick up than if statements. . but I guess in a general case like, not sure if Id wanna like. . cuz like you said. . you said you'd probably like like if there's a hard enough concept you'd just Google it right? and maybe find like a Youtube or some slides on it. . . umm

[00: 55: 01. 03] Interviewer: How long do you think you'd work on a problem until you give up? Or went to Google or. .

[00: 55: 09. 20] J: I try to give myself an hour. .

[00: 55: 13. 03] F: Once I've made like serious. . like a couple of attempts. . and then just like ripping my hair out I'm just like Google explain to me what am I doing wrong. . .

[00: 55: 19. 05] Interviewer: So in that situation what do you find helpful that Google gives you? Like what kind of information are you looking for? . . Do you understand where I'm going with this? Cuz you've reached, you've tried it four times, this is here, and this is here. . I'm like literally, why are you broken?

[00: 55: 39. 26] F: So. . ok so it depends on. . so sometimes it s a logical error. . or sometimes it s like you just don't know how like, when I first started I had no idea. . like. . you know like. . its like. . I have no idea how to use a for each loop. .

[00: 55: 45. 17] Interviewer: Ya. . .

[00: 55: 45. 17] F: Versus like a for. .

[00: 55: 47. 07] Interviewer: Like a regular for loop

[00: 55: 48. 12] F: Ya. . so its like stuff like that

[00: 55: 50. 06] Interviewer: So what kind of . . what kind of information would you like to see. . you don't know how to use a for each loop. . .

[00: 55: 54. 26] F: Oh then. .

[00: 55: 55. 13] Interviewer: You don't know what to work with. . .

[00: 55: 55. 10] F: Then. . I guess. . . for that Id just go with the documentation, and be like oh what arguments is it expecting? Um. . whereas if its logical like I think I said earlier, I really like pictures. .

[00: 56: 06. 14] Interviewer: Ya. .

[00: 56: 06. 14] F: so if its like a logical error, then I would really like a pictures to like run through like the steps or phases or . . like the picture I should be seeing like as I go from like step-to-step I guess. . .

[00: 56: 18. 06] J: I'm kind of the same way. . for a for each loop Id kinda want to see examples and how its used. . and the actual syntax. . um. . .

[00: 56: 31. 06] J: Ya. . for example. . Id be like if there were to call factorial then like inside to call factorial again. . and then it will pass this number. . and as you can see it like you know . . It's like the same thing but like cut down smaller I guess. .

[00: 56: 38. 23] Interviewer: At what point would you want someone. . cuz that's pretty close the answer right?

[00: 56: 44. 07] J: Mmmhmm.

[00: 56: 41. 29] Interviewer: Um how long do you think you'd want to try this out before you got something like that? Or would you want something like that right away?

[00: 56: 54. 20] J: Ummmm. . .

[00: 56: 52. 17] Interviewer: Cuz this goes back to like asking for hints right?

[00: 56: 56. 03] J: Mmmhmm. .

[00: 56: 56. 03] Interviewer: How much of a hint do you want? Like do you . . . cuz me telling you hey, check your base case, is very different than me showing you hey you literally use factorial on itself with the number 10. . this is what it does. . so you need to do it for number 1. . Do you see where I'm going with this?

[00: 57: 17. 15] Interviewer: Cuz for example you're talking about going to Google. . you stuck on a problem, most people will type it into Google, usually takes you to StackOverflow, which is literally where people do just that. . right?

[00: 57: 29. 20] Interviewer: So I'm trying to understand like if you need additional information. . not just at what point do you need additional information, like what additional information are you looking for? Other than the answer. .

[00: 57: 45. 28] F: Hmmm.

[00: 57: 48. 19] J: Hmmmm. . .



[00: 57: 54. 16] F: It's just like the general. . . I dunno is that just answer like. . . I just want like a general approach as to like how you use. . just like. . . ummmm. . . .

[00: 58: 15. 24] J: I dunno, I think maybe it depends on how long I was working on it but like , yeah, like I said. . Id give it an hour. .

[00: 58: 21. 01] Interviewer: Ok. .

[00: 58: 25. 04] F: I mean if was less than an hour, like if I was just starting on it I wouldn't want as much information. . like maybe its. . yeah. . it depends on how much time. .

[00: 58: 35. 06] J: Also a lot of times it like depends on like , its a case by case thing I feel like cuz its like, I have made like progress of a certain amount, but its like at this certain point, its like um, I need some help. But I don't feel like that's something that can just be provided - like generically, without like going to a TA and being like, hey I've come to this point like. .

[00: 58: 52. 19] Interviewer: What do you need to do. . .

[00: 58: 50. 15] J: Yeah, yeah I've done like this much , I'm pretty sure I've got a general idea down but like, like at this specific case, what should I be doing. . I feel like. .

[00: 59: 00. 21] Interviewer: Do you think you would ask something like that if the FAQ had the option to ask a question. .

[00: 59: 06. 13] J: Ummm. .

[00: 59: 06. 20] F: Um. . honestly Id prefer to go to the TA person. . um. . . cuz a lot of times they'll respond but they haven't fully answered the question, at least what I was expecting, I guess. At which point I have to ask again, and then. . .

[00: 59: 20. 05] Interviewer: That's interesting. .

[00: 59: 20. 05] F: Then we have to keep going back and forth. .

[00: 59: 24. 03] J: Ya. . .

[00: 59: 21. 12] F: And it take s along time, whereas if you go to them its like immediate feedback. . like right away I guess.

[00: 59: 29. 14] Interviewer: that's very interesting. . .

[00: 59: 30. 15] J: Ya, , ya I kinda feel the same way . . there's like more immediate feedback and its just like , I could be like, I have no idea what that means. . .

[00: 59: 36. 01] F: Ya. .

[00: 59: 36. 01] J: I have to like type this out and ask them again, and wait again. . but if its in person like I can. . I feel like I will get feedback faster. . .

[00: 59: 51. 05] Interviewer: Interesting. . so it's the more. . It's the immediate thing not so much that it's vetted by a professor. . vetted by an instructor. . .

[00: 59: 57. 12] J: Well. .

[00: 59: 57. 12] F: ya. . .

[00: 59: 57. 12] J: Well there's that too. . haha

[laughing]

[01: 00: 04. 08] J: Well yea, yea, I think immediate feedback is more important than um being endorsed by an instructor. .

[01: 00: 11. 07] Interviewer: Interesting. .

[01: 00: 11. 07] J: I mean. .

[01: 00: 11. 07] Interviewer: No. . its cool. .

[01: 00: 18. 08] J: Or they're like similar, because its like I'm getting immediate feedback from someone who' credible -

[01: 00: 21. 19] Interviewer: Ya, ,

[01: 00: 21. 19] J: Right. . .

[01: 00: 21. 19] Interviewer: ya - there's no right answer literally - I don't know the answer either - which is why I'm asking you. . .

[01: 00: 29. 06] F: A lot of times it s just like , sometimes I feel like they can't dumb it down enough. . . so. . .

[01: 00: 36. 01] Interviewer: You mean like you want hem to dumb it down more. . or

[01: 00: 39. 10] F: Sometimes. . sometimes they think like oh this should be enough to like. . but it's like. . cuz like an example back when I was in 1114 like, for the first time like, I think , when we were first doing arrays or something. . . and um. . during one of the labs I was like hey! like how. . how do I do this. . and she was like just use an array. And I was like what the hell is an array? What's an array. . like so it's like. . You know sometimes I'm like oh just use this. . this. . this and that. . and like ok. . . and sometimes even if you use the documentation. . I have like no idea how it's suppose to be used. . so. .

[01: 01: 10. 26] Interviewer: Ok. .

[01: 01: 10. 26] F: SO that the thing if I'm the right person, they could like give me like a quick example or something like that . . like oh this is how you use it. . um. . . and then I use that to solve the problem and . . if you just tell me like oh go use this, then I'll be like oh um. . . well I don't know how to use that either. . [laughing]

[laughing]

[01: 01: 29. 12] J: Ya ya ya

[01: 01: 35. 21] F: It's just like a series of oh god. . [laughing]. . um. .

[01: 01: 37. 28] Interviewer: So. . if you couldn't go to them in person. . what would you like to see on the page that would help you do that? . .

[01: 01: 42. 29] F: Ok um. . .

[01: 01: 42. 29] Interviewer: That wasn't a planned question , I literally just came up with that.

[01: 01: 58. 23] Interviewer: Cuz its an interesting statement right? Your talking about this sense of urgency. . . you're like hey! if I show up to their office hours they're gonna tell me what to do. But if they tell me what to do and I don't understand, I can literally ask them a question right away. . and they can tell me more thing s that I can understand or don't and you just keep going back and forth.

[01: 02: 09. 10] J: Ya. .

[01: 02: 09. 10] Interviewer: So its essentially what's happening online its just much faster. .

[01: 02: 18. 04] F: Hmm ya. .

[01: 02: 15. 28] Interviewer: SO what kind of information would you like to see or would you like them to give you in person that would minimize the number of this like back and forth like you have this . . you have the option to ask a question or ask for a suggestion if you want it or like a hint that someone has thrown into the bank. . and everything is still broken. . why. . .

[01: 02: 48. 29] J: I'm not really sure, but I'm just thinking about the example you said about when the TA said like go use an

array. . . so its like Id be like I don't know what an array is and then they'd be like. . ok. they'd ask me like what do you know about arrays? or like what do you know about . . I dunno, , integers or something. . but ok ya. . you can store one thing in an integer but you can store multiple thing sin an array. . . .

[01: 03: 09. 12] Interviewer: YA, , ,

[01: 03: 12. 08] J: Of the same type. .

[01: 03: 10. 06] Interviewer: Ya these are all really god - you shouldn't feel embarrassed about it. . . its actually like really hard. .

[01: 03: 22. 28] J: Ya. . because like if I didn't understand something, I feel like would the Ta would help me to . . get me to understand. . the TA would ask me. . what do you know? . . or ? . . . and just keep saying no until I say yes. . right?

[01: 03: 33. 09] Interviewer: YA. . I mean that's frequently what happens with me. . that's why I'm asking. . .

[01: 03: 42. 27] F: I feel like at that point its better to just figure it out on your own. . .

[01: 03: 47. 20] J: ya, , ,

[01: 03: 45. 01] F: Cuz after a certain point its just like. . . I feel like its like hard to relay information through text right. . you can't just have these small like . . but wait I need - they gotta explain something. . they're gonna be typing something. . but until they fully type out what they want, you could not unders. . you might not get something in the middle. . but. . so you cant just be like. . but wait wait wait. . what did you just say? . . you know like. .

[01: 04: 06. 21] Interviewer: Ya

[01: 04: 06. 21] F: soo. .

[01: 04: 16. 04] J: Ya. . It's harder for me to type out telling a TA like I don't understand what you mean by that. . rather than saying it in person. . like saying it in person is so much easier than typing it out right? . . I think. . or. . .

[01: 04: 26. 07] Interviewer: Is it easier or is it just faster?

[01: 04: 33. 28] Interviewer: Cuz you speak faster than you type. . everyone does. .

[01: 04: 35. 27] J: Ya. . .

[01: 04: 36. 22] F: YA. , ,

[01: 04: 35. 27] Interviewer: So what is it about this person to person contact. . . its just really interesting. . . . if you're it this way, you know it would take 4 steps, or you could do it this way it takes like 13. . but the answers still the same. .

[01: 05: 15. 17] J: Would a group chat be possible maybe?

[01: 05: 13. 14] Interviewer: A group chat with who?

[01: 05: 19. 09] F: It could be like everyone. . or. .

[01: 05: 22. 16] Interviewer: Isn't that essentially what Piazza does?

[01: 05: 26. 09] F: Umm. . but it's like all online. . It's not like. . .

[01: 05: 27. 24] J: It's not immediate. . .

[01: 05: 39. 07] F: It'll be like right there. . and you'll be like oh such and such is online, they could be anonymous, or it could be like instructor such and such is online at the moment, and they can just like and chat with them I guess, if they feel like being helpful. . .

[01: 05: 51. 08] Interviewer: Ya. . I get that. .  
 [01: 05: 55. 15] J: Does Moodle have that?  
 [01: 05: 55. 06] F: It does? . .  
 [01: 05: 55. 06] Interviewer: I think. .  
 [01: 05: 57. 20] J: It's a chat?  
 [01: 05: 57. 20] F: Uhh no. . . I think it's a private message  
 [01: 06: 00. 27] J: Ya. . . . I remember using that before  
 [01: 05: 59. 27] Interviewer: Moodle has . .  
 [01: 06: 04. 23] J: But you can see who's online with Moodle. .  
 [01: 06: 06. 04] Interviewer: Yes - you can definitely do that. .  
 [01: 06: 08. 15] J: But you can't see who's online with piazza. . .  
 Or it just says like a number. .  
 [01: 06: 09. 10] F: Ya it doesn't say who is online. .  
 [01: 06: 10. 18] Interviewer: I don't even know if it does that. .  
 .  
 [01: 06: 15. 07] J: I don't think. .  
 [01: 06: 13. 10] F: Really? . . .  
 [01: 06: 15. 19] J: Maybe it changes the views. .  
 [01: 06: 15. 19] F: Oh the views. . it doesn't. . .  
 [01: 06: 21. 11] Interviewer: Ya. . I wasn't sure what you were  
 talking about. . .  
 [01: 06: 22. 18] F: Ya, I was thinking of views then. .  
 [01: 06: 30. 12] Interviewer: If we had had that option -in my grad  
 class we would've spammed the professor - and been like don't leave.  
 . come back don't leave. .  
 [laughing]  
 [01: 06: 36. 18] Interviewer: Its this person to person contact  
 that keeps coming up. . but ya. . a group chat. . ill keep that in  
 mind. . anything else. .  
 [01: 07: 16. 00] Interviewer: Other than making you question your  
 math skills for factorial. . .  
 [laughing]  
 [01: 07: 21. 11] F: I was like oh god. . .  
 [01: 07: 19. 16] Interviewer: You were silent for a very long time.  
 . . .  
 [01: 07: 26. 06] F: I just couldn't understand why it was wrong. .  
 and if they used the wrong font. . .  
 [01: 07: 31. 13] Interviewer: But yeah. . .  
 [01: 07: 57. 02] J: Oh I also noticed it says Behaviors - I'm not  
 sure what Id want it to say but I'm not sure what . . .  
 [01: 08: 02. 20] F: What?  
 [01: 08: 00. 07] J: like it says Behavior. . . right. .  
 [01: 08: 04. 18] Interviewer: Yup that says Behavior. .  
 [01: 08: 07. 04] J: I'm not sure if that's the word Id want to see.  
 . .  
 [01: 08: 12. 00] F: I didn't even notice that, I just . . . .  
 [01: 08: 14. 10] J: You just see the example ya. . .  
 [laughing]  
 [01: 08: 20. 28] J: What would I wanna see instead of Behavior. . .  
 umm. . .  
 [mumbling. . . ]  
 [01: 08: 42. 00] J: And this is gonna be used for homework or stuff  
 like that. . .  
 [01: 08: 40. 13] Interviewer: Ya. . . ya. . . stuff that gives ya  
 grades. . .

[laughing]

[01: 09: 14. 16] Interviewer: Ok here's something - when you guys were doing CodingBat exercises the one thing in terms of feedback that would have been the most helpful for you to receive while you were trying to complete the exercise?

[01: 09: 23. 04] F: Um. . .

[01: 09: 24. 24] J: Um. .

[01: 09: 29. 28] F: Maybe like a debugging type thing. .

[01: 09: 29. 28] J: Ya so I can actually see what my code was doing as I'm stepping through it. . . um. . .

[01: 09: 44. 29] F: Ya Id wanna see debugging cuz I feel like I didn't really debug until late. . very late. . maybe like 3114. Like I didn't really use like, I mea like, I didn't debug, like really learn how to use the debugger 'til like , 250six, 3114. . .

[01: 10: 07. 25] Interviewer: That works. .

[01: 10: 14. 27] Interviewer: Do you guys have any other questions for me? . . . About anything really. .

[01: 10: 17. 05] J: What would. . practice a different Java exercise? . . What would happen if I were to like click. .

[01: 10: 19. 25] Interviewer: Click on that?

[01: 10: 19. 25] J: Ya. .

[01: 10: 21. 27] Interviewer: Um. . It would essentially take you to , like you were talking about CodingBat has them laid out like String1, String2, . . all String questions. . ideally this would be in a list of . .

[01: 10: 31. 07] J: like recursion. .

[01: 10: 33. 29] Interviewer: YA. . . it would something else in the factorial section or. . . cuz factorial technically practices recursion. .

[01: 10: 41. 17] J: Ya. .

[01: 10: 43. 02] Interviewer: So it'd probably be some other type of recursion problem. .

[01: 10: 48. 00] J: Cuz like, I feel like that saying that it's in a group of recursion. . would tell me I need to use recursion. .

[01: 10: 52. 20] Interviewer: Right. .

[01: 10: 52. 20] J: But if that wasn't there. . um. . if it was just factorial. . it would be harder for me to figure out. . if I didn't know factorial. . .

[01: 11: 16. 10] F: Wait so like at this point, were not supposed to know that immediately were supposed to use recursion right?

[01: 11: 18. 15] Interviewer: Well I mean ideally you would have taken something in class. . . but like no, there's nothing in here that's telling you use recursion. .

[01: 11: 23. 29] F: So I intuitively think like oh - recursion. .

[01: 11: 24. 19] Interviewer: Right. .

[01: 11: 28. 16] J: But I think telling me , base case would tell me recursion. .

[01: 11: 32. 09] Interviewer: Right. .

[01: 11: 32. 29] J: Cuz I'm like oh that's like the first thing they definitely like, I dunno, usually when I learn about recursion, or in like proof by induction like they rally emphasize you gotta do base case first. . so like when I had N\* for 3114 before you can press this key on your keyboard you better make sure you do a null check. Cuz. . . right? . . Isn't that what he said. . . didn't he say something like that?

[01: 11: 58. 04] F: Probably. . .  
[laughing]  
[01: 12: 00. 24] Interviewer: No but that's like an important thing to think about right? And that goes back to when, and that's why it literally doesn't even give you numbers or anything. . . its just like think about an appropriate base case. So there's a lot happening in that one sentence. . But my goal is also to make sure you guys, like when I give you things on a page I wanna you to also be able to use everything you can. . whether you choose to use it or not. . id it helpful? do you feel like you need it? things like that. . . so. . . .  
[01: 12: 36. 27] Interviewer: And that's why it shoes up before you type anything in. . So if you clicked on this and then this showed up. . what does that make you think of?  
[01: 12: 51. 22] F: Recursion. .  
[01: 12: 51. 22] J: Right. . .  
[01: 12: 54. 28] J: Like I feel like if I were to learn anything from class - it would definitely be base cases considering. .  
[01: 12: 57. 10] F: Ya if the topic was recursion ya. . .  
[01: 13: 06. 08] Interviewer: So this links back to you saying hey maybe have a link that says you know. . teach me about . . . so you would like to see FAQs more conceptual or logical and solution? . . .  
[01: 13: 43. 24] Interviewer: I should've let you go a while ago I'm sorry-  
[01: 13: 42. 27] J: Well as long as I want to be like spoon-fed , I guess this should be good for helping us learn I guess. . . so we can like think independently, and not just always be like hey hey. . .  
[01: 13: 57. 26] Interviewer: DO you think that gave you enough information or do you think you'd go to Google after that. .  
[01: 14: 01. 26] F: Oh yeah. . if I didn't know recursion. . ya. . .  
[01: 14: 01. 25] F: Id be like Google what is this asking from me. .  
[01: 14: 08. 02] J: AY. . ya. . if I didn't know what recursion was at all. . and then I clicked on that. . I don't know what base case is. . so then I like Google base case. . [laughing]  
[01: 14: 20. 13] F: But also the thing about FAQ is like, since I have to wait , I might just like Google it and look at Stack overflow, to tell me like, or someone is like oh how would I go through it and then I'll like see what they say. Cuz they've already answered everything  
[01: 14: 29. 22] Interviewer: Right  
[01: 14: 29. 22] F: And hopefully they'll have a similar problem that I had . .  
[01: 14: 32. 02] Interviewer: Interesting  
[01: 14: 42. 00] Interviewer: Alright. . I think I'm done. . do you guys have anything else for me? . . suggestions , interesting stories. . .  
[laughing]  
[01: 14: 53. 09] Interviewer: Thanks guys!

## *Appendix H: Round 2 – Focus Group 2 - Transcript*

[00: 00: 04. 23] Interviewer: OK so Ill go ahead and hand out some consent forms for you guys , um read it sign it and um Ill read some stuff of it directly and we'll go round, and introduce ourselves and we'll get started. It shouldn't take more than an hour. . . but 2 pens - maybe a third?

[00: 00: 32. 18] Interviewer: Ok. . .

So for the risks is that what you have to write or . . .

[00: 01: 51. 25] Interviewer: Ya well -the way Virginia Tech run - well just research in general is governed by something called IRB - Institutional Review Board. . so everything I submit - or turn in to you guys - or run through a study - written, oral anything - has to pass IRB approval. And so IRB requires the consent form. . .

[00: 03: 02. 22] Interviewer: Ok - we can go around and do some introductions and then I'll introduce myself and tell you a little bit about what I do and then Ill read a paragraph that gives you a little description and we'll go ahead and start. So you can go ahead. . .

[00: 03: 12. 27] E: I'm E, and I'm a senior.

[00: 03: 16. 02] D: I'm D and I'm a freshman.

[00: 03: 24. 20] M: I'm M and, I guess I'm a senior.

[00: 03: 24. 20] Interviewer: Guess is good enough! Ok! I'm Priyanka and I'm getting a Masters in Computer Science, and so hopefully will be graduating by the end of the summer - which is exciting. Which is what this research is gonna help me do. Um - and so let me go ahead and read you a little paragraph and um. So before we start - I'd lie to point out - if you have differing opinions through this whole thing feel free to voice them - so its ok to disagree and stuff like that. I really do want you to be open, and cycle through feedback and design a system . And also just fyi - that's why my phone is on the table - I'm audio recording cuz I can't write as fast as we can speak - and so this will help me later um. I then go ahead and delete the recording once my transcription is done and the whole thing is anonymised.

[00: 04: 21. 15] Interviewer: So we're going to be talking about drill-and-practice systems. Drill and practice systems are typical online tools - you'll see them a lot. tech uses CodingBat and I'm assuming all of you have used CodingBat in some capacity at some point during the program - and um a couple of other ones like CodeAcademy, and if you've ever designed stuff Lynda. com is something that's pretty popular. So my research team is in the process of developing something pretty similar called CodeWorkout and so our goal is once it's done to launch it for Tech and for use in class or whatever. so for the back and forth - when I'm referring to things for drill-and-practice, and CodeWorkout. . I'm talking about the same thing so just synonymies that. So for the purpose of this specific focus group - my interest is exploring the role of feedback within CodeWorkout and how best to basically provide you , as a user, feedback. How to provide you feedback as you're going through the process of completing an exercise. Whether for homework, for fun or however. So we'll look at a couple of screens, we'll talk about some feedback through the process of completing an exercise

and then we'll - we'll get some comments and feedback and go through that. We good? -Excellent.

[00: 05: 34. 07] Interviewer: Ok we'll start by looking at a sample screen and um - 2 seniors one freshman - I think this will be fine. Ok so let's say you open either CodingBat or this and you do this for homework or whatever and that's what it looks like when you first start. So when you first look at that exercise. . . I know some of you have done factorials and some other stuff - that's totally fine - don't worry too much about actually solving the problem. So once you see that question - talk to me about your initial reaction - how you would go about understanding what you see on the page and sort of think aloud as you go through. .

[00: 06: 47. 01] D: So - I know - well have you ever heard of Hacker Rank? . .

[00: 06: 41. 23] Interviewer: Ya -

[00: 06: 45. 13] D: So usually when they have problems like these they have the function header like instead of just having this line -like they have your language selection like java or something like that , and then you have a function header. So in this I guess it'd be - public int factorial - and then it would have the parameter. Instead of just saying like you can write this one. . I guess it depends on your level of programming if you're trying to practice that or not. . .

[00: 07: 14. 04] Interviewer: So - as you go through this when you first see the thing what is your reaction - are you trying to look or something else on the page - are you. .

[00: 07: 21. 15] M: I'm wondering why that bar is there? Is that just . .

[00: 07: 24. 00] Interviewer: I think that's just a printer thing - you're good. . .

[00: 07: 21. 08] M: Oh ok. .

[00: 07: 29. 21] M: Well then ya - I would guess my first reaction would be like what he said um knowing that there's nothing, like nothing there so you don't know what to call the function.

[00: 07: 37. 00] Interviewer: Ok. .

[00: 07: 37. 00] M: So assuming it's not there I guess the function name doesn't matter - or the parameter names , um so after that I guess you would just begin writing the function.

[00: 07: 51. 08] D: I dunno also- so like what, what is this trying to like help you practice with? Like is it just. .

[00: 07: 54. 07] Interviewer: Like if it's just a question you have to do. .

[00: 07: 54. 07] D: Oh ok. .

[00: 07: 59. 05] Interviewer: Yup. .

[00: 07: 59. 05] D: Cuz I know CodingBat would have like things that are like oh these are like strong questions or these are array questions or something like that.

[00: 08: 10. 07] Interviewer: So what is your first reaction - since you just worked on CodingBat stuff - when you get that problem.

[00: 08: 13. 23] D: If I got it - um I would just uh. . .

[00: 08: 20. 26] Interviewer: You can move it closer - the writings a little small.

[00: 08: 24. 10] D: SO I would just start probably writing it - it doesn't look too difficult



[00: 08: 28. 07] Interviewer: ok. .

[00: 08: 28. 07] E: Well I guess - we're making assumptions we know that we know what factorial is. . . If there is information that factorial is like giving examples and that kind of stuff I guess - like giving a - like if it was a different problem that I dunno - was like what's that - Fibonacci sequence? and like if you didn't know what that was and it was just in the title - like how would you even begin to understand the problem I guess.

[00: 08: 52. 22] Interviewer: Ok. . .

[00: 08: 52. 22] M: I think I'd probably start of by looking at the Java API -to - specifically the Math library to see if there is a factorial function?

[00: 09: 00. 20] Interviewer: How about anything else on the page? Are you looking for more information , are you good to just read the question? Keep going. . . you can say no or yes or whatever

[00: 09: 15. 25] D: I think its pretty much good to go I guess.

[00: 09: 15. 25] E: YA

[00: 09: 15. 25] M: Yup

[00: 09: 21. 14] Interviewer: DO you think you want feedback or any additional information at this point or would you just start typing.

[00: 09: 31. 08] D: Uhh I think what he was saying before about factorials - if this is something you're using for like an intro level course - there's a chance that I would not have known factorial. .

[00: 09: 37. 12] Interviewer: Right and I'm making that assumption - if you've either taken it in lecture and now you have to do it - or you haven't made it to the lecture and now the homework is due so you're gonna start early. I mean its ok whether you know what factorial means or not - I mean it just happens to be the title.

[00: 09: 54. 28] D: Ok true. .

[00: 09: 54. 28] M: Well I would think that it would hopefully related to something you've covered in a course before that so.

[00: 10: 00. 21] Interviewer: Right. .

[00: 10: 00. 21] M: Like I think for the CS1114 we haven't really done anything with doing a factorial function or much of this stuff in the Math library. So that would be kind of surprising to see. . Umm and if its not like readily there in the Math library like there's and actually function for it and you have to try and actually reason your way into making , liking writing a completely new function for it - um that would probably be a bit more difficult.

[00: 10: 39. 29] Interviewer: Ok . As you guys . . so like when you have gone through CodingBat at all. So if you just read the question right? What is your usual process - do you read the question, whether you understand it or not and like type stuff out or like. . .

[00: 10: 51. 02] D: So for me I would just type it out just to see what's available to me - since this paper I dunno if I was typing - I would see if there was like syntax highlighted. .

[00: 11: 03. 17] Interviewer: mmmhmm

[00: 11: 08. 17] E: Or if there is. . . mmm check my answer. . so if there was a way to actually run it I guess I'd get some test data to see if it was working properly or not. . . you know - like even like even I didn't know the problem I would just run it once- to see

if it was working or not and so even if I left it blank like return 0 over some time I'll just run it.

[00: 11: 27. 12] Interviewer: OK - what about you?

[00: 11: 24. 22] D: Pretty similar -because I know that like seeing - cuz like actually seeing what the test data is and what it expects as the value - like the answer -hat will sometimes help me if its kinda of an ambiguous question or an ambiguous exercise. So like seeing what the input is and what it wants as the output.

[00: 11: 48. 20] Interviewer: Ok. .

[00: 11: 45. 26] M: I usually um depending on the level of difficulty of the question try and map it out in my head and I'll identify if I think there are any special cases um for the problem - like for this one probably like a special case would be 0 factorial. Um and then after that try and figure out um some sort of structure that would produce this value and then produce that side output. . and then write. .

[00: 12: 15. 14] Interviewer: ok. . ya. .

[00: 12: 25. 27] Interviewer: um. . ok ya- so there's a couple things on the page that we can kinda go through. So there's the title, the questions, and text box that typeable, there's check my answer, you can - that selectable link and that's a drop down. So um I gonna assume at this point you're gonna read the question , go through it and try and type it out - ok so we'll jump back and forth.

[00: 12: 40. 13] Interviewer: Ok. . . so let's say you type some code in and you hit check my answer - and this is the first screen you get.

[00: 13: 01. 25] E: I was just seeing if the feedback bar was there before. . .

[00: 13: 03. 11] Interviewer: Oh ya go for it. . .

[00: 13: 10. 29] M: So the thing to which the error is pointing is the result after running it?

[00: 13: 14. 12] Interviewer: No that is the expected. .

[00: 13: 22. 24] M: The expected?

[00: 13: 20. 08] Interviewer: So talk to me about your reaction. . you typed that stuff out - that's the code you get - you hit check my answer and that's what it looks lie basically. .

[00: 13: 32. 27] E: Ya I would probably expect my own answer -

[00: 13: 37. 05] Interviewer: Ok

[00: 13: 38. 19] E: I mean 0 I guess you could have both like I guess when you're doing like test cases this is what you gave us but you expect like a 1 or 2 or something.

[00: 13: 47. 26] Interviewer: Ok - do you guys fin that like location and area of feedback intuitive , like is it where you're expecting it to be on the right or. .

[00: 13: 56. 14] D: I think so yeah - Its just kind of like - if you think about it its just like a continuation so you've got one part that you're working on here and the second part its almost like the next page in a book the second part of the problem is on the right.

[00: 14: 07. 15] E: Usually I like to see things on the next line and like and indented so I know its like nested within that thing - uh so like maybe like factorial 1 and then the like next line tabbed over its like expected 1 and then your answer on the next line.

[00: 14: 24. 06] Interviewer: Ok. . ok fair enough. . so. . now you're looking at this right you've got some x's and some is red and

some is green. Your goal is to eventually end up with all greens right? So um what is your. . what is your process normally in terms of completing exercises in terms of feedback. . um do you - would you like to get more feedback throughout - periodically as you complete an exercise? So this happens after you hit check my answer once. . .

[00: 15: 00. 06] M: I usually would like to see what my actual output was - and then compare with an expected value, um and then I could piece from there where I've gone wrong. Um so at least having the expected value back would be ideal.

[00: 15: 21. 12] Interviewer: Ok. Um so lets say you're doing this and that's your response right. . you want to get everything set as green right? SO how would you go about doing that? . . What is your next. . .

[00: 15: 30. 25] D: I would -I would look the ones that it doesn't work.

[00: 15: 34. 21] Interviewer: Ok.

[00: 15: 34. 21] D: So there the input that is doesn't work - I just kinda run through my head and I would say like why isn't it working? Why isn't my code working for this specific input?

[00: 15: 45. 26] Interviewer: Ok

[00: 15: 45. 23] D: And then I would start seeing like where it would - like how I could change my code to meet more inputs.

[00: 15: 51. 22] E: Ya - so its kinda like a debugging process that you just run through the code with like you know the parameter hints - and how its changing and what the end result is. like if that's right or not. And at that point you know like somewhere in there there's something wrong.

[00: 16: 09. 07] Interviewer: Um so - let say that your stuck - right. you can't figure out how to make them all turn green - they just like won't turn green. What do you guys typically do?

[00: 16: 19. 29] D: Look at the FAQ like trying to find out what - cuz like maybe in FAQ its got hints about what specific functions you're trying to use.

[00: 16: 28. 19] Interviewer: Ok - so you'd wait to click on the FAQ until after you turned something in at some point. Ok Ill come back to that in a second. What about you guys?

[00: 16: 38. 07] M: Same as him. . .

[00: 16: 44. 00] E: Yea I guess. Just try to debug it and then . . .

[00: 16: 48. 09] Interviewer: So during you're debugging process - um how are you guys about potentially getting a hint or a suggestion? At what point would you like one? Would you like one to appear. . . lets say you've been on a page. Lets say for example that is what your screen looks like after your tenth submission - um so where are you at? Would you like hint?

[00: 17: 22. 05] Interviewer: So lets say instead of that screen - let say you have this screen - that little button says ask for a suggestion. So if is this your tenth submission and your screen look like this - or even after your second . . Talk to me about that button -how do you guys feel about it - would you use it?

[00: 17: 43. 11] M: Doe sit eliminate anything form your score if you use it?

[00: 17: 47. 09] Interviewer: No it does not

[00: 17: 47. 09] M: Ok. .

[00: 17: 47. 09] Interviewer: Ya - your hints are free.

[00: 17: 52. 29] M: Ok then ya - I'd use it

[00: 17: 50. 19] E: I guess , if I was stuck on a problem and I didn't know what to do next that would be a last resort I guess.

[00: 18: 01. 07] Interviewer: Ok interesting - do you wanna elaborate a little on that?

[00: 18: 01. 07] E: Ok so if I'm trying my best to understand the problem - if I'm asking for help I'm kind of like kinda cheating a little bit I guess - and so uh. . .

[00: 18: 12. 05] Interviewer: Do you feel that way even of it doesn't take points of?

[00: 18: 16. 28] E: Ya - because. . . uhhh

[00: 18: 22. 24] Interviewer: Every one responds differently so please don't feel bad. .

[00: 18: 28. 25] E: So I guess doing this is a benefit of my understanding - so I don't know if its great or not - but if its optional then I wanna try it as best I can before reporting to that.

[00: 18: 43. 12] D: Yea - Yea - Cuz I remember always hearing that its always better to work through a problem - and like try and dredge up whatever you think you know about the problem - like how to solve it. And if you can do that , if you can solve it - that will help you retain information - like that will help you understand it better than if you ask for a suggestion - and its like do this - and you might get it right and then your like of course I should use this but that's not the same as being - as like working through the problem. SO like I would wanna use that probably if I'm really stuck and I know that there's a little chance that I would get it correct.

[00: 19: 23. 21] M: I feel the same way too -but assuming that the premise was that we've gone through this 1 times and we've got the same output - the same error messages , we're not getting anything different - I would say I'm pretty stuck at that point , if I submitted it 10 times and I'm getting the same exact things wrong.

[00: 19: 43. 00] Interviewer: Soo what if you saw that screen after your first submission? SO you literally type in your code - and as soon as you hit check my answer this is what shows up.

[00: 19: 56. 11] M: Ok so then I wouldn't check it.

[00: 19: 56. 11] Interviewer: You wouldn't ?

[00: 19: 56. 11] M: YA. . .

[00: 19: 56. 11] Interviewer: K - what about you?

[00: 20: 00. 13] E: Ya - so I wouldn't either uh - I guess for the simple reason that hint/suggestion is probably not there most of the time I guess in spaces outside this CodeWorkout thing - so if I like was doing a test of something . . if I was doing something by myself - I can't just say oh I need a hint - where is the button that I can click on.

[00: 20: 24. 12] D: Honestly it depends on how I'm feeling that day [laughing]

[00: 20: 24. 12] Interviewer: Nope - that's an honest answer. And you guys did a bunch of stuff in CodingBat too in 1114 so this pretty fresh of you.

[00: 20: 25. 21] D: So if I feel like I can do this problem and I can understand it - like I kinda understood where I went wrong then Ill just try again with different tries - but if I'm just trying to get it done as quickly as possible you know I've got other things to

do that day - then I saw that on that first try and I'd probably hit that.

[00: 20: 56. 22] M: [00: 20: 57. 13] M: I like to - I don't like moving on to different versions of problems. I like to try - like if I get stuck on a problem go through as many times until I can actually get it right. and generally for homework at least, since I know that's just for my personal avocation at the most part that's the spirit of the homework.

[00: 21: 14. 24] Interviewer: Right -

[00: 21: 14. 24] M: If I go through it a number of times, like a sufficient number of times on my own and I feel like I've exhausted what I can do in it - then I don't feel bad about if it offers a hint - or going to office hours or something and trying to get some advice because that's how you learn.

[00: 21: 33. 27] Interviewer: So do you think you. . well let's journey back and then come forward a little bit. So you said at some point you would - so you turn that in the first round - do you think you would click on . . so in the beginning FAQs were on the front-page right? But you guys were pretty firm on typing tuff in without clicking on it. So um - lets say you click on it -and you have this and at this point it looks like this and you would rather - you said you'd like on the FAQ to see what it said?

[00: 22: 06. 24] D: Ya. .

[00: 22: 08. 23] Interviewer: So lets say the FAQ tell you this. . . . So the screen portrays the beginning since it's with the assumption that you're like I don't know what it means after you read the question. . . .

[00: 22: 30. 23] M: Ok so FAQ is not a frequently asked question - with an answer.

[00: 22: 35. 21] Interviewer: So what if you had the option to ask a question too? And someone could respond to you in that section - how would you feel about that. . .

[00: 22: 40. 07] M: That would be interesting. . . that opens up a whole range of possibilities of what you can ask. But if there is someone there and you know the other person on the other end is really component - um you can ask them one question - . . it would be very useful! -I would probably similar to the suggestion button - I would really wait after trying it certain number of times until I feel like I need help and then go for it.

[00: 23: 11. 20] D: Uh ya - I think that would be useful. . . When you ask the question would it just be a little line of text box - and then you ask the question and they respond. . .

[00: 23: 16. 03] Interviewer: YA. . . .

[00: 23: 16. 03] D: and then that goes away. .

[00: 23: 23. 22] Interviewer: Or it could show up. . so I looking for feedback on options - of what hints could be right?

[00: 23: 24. 12] D: So it'd be interesting if like um - so if it was like that and kind of like you ask a question and you get a response. But then also if like the administrators are noticing a lot of people are asking the same question on this problem - they can just set it up as like permanent response. Have a little thing that says - this question and then people don't even have to ask it anymore it just shows up there automatically.

[00: 23: 53. 02] Interviewer: Ok. . you're quiet. .

[00: 23: 53. 02] E: Hhah - I was just thinking so , I was just thinking of a way I guess on how to innovate on it I guess. . .

[00: 24: 01. 27] Interviewer: No - go for it. . .

[00: 24: 01. 27] E: So if the FAQ um section - was empty initially and it only gets like filled in whenever someone asks a questions and it stays there permanently I think that would be pretty cool.

[00: 24: 11. 26] Interviewer: When you say stays there permanently - you mean like always - open so you don't have to click on it . . so when you show up to the question its already there?

[00: 24: 20. 09] E: Ohno - no . . like like if this was the first day of the assignment and someone was like oh I dunno what - like how to proceed and they see that FAQ is empty - or they see a text box to ask a question - like they ask a question and then I guess a TA answer s it - that question and answer would I guess just be like inserted into the FAQ, I guess. . .

[00: 24: 43. 13] Interviewer: So would you. . right , so would you um would you want to see that only if you clicked on it or would you like it just to show up? S it basically has the question -it says check my answer - it just looks like this - instead of this. . .

[00: 24: 59. 00] E: I guess - its 2 ways. . Either you click on FAQ and then that either shows you question and answer - or it just shows you list of questions. . . and then you would click on the question to reveal the answer. . I guess.

[00: 25: 16. 10] Interviewer: mmmhmmm. . would you guys feel comfortable asking a question?

[00: 25: 13. 18] M: I would feel comfortable asking a question - but going back to what he said- I would prefer even just not seeing the questions. Um you know - right when I start the problem - cuz I feel like that would be kind of distracting and also kind of guide me toward a way that I may not think. Um so I would like - maybe if the questions and the answer could be separated - like he said ,,, but I would also want the questions hidden away as well.

[00: 25: 47. 19] D: YA - cuz I like , I like just seeing a problem first and then seeing if I can just work it out on my own - cuz if I can boom - I understand the concept. Ya - exactly like you were saying- if it showed up then ya its gonna guide me a little differently.

[00: 25: 57. 14] Interviewer: Ok. . so you said you feel comfortable asking a question. . how about you guys? If you had the option to ask a question. .

[00: 26: 08. 18] E: Ya - ya I know a lot of people are afraid to ask it because - I guess they'll feel stupid or something? And a way to remedy that is just to make the process anonymous I guess - so no one knows I'm asking this so there's no harm to me , I guess. . other than getting the right answer. .

[00: 26: 20. 15] Interviewer: SO like completely anonymous?

[00: 26: 26. 11] E: Ya. . .

[00: 26: 26. 11] M: Depends on the question. . . So for some questions I would feel only comfortable asking if it's anonymous. Like I would ask some questions on Piazza anonymously and I've asked some questions with my name on them- and its based on how hard I think the problem is and what were the merits of it. Um that I put my name on it or not.

[00: 26: 49. 03] Interviewer: what about you? know you guys have piazza for your class. . .

[00: 26: 49. 03] D: Ya - so probably anonymously . . I mean - I could see it being- you could have like a check - make a anonymous or not. . . and that be useful. .

[00: 27: 06. 20] Interviewer: So what about responding to this. . . would you. . how would you guys feel about that? Would you rather have like I mean cuz we can have anyone in the class who's registered respond. . um so you guys are helping each other out kind of.

[00: 27: 12. 23] D: YA. .

[00: 27: 12. 23] Interviewer: . . or would you prefer the response to come from someone a little more official like an instructor or a TA or. .

[00: 27: 24. 23] M: I feel like in this format - for an actually problem format - its as opposed a discussion forum like Piazza - where everyone's there. . . I feel like this should probably be limited to just instructors - or people with the expertise to answer it so that way your just asking the question - you don't have to go through a chain of different peoples response. Cuz if other students answer it there's the possibility that its not correct- and that your not getting it from an official source so you'd have to allow for more people to answer them - you'd have to got through a whole thread just to find an answer.

[00: 28: 02. 22] E: And think like if you were to like make students answer the question -they'd have to get the questions - the answer - the question correct first right? Otherwise then I guess they're not really helping anyone so. .

[00: 28: 14. 28] Interviewer: so going off of people contributing to other people - so lets say if you go back the whole ask for a suggestion right? you have the option to ask for a suggestion - your there. If you decided - hey this is your 10th try , would you rather something show up on the page - like hey you've been here for like 10 minutes. . you may wanna think about blah - or would you rather just hit the button and get the thing when you need it. . . even if you've been there for a while.

[00: 28: 48. 17] M: You mean - are you talking about the suggestion button - or rather just a suggestion on its own just appearing?

[00: 28: 46. 11] Interviewer: Right - clicking the button to get a suggestion - or just having a suggestion just appear on its own. .

[00: 29: 00. 29] M: I prefer the button. .

[00: 29: 00. 25] E: Maybe like a reminder that says hey this button is here. .

[00: 29: 05. 18] D: Ya that's what I was thinking. .

[00: 29: 05. 18] Interviewer: you mean a reminder after you've been on the page awhile. .

[00: 29: 09. 21] D: Ya

[00: 29: 09. 21] E: Ya. . .

[00: 29: 13. 11] E: And say hey don't forget - if you're having trouble then this is here to help you. . .

[00: 29: 14. 22] Interviewer: I like that. .

[00: 29: 14. 22] M: um. . I don't know . . if the , if the number of submissions isn't penalized , I would prefer for the button to show up after a set number of submissions -

[00: 29: 30. 19] Interviewer: Ok. .

[00: 29: 31. 28] M: Um. . otherwise if the number of submissions is penalized then maybe something time based - like you had mentioned. . . but ya. .

[00: 29: 40. 22] Interviewer: And the reason I ask about this is cuz it sort of follows the same process as the FAQs right? where you have people going back and forth - and can you see it all the time or not. . . um - same way with FAQs with people contributing versus instructors. . you said you prefer for it to be someone official. Now what about suggestions - lets say there was a bank of suggestions. . You ask for suggestions and it's going to give you a hint of some sort. What if you guys completed the exercises - you managed to make it through - they're all green so you're good to go. And a popup show up that says hey would you like to contribute a suggestion. SO you basically giving a hint that someone else will get when they hit that button. How do you feel about that?

[00: 30: 23. 18] D: I think that'd be kind of useful - I mean cuz I feel like kinda stuck to the [pint - like oh yes I got it an then you know - because you worked through the problem you kinda know if you have trouble with it t first - you know where you were first locked up. Like where the first problem arose as so you could contribute that first stepping-stone. And then if someone did need help and decided to use that then they could go for it. . .

[00: 30: 51. 20] Interviewer: You were thinking something - go for it. .

[00: 30: 58. 17] E: So I was just - that opens up the possibility of a lot of repeated suggestions. . SO maybe like hey! here's some suggestions that other people already suggested - like would you like to vote - up vote one of them. . .

[00: 31: 10. 13] Interviewer: Mhmmm - you mean instead of adding a suggestion - you up vote. . .

[00: 31: 15. 21] E: ya - or do you wanna suggest something like that. .

[00: 31: 15. 21] M: I would prefer I mean if - if were going to submit suggestions to have someone like an instructor or someone evaluate them and then either add them to the bank or not add them to the bank based on that. .

[00: 31: 31. 08] Interviewer: Fair enough. .

[00: 31: 31. 08] M: Because I would feel like a lot of people wouldn't add a lot of very useful suggestions - or um they wouldn't just know how to phrase it correctly or they would just add something just to add something? And that seems just kind of pointless and wasteful if they do that. . .

[00: 31: 55. 00] Interviewer: Mhmmm. . and what about when you get suggestions? How do you feel about the option -of saying ya - hey I like this suggestion that was helpful - or you're gonna get the suggestion based on the assumption that it would be vetted.

[00: 32: 12. 08] D: Uh ya - I'd want the suggesting to be vetted - like when I was saying ya it'd be great to like suggest it ya -in the back of my mind I was tanking like ya hopefully someone's looking through it make sure that they are actually useful. .

[00: 32: 20. 22] E: So. . so I guess a way to - I guess to judge if a suggestion is helpful or not - is if you get a suggesting and if you solve a problem after that - that's kind of like empirical evidence that hey this suggestion actually did help me or not. . .

[00: 32: 35. 22] Interviewer: What do you mean solve the problem?



[00: 32: 35. 22] E: Like if you said - like if your stuck on a problem and you like get a suggestion - and the after reading that suggestion you get the problem right - that kinda tells I guess the program or whatever whose evaluating the helpfulness and suggestions that that would actually help you solve the problem. Cuz that would maybe do like a ranking like that or something. . .

[00: 32: 53. 01] M: But I feel like a lot of people even if you get the problem right , some people don't know how to explain things - or some people might even - like make jokes or something and that could be even you know with an up voting system - that could become like popular - and oh this ones really funny or you know hahah or something - and its sure it could be witty you and it might tangentially be related but like it might not really be effective in teaching someone else. . . .

[00: 33: 26. 02] Interviewer: How about different trains of thought? How do you , cuz there are multiple ways to do one problem right - so what are you guys' - like if you get stuck on something you go to a TA.

[00: 33: 46. 07] D: A lot of times - like if I'm gone to a TA -a lot of times I'd be as simple as like I'd be trying to do something a lot more complicated than it needs to be. And then the TA would be like you can do this in a much more simpler way - and so - and that I feel like that actually helped me cuz because then like going forward into the future when I come across similar problems I can be like oh I was taught this way to be like simpler. So - maybe with this if you kind of - if you solve it and have like complicated solution that doesn't match like the most efficient solution. - it could show you this is the most efficient way to complete this problem. .

[00: 34: 24. 13] Interviewer: As in after you've submitted it?

[00: 34: 24. 13] D: After you've submitted it and get all of the parts correct.

[00: 34: 33. 23] M: Well - I feel like personally, its really dependent on which TA you go to . . . .

[laughing]

[00: 34: 35. 13] M: Cuz I feel like your mileage varies depending on which one it is - I've gotten some really useful advice - and some very not so useful from others. And um even then - sometimes I've had situations like he was saying, I'm doing it a certain way and I not thinking about it correctly and they offer a way that, more appropriate for the situation. But there are other times where the way I'm doing it ,is actually valid - and they acknowledge that its valid but they have another way in mind and instead of helping me on my way - or try to think more about my way. . they prefer to just tell me their way and just steer me in that direction, which gives me another point of view - but if my way is correct and it would work - ad its just a way that you're not familiar with , I don't feel that's very useful.

[00: 35: 42. 24] Interviewer: So what are your - do you have any thoughts about . . so essentially when I build feedback into the system. . the goal is you should be able to get just as much feedback from the system -or get enough hints to complete each exercise moving forward - even if you didn't have a TA right? - or at least a face-to face confrontation with the TA. Maybe there could be someone on the back end who is like responding to your FAQs or

whatever. So what are some of your thoughts on that - if you were to help them, ya so they're solution isn't wrong - its just the way you would do it. . . so trying to get feedback on that.

[00: 36: 36. 10] D: I feel like it would be helpful in the case where they're trying to steer you in their direction if TAs would be like yes, you could keep doing this. . . like kinda walk like they just kinda step into your shoes and saw where you were going with it - and saw that it would actually work and then say that this is an easier way like - cuz hats an explanation where you're learning yes my way s fine - but I can still improve and do something like this which is simpler.

[00: 37: 06. 01] Interviewer: Thoughts?

[00: 37: 08. 04] E: I mean - I guess that's - I guess the question your actually asking is how do you teach something well and I guess I'm not a teacher. . . The way I learn is from examples I guess - so maybe if there's like oh lets go over factorial too. - and it did kinda of like an animation thing - I dunno that's just kinda how I learn through example.

[00: 37: 32. 27] M: I feel like this is fundamentally different from the interaction I would expect from a TA. .

[00: 37: 38. 18] Interviewer: Ya. .

[00: 37: 40. 04] M: Ya - for a TA - I would expect them to try. . well they can instruct me in their way but also try match more with my way. . . and guide me along that path to try and help me figure out what I'm doing but this since its a problem - it doesn't - I wouldn't necessarily expect someone to be on the other end like helping in real time or anything so if - just of suggestions - I would feel the best way to offer suggestions would be to guide for the most effective solution - or the simplest solution. Um and then afterwards offer multiple possible solutions - like you cooed have done it this way - or you could have done it this way. . . like offer it a the end - after you've solved it. . .

[00: 38: 22. 22] Interviewer: So after you've solved it. . ok. . um do you think at any point once you're stuck for a while do you think you guys should have the option to see the answer or . . . . do you think you just work on it until you figure it out. .

[00: 38: 39. 25] D: I say work on it until I figure it out. .

[00: 38: 39. 25] E: I'd probably say like at some point I jut want the answer and then learn from that.

[00: 38: 52. 04] M: Ummm. . . I supposed I would. . I like suggestions after a certain period of time and as long - if it's an optional assignment then I know I'm not going to actually necessary complete it - then I would probably want to see an answer - but if its something like if its for a graded assignment um - I probably would not want to see the answer. I'd prefer to just get it wrong and then find out later on . . .

[00: 39: 20. 14] D: That's true - like if it was , if it was some sort of homework assignment - and I know I could go to any of the TAs for help - I'd prefer to do that than see the answer. . .

[00: 39: 34. 16] Interviewer: Interesting - so is there any additional feedback on the path that you think would have been helpful for you guys to figure out. . you guys have you read through the cod and figured out why it's wrong. ?

[00: 39: 46. 08] E: Ya. .

[00: 39: 48. 01] D: Umm. . ya. .

[00: 39: 55. 23] Interviewer: I have another copy so you guys can bring it closer. . .

[00: 40: 19. 01] Interviewer: Ya - I had some confusion with the math yesterday. So now reading the code , understanding what the person did or did not do - do you feel like any other feedback were you in the situation with that response - test result on the left. DO you feel like any other feedback on the page or any other - like maybe your FAQ could've given you some other stuff. Like what do guys think would've been helpful.

[00: 40: 40. 14] M: so I'm specific?

[00: 40: 40. 14] Interviewer: Mmmmmm so lets say you wrote that code - I know it's terrible - but assume you wrote that code, and this is the response you got. And these were expected, and this is what it should have given you. .

[00: 40: 52. 10] E: Ya. . .

[00: 40: 57. 22] Interviewer: But for your solution factorial of 1 was not. . it should've been 1, but it wasn't. Factorial of 2 wasn't 2 - but 3 and 4 worked and 5 and six didn't.

[00: 41: 07. 23] D: So to me this code just looks like someone doesn't completely understand what factorial means. .

[00: 41: 14. 12] Interviewer: Right way?

[00: 41: 20. 02] D: Cuz it only takes into account - like the only reason 3 and 4 work is because its 3 times 2 times 1, and 4 times 3 times 2. . .

[00: 41: 25. 25] M: Right. .

[00: 41: 29. 13] D: Versus - what would be useful though is I could actually see - why isn't factorial of 1 , 1. And then I could see that my answer was what negative or like positive 2. . or no 0. And then 2 would be 0. . .

[laughing]

[00: 41: 43. 16] Interviewer: So were you to get stuck like that and before you started really- you were like I don't know how to do factorial and it says think about an appropriate base case. . . so what does that like lead you to think about. . .

[00: 41: 59. 04] E: So I guess - so are you talking about like ways to tell the student to fix their solution?

[00: 42: 07. 24] Interviewer: YA so ideally you want to give someone as much feedback as they can while solving this right? So if someone writes that code and that's the answer you're getting and I tell you basically you can't go to Google - you need to solve the problem. . . Ideally your goal is all greens.

[00: 42: 16. 23] E: So something very I guess specific to this problem I guess - is that it kind of implies recursion - so maybe if you didn't see another factorial call in there you would say like don't forget about recursion. . . but that's kinda specific to this.

[00: 42: 31. 07] Interviewer: Right? Would you wanna see something like that as you were going through it?

[00: 42: 38. 18] E: I guess ya - maybe. .

[00: 42: 37. 11] M: Ok. .

[00: 42: 42. 28] E: If they're just trying to learn recursion or something then I guess that would be helpful. . I don't know how you would apply that to all problems.

[00: 42: 52. 15] M: I feel the problem with this code is the person doesn't understand , what factorial is or how it works. . . so the FAQ response to think about an appropriate base case seems really

ineffectual. Like if you don't know what a factorial is or how it works then you literally wouldn't know what an appropriate base case would be. . .

[00: 43: 08. 06] Interviewer: So for example if you didn't understand the question, and that was the first thing you got before you wrote code, um - do you think that implies - or that statement tells you how to go about it. DO you think you'd want more information before you even started?

[00: 43: 21. 07] M: I think a better thing to have in an FAQ would be a definition - or a formal definition of what factorial is . .

[00: 43: 29. 19] Interviewer: Ok. .

[00: 43: 29. 19] M: So factorial is - bah blah blah. . . and that way then it leaves the leader to figure out how to program that. . .

[00: 43: 36. 10] Interviewer: Ok. . do you think you guys would click the FAQs? . . Like you read the question - you didn't know what factorial was - do you think you would click the FAQs before you got anywhere else on the page? . .

[00: 43: 51. 17] Interviewer: Ok so more like when CodingBat has these little examples that substitute these examples in there and substitute some numbers in there and give you the appropriate solution.

[00: 44: 00. 10] D: Ya - so I remember a couple of time in like CodingBat - I would look , I know this right at the beginning I would need to do some like comparisons or something - I notice in the FAQs like oh its a String comparisons and stuff. . and I just clicked on that so I get some examples. . and then - cuz I know the proper syntax jumping into the code -with the definitions. . .

[00: 44: 18. 03] Interviewer: YA. . . . thoughts?

[00: 44: 23. 22] E: I dunno. . . .

[00: 44: 26. 24] Interviewer: Um ya - you guys did great. . . that's really everything I had. . . do yell have any questions for me?

[00: 44: 40. 21] Interviewer: I there anything on here that you think would have been more helpful or so you think something should go away?

[00: 44: 44. 11] M: Ok well definitely , of the feedback it should have what the actual run produced - that's like again I think. . . um. . . I think having an FAQ section and a hint section is a good idea - um if you structure it a certain way. . .

[00: 45: 10. 23] Interviewer: Like what way?

[00: 45: 10. 23] M: Ya - the FAQ for example should have a definition of relevant items in the , in a problem statement that the programmer might not know- - like what a factorial is . Everything else in there seems like something the person should know. And then maybe below that, or maybe even in like a separate section um - you could also have thing that we talked about earlier, if someone asks a question and it shows up - then that's another thing. Cuz I feel like that would be more hint worthy - uh whereas, just definitions or what a factorial is or whatever, that seems not as help. . . it doesn't seem like you're taking anything out. . or taking anything away from trying to solve it yourself, where its just more general information about the problem. .

[00: 46: 08. 08] Interviewer: Mhmmm - ya.

[00: 46: 13. 17] D: I was thinking the FAQ if -like if you have a little below the - whatever the questions or

[00: 46: 17. 09] Interviewer: Mmmhmm

[00: 46: 17. 09] D: like below , like ask your own question - and that goes to like a database. . so the instructors can look at that. And then see like who asked what question and like how many of these questions. And they see like a lot of people are asking like a similar question. . you can just choose to add it automatically to the FAQs. .

[00: 46: 42. 11] Interviewer: So you talked about like separate sections. . do you think like the FAQs when you first get to the page - like if you didn't understand the question like lends yourself to clicking on that - or do you think your first reaction would not be to click on that if you didn't understand that question. .

[00: 46: 56. 20] M: Honestly I hadn't really noticed the FAQ down there until, he pointed it out and he started talking about it. I was basically looking up here. . and I didn't really explore the rest of the page - I . . it took be awhile to even really look at what these other things were. .

[00: 47: 08. 26] Interviewer: Mmmhmmmm

[00: 47: 15. 21] M: Um so maybe if you want people to notice more - maybe make it a little more eye catching?

[00: 47: 22. 18] Interviewer: Would you want to notice it more or would you only want to go looking for it if you were stuck?

[00: 47: 26. 11] M: Well I'd like to know its there, um so you - after knowing that its there for the first time maybe if there was like - for your first assignment if there was like a tutorial and it tells you how to go about solving this and the format of it , then it really wouldn't need like something to draw you down there - but otherwise if you're just getting it straight off the bat , maybe something like in the problem statement like - there's an FAQ in the bottom or like a link at the top, one that takes you down to the bottom.

[00: 47: 57. 29] Interviewer: Mhmmmmmm. . thoughts?

[00: 48: 00. 11] E: I don't necessarily agree with that. . . I think it's pretty typical to have it down there - and once you see it once you kinda see - you know its there for like the rest of the problems so. . I don't know. . and it has a big enough font that it's comparable to the title - I dunno.

[00: 48: 18. 02] Interviewer: What about you? You just did CodingBat. . now it look a little bit different. .

[00: 48: 17. 26] D: Ya but I - I notice d the FAQ , I mean just kind of - I took in the whole page. . and I saw that down there - especially once you started talking about if you don't know what to do . . I automatically just started looking around like what can I do for help and so. . . that's why I mentioned it earlier.

[00: 48: 39. 21] Interviewer: Excellent . .

[00: 48: 41. 05] E: I just wanted to. .

[00: 48: 41. 05] Interviewer: Nope go for it - I've got time

[00: 48: 41. 05] E: So I'm assuming the tags - I'm assuming these are tags. .

[00: 48: 43. 13] Interviewer: Mhmmhmm

[00: 48: 43. 13] E: It says java compile. .

[00: 48: 48. 20] Interviewer: Ya. .

[00: 48: 46. 20] E: So I guess for a problem like factorial - you'd wanna have like a recursion tag - something that kind of gives you some insight. . .

[00: 48: 51. 13] Interviewer: Mhmm - ya. Would you wanna see tags on the page as you're working on the question?

[00: 48: 57. 01] E: Uh. h. .

[00: 48: 57. 01] Interviewer: So these are essentially little thumbnails and essentially they expand when you. . you click on it - as you go through the exercise lets say this entire workout has like 3 problems you have to solve for homework

[00: 49: 06. 05] E: Ya. . .

[00: 49: 08. 00] Interviewer: SO this is on the page - and it's got some sort of tag on it and its little thumbnail. Would you wanna see like tags on the page. . .

[00: 49: 17. 28] E: Ya - cuz like if you can click on a tag - like usually it gives you like a list of like other problems that have that tag in it. So usually it gives you a list of the other problems that have that tag in it. SO if you're stuck on this problem and you know it has to do with recursion - you just click on the tag and practice other recursive problems and then come back to this and say - ok now I have a better understanding or something like that. .

[00: 49: 44. 04] D: What do those numbers down here mean - like 0. 2, sixty xp. .

[00: 49: 41. 07] Interviewer: Those are supposed to be points. . but don't worry too much about that. .

[00: 50: 01. 29] M: I think that would be a good suggestion - if you click, click on the tag and go to another problem that's similar type, then work on that.

[00: 50: 08. 05] Interviewer: Ya. .

[00: 50: 10. 15] E: And then maybe have a ranking of the toughness of the problem - like I'm assuming that's what those medals are? .

[00: 50: 18. 19] Interviewer: YA - as you guys have sued CodingBat or something similar - you like the way they're ranked , they're kind of in order - they're grouped by string and logic. .

[00: 50: 30. 06] E: Ya. . .

[00: 50: 30. 06] Interviewer: DO you guys see that when you used to do things for assignments? Do you actually see that it's grouped like that? Or do you just get questions. . .

[00: 50: 44. 11] D: It was just. . it was grouped by like week,

[00: 50: 46. 14] Interviewer: Right. . so it could've been anything. .

[00: 50: 46. 14] D: Ya. . .

[00: 50: 53. 05] M: Right - and if you wanna see what its grouped by type - you have to go out of the group assignment sort of thing and it has it like in another space where some of them are linked together in like a group. .

[00: 51: 04. 02] Interviewer: So essentially if you got this in like a homework problem you wouldn't really have no idea if it was related to recursion or not. . . you'd just have to figure it out. .

[00: 51: 11. 18] D: Ya - that's why like the tags would be useful cuz then you could see like -

[00: 51: 12. 11] Interviewer: Mhmm

[00: 51: 12. 11] D: I think like CodingBat when you're doing it had something like - it had the lead up to - it's was like home and then

array 2 or something - and then there were specific problems. Even if you clicked on it form like your instructors specific page. . Ya but that wasn't intuitive. That was something you'd have to notice and like look for.

[00: 51: 30. 09] Interviewer: Ya - cool. . well do you guys have any other questions for me?

[00: 51: 45. 16] E: No. .

[00: 51: 45. 16] M: Well what like your timeline to get this sort of operational?

[00: 51: 45. 16] Interviewer: SO I will be doing my thing - I'd mainly focused on feedback. so I wanna get this nailed and I'd like to provide the best thing I can. The rest of my team will still be working on it - so their goal is to have it operational hopefully by the time everyone's back in the fall - um we can get people to test it out and see how it works. . . And I think once its tested and doing a good job - I think they'll try and launch it.

[00: 52: 22. 22] M: How much has the feedback that you've gotten through these group discussions affected how the team is designing.

. .

[00: 52: 28. 23] Interviewer: My feedback was incredible for the first round of focus groups - that I did so that's how some of these buttons and the FAQ concept and just the whole thing came out. . I wasn't actually thinking about it like that and it's actually very interesting for me because I enjoy teaching a lot. I've been a TA for many years - so understanding hits learning process has never been something I've thought about until I began doing these focus groups. So it's been really helpful - and groups of people think differently - and sometimes they're good with all things - sometimes there's just that one person that's confused about why. . and I really like that one outlier because it makes me think of it in a different way. FAQs were suggestion through a focus group - s its been really really helpful and this has actually been my favorite part of this thesis so far.

[00: 53: 47. 21] Interviewer: But ya - that's all I had for you guys - thank you so much for your feedback. If you guys have any other follow-up comments, questions, links you wanna throw my way - feel free to email them out to me.

[00: 53: 53. 28] E: Sounds good. .

[00: 53: 57. 11] D: Ya

[00: 53: 55. 21] Interviewer: Thanks so much for donating your hour guys!

[00: 53: 55. 21] M: No problem

## *Appendix I: Round 2 – Focus Group 3 - Transcript*

[00: 03: 44. 18] Interviewer: You guys can go ahead and finish filling out the forms and we can go ahead and start. Its jut a few questions. . . Ok so for those of you that don't know me - I'm Priyanka and I'm getting my Masters in Computer Science and the plan is to graduate this summer - my research is what this group is for.

[00: 04: 22. 29] K: I'm K I'm gonna graduate -I just had surgery.  
[laughing]

[00: 04: 39. 29] R: Ok - I'm R, I am getting a Masters in ME and a Bachelors in CS, and Ill be graduating in hopefully a year

[00: 04: 53. 02] C: I'm R - majoring in CS and I'll be graduating in December. .

[00: 04: 59. 11] S: I'm S - also majoring in CS and also graduating in December.

[00: 05: 09. 12] Interviewer: Great! As we get started on this I'll give you guys a little bit of background in a few minutes. But if you guys have any conflicting ideas , I know K's done this once before. Feel free to voice them, feel free to pass on any opinion you have about anything I show - or any Ideas you think maybe that are bad even if they are conflicting. . go for it.

[00: 05: 30. 29] Interviewer: So drill and practice systems are typical online tools that help with learning a new concept or a material, through a practice workouts and exercises. So one example that Tech uses is CodingBat for primarily lower level classes. So my research group and I are working on developing a slightly different version of a drill and practice system called CodeWorkout. So if I refer to , either drill and practice or CodeWorkout, they're relatively interchangeable for this purpose. So for this focus group I'm interested in exploring the role of feedback within CodeWorkout and how best to provide it while you're completing an exercise. So we'll talk a little bit about feedback while throughout the process and then we'll look at a sample exercise in various stages and we can talk about some feedback that you see or don't see - and go from there. . cool?

[00: 06: 17. 05] K: Ok!

[00: 06: 17. 05] Interviewer: Excellent - ok so we will start with this. . .

[shows first exercise screenshot]

[00: 06: 26. 14] Interviewer: Ok so you have to do an exercise problem for homework and this is the first screen you see. . . Let me know if there's anything you can't read. .

[00: 06: 51. 27] Interviewer: So when you're done, talk to me about your reaction when you first read the exercise.

[reading the screenshot]

[00: 07: 15. 09] K: So this would be the very first exercise someone would see?

[00: 07: 15. 09] Interviewer: Yes. And some things to keep in mind, that our discussion is going to be focused on, would be like, what's you first attempt to look for feedback as you're working through this exercise, do you look for it right away? At what point in the process do you start looking for it on the page? Things you notice. . .



[00: 07: 33. 29] K: That big black box seems very intimidating. .  
 [00: 07: 38. 17] C: Ya. . .  
 [00: 07: 41. 05] Interviewer: Ok. . . it makes you scared to start.  
 . . why?  
 [00: 07: 43. 12] K: I dunno - makes me feel like it's like a hacky  
 thing. .  
 [00: 07: 49. 05] Interviewer: Ok  
 [00: 07: 49. 05] K: And like, when I think hacker I think oh  
 someone's really smart and they know what they're doing , blah blah  
 blah. I guess I just um. . what's the word. . . I . . like when  
 you think of something and you're reminded of something else. .  
 These are my things. . .  
 [00: 08: 12. 23] Interviewer: You mean association?  
 [00: 08: 12. 23] K: YA! I associate big black box with hackers and  
 smart people. And I'm just like uhhhh. . . this . . that I don't  
 have to write. . .  
 [00: 08: 19. 13] Interviewer: Thoughts?  
 [00: 08: 29. 03] S: Uhh my thoughts are that this question is very  
 confusing. . I had to read it like 3 times to understand what is  
 going on.  
 [00: 08: 30. 20] Interviewer: Ok. .  
 [00: 08: 28. 10] C: These wordings on these questions are always  
 like really like. .  
 [00: 08: 31. 02] R M: You gotta read through it a few times. .  
 [00: 08: 37. 05] S: Ya. . . they're not really - what they want  
 you. . what you're trying to say. . I dunno  
 [00: 08: 38. 05] C: CodingBat does the same thing. .  
 [00: 08: 38. 05] K: And the inputs and outputs usually confuse me  
 too, like they always give examples about the inputs and outputs. .  
 and sometimes that confuses like how they. .  
 [00: 08: 48. 16] R M: . . How they correspond. .  
 [00: 08: 48. 16] K: Ya. . how did they get it? Like how did you. .  
 [00: 08: 51. 21] C: Ya - nice little explanation on like for each  
 example would be nice. . like this is this. . and go through a  
 example really quick and like why it's ten. . . or why its zero. .  
 [00: 09: 05. 28] S: Hmmm. .  
 [00: 09: 05. 28] Interviewer: Ok. . so would you like some sort of  
 feedback at this point -like right after you read the question? Like  
 is there anything on the page that would be helpful you think or  
 that you. . .  
 [00: 09: 16. 25] K: Maybe like a explain this question more type of  
 thing. . .  
 [00: 09: 21. 23] S: Ya , it's just check my answer not here right  
 now - there's no. .  
 [00: 09: 22. 22] K: Ya. . . well I dunno  
 [00: 09: 37. 29] C: think sometimes though like the - like on like  
 Code Academy and stuff like the hints. . . .  
 [00: 09: 37. 29] Interviewer: Do you wanna turn around? - I feel  
 like your neck hurts. .  
 [00: 09: 37. 29] C: No. . if there's a thing like oh I'm stuck -  
 give me hints. . that often you don't. . you make less of an  
 attempt to try and figure out and solve the problem. .  
 [00: 09: 50. 04] R M: Ya. . .  
 [00: 09: 50. 04] C: . if that kind of thing exists. . you kinda. .  
 you're like ehh eventually I'm just click the hints thing, so I

might as well just click it now - and then you kinda get used to that. . .

[00: 09: 57. 20] R M: Then you're not actually trying to solve the problem. . . and you're not getting anything out of the exercise. .

[00: 10: 24. 04] R M: Right. . . but I do like. . ultimately like these little examples that say oh here's one that sum to ten and then it doesn't and then you kinda figure out why that is. .

[00: 10: 24. 04] C: And then how do you understand the problem? . . That you didn't initially understand and you do it on your own more or less. . .

[00: 10: 17. 20] Interviewer: What were you saying?

[00: 10: 24. 04] S: I was saying just a little explanation would be the best bet. And then after you try it a couple of times, then maybe a hint button appears or something. .

[00: 10: 25. 17] Interviewer: Yeah. .

[00: 10: 25. 17] S: That way you're forced to try it at least. .

[00: 10: 28. 02] R M: Right

[00: 10: 28. 02] C: Yea. .

[00: 10: 28. 02] K: Ya. . I like that. .

[00: 10: 33. 26] R M: instead of having it there. . from the get go

[00: 10: 33. 26] C: YA. .

[00: 10: 33. 26] R M: Cuz even if you can make a couple of unsuccessful attempts. . it'll unlock a hint or something

[00: 10: 38. 05] C: Ya - cuz even Mastering Physics also does that. .

[00: 10: 44. 07] K: Ya. .

[00: 10: 45. 12] Interviewer: Y - I think they give you hints after a certain points or? . .

[00: 10: 44. 00] C: Ya. . you try it once and you can have a hint. .

[00: 10: 59. 22] S: I dunno - the hints are kinda hit or miss. .

[00: 10: 49. 09] Interviewer: We're gonna get to that. . . Um. . . do you think you'd like/. . for example - so as you look at the paper there's a bunch of stuff on it. There's like a title, there's a description - the big black box that's scary

[00: 11: 19. 27] K: Yes. .

[00: 11: 21. 20] Interviewer: Nope that fine - the feedback is really useful. .

[00: 11: 21. 11] Interviewer: The check my answer and then there's the thing called FAQ and so lets say for example. . lets start with if you see that on the page what are you expecting that little dropdown to have. .

[00: 11: 37. 29] K: Like Facts about how to use the site - not necessarily about the question itself. .

[00: 11: 38. 29] C: Right.

[00: 11: 43. 25] S: Ya. .

[00: 11: 43. 08] R M: Ya. . FAQ to me um is just general - general information about the site or how to do things. .

[00: 11: 47. 18] K: Ya. .

[00: 11: 52. 09] Interviewer: But it doesn't relate directly to the question?

[00: 11: 52. 01] S: Right. .

[00: 11: 52. 01] C: Ya. .

[00: 11: 56. 03] K: YA

[00: 11: 52. 01] R M: I mean even if you renamed it to something else?

[00: 11: 55. 19] C: Jut the way it looks it doesn't really look like its part of the problem. . after this you're just assuming that the problem is done.

[00: 12: 01. 15] K: It looks like a different section almost

[00: 12: 05. 00] C: Ya you're thinking that's where the Ads and stuff would go kinda . . you just ignore it. .

[00: 12: 13. 16] S: Actually I didn't see an FAQ until you said there was an FAQ so. .

[00: 12: 11. 00] Interviewer: Actually that really interesting for me too. . . ok. . .

[00: 12: 21. 04] Interviewer: So lets say you click on it. . we'll start with that right? Um. . like you click on it and lets say I give you the assumption that it has something to do with the exercise and its not FAQs about the site. . First of all, what do you think would be a good rename? Or what would you expect to see if you thought that was going to give you some sort of hint or be an explanation. . kinda similar to what you were talking about. . Tell me what the ten does. . or tell me how you go that or. . like what would make you look at that? Cuz initially its below the fold cuz you can see if you want to - not if you don't, kinda thing

[00: 12: 50. 12] K: So were assuming the fact that it deals with the question. . and what would we rename it to be?

[00: 12: 56. 21] Interviewer: Mhmm. . or what would you expect to see under there. . would you expect to see it right away , would you prefer it to be hidden. . let start with the rename. .

[00: 13: 13. 27] Interviewer: Cuz you mentioned it was so far below the involvement with the exercise. .

[00: 13: 11. 05] K: You could always name it like the name of the question FAQ - like blue ticket FAQ. . or like frequently asked questions about this question or. .

[00: 13: 20. 06] C: Hahah

[00: 13: 26. 10] K: I dunno

[00: 13: 23. 22] C: Right - I'm trying to think of another . .

[00: 13: 27. 10] R M: Maybe 'trouble understanding? ' and you click that and . .

[00: 13: 29. 11] C: It clarify what the questions asking?

[00: 13: 29. 11] K: Yea. .

[00: 13: 36. 19] Interviewer: Ok. . so. . lets say you click on a FAQ and this is what you get. .

[shows second screen]

[00: 14: 10. 16] R M: So this seems to me to be basically a hints section. .

[00: 14: 10. 16] C: Right. .

[00: 14: 10. 16] R M: So maybe you should just call it hints?

[00: 14: 14. 10] C: YA. . .

[00: 14: 14. 10] S: Ya. .

[00: 14: 14. 10] C: I mean given the uh - the student. .

[00: 14: 24. 01] R M: Instead of FAQ which is more general information about this website. . that's what I associate it with anyway. .

[00: 14: 35. 02] Interviewer: Thought. .

[00: 14: 39. 06] S: Um no - he's right. .

[00: 14: 41. 20] S: To me if I don't really know anything about programming and I'm like alright lets try and figure out what's going on it doesn't really help. I mean' try using a local variable'

- great now I need to look up what 'local variable' is if I haven't done it already. .

[00: 14: 54. 17] R M: Maybe you could have hyperlinks to a dictionary or something. . .

[00: 15: 01. 14] K: Or a glossary? . .

[00: 15: 01. 14] R M: Ya a glossary. .

[00: 15: 01. 14] Interviewer: Wow I haven't heard the word glossary in a long time. . .

[00: 15: 03. 26] K: I love me a good glossary hhhaha

[00: 15: 09. 23] Interviewer: Umm ya - ok fair enough. Ok so you said that doesn't. . - to get back to your statement - you said telling you 'using a local variable. . . 'And so I do want you to kind of have that assumption to think back a little bit to when you guys first started - cuz these are some lower level. . .

[00: 15: 26. 07] R M: Ya. . .

[00: 15: 23. 16] S: I was a little confused. .

[00: 15: 26. 25] C: Ya - at that point these type of questions the term local variable is kind of . . FAR outside . . . .

[00: 15: 37. 13] S: Its like 2114 instead of 1114. .

[00: 15: 39. 15] C: well. . . .

[00: 15: 43. 23] K: Differentiate between local and global. .

[00: 15: 48. 08] C: Ya - you really don't know the terms - you just know if I put it in this function and try to use it outside that doesn't work. .

[00: 15: 50. 23] R M: Ya. . .

[00: 15: 54. 11] Interviewer: OK - so what kinda of . . lets say for example you think ya it related more to a hit. Cuz clearly the box is still empty so they haven't really figure out any kind of code to write - they're still trying to figure out the question. what kind of stuff would you expect to see in there if you didn't know where to start and you basically looking around the page to get extra information. . Would it be more of a concept driven thing? would you wanna see part of a solution?

[00: 16: 20. 27] K: I'd like to see how someone got one of those solutions. .

[00: 16: 20. 21] Interviewer: Like one of the given solutions?

[00: 16: 27. 18] R M: Ya - well you can't really give the code but just an explanation on how . .

[00: 16: 26. 12] K: ya. .

[00: 16: 27. 14] R M: Why it comes down. .

[00: 16: 27. 14] K: Like logically break down like how they got it. .

[00: 16: 35. 13] C: Maybe like a rough pseudo code? - not like a detailed one but just. . like if this sum equals this . . then therefore . . or if this pair equals ten then this is zero , or ten or whatever the question was.

[00: 16: 46. 28] K: Maybe instead of one of the hints that say like oh you need like an if statement blah blah blah - maybe its like here's like a lot of the pseudo code - or here's how to do what you want in English.

[00: 16: 57. 15] C: Or maybe instead of saying use a local variable - maybe have a different example of a local example. . uh local variable. .

[00: 16: 59. 16] S: I think that'd be a good Idea.

[00: 17: 03. 14] K: Ya. .

[00: 17: 01. 27] R M: So it doesn't relate to the concept. .

[00: 17: 06. 00] C: So you can see the problem and you can actually figure out. .

[00: 17: 03. 10] Interviewer: So you're explaining the concept of the actual sentence. .

[00: 17: 09. 12] R M: Ya - and then I know when I'm learning things it makes much more sense if I have an actual example of something being used. .

[00: 17: 11. 27] C: Ya I don't wanna be given the answer - but if I have an example of how to use that or. .

[00: 17: 16. 27] R M: Then I can apply it. .

[00: 17: 16. 27] K: Right. .

[00: 17: 21. 17] C: And the apply it - yes. . .

[00: 17: 18. 29] K: Ya - I agree with that.

[00: 17: 20. 15] R M: I would find that much more helpful.

[00: 17: 25. 09] Interviewer: Ya - that's actually really helpful.

[00: 17: 28. 09] Interviewer: Um ok- so lets say you have the option to ask for an FAQ or ask for a hint, do you think you guys would post or? Like for example that popped up and there was the option that said hey um here's all the hints we have and then there's a button that says you know ask a TA or ask for a hint - do you think you would. . How comfortable do you think you would be. .

[00: 17: 48. 26] R M: For me personally I just never use it. .

[00: 17: 54. 07] S: Ya I always read what other people write but I never do it myself. .

[00: 17: 54. 07] K: Same here. . .

[00: 17: 57. 23] C: Ya - you guys don't have piazza and stuff right?

[00: 18: 03. 05] R M: ~no I was thinking more of like a CodeAcademy. .

[00: 18: 06. 25] S: Maybe

[00: 18: 06. 25] C: Ya

[00: 18: 07. 17] R M: Like a forum for each problem. . .

[00: 18: 09. 13] C: Well just forums in general I just don't use

[00: 18: 14. 11] R M: I never post on them

[00: 18: 29. 13] R M: Well - like Project Oiler - you can get a forum on any particular question - but only answer after you've answered it- which is kind of interesting. .

[00: 18: 23. 17] Interviewer: Interesting. . so you have to submit something in order to be able to have someone. .

[00: 18: 23. 24] S: You have to actually answer the question correctly and get the right answer before you can like have a forum. .

[00: 18: 36. 18] Interviewer: Ohh. .

[00: 18: 38. 12] C: That's. . .

[00: 18: 36. 20] Interviewer: SO like you wouldn't be able to post unless. .

[00: 18: 38. 15] R M: Right. .

[00: 18: 38. 15] Interviewer: Unless you've actually answered something. .

[00: 18: 46. 02] Interviewer: Um. . so Ideally the goal isn't for it to be some sort of threaded discussion - it would just be ask a question and then um either someone else in the class would respond or a teacher or instructor would be in charge of responding - um. . how do you guys feel about that? I know you said you don't use piazza but that's a little more threaded than. .

[00: 19: 06. 23] S: But also you know - something like that especially because it's probably just email or something - you don't expect a reply right back. you're trying to do it then and there you kinda want it like. .

[00: 19: 13. 01] R M: You're trying to solve it. .

[00: 19: 13. 01] S: You kinda want instant feedback

[00: 19: 20. 10] C: YA - I dunno for something like that - any kind of system like would be not even just overkill but detrimental - to the design of the . .

[00: 19: 30. 17] R M: I mean when you're doing these sorts of problems you wanna knock them out one by one - just real quick. Well having to wait for a response. .

[00: 19: 35. 18] C: right. .

[00: 19: 35. 18] K: It slows you down. .

[00: 19: 39. 03] C: And I think it's a crutch for something like that too. .

[00: 19: 44. 20] S: YA and some people don't like skipping ahead or skipping around - so they're just like - alright I'm stuck on this problem I'm just not gonna continue. .

[00: 19: 44. 03] C: Right. .

[00: 19: 48. 27] Interviewer: Fair enough. .

[00: 19: 51. 20] Interviewer: OK so let s say and we'll come back to this a little later once we talk about hints a little bit. Let's say you type some stuff up and then you end up with this. .

[shows next screen shot]

[reading next screen shot]

[talking amongst themselves]

[00: 20: 43. 06] R M: I don't like that it doesn't show my output though as opposed to what it's supposed to be. . or does it?

[00: 20: 43. 06] K: Ohhh. . .

[00: 20: 48. 07] C: I think it. . . I don't remember. . . I think it has expected and you're

[00: 20: 55. 09] R M: Ya my output versus expected out put. . .

[still reading]

[00: 21: 02. 04] K: It just tells you that you're wrong but it doesn't tell you what you've put out right?

[00: 21: 08. 03] C: Correct - it just gives you what tests they rand and what the expected output was and whether you had that or not - it doesn't tell you what you outputted. .

[00: 21: 16. 26] R M: Just showing me what my output is I can be like oh this is why that happened. . .

[00: 21: 23. 21] C: Say this is the test -and underneath of it go like this is what you outputted. .

[00: 21: 24. 07] Interviewer: Interesting - ok. Well yeah -I think that's helpful I agree. . so you guys can keep looking at that and we'll just talk around it. So just in general you guys seem pretty accepting of the location of the feedback where it was - it was kind of an oh yeah - ok I get it - I understand where its at. .

. [00: 21: 45. 18] S: Ya - its intuitive.

[00: 21: 50. 00] C: Ya - I think it's in a good spot - if it was underneath I wouldn't like. . . especially if it was a smaller screen you'd have to start scrolling. .

[00: 21: 56. 10] K: and plus you can compare code directly to the feedback - side by side

[00: 21: 57. 16] C: Ya that's what I mean - since it's side by side and not underneath you don't have to scroll. .

[00: 22: 06. 14] K: Mhmmhmmmm. .

[00: 22: 06. 21] Interviewer: Ok - so you see that and obviously your goal is to end up with all greens - right?

[00: 22: 08. 23] S: Correct.

[00: 22: 09. 26] Interviewer: So you see that - you see the broken code than you have written. .

[laughing]

[00: 22: 13. 28] Interviewer: SO if that as code that you've written - and obviously you're stuck right? and say it's the first time you're stuck - you just wrote that from a blank screen -and then ended up with that output on the right. Um what do you think your next steps would be - in terms of looking for more feedback - or trying to get greens and fix your code. . .

[00: 22: 49. 09] K: Bang away at the code. .

[00: 22: 54. 05] Interviewer: Sorry - you said you'd bang away at the code?

[00: 22: 51. 27] K: Ya - I'd look at the first one that I got wrong, deduce why I got it wrong - and then change my code to suit that tests. It's usually how I function.

[00: 23: 02. 19] C: Ya - you just look up the first test you fail. .

[00: 23: 09. 09] S: I can see why that code failed. . .

[00: 23: 14. 12] R M: If I was someone more inexperienced at coding I might look for some sort of button to highlighted, maybe click that for a hint. - Get a hint. . I dunno

[00: 23: 25. 09] Interviewer: Well there's a tiny button on the right bottom

[00: 23: 27. 29] R M: Ohh that what that's supposed to say. .

[00: 23: 29. 01] Interviewer: Ya

[00: 23: 37. 10] R M: Ya - so something like that - if I'm having trouble I'd click on that . .

[00: 23: 41. 18] Interviewer: YA - do you think you'd click on it right away?

[00: 23: 42. 20] R M: No

[00: 23: 42. 20] C: NO

[00: 23: 42. 20] R M: I'm the kind of person , I'm gonna try it a few times and then I'm if I get stuck an I'm frustrated

[00: 23: 51. 11] K: Ya - I'm the same way

[00: 23: 52. 29] S: I would first took at the what test I failed and see why my code didn't pass. .

[00: 23: 52. 29] C: Ya - I don't wanna give up that easily - I already wrote something I mean why would I give up right then and there. . .

[00: 24: 08. 09] Interviewer: So in this situation you're literally clicking a button and getting feedback right? Lets say you talked about - I'm gonna use your example - you're kinda wanna bang away at it for a little bit before you're gonna ask for a suggestion. Do you think you'd find it helpful if it showed up on the screen? Lets say you try that for - I dunno 3 tries - you're feedback screen looked like that - nothings fixed its still broken -um do you think after a certain number of tries or waiting. .

[00: 24: 40. 04] R M: I wouldn't like that - that would make me feel like crap

[00: 24: 41. 17] S: Ya.

[00: 24: 39. 02] R M: Like I'm not good enough. . .

[00: 24: 43. 07] C: Ya - its like maybe a hint would help. . ya no.

[00: 24: 51. 22] C: I still feel like something like should be like no hints or suggestions other than - here's one that works. Here's what you did and why it does or doesn't work. . and that's it.

[00: 24: 58. 25] R M: Ya - I don't agree - some people aren't gonna get the problem and they might

[00: 25: 06. 19] C: then they need to work it out. . .

[00: 25: 14. 07] S: I think it stood far over - I didn't even see it at first until someone mentioned the hint button - but I think it should go over here with the code and just appear when the feedback appears.

[00: 25: 19. 11] Interviewer: Like underneath the black thing?

[00: 25: 19. 11] S: Ya - cuz I'm already like I already know where that button is - and if you keep all the button close together. Cuz maybe if my screen was a little shorter and I had to keeps scrolling over I may not even see that and like. .

[00: 25: 31. 02] Interviewer: Fair enough. .

[00: 25: 31. 02] K: Ya. . I think what you said is good

[00: 25: 33. 07] S: Ya - its just too far over. .

[00: 25: 41. 24] Interviewer: So you'd rather ask for a hint instead of something just showing up -

[00: 25: 40. 17] S: Ya -

[00: 25: 40. 17] Interviewer: So what if something shows up and says hey! you've been here for like ten minutes . . .

[00: 25: 47. 05] S: Maybe I wanted to go to the bathroom or something - ya you can't. .

[00: 25: 52. 27] C: I mean sort of like if you mess up x amount of times or . .

[00: 25: 57. 07] S: Or take too long - you get discouraged

[00: 25: 57. 07] R M: Exactly - I feel like I'm not good enough to do the problem. .

[00: 25: 59. 04] C: I'm just gonna give up coding forever.

[00: 26: 04. 28] S: Ya. .

[laughing]

[00: 26: 30. 00] C: It's like Super Mario world when you die a bunch of times and it asks you if you'd like to take an easier route. . you know how may times I've done that. . . ZERO. . . It's why I just don't think a suggestion should be. . no. You either get it or you don't. . .

[00: 26: 38. 04] R M: And I think suggestions should be there if you want them. . .

[00: 26: 43. 26] S: I just don't think it should prompt you. .

[00: 27: 08. 29] S: think it should be there in the beginning and if it appears after 3 tries, 5 tries. . then

[00: 27: 06. 28] R M: Ya - I'm with you

[00: 27: 01. 13] C: Ya - but I see it as. . 5 times I'm gonna click the wrong answer there's the hint - now I read the hint now I'm gonna get it - now I'm gonna move on.

[00: 27: 06. 28] K: Then they aren't doing what the sites meant for which is learning.

[00: 27: 06. 28] C: Right. .

[00: 27: 12. 00] K: They're just there to - hwy are they even there?

[00: 27: 15. 14] R M: To pass a homework

[00: 27: 13. 11] S: Right. .



[00: 27: 19. 06] C: Right! SO if there is no hint. . . then. .  
 [00: 27: 19. 06] R M: Is there any sort of happy medium between those 2  
 [00: 27: 20. 28] C: Probably. .  
 [00: 27: 20. 28] Interviewer: Cool - thanks . . . lets talk about that. .  
 [00: 27: 27. 08] C: Another thing is people are very competitive and . .  
 [00: 27: 28. 10] K: That's true. .  
 [00: 27: 28. 10] C: Maybe if you had a score and if you use hint s- you couldn't get as high of a score. .  
 [00: 27: 32. 17] S: I like that Idea  
 [00: 27: 36. 02] R M: Ya - I like that. .  
 [00: 27: 34. 14] C: SO you tempted not use the hint - but its there if you need it.  
 [00: 27: 40. 24] K: Mmhhh  
 [00: 27: 40. 13] C: But then . . maybe this problem's worth a thousand points - maybe if you use a hint you loose like a hundred points or something. . .  
 [00: 27: 46. 15] S: Sure. .  
 [00: 27: 46. 15] C: and use another hint - you'll lose another hundred points.  
 [00: 27: 49. 04] Interviewer: Ok. .  
 [00: 27: 49. 04] C: And you could have a leader board - people love competition. . .  
 [00: 28: 02. 23] S: My family very competitive and it gives you something to work towards too. .  
 [00: 28: 02. 23] Interviewer: So I kinda understand what you're saying. SO I wanna go back to your statement that you made a little while ago. . you said they if you have to ask for a hint a little while into the thing you feel discouraged- or it makes you feel incompetent like you're not good enough to do the problem. . . What do you think a good a good way to . . . I mean the goal of this is to encourage people to learn.  
 Even if it's not worth any points - right? You still want them to be able to do this - so when they take the final in like 3 weeks they know what they're doing - so what do you think would be a good way - either through different wording on a button, or a different way to display feedback that would make you feel less incompetent to ask for help. . in the situation of taking an exercise. . .  
 [00: 28: 51. 07] R M: Just call it hints/ Suggestions. Don't say 'do you need a hint? ' or 'do you need help? '.  
 [00: 28: 57. 24] C: Don't phrase it as a question  
 [00: 28: 57. 24] S: Don't phrase it as a question. . .  
 [00: 29: 06. 08] K: Ya - I think the boys got it.  
 [00: 29: 04. 29] Interviewer: OK. . don't' phrase it as a question - I got it!  
 [00: 29: 13. 04] S: Well this is technically a statement - ask for . .  
 [00: 29: 13. 04] R M: Its areole small change but it doesn't feel as demeaning. .  
 [00: 29: 16. 09] Interviewer: But that is a statement - that's not a question. .  
 [00: 29: 18. 28] C: Ya - but its still ASK for a suggestion. .  
 [00: 29: 25. 13] S: Ya -

[00: 29: 27. 27] Interviewer: So just to round it off - do you guys see anything on the page you think would be helpful to be there if you were for an inexperienced programmer - that you don't see? Or do you think there's too much info on the page?

[00: 29: 41. 19] S: the stuff on the left - what is that exactly?

[00: 29: 42. 07] Interviewer: So for example you were in the middle of a workout and there were 4 exercises that's,

[00: 29: 52. 04] K: I think that's fine - if you have like a pack of questions - you're trying to get through them - those are the other questions in the pack or something . .

[00: 29: 58. 22] S: Right. . .

[00: 29: 58. 22] K: That way if you get stuck on one you can quickly go to and then ease your way back. .

[00: 29: 59. 10] C: Through. .

[00: 29: 59. 10] S: Right. . .

[00: 30: 17. 20] C: think having like some kind of like -Ok so if you had to do like 5 questions and then when you first started there were 5 over here - I answered one and then it goes away, and then there's 4. . . and then there's 3.

[00: 30: 19. 25] R M: It would make you feel . .

[00: 30: 17. 20] K: Something to work towards. .

[00: 30: 17. 20] C: Right - Right - Right

[00: 30: 21. 24] S: You're making progress. .

[00: 30: 21. 24] C: . . Incrementally

[00: 30: 26. 17] R M: Which is very important. .

[00: 30: 23. 26] C: Right. .

[00: 30: 27. 13] R M: Its visual in some kind of way. .

[00: 30: 27. 18] Interviewer: Ok that's interesting . . . talk to me about making progress. Do you think being able to see that you're making progress just within the exercise would be helpful. .

[00: 30: 33. 06] C: Yes

[00: 30: 33. 06] S: Yes

[00: 30: 33. 26] R M: Right - like this here - with the red and the green. .

[00: 30: 35. 25] Interviewer: Right forget the left bar - but just in here. . . what do you think would be. .

[00: 30: 41. 11] R M: Like this. .

[00: 30: 44. 22] Interviewer: OK so that. .

[00: 30: 46. 04] C: Ya like red - then green green green - now I got this one left. .

[00: 30: 50. 05] S: Or do like web-cat where it had that bar saying how close your are to being done. .

[00: 30: 51. 29] C: Right - that's good

[00: 30: 52. 12] S: You could have the green little checks but at the bottom say how close are you to being done. .

[00: 30: 56. 02] Interviewer: Interesting. Ya cuz there is the concept of a hidden tests. .

[00: 31: 02. 15] R M: Or 4 out of 5 tests pass. .

[00: 31: 00. 11] Interviewer: Ya - so you have some sort of total idea of how many tests are there because there's always those hidden tests that you can't

[00: 31: 05. 08] K: Ya -

[00: 31: 11. 17] Interviewer: . . a completion progress. . I like that - that's interesting. . .

[00: 31: 14. 17] Interviewer: Um - so I'm gonna throw this last wild and wacky out there. So lets say you guys fix that broken code and everything turns green and a pop-up appears essentially that says - congrats on finishing your exercise would you like to provide a suggestion for someone else to use? How do you guys feel about that?

[00: 31: 46. 06] R M: I think that might be good - cuz some people think differently cuz maybe the suggestions that were there didn't help them but after they did the problem - well if I knew this at the beginning - this could have been a lot easier. .

[00: 31: 51. 17] S: Well what if someone just pastes into their code?

[00: 31: 56. 02] R M: But you would have a moderator

[00: 31: 56. 02] Interviewer: Ya - there'll be a moderator

[00: 31: 59. 20] S: Ok - just making sure

[00: 31: 59. 16] C: That was the assumption I was making too

[00: 32: 00. 11] Interviewer: Ya - and then I mean something else to think about is once you submit you're suggestion - the person that gets it maybe there a way to up vote or down vote. Helpful or not helpful. . .

[00: 32: 18. 28] K: I like that. .

[00: 32: 19. 26] S: Everyone likes up votes now because of Reddit so. .

[00: 32: 24. 28] R M: I have no strong feelings

[00: 32: 22. 09] K: HAHA - I have no strong feelings. .

[00: 32: 28. 22] C: Ya -I don't up vote or don vote anyway so.

[00: 32: 26. 22] K: I do. . I do it on I'mgur - the only one that counts. IF something's really good I'll up vote it. SO if it's a really good suggestion - I'll be like you know what you're talking about

[00: 32: 43. 10] Interviewer: Do you think you would care whether the suggestion was given solely - so it would pull form a bank if you asked for a suggestion or got a hint or whatever - do you think it would be helpful if other students were to respond or do you think you'd just want it to be - if you were asking for a suggestion you'd expect to be official like form a TA or someone who was moderating. . .

[00: 33: 05. 04] R M: Um. .

[00: 33: 05. 04] K: I don't really have a preference. .

[00: 33: 05. 04] R M: Ya -

[00: 33: 10. 21] S: there are some rally smart students out there so but I would like to know how valid their answer is . .

[00: 33: 15. 22] R M: Right - then maybe like an up vote system would be useful -almost like StackOverflow - right. .

[00: 33: 18. 19] C: Mmhmmm

[00: 33: 25. 22] S: Right maybe they felt like they knew what they were talking about but maybe they felt like they made a mistake or they were going off on the wrong track - you'd wanna know. You don't want to be going down that wrong track - just like oh yea - it sounds like a good Idea - and try it and it fails. But if they did it - and you know got it checked out/ verified that it was the right answer. . .

[00: 33: 45. 24] Interviewer: Thoughts K?

[00: 33: 43. 08] K: I agree with what they said

[laughing]

[00: 33: 58. 00] Interviewer: So I'm basically almost done - just to close out. . I know you guys have all used CodingBat at some point - what kind of feedback - what's the one thing you think while you guys were talking 1 that - and doing homework exercises in that. The 1 thing in terms of feedback that you wish you had gotten but you didn't. That you could've found most helpful. . .

[00: 34: 39. 27] S: The problem with CodingBat was when I had to use it I had to do it for an assignment - and I didn't really care at the time - so I just looked up to see what the answers were on Google.

[00: 34: 42. 07] Interviewer: See - this we run into the same problem right? Cuz you're talking about not - making someone learn - you're talking about just trying your hardest . .

[00: 34: 55. 11] S: But see with CodingBat here wasn't a whole lot of feedback to begin with. . .

[00: 35: 02. 09] C: Its are you right or are you wrong - that's all we got. .

[00: 35: 07. 10] K: I mean they did the red and green with the. . .

[00: 35: 08. 15] C: But they weren't. . .

[00: 35: 13. 21] S: Right that's what I'm saying that's all you got.

[00: 35: 16. 20] C: Now if you give you your output that would've been nice. .

[00: 35: 15. 10] S: Ya -

[00: 35: 20. 20] Interviewer: Did they not give your output in CodingBat. .

[00: 35: 19. 17] R M: I don't know

[00: 35: 24. 08] K: It been awhile since I've used it. .

[00: 35: 22. 21] C: I'm almost positive

[00: 35: 29. 03] Interviewer: So maybe your output underneath was shown there. .

[00: 35: 38. 10] R M: I really don't think they did.

[00: 35: 37. 20] S: Sometimes I'd get empty brackets or something. .

[00: 35: 46. 27] Interviewer: It doesn't throw exceptions. .

[00: 35: 55. 01] R M: Oh yeah - wed get array out of bounds exceptions all the time. . .

[00: 35: 59. 02] C: You'd get the stack. .

[00: 35: 56. 15] S: Right. . wait what was the question?

[00: 36: 02. 29] Interviewer: I just said feedback wise what was the one thing that feedback wise - either this system doesn't have or could use . . or that CodingBat didn't have that you could've used when you were doing an assignment.

[00: 36: 11. 14] R M: My output versus expected

[00: 36: 11. 14] C: Right

[00: 36: 19. 00] S: Right - so this input - expected output - your output.

[00: 36: 21. 02] R M: I'm not sure what . . .

[00: 36: 57. 01] S: I still think that would be sufficient enough - I still like you give them a question prompt and then you just give what a simple input and output would be - I still would like a slight explanation of why that output came out. .

[00: 36: 34. 23] Interviewer: Like in words. .

[00: 36: 57. 01] S: Right like so you got like what nine, 1, zero. You could be like - so since  $sum\ a + b = ten$  therefore this - the output is ten cuz one of the sums is ten.

[00: 36: 52. 17] R M: Maybe you could have a little button you click that shares the ten -  
[00: 36: 57. 01] S: I dunno just something to like explain why this sample input gets this output - cuz like I said I had I had to read that question like 3 times just to figure out what was going on - it really wasn't clearly worded.  
[00: 37: 04. 03] Interviewer: Do you think it'd be easier to have these like 3 examples in like whatever we decide to rename the FAQ in? Or do you think you'd. . .  
[00: 37: 14. 18] C: I think that'd be ok. .  
[00: 37: 12. 03] R M: I mean I think having them here is helpful - they're towards the top of the page right - right after the question. Which I assume you're going to read if you're going to attempt the exercise. .  
[00: 37: 23. 05] Interviewer: That's the hope  
[00: 37: 24. 16] R M: So that kinda prioritizes that -as opposed to putting them in the FAQs - which you have to click and then it reveals. .  
[00: 37: 39. 21] S: Um - ya maybe if you had the explanation in the FAQ that might be helpful - but also maybe labeling those as an example - like cuz like you don't really know that's an example right there - its not really defined. .  
[00: 37: 50. 02] R M: don't know - I mean you could do 1. .  
[00: 37: 50. 02] C: I mean you could do 1 but who says which part you're gonna do first you know?  
[00: 37: 55. 14] Interviewer: Alright that good! Do you Gus have any questions for me?  
[00: 38: 01. 29] K: I'm satisfied. .  
[laughing]  
[00: 38: 01. 29] Interviewer: Excellent! Well that's it guys thanks!