Understanding the Preparation Phase of Technical Interviews

Brian A. Bell

Thesis submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

Master of Science
in
Computer Science & Applications

Chris Brown, Chair
Sang W. Lee
Mohammed F. Farghally

May 4th, 2023
Blacksburg, Virginia

Keywords: HCI, Technical Interview, LeetCode, Software Engineering

Understanding the Preparation Phase of Technical Interviews

Brian A. Bell

(ABSTRACT)

Technical coding interviews are a core part of the evaluation process of software engineering (SWE) applicants. This process requires SWE job seekers to typically complete either one or multiple rounds of such interviews which are designed to measure their technical understanding of software engineering topics such as Data Structures & Algorithms. However, there are additional considerations made during the evaluation process, such as the applicants behavioral skills. Skills such as communication, problem solving, and stress tolerance, are just some of the skills that may be used in addition to the general technical skills. Both of these skill areas, in addition to the cognitive and social complexities associated with the various types of interviewing environments, result in a challenging event in which to properly prepare for. Our research aims to better understand how SWE job seekers prepare for such interviews through survey usage which analysis their used services, study habits, and educational background, thus providing useful insight and understanding into the complexities associated with the preparation process as a whole. By understanding the challenges and practices associated with the preparation phase of technical interviews, our research aims to help SWE job seekers, hiring companies, and future research creation.

Understanding the Preparation Phase of Technical Interviews

Brian A. Bell

(GENERAL AUDIENCE ABSTRACT)

A Technical coding interview is a form of interviewing which requires the applicant to solve a given problem by coding the solution. Technical coding interviews are a core part of the evaluation process of software engineering(SWE) applicants. This process requires SWE job seekers to typically complete either one or multiple rounds of such interviews which are designed to measure their technical understanding of software engineering topics. However, there are additional considerations made during the evaluation process such as the applicants behavioral skills. Skills such as communication, problem solving, and stress tolerance, are just some of the skills that may be used in addition to the general technical skills. Both of these skill areas, in addition to the cognitive and social complexities associated with the various types of interviewing environments, results in a challenging event in which to properly prepare for. Our research aims to better understand how SWE job seekers prepare for such interviews through the analysis of their used services, study habits, and educational background, thus providing useful insight and understanding into the complexities associated with the preparation process as a whole. Future resources, hiring companies, and SWE job seekers themselves are some of the parties our research aims to help.

Dedication

This paper is dedicated to my brother Kaleb, "Be humble for you are made of earth. Be noble for you are made of stars."

Acknowledgments

I am forever thankful for the guidance of my advisor, Dr. Chris Brown, who has continuously offered support and feedback throughout my research career. I am very thankful for everything that he has done for me and I owe him a lot. I would also like to thank both Dr. Sang Won Lee and Dr. Mohammed Farghally who have positively impacted me during my time as Virginia Tech. Whether that has been as my professor or as a supporting researcher, you both have truly helped shaped me into a better man.

I would also like to acknowledge the unwavering support given by my friends and family. Additionally, I am thankful for the GERMAN Club of Virginia Tech for providing me with friendships that will last a lifetime.

Last but not least, I am grateful to my pup Ollie who has been with me throughout the majority of my graduate journey and has always offered love and happiness even on the most difficult of days.

Contents

List of Figures

List of Tables

List of Abbreviations

CtCI Cracking the Coding Interview

OOP Object Oriented Programming

RQ Research Question

SWE Software Engineering

Chapter 1

Introduction

Software engineering positions oftentimes require applicants to go through one or multiple rounds of *technical coding interviews*. These technical interviews typically involve a one-on-one interview with a companies software engineer, or a third party engineer, whom gives the applicant a puzzle which is to be solved by code and through the usage of data structure and algorithm knowledge. These interviews are used by companies to test candidates in an array of necessary hard and soft skills such as problem solving ability, technical knowledge, communication and/or the ability to handle obscurity. These interviews are naturally challenging in nature and oftentimes require candidates to prepare weeks or even months ahead. For example, a candidate may be asked to design an algorithm which can organize any randomly generated array of integers by their common denominators. This requires knowledge of data structures & algorithms, their chosen programming language, and the pros and cons of various different solutions all while being under the pressure of succeeding in the allotted time.

As a result, many candidates experience heightened levels of anxiety or stress leading up to their technical interview [12]. Our research aims to better understand how applications prepare for this style of interviewing and what additional researches may aid them in their pursuit of a software engineering role.

Motivating Example

I would like to begin by presenting a popular technical coding interview problem found on LeetCode[3], an online learning platform designed to aid candidates in preparing for technical coding interviews.

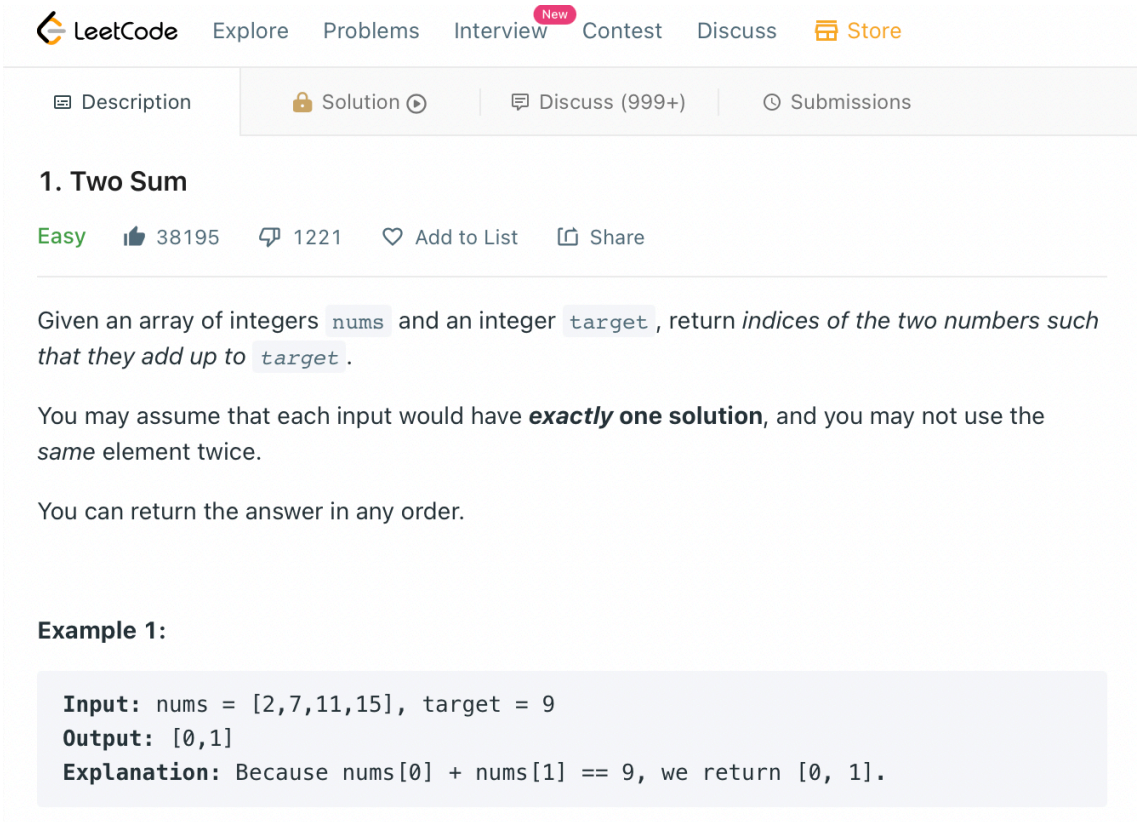

Figure 1.1: *This problem can be interactively attempted at leetcode.com/problems/two-sum/. LeetCode provides a similar problem solving environment to technical coding interviews minus the presence of an interviewer.*

We would like you to take some time - regardless of your coding proficiency - and attempt to solve the problem. Were you able to solve it? What were the time and space complexities of your solution? Were you able to at least come up with the solution logically instead of through code?

According to a published LeetCode community report - within the past six months - "Two Sum" has been asked during technical coding interviews for companies such as Amazon, Adobe, Apple, Google, and Microsoft[4].

1.1 Motivation

1.1.1 Research Objectives

The goal of this research is to discover underlying study patterns used by individuals seeking roles as software engineers. Some of the questions we hope to answer are as follows. What study habits worked for the majority of surveyed individuals? What resources aided in the successful completion of a technical interview? These are some of the questions we hope to answer through the usage of a user study and hope this information can be used to both reduce pre-interview stress as well as build confidence in future SE career seekers.

1.1.2 Perceived Problems

Addressing the currently perceived problems associated with the current technical coding interview preparation process will allow for a deeper understanding and potential discovery of possible solutions to these problems. According to an article on *gitlab.com*, technical interviews are not like the job in which the applicant is applying for [16]. We will discuss the technical interview process in depth further on in 2.1 but for now, it is important to understand that applicants are often required to utilize additional resources for their preparation which spans past their academic knowledge. As a result, there are various problems we perceive in current preparation methods.

The first being an increased amount of stress which negatively effects the participants. As shown by Behroozi et al. [12], stress does tend to negatively effect an applicants performance during the technical interview it self. However, this research was focused on variables associated with the interview itself and not on the preparation phase. We see the stress associated with the preparation phase does indeed negatively affect applicants and research which was

done by Kinnis et al. further supports this [17].

Going beyond the problems of stress, we also understand the lack of familiarity with technical interviews experienced by most CS students [13]. Knowledge of such interviews comes with time and many college students are first exposed to technical interviews during their undergraduate careers. How are students expected to prepare for an interview in which they lack experience for? Additionally, every company tends to conduct their interviews in their own way which further causes confusion among candidates. This is a problem we aim to hopefully address by exploring how exactly candidates approach such events.

Lastly, there are a plethora of resources out their in which SWE job seekers use to prepare themselves for their own respective technical interviews. The problem we see with the vast amount of resources is a lack of cohesive ideas on how to properly prepare for these interviews. This issue also may lead to further stress and anxiety in applicants as they could potentially feel overwhelmed with not only the vast amount of offered services but also the wide array of material that is required to be studied. By analyzing the commonly used resources, we hope to understand the commonalities shared between each service and alleviate some of these concerns.

1.2 Research Overview

We conducted an empirical study which aimed to better understand how both computer science students and self identified software engineers prepare for their technical coding interviews. To do this, we developed three main research questions which we allowed to guide our research; RQ1. How do SWE(Software Engineering) job seekers prepare for 'Data Structure and Algorithm' - focused technical interviews?, RQ2. How do applicants perceive the preparation process for technical coding interviews?, RQ3. How can universities bet-

ter promote supplemental studying methods for SWE job seekers preparing for technical interviews? To answer these research questions, we surveyed 131 SWE job seekers and interviewed 3 computer science students. Once our studies and interviews were completed, we analyzed our results and recorded all notable trends that we discovered.

1.3 Research Questions & Contributions

RQ1: How do SWE(Software Engineering) job seekers prepare for 'Data Structure and Algorithm' - focused technical coding interviews?

With the wide array of technical coding interview preparation methods out there, it can be quite difficult for a SWE job seeker to find an approach that appropriately prepares them to ace their own interview. In this thesis, the main question we would like to answer is how SWE job seekers prepare for technical coding interviews which focus on Data Structure and Algorithm type questions. We believe that discovering certain studying trends will allow for both future researchers and academic institutions to develop systems that will provide SWE job applicants with the necessary material needed in successfully obtaining a job position. Additionally, we aim to better understand exactly how SWE job seekers utilize resources such as tutoring, group studying, and mock interviews. This would provide further insight into what mediums are most commonly used during the preparation process.

RQ2: How do applicants perceive the preparation process for technical coding interviews?

This research question is designed to gain a better understanding of how SWE job seekers felt about the preparation process. This includes understanding how they generally feel during the process (confidence and anxiety levels) as well as their personal value towards certain areas of skills such as nonverbal communication and problem solving ability. By asking this

question, we aim to help bridge the gap between what is best for the hiring company as well as what is best for the SWE job seeker. Additionally, we believe it is important to understand how SWE job seekers feel about the preparation process as it may impact how they prepare.

RQ3: How can universities better promote supplemental studying methods for SWE job seekers preparing for technical coding interviews?

Our third research question is designed to aid in the discovery of potential solutions to technical interview preparation problems experienced by SWE job seekers. Students, although being well studied on academic material, are frequently not adequately prepared for the technical interview process [24]. Additionally, the technical interview will not test the candidate on material that will be used by the position [20]. By understanding these roadblocks, we can help improve preparation resources and reduce negative feelings such as stress and anxiety for candidates during both the preparation process and the interview itself.

Chapter 2

Background

Chapter 2 will provide the reader with a better understanding of the entire technical interview process. Section 2.1 will delve into current interview practices used by well known and sought after companies such as Meta, Google, and Amazon. No two companies interview the same way but they all do share some similarities when evaluating candidates. Section 2.2 will provide some background on current technical interview preparation services. These services will include the website LeetCode, the book Cracking the Coding Interview, and the structured technical problem set Blind 75. Lastly, section 2.3 will refer back to the previously discussed technical coding interview question titled "Two Sum" and provide a thorough explanation of the solution(s). This will hopefully provide the reader with a good understanding of the difficulty associated with current technical coding interview problems.

2.1 Current Technical Interview Process

To better understand how students and other software engineering job seekers prepare for their technical coding interview(s) we first must take a look at the interview process as a whole. This section will focus on the generally accepted technical interview process that is shared by many companies. It is important to note that every company designs their technical interview process around the technical role being hired for. [15]

2.1.1 General Process

Purpose of the Technical Interview

The technical interview process was designed to provide employers with the necessary information needed to determine which applicant is the best fit for the current offered job. These interviews typically consist of questions which relate to an applicants prior work experience, personality, and technical skills. The number of interviews and type of questions more often times than not will relate to the specific job that was applied for. It is also important to note that the material covered often will depend on the size of the company as well as the level of the role that was applied for. Some companies may only require surface level knowledge on the coding stack associated with the role were other companies may require a technical coding interview that delves into data structure & algorithm knowledge that is not even used in job itself. Software engineering is a very complex field with many avenues for expertise which brings attention to the fact that there are a wide array of interview styles and material knowledge used.

Types of Software Engineering Interviews

There are four main types of technical interviews that are currently being used [8]. Whether these interviews are given or not is up to the company in which the applicant has applied.

Initial Screening Interview: The initial screening interview is normally the first interview a candidate will take during the entire interview process. The interview time is scheduled ahead of time once the candidate makes it to the interview stage and is either done over the phone or through an online meeting medium such as Zoom. The interview consist of the candidate briefly discussing with the recruiter the basic requirements of the

role, why the role was applied for, and potentially some basic technical questions to see if the applicant is knowledgeable enough to continue to the next interview.

Take-home Assessments: The Take-home assessment can normally either come after the phone screening portion or act as a candidates first interview. These assessments are often times used to filter out applicants based on basic technical skill requirements and are given through a wide array of mediums. Some take-home assessments consist of structured coding projects that are expected to be submitted within a few days of receiving the starting material. Other times the take-home assessment will consist of an online test which consists of a number of technical coding problems relating to data structure and algorithms. Typically, these questions are similar to the technical coding interview questions but are often times done in an online IDE that offers luxurious such as syntax checking and testing.

Technical Coding Interview: These interviews are the core part of the technical interview process and are the focus of our research. These interview are typically done synchronously in-person or remotely and are often times given after previous weeding out rounds. They are designed to test an applicants current technical knowledge on more advanced topics in addition to certain soft skills such as communication and attitude. These interviews traditionally have taken place at the location of the company but due to the pandemic, have begun to instead take place through platforms such as "HackerRank" and "Codility" [14].

The number of technical interviews depends on the company and role applied for but often times the interview will consist of at least one 30 - 45 minute coding round which may ask a candidate to solve up to three technical coding questions in a programming language of their choice. These technical coding questions are very similar to the problem presented in Sections 1 and 2.3. The applicant will be asked to walk through their thought process as

well as writing their code live for the interviewer. Questions from the applicant are expected and often time encouraged [7] and provide the interviewer with a better understanding of how an applicant deals with obscurity. Once the applicant arrives at a functional solution, the interviewer may ask the applicant how the solution could be improved upon. These improvements are similar to the example solutions given in Section 2.3. Once the interviewer is happy with the given solution, or if time requires it, the interviewer will then present the next problem.

Behavioral Interviews: The behavioral interview is either given between various rounds of technical coding interviews or after an applicant has made it past their scheduled technical coding interview rounds. This interview is often times given as a way for the current software engineering team leads to gauge if the applicant would fit in to the culture of the company and how they may act as a professional colleague. Other times no feedback is required to be submitted by the interviewer and the interview is instead used to give you an opportunity to not only take a mental break from the technical rounds, but to instead discuss your interests and ask formulated questions.

2.2 Current Services

There are a wide variety of services currently offered which each aim to aid in the successful completion of a technical coding interview. These services range from online problem sets, technical courses, text book study guides, to many others which are offered through a wide range of mediums. We will provide a brief overview of some of the offered services below.

2.2.1 LeetCode

LeetCode [3] is a website which offers users the ability to practice various areas of computer programming through various technical coding problems. The site is most often used for SWE (Software Engineer) job seekers who want to practice the necessary concepts to pass their technical coding interviews. There are currently over two-thousand available problems which relate to areas such as Algorithms, Databases, Shell, and Concurrency [3]. Our research will focus solely on the data structure & algorithm problem sets in relation to the technical coding interview preparation process.

2.2.2 Blind75

The blind75 [10] is an organized list of the seventy-five most frequently asked leetcode questions through a wide set list of software companies. The blind 75 has helped many people obtain SWE jobs and has even helped some individuals land jobs at FAANG (Facebook, Amazon, Apple, Netflix, Google) companies as well [5].

This Blind75 was originally published by an anonymous Meta(Originally Facebook) tech lead on Dec 30, 2018 on teamblind.com [10]. The post was titled,"New Year Gift - Curated List of Top 75 LeetCode Questions to Save Your Time" [10] and aimed to offer job seekers a more structured study plan when preparing for technical interviews.

2.2.3 Cracking The Coding Interview

Cracking The Coding Interview [22] is a technical coding interview preparation textbook written by former Google software engineer Gayle Laakmann McDowell. The textbook was first published in 2008 and aimed to provide guidance on technical job interviews. The

book consists of a brief overview of the entire interview process as well as an organized list of practice problems which will give the reader a better understanding of the necessary knowledge needed to complete their technical interview(s).

2.3 Walk-through of "Two Sum" Problem

The following section will refer back to the problem titled "Two Sum" which was originally presented in the introduction chapter 1. This section is recommended if you have no experience with current technical coding interviews and will provide you with a brief outline of what knowledge is needed to successfully complete an interview. Our goal is for the reader to understand how difficult preparing for technical coding interview questions can be. LeetCode was used to reference all technical coding problem solutions.

Solution 1: Brute Force

Algorithm

The brute force algorithm is relatively straight forward. The approach is to loop through each element x and find if there is a second element which meets the case of equaling *target* - x.

Java Implementation

```
1 class Solution {
2     public int[] twoSum(int[] nums, int target) {
3         for (int i = 0; i < nums.length; i++) {
4             for (int j = i + 1; j < nums.length; j++) {
5                 if (nums[j] == target - nums[i]) {
```

```
6                       return new int[] { i, j };
7                   }
8               }
9           }
10          return null;
11      }
12  }
```

Complexity Analysis

Time Complexity: $O(n^2)$. We try to find an elements compliment by iterating through the rest of the array. The initial element requires a loop which takes *O(n)* time and the additional loop adds on O(n) time as well. Thus the time complexity is $O(n^2)$.

Space Complexity: $O(1)$. The input array in no way influences the space requirement in this problem, therefore only constant space is used.

Solution 2: Two-pass Hash Table

Algorithm

This solution improves upon the run time by sacrificing some space. This is done by taking advantage of what is known as a hash table. Lets consider a simple implementation which utilizes two separate iterations. The first iteration will add each element's value as a key and its index as a value within the solutions hash table. The second iteration will be used to check if each elements complement *target - nums[i]* exists in the hash table. If the complement does indeed exist, the current element's index is returned alongside the index of the it's complement's index

.

Java Implementation

```
class Solution {
    public int[] twoSum(int[] nums, int target) {
        Map<Integer, Integer> map = new HashMap<>();
        for (int i = 0; i < nums.length; i++) {
            map.put(nums[i], i);
        }
        for (int i = 0; i < nums.length; i++) {
            int complement = target - nums[i];
            if (map.containsKey(complement) && map.get(complement) != i) {
                return new int[] { i, map.get(complement) };
            }
        }
        return null;
    }
}
```

Complexity Analysis

Time Complexity: *O(n)*. The list containing n elements is traversed exactly twice. The hash table reduces the lookup time to *O(1)*, which results in the final time complexity being *O(n)*.

Space Complexity: *O(n)*. The space complexity is dependent on how much space the solution uses. In this case, the hash tables size depends on the number of given elements n. Therefore the space complexity is *O(n)*.

Conclusion

These are just two of the many possible solutions that exist for such a coding problem. It is important to note that applicants are able to answer these questions in any appropriate programming language as well, which further increases the number of available solutions. Additionally, applicants are expected to be able to understand and implement the correct data structures and/or algorithms while also communicating their thinking process throughout the interview. Success of a technical coding interview is the culmination of many months of practice which include understanding when and where to apply such data structures and algorithms, knowing how to properly communicate their thinking process, and properly handling the stress that comes with both being watched by the interviewer and having a limited amount of time to solve the problem.

Now with considering the vast openness of such questions combined with the total number of potential coding questions reaching into the thousands, we are able to gain a glimpse into the level of difficulty associated with technical coding interviews. As mentioned in 2.1, many current technical interview processes require applicants to attempt up to three technical coding questions in a span of 45 minutes. This time constraint paired with the challenges brought upon by such problems has the potential to leave the applicant in a very tough situation.

Chapter 3

Review of Literature

3.1 Introduction

Current technical hiring process are currently widely discussed within academia however, we have found that research which focuses specifically on the preparation phase is relatively light. To the best of our knowledge, majority of the currently published technical interview research focuses on the technical coding interview portion itself and the preparation process is only briefly discussed if at all.

3.2 The Effects of Anxiety and Preparation on Performance in Technical Interviews for HBCU Computer Science Majors

Kinnis et al. [17] conducted a study which focuses on the effects of anxiety and preparation on technical interview performance among African-American students at Historically Black Institutions [17]. Their goal was to provide detailed results which would aid in better understanding the anxiety among Computer Science students of Historically Black Institutions. To do this, they published a survey which asked questions about students' experiences with the technical interview process. This survey consisted of free response, specified intervals, and

Likert scale questions. Their study found that higher anxiety resulted in lower performance. Additionally, they found that after four interviews, participant's anxiety level remained the same or decreased. Lastly, they found that when preparing for technical interviews, participants used mock interviews 58% of the time, online services such as *LeetCode* 16% of the time, and used *Cracking the Coding Interview* 12% of the time.

3.3 Debugging Hiring: What Went Right and What Went Wrong in the Technical Interview Process

Behroozi et al. [13] conducted a qualitative study to determine where in a"typical hiring pipeline" job candidates are left behind. Referred to as "leaky pipelines", these leaks typically result in qualified candidates being lost during the process. Their goal was to better understand where in the hiring process these candidates are left behind and what could be done to improve the experience for both the applicants and the company hiring. They conducted study consisted of analyzing over 10,000 reviews on 19 different companies from Glassdoor[2], which is a website where candidates can leave their personal experience on specific companies' hiring processes. The results consisted of several identified poor practices done by the company hiring which had resulted in candidates not receiving a fair evaluation. Some of the practices identified were, not adequately communicating with the candidates throughout the process and using inexperienced interviewers. The results of their findings allowed them to establish a set of potential guidelines for companies to follow which would improve their hiring processes.

3.4 Cracking the Coding Interview

Gale Laakmann McDowell [23] is the author of various job interview preparation books including Cracking the Tech Career, Cracking the PM Interview, and Cracking the Coding Interview(CtCI). Her work has been noted in the press by various newspapers such as *The New York Times*[21], *The Guardian*[18], and *The Wall Street Journal*[15]. McDowell has worked as a software engineer for some of the most sought after software engineering companies such as Google, Apple, and Microsoft. She has been labeled one of the top interviewers at Google where she served on the hiring committee, interviewed hundreds of candidates and analyzed thousands of candidate submissions. CtCI contains four main sections which each aim to help the reader with the different components of the interview process. The first section is labeled as the "Introduction" portion of the book and provides background information on various details such as a general overview of the entire interview process, the hiring processes used by top companies (Google, Facebook, Amazon, etc.), the structure of the actual technical interview portion, and how offers are eventually given to qualified candidates. The second main portion titled "Data Structures" dedicates a chapter to each of the most often used data structures such as Arrays, Linked Lists, and Trees. Following this portion of the book comes the section titled "Concepts and Algorithms". This section focuses less on the data structures used and more on the topics that require logical reasoning such as bit manipulation, general math, sorting & searching, and the various programming paradigms. Lastly, the book dedicates a large portion of the text to providing a detailed overview of various "Knowledge Based" topics. This section focuses on the unique characteristics of various programming languages such as Java, C, and C++.

3.5 Does Stress Impact Technical Interview Performance?

Behroozi et al. [12] conducted an empirical study which aimed to discover how exactly stress impacts technical interview performance. To do this, they first conducted a randomized controlled trial with 48 Computer Science students. The participants were compared in both private and public whiteboard settings. To properly gauge the affects of stress on interview performance, the researchers focused on various core adjustments that were made during the interview that they believed would impact stress. The most notable results were found by just having an interviewer present which they found to reduce the participants performance by more than half. Additionally, they found that stress and overall cognitive load were significantly higher in the traditional technical interviews when compared to the private interviews. These results provided the researchers with the ability to propose interview modifications which would potentially alleviate some of the stresses associated with traditional technical interviews.

3.6 Hiring is Broken: What Do Developers Say About Technical Interviews?

Behroozi et al. [11] conducted a qualitative study using a popular online news website called Hacker News [1]. They grouped notable trends of comments and concerns shared by candidates during their interview process. Some of the concerns mentioned were candidates' overall anxiety, affect, and time commitments which all were a resulting effect of the interviews. They also found that the companies that typically use technical interviews as a primary assessment instrument may unfairly filter out qualified candidates. Through their analysis, they were able to develop multiple technical interview process guidelines which

would potentially alleviate some of the notable issues that were currently present. Overall, the findings of their research show that further research into the topic of technical interview preparation and its affects on candidates are needed.

3.7 Developing an Agent-based Virtual Interview Training System for College Students with High Shyness Level

Xinpei et al. [19] conduct a user based study which aims to discover whether an agent-based virtual interview training system would benefit college students with notable high levels of shyness. Their user study showed that their system did provide shy college students with reduced levels of anxiety and an overall improvement in interview performance. However, they did note that a potential limitation was due to their study only being conducted in an online environment rather than a real interview. This suggests that further research which aims to apply such practice in a real interview setting may benefit and provide further insight into the topic of interview performance and preparation.

3.8 Conclusion

Our study aims to build upon the previous works and delve into a less focused aspect of the technical interview process which, in our opinion, is one of the most important factors in determining a successful interview or not. Understanding the resources used, emotions felt, and overall personal opinions of applicants would provide future reference data for researchers, more confidence and potential success in applicants, and improved hiring practices

for companies. Specifically, Brian's own personal experiences with many technical interview processes paired with dialogue shared between internship seeking students inspired this research to take place. The end goal is to bring more attention to how job seekers prepare and what resources they use to prepare for their respective technical coding interviews. Additionally, current works which include both the noted related works and others, lack a detailed examination into the preparation process of SWE job seekers specifically. These works either focus on the entire interview process or the technical coding interview itself. Although the preparation process is mentioned in some of these works, they do not provide enough insight and research which is what our work hopes to do.

Chapter 4

Methodology

To study the steps used by candidates to prepare for technical coding interviews, we created two categories of surveys and a set of interview questions. The Google Forms platform was used to create both categories. The surveys were identical excluding a set of specific questions that were unique to the applicant body we were studying. This was to provide data to our supplying companies in return to providing us with more than 100 survey participants. Below we will go in depth on the creation of the survey & interview question process, publishing of the surveys & interview conducting and the general data analysis.

4.1 Survey 1 - Students & Other General Applicants

4.1.1 Intro

Our first survey, which can be found in the appendix A.1, consisted of 85 questions which aimed to provide us with a general understanding of how applicants prepare for their technical interviews. This survey was shared with Virginia Tech students and Computer Science faculty specifically. The survey can be further broken down into 13 sections of questions which all aim to both support and provide answers to our research questions. Additionally, there are various sections that are only to be taken by individuals who met a certain criteria. This was handled by having certain responses taking participants to a section that is further

along in the survey. For example, whether they are a current working professional or not. We used a combination of demographic, open ended, closed ended, Likert scaling, multiple choice, and rating questions. This provided us with an abundant amount of information to analyze and also gave the participants both structure and freedom to express their opinions.

4.1.2 Demographics

The first three sections consisted of necessary demographic survey questions. The first section consisted of mostly standard questions such as asking the participant to provide their identified gender, ethnicity, and race. The following question asked participants whether they have obtained a degree in Computer Science or plan to in the future. If they said no, the survey would end and be submitted. This allowed us to only focus on individuals who have obtained or plan to obtain a degree in Computer Science. We additionally added a question asking if the participant identified themselves as a working professional or not. If they answered yes, they would skip over section two, which was specific to students, and move onto section three, which was specific to working professionals. Section two and section three asked specific demographic questions relating to the participants label(whether they were a working professional or a student.)

4.1.3 General Background

The following two sections, 5 and 6, were designed to obtain vital background data on the participant. Section 5 was determined whether the applicant could continue to the full background section based on if they had completed at least one technical interview. Section 6 was designed to gain an insight on the applicants experience with participating in technical interviews. Questions that ask number of technical interviews, comfort levels during an

interview, and in person experience were here.

4.1.4 Preparation Techniques

Sections 7 and 8 were the main focus of our research as these questions related directly with all three of our research questions. These questions asked the participant questions such as how they go about preparing for a technical coding interview, what resources they use, and their overall confidence in various areas. It was important to focus on general preparation and not on specific used resources such as LeetCode in this section. We utilized various question types such as Likert scale, matrix, and short answers which were used to gain a better understanding of the resources used by our applicants.

4.1.5 Challenges Faced During Preparation

Section 11 was designed to provide answers to RQ3 5.5 which aimed to discover the perceived roadblocks for applicants during their preparation. This section consisted of a combination of short answer, Likert scale, and multiple choice to provide a variety of data to analyze. These questions related directly with the participants emotional state when participating in various preparation strategies such as mock interviews and general studying. An example question which was asked was, "What has personally been the most difficult thing you have faced during your studying process?" Additionally, we asked questions which we hoped would provide insight on any challenges that were consistent between participants. The goal of these questions were to also help with improving the technical interview preparation process for applicants.

4.1.6 Preparation & Academic Education

Section 12 focused specifically on the role university education plays in the preparation phase of the technical interview process. All questions revolved around the benefits that academia provided for our participants when studying. The bulk of these questions were styled as Likert scale questions and asked the participants to provide their agreement on whether their courses specifically helped with the various topics that are included in technical coding interviews (Data Structures, Algorithms, Time Complexities.) Additionally, we asked participants if they would be interested in a course that would be specifically designed to help prepare students with technical coding interviews. This was to allow for future research within the research area of software engineering education.

4.2 Survey 2 & 3 - Exponent & Pramp users

The second and third surveys, which can be found in our appendix B.1 and C.1, each contained a company specific section unique to each of the two participating companies, Exponent and Pramp. The general sections remained almost identical to our general survey so please refer to 4.1 for section descriptions. In exchange for providing us with a substantial amount of survey participants, both Exponent and Pramp requested we add an additional section to survey their own users to provide feedback on their respective platforms. Questions in this section were to gain a general insight on how the specific users used their respective platform and asked questions to gain a better understanding on their opinions. An example question being, "Which Exponent features have you used?" We did not use any of the questions in these sections as they did not relate directly to our research goals.

4.3 Pilot Interviews

We conducted several pilot interviews with Virginia Tech students to gain a more personalized understanding of how they prepare for technical interviews as well as their overall opinions of the technical interview process. Each participant participated in a 15 question qualitative pilot interview study which lasted from 45 minutes to an hour and was conducted either in-person or through the Zoom platform. A copy of our interview questions can be found in our appendix D.1. The interviews were recorded live and then transcribed during the data analysis phase. The questions presented asked the participant their experience with technical interviews as well as the various components that go into technical interview performance(emotional state, preparation techniques used, etc.) Once each interview was completed, the participants were each given a $20 amazon gift card as compensation.

4.4 Data Analysis

To store our data, we utilized Google Sheets. We first copied the survey data over to their own respective sheets. The responses were then copied over to a reorganization sheet which was used to place all three surveys side by side. This allowed us to note any unknown inconsistencies between the three surveys. It is also important to note that during this pruning process, we decided to remove various questions due to lack of value and/or lack of consistency. This insured that all three surveys could be combined and analyzed as a whole. Once the surveys were combined into a single sheet, we utilized various built in functions to calculate values such as various counts, averages, medians, min, maxes, and standard deviations. For Likert scale questions, we used an unpaired t-test to statistically analyze categorical responses from our participants. For free response questions (open-ended and

short answer), we used an open-coding approach to derive themes from our participants responses. Once all the data had been cleaned, we then utilized the google sheets graphing functionality to create our notable graphs which showcased discovered trends in our data.

Interview data analysis began with transcribing the live audio transcriptions saved by Zoom. The participant responses were then moved over into an independent google document per participant. Once this was done, the audio transcriptions we analyzed using open coding that allowed us to define categories and group similar opinions together. This open coding technique involved two researchers who both analyzed and developed their own groupings of the free responses. Once this was done, the two researchers came together to discuss their groupings which were then combined into a finalized set of groups. These groups provided a high level overview of the free responses given by our interviewed participants.

4.5 Participant Descriptions

We had a total of 131 survey responses. 104 of our participants identified themselves as Male, 27 identified themselves as Female, and 0 self identified as other. There were a total of 35 self reported students who ranged from Freshman to PhD. The remaining 96 were self reported software engineering professionals. 83 of these professionals shared their total years of professional experience which had a calculated average of (9.32 ,n=83). 89 of our participants had participated in at least one technical interview consisting of data structures & algorithms. The calculated average number of interviews was (7.41 ,n=89). Additionally, 117 of the participants had experience with in-person interviews as well. Lastly, out of our 131 total participants, 93 came from Exponent, 34 from Pramp, and the remaining were from Virginia Tech. The participants from both Exponent and Pramp were user of the respective platforms.

We conducted a total of 3 interviews which were all done through the the video communication platform Zoom. Two of our participants were current Virginia Tech students and the last was a Virginia Tech alumni. All three were Computer Science majors and had previous experience with technical coding interviews.

Chapter 5

Results

5.1 Demographics

There were a total of 131 participants with 104 being self identified Males, and 27 being self identified females. Majority of the participants(73.28%, n=96) were self identified software engineering professionals, and the remaining group of participants(26.72% ,n=35) being students. The following distributions were taken from the 35 self identified students; Freshman(40%, n=14), Sophomore(0%, n=0), Junior(22.86%, n=8), Senior(31.43% ,n=11), Masters(20%, n=7), and PhD(5.71%, n=2).

5.2 General Questions

We began our survey with questions that were designed to give us an idea of the overall experience of our participants. This included questions that aimed to gauge their professional experience as well as their experience with interviewing. The 96 self reported software engineering professionals of our 131 total had an average of around 5 years of experience (avg = 5.91, std=7.31) as seen in Figure 5.1.

We found that majority of our participants(82.4%, n=108) had completed at least one technical coding interview, displayed in Figure 5.2, with a calculated average of (mdn = 3, std

Figure 5.1: *Number of years of experience*

= 12.5).

5.3 RQ1: How do SWE (Software Engineering) job seekers prepare for 'Data Structure and Algorithm' - focused technical coding interviews?

As mentioned in 4.1.4, section 7 and 8 consisted of various questions which related directly to RQ1 5.3. Our first group of questions asked our participants how they spent their studying time. In relation to overall hours spent per week studying, the following groupings were recorded; 0 hours (13.74%, n=18), 1 hour (8.40%, n=11), 2 - 5 hours (44.27%, n=58), 6-10 hours (22.14%, n=29), 11-40 hours (15.27%, n=20). The highest amount of hours spent

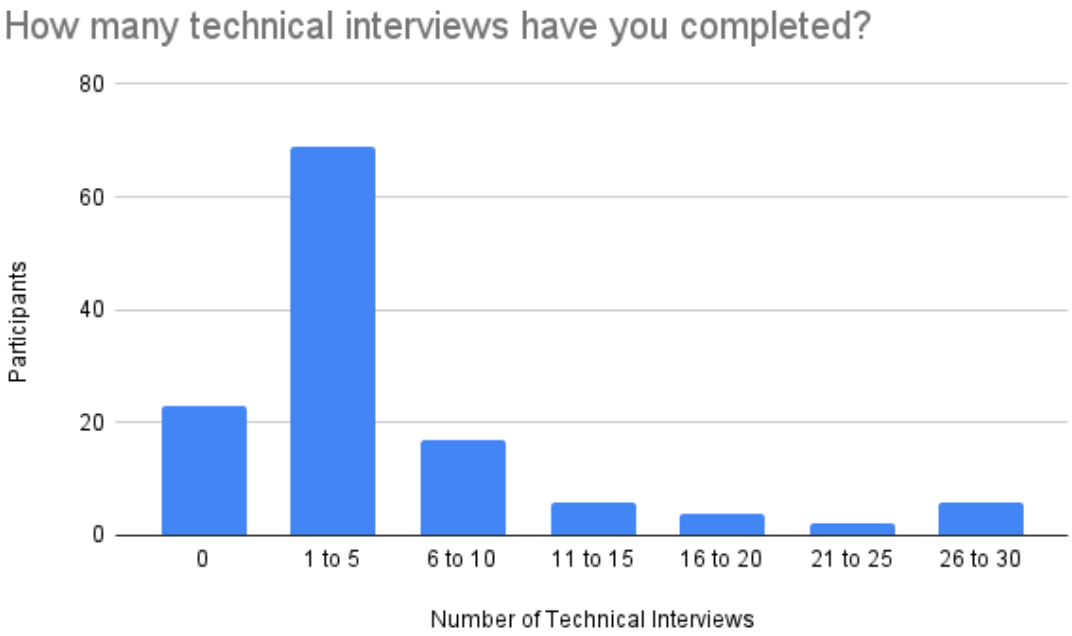

Figure 5.2: *Number of interviews completed*

studying was recorded as 40. The calculated average was recorded at 6.85 hours per week. Participant responses were varied when asked when exactly they begin studying for their technical interviews. Responses spanned from"3-6 months before" to "A week before an interview". There was no noticeable commonality when analyzing these responses.

Our next set of questions related to group studying participation which included mock interview, one-on-one tutoring, general group participation questions. (46.56%, n=61) of our participants had participated between 1 - 5 mock interviews and (37.4%, n=49) having never done one. For one-on-one tutoring, majority of the participants (70.9%,n=93) had never participated in at least one one-on-one tutoring session. In relation to group studying, under half (38.17%, n=50) had prepared in a group setting such as studying with friends, family, or within study groups. Additionally, we found no statistically significant results associated between the number of technical interviews completed and the number of hours studied,

participation in group studying sessions, and/or one-on-one tutoring.

Our interviews, described in 4.3, provided us with some qualitative data which provided insight into how exactly our participants prepared for their technical interviews as well as their general opinion on the preparation process.

Through our analysis of our results, we found that the preparation process really depended on the individuals social and technical experience. However, we were able to discover some commonalities between the three individuals who were interviewed. The first was the idea of adjusting their study habits based on the company in which they are interviewing for. The technical interview process is different between companies as mentioned in 2.1.1 which means preparing for one company technical interview may not be the exact same as preparing for another. Another notable commonality was the usage of resources such as LeetCode and Glassdoor. LeetCode provides enough material to cover any potential technical coding interview question while Glassdoor provides user published information pertaining to the interview process of specific companies. Our participants all noted usage of these resources as well as other less popular ones.

5.3.1 Used Resources (Websites, Books, Courses)

There are a plethora of resources software engineering job seekers utilize in their technical interview preparation. These resources are often published through various mediums such as websites, online courses, physical textbooks, and online problem sets. We focused on platforms and publications that were often discussed through online forums, videos, and through face to face suggestions. We have initially described each of the three main resources which revolved around our hypotheses in the following section 2.2. In addition to these services however, we will note the significance found from some of our other services as well.

Figure 5.3 shows how familiar each of our participants were to each of the 8 services specified.

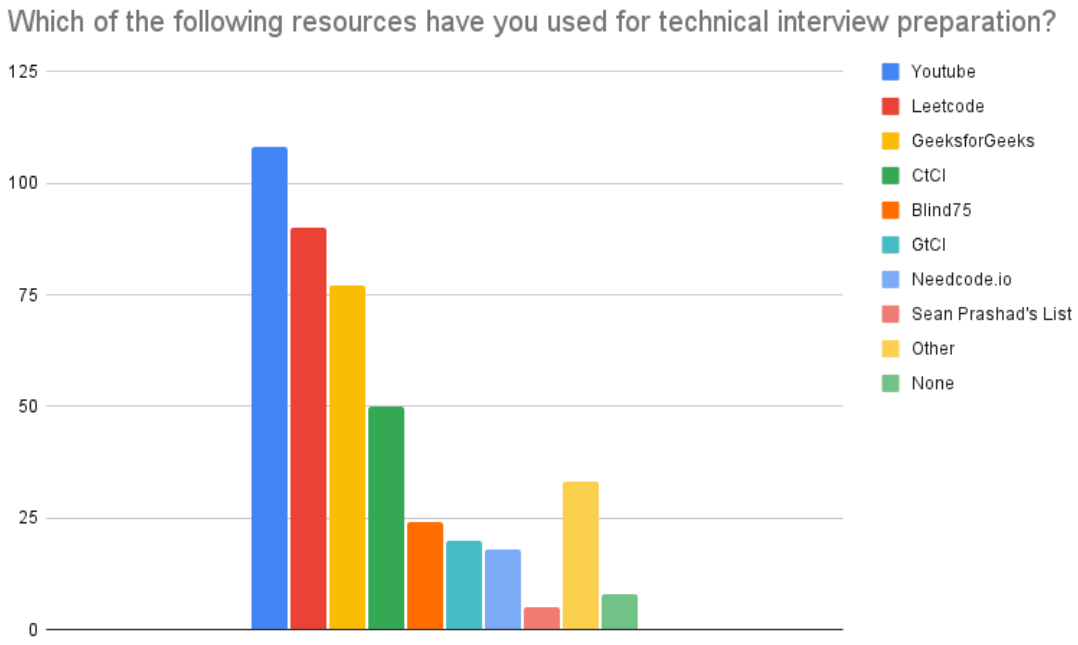

Figure 5.3: *Number of participants who have used the listed services.*

Out of our 131 participants, the most popular resources used were YouTube (82.4%,n=108), LeetCode (68.7%,n=90), and "GeeksforGeeks" (58.7%,n=77). This suggests that LeetCode is overall the most popular practicing platform to use in pair with the additional resources. We also provided a free response question which allowed the participant to note any utilized resources that were not from original list of 8. Some notable services included "Hackerrank", "Algoexpert", and "Udemy".

5.4 RQ2: How do applicants perceive the preparation process for technical coding interviews?

Our second group of questions were designed to better understand how our participants viewed the process of preparing for technical interviews.

We asked our participants to evaluate the importance of 6 different areas associated with technical interview performance. The following were the 6 areas; Problem solving ability, Nonverbal communication, Oral and verbal clarity, Providing clear & concrete examples, Enthusiasm, and Confidence. Note that in the following set of questions which ask the participants to rank their confidence on these areas, we combined Enthusiasm & Confidence into overall attitude. Figure 5.4 provides an overview of the responses given by the 128 participants who answered these questions. Additionally for the opinion on importance question, we analyzed the variance of the responses using the one-way ANOVA function which showed that the participants did not value each of the skills equally ($F=26.389$, $p<0.01$). We then used the Tukey Kramer function to show the difference between skill groups as noted by the ANOVA function. The Tukey Kramer function showed that the 'Problem Solving Ability' skill was viewed as more important than any of the other mentioned skills ($p<0.05$).

We then asked our participants to rank their confidence levels in the previous mentioned areas. Note that the question scale ranged from 1(Not At All Confident) to 5(Completely Confident). We found that on average, majority of our participants felt either somewhat confident or fairly confident as seen below in the following figure 5.5

We also found that majority of the participants felt anxious when studying for a technical interview. (58.78%,n=77) of participants responded to the statement, "I feel very anxious when studying for a technical interview" with a 3 or above on a scale from 1(Strongly

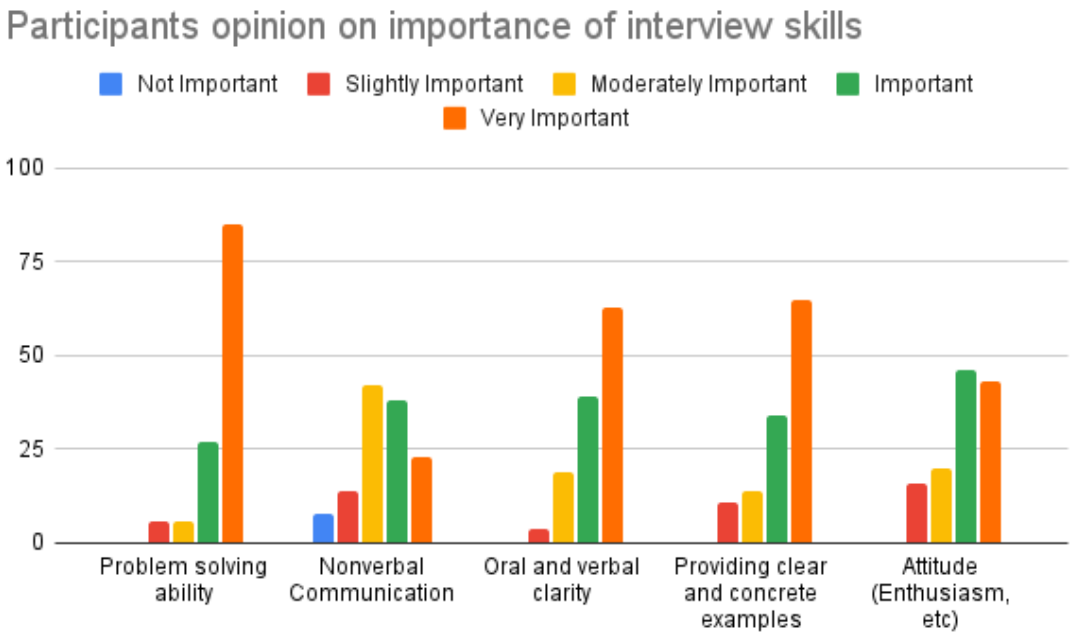

Figure 5.4: *Value of importance*

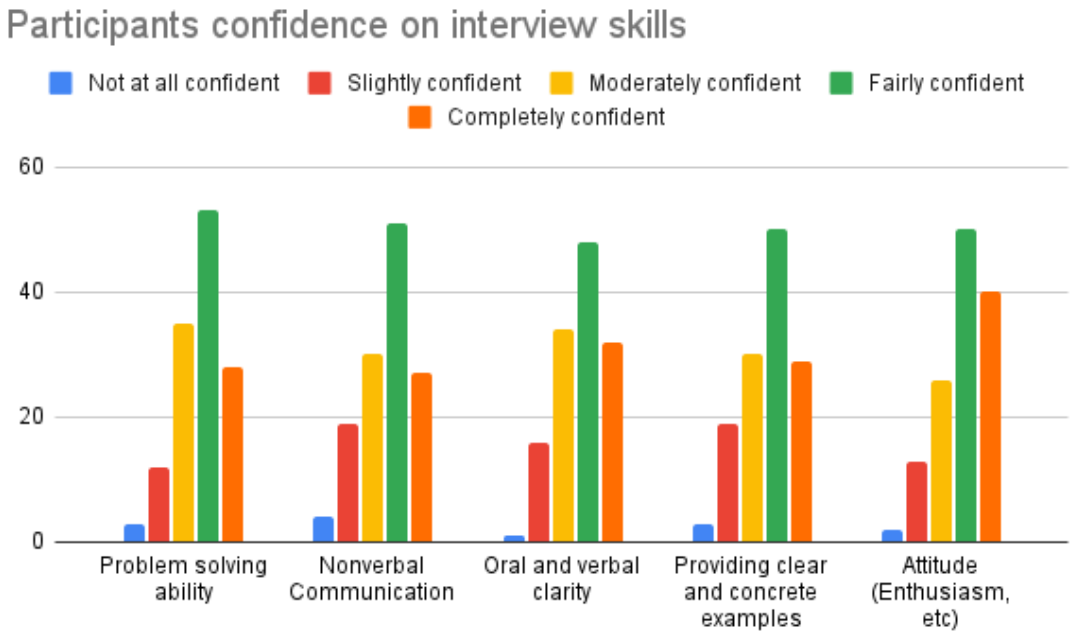

Figure 5.5: *Number of participants who have used the listed services.*

Disagree) to 5(Strongly Agree) as seen on 5.6.

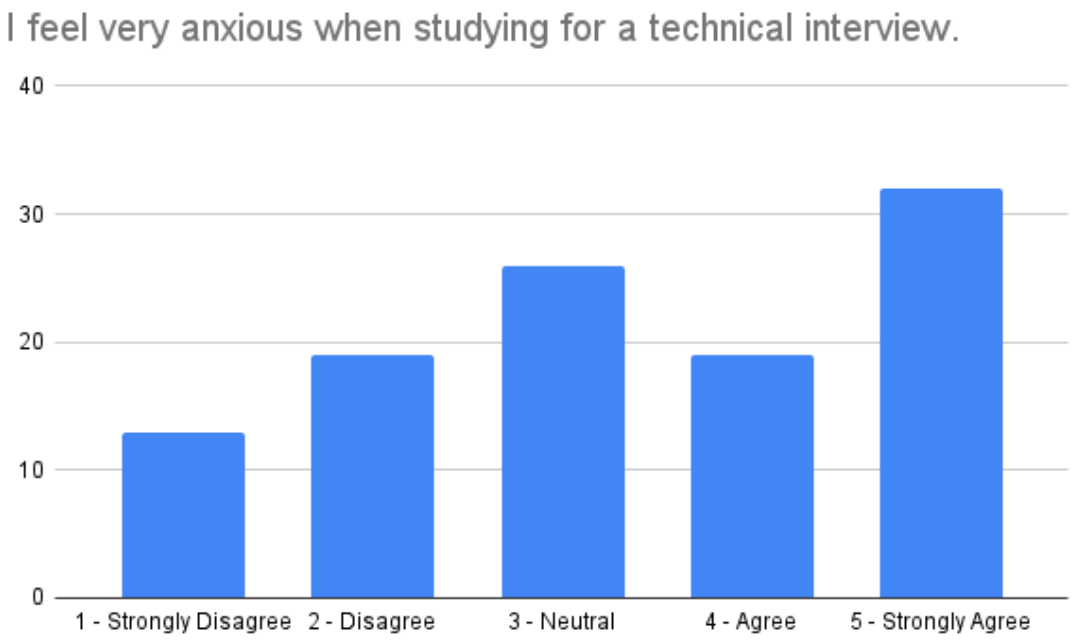

Figure 5.6: *Overall feeling of anxiousness when studying for a technical interview.*

A related question aimed to gauge whether or not the participants found it difficult to balance their technical interview preparation with their other daily tasks. The question again utilized a scale from 1(Strongly Disagree) to 5(Strongly Agree) with majority of participant responses (60.31%,n=79) being between 3 and 5 with the highest response being 5(27.48%, n=36).

After completion of the previous questions, we aimed to better understand what they believed to be the main cause of their increased anxiety. We did this by providing them with a multiple choice question which had the following responses that could be selected;

- a. Poor performance in past interviews is what causes me to struggle in future interviews.
- b. There are too many topics to master in regards to Data Structures & Algorithms.

- c. Not knowing what will be asked during these interviews is the most stressful part.
- d. The CS curriculum did not adequately prepare me for the current style of interviews.
- e. Balancing interview prep time with other commitments is too time consuming.
- f. Other
- g. None

Below is a table 5.1 which provides the responses from the 131 participants.

Table 5.1: refer to previous list for choice selections

Response	***Participants***
a - Poor performance in past interviews	52
b - Too many topics to study	73
c - Unsure on what will be asked	73
d - College did not prepare me	43
e - Balancing of prep and other time commitments	69
f - Other	70
g - None	8

We then provided a free response question which asked the participant specifically what they found to personally be the most challenges aspect of preparing for their technical coding interview in which (55.73%,n=73) participants responded. Of those 73 responses, the number one response was specifically related to issues involving time (21.92%,n=16) whether this be not being able to find time during their busy schedules or just not starting their studying early enough. Additionally, (16.44%, n=12) of the participants mentioned feeling overwhelmed with the vast amount of information that could be brought up during their technical interview.

Our concluding question asked whether they felt well prepared the day of their technical interview, majority chose 3 (32.82%,n=43) on a scale from 1(Strongly Disagree) to

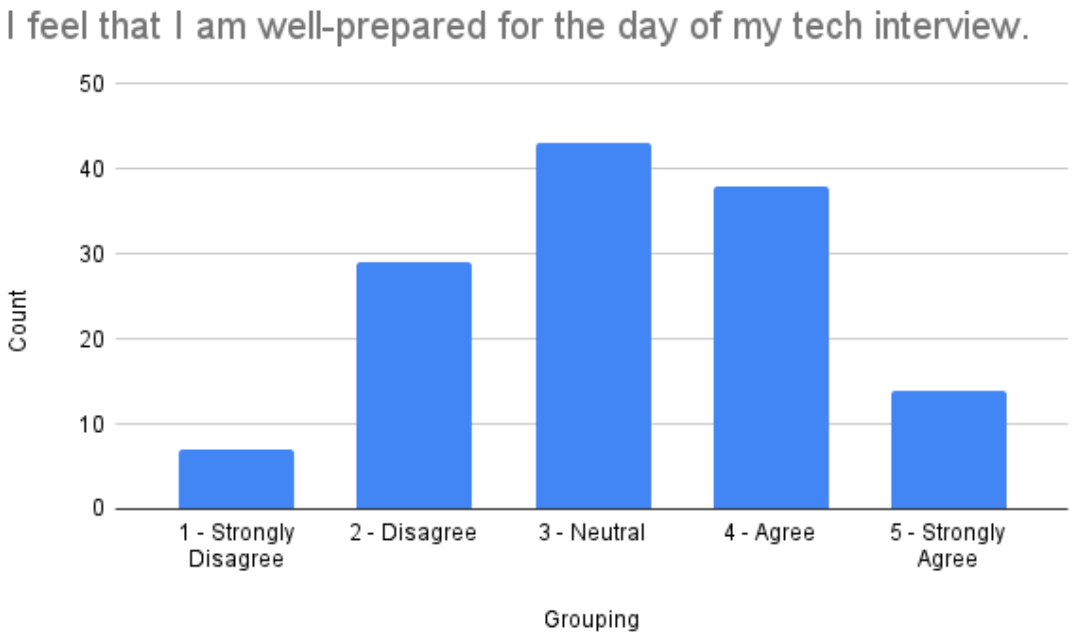

Figure 5.7: *How prepared they felt the day of their interview*

5(Strongly Agree), displayed on Figure 5.7 with the average being calculated as follows (avg=3.18,std=1.06).

5.4.1 Statistical Analysis

We divided candidates into two groups depending on their answers to the following questions: whether they practice with others or not (yes/no) and whether they self identified as a software engineering professional. These groups were created to investigate the relationship the candidates overall feeling of preparedness and how they prepare for such interviews. An unpaired two-tail t-test was used here. Our results showed that the participants who practice with others feel overall more prepared for their interviews ($p < 0.001$). Additionally, self identified software engineering professionals felt more prepared than the other groups which consisted of both non-professionals and students ($p < 0.05$). Overall, having more

experience in technical coding interviews consistently indicated that the participant felt more prepared for their interview. The self identified software engineering professionals group was then divided into two sub groups (high/low) based on their years of experience and their number of technical interviews. The results showed than group with higher technical coding interview numbers felt overall more prepared ($p < 0.05$).

5.5 RQ3: How can universities better promote supplemental studying methods for SWE job seekers preparing for technical coding interviews?

Our final group of questions related directly with the relationship between the participants university course work and their interview preparation. We asked our participants whether their undergraduate courses had helped them prepare for their technical interviews, which resulted in around (36.64%, n=48) saying yes, (48.85%, n=64) saying no, and (14.50%, n=19) being unsure.

The participants were then asked to rank from a scale 1 (Strongly Disagree) to 5 (Strongly Agree) how well their courses prepared them for the specific material often presented in the interview which were data structures, algorithms, and time complexities. Participants responded with averages of (avg=2.64, std=1.28) for data structures, (avg=2.69, std=1.26) for algorithms, and (avg=2.82, std=1.26) for time complexities.

When asked whether the participants would be interested in an academic course designed to specifically aid technical interview preparation, (74.81%, n=98) said yes, (15.27%, n=20) said no, and (9.92%, n=13) were unsure.

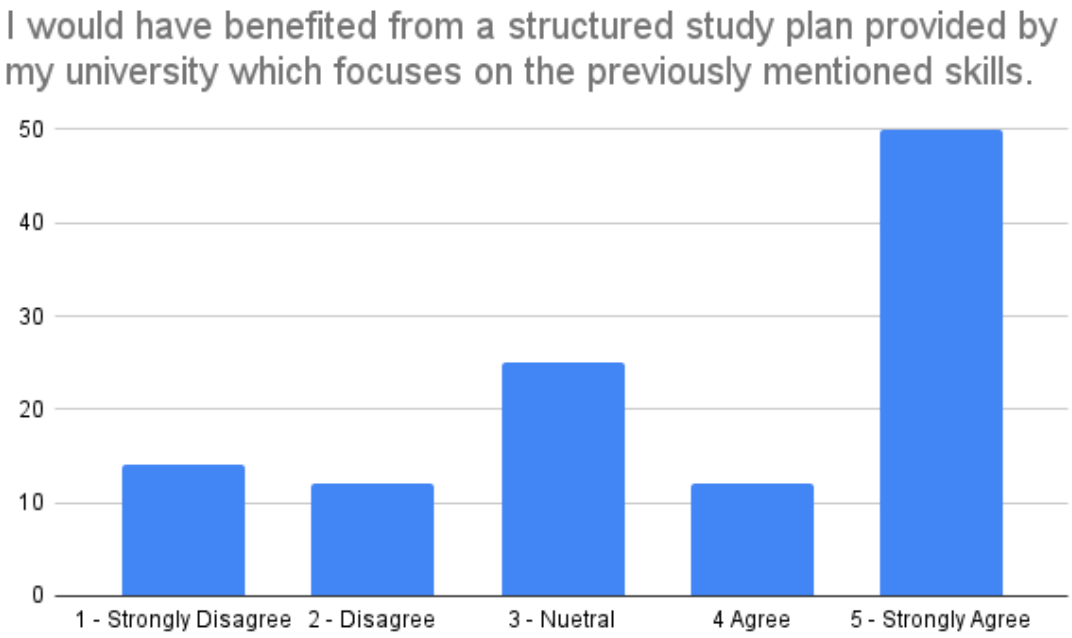

Figure 5.8: *Number of participants who have used the listed services.*

Lastly for our survey, the participants were asked if they would benefit from a structured study plan provided by their university which focused on the following skills; Problem Solving Ability, Nonverbal communication, oral and verbal clarity, ability to provide clear and concrete examples, general attitude (confidence, enthusiasm, etc). Responses were recorded on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree) and are displayed in the following figure 5.8. On average, participants agreed that a structured study plan would aid them (avg=3.69, std=1.35).

Our interview additionally contained two questions which related to RQ3. We first asked our participants whether there were any university courses that they had took which they felt had helped them during their technical coding interview preparation. All three felt there were specific courses that they felt did help them during their preparation. Courses mentioned were Data Structure & Algorithm Analysis and public speaking. The Data Structure

& Algorithm Analysis course was mentioned to provide them with a general understanding of how to analyze the time and space complexities of various data structures and algorithms. They also provided them with a general understanding of various data structures and algorithms which are commonly used in interviews. The Public Speaking course was mentioned by one individual aided in the improvement of their general communication skills. All three students also stated that although the courses at a high level contain material that would adequately prepare them for technical coding interviews, they felt the structures of such courses could use improvements. One student noted that the Data Structure & Algorithm course(s) contained projects that were not practical and provided no aid in relation to technical interviews. Another participant mentioned that they felt there could be improvement to some core classes such as Comparative Languages in which they felt would benefit from having a section which teaches students how to apply certain languages to certain problems depending on the problems needs. All three believed that SWE job seekers would benefit from a specific course which would be designed to prepare CS students for technical coding interviews. Our participants provided ideas for such a course as well which were as follows; mock interviews, interview styled public speaking, and technical coding problem pattern recognition.

Chapter 6

Discussion

6.1 Introduction

We conducted an empirical study to better understand how SWE job seekers prepare for their interviews. Our data provided some interesting insights on how SWE job seekers tend to allocate both their time and resources during their preparation process as seen in Chapter 5. Our research aims to provide additional building blocks for future research in related fields as well as provide data which may aid in the improvement of both the preparation phase as well as the technical interview process as a whole. Below we will highlight some of the key findings found from our research.

6.2 Revisiting the Research Questions

6.2.1 RQ1: How do applicants prepare for Data Structure & Algorithm - focused technical interviews?

The results presented in relation to RQ1 5.3 may provide researchers, SWE-hiring companies, and SWE job seekers with a better understanding of how applicants prepare for such interviews. The majority of survey participants spend 10 hours or less per week preparing

with the average being rounded to 6.85 hours. This does show that participants do tend to allocate time aside to prepare however, we must acknowledge that our participants on average had completed around 7 technical coding interviews which may reflect an increased view of importance on studying. There seemed to be no commonality between participants on when exactly to start studying. The responses had ranged from studying year around to studying a month out from the technical interview itself. This may reflect poor understanding of how much preparation time is needed to adequately prepare for such interviews. Preparation methods which involve others was found to not be a relatively common method of preparing as well. Majority of the participants had not participated in either a one-on-one tutoring or a group studying session which was an interesting finding. However, we did find that majority of participants had participated in at least one mock interview. These findings may suggest that SWE job seekers do seek to prepare for all aspects of the interview instead of just the material components. This also contradicted our second hypothesis of individuals not commonly using mock interviews as a way to prepare. When these results are put beside the results found by Behroozi et al. [13], there seems to be a relationship between the lack of structure and/or commonality in majority of individuals preparation routine. This lack of proper preparation may be a result of the hiring company hosting poor hiring practices such as, "not adequately communicating hiring criteria, conducting interview with inexperienced interviewers, and ghosting candidates"[13]. Additionally, Behroozi et al. provided a set of guidelines that hiring companies may use to alleviate the confusion found by their candidates. Practices such as providing interview feedback, use of clear and concise advice and/or suggestions during the initial contact are just some of the solutions presented that may also provide participants with a better understanding of what knowledge and time is necessary to succeed in future interviews.

When we looked into the services most commonly used, we found the results to be similar to

what we expected. The top three preparation materials used were *LeetCode*, *GeeksforGeeks*, and *Cracking the Coding Interview*. LeetCode was hypothesised to be one of the most popular resources as it provides SWE job seekers with a wide variety of study material as discussed in 2.2.1. Around 70% of our 131 participants had used LeetCode during their technical interview preparation. This may suggest that resources which offer a plethora of study material all while provided incentives to maintain daily usage may promote higher usage when compared to textbooks, study guides, and other materials. Initially, we hypothesized that *Cracking the Coding Interview* was also a popular choice in relation to technical interview preparation. The style of such a resource at first glance tends to provide SWE job seekers with everything needed to be prepared during their interview. Less than half of our participants had used CtCI during their preparation which may warrant more in depth research into choice of platforms past the previously mentioned financial barrier. Additionally, with software engineering being a relatively new career when compared to other areas, it makes sense that there are so many current preparation services out there in addition to the many new ones. Continued research which focuses on current and emerging resources may be useful and may provide an answer on why SWE job seekers are varied in their used services. It may also provide further support towards the improvement of current resources. For example, removing financial barriers, more authentic environments, feedback from others, etc.

6.2.2 RQ2: How do applicants perceive preparation for technical coding interviews?

Technical interview preparation is stressful. Our results showed that majority of applicants felt their anxiety was noticeably higher when preparing for technical interviews. Additionally, the research presented by Behroozi et al. [12] showed the impacts associated with actions taken by the interviewer during the technical coding interview itself with the partici-

pants performance being reduced by more than half [12]. We wanted to understand how the participants perceived the preparation phase specifically to better understand what resources could be provided to alleviate any concerns and/or to provide better opportunities to build further confidence. However, something we came across was that majority of our participants had felt either somewhat confident or fairly confident in the various knowledge areas associated with technical interviews. An interesting area of our results was the fact that majority of our participants truly felt that balancing both technical interview preparation with other daily required tasks was very difficult. A possible solution to such problems would be integrating their technical coding interview preparation into the structured Computer Science curriculum given at their university. Additionally, SWE job seekers may benefit from a technical coding interview process that has more specific areas of focus which would negate the issues associated with being unsure of what to study. An area that contradicted our original understanding was how majority of our participants felt rather confident the day of their technical interview. This contradicted the results found in relation to lack of understanding of how exactly to prepare. This can inspire future research to look into the relationships associated with certain preparation methods and their affects on actual interview performance.

6.2.3 RQ3: How can universities better promote supplemental studying methods in students preparing for technical interviews?

The core responsibility of universities is to shape students through the education of their chosen discipline. Due to the dynamic nature of the Computer Science field however, academia requires constant adjustment to meet the evolving needs of SWE based industries. Our third

and final research question aimed to aid in this problem by providing details which give a deeper look into what exactly universities can do to provide the necessary academic support needed by both current and future CS students. From our research we were able to discover some useful opinions of both current students and alumni. One of the biggest results was that majority of the participants in which we surveyed as well as interviewed felt they would benefit from a course which was specifically designed to aid in interview preparation. When discussing which courses they felt had prepared them the most, there was no consistent answer or group of related courses. Majority did mention their undergraduate courses which taught interview topics such as Data Structures & Algorithms, Time Complexities, and general coding knowledge but again felt that these classes were not designed to aid in the preparation of technical interviews specifically. More specifically, we found that over half of our participants felt that their undergraduate classes had either not helped or were unsure whether these courses had helped them. These results show that current CS curriculum's lack the necessary material to prepare students for their technical interviews and may require additional adjustments to alleviate such problems such as additional offered classes or free study guides. This led into us ask questions to gauge participant interest in university provided study plans. Again, majority of the students agreed that such an offering would help them in their preparation. These results do shed some light on the burdens currently plaguing technical coding interview preparation.

6.2.4 Final Notes

In addition to the overall discussion of our research question related results, we wanted to also note some notable interesting areas of discussion. One of the first topics involves the debate between who is exactly responsible for changing their role in the interview process, the applicant, university, or the hiring company. For example, should universities be expected

to better prepare future and current SWE job seekers for such technical coding interviews? The results show that SWE job seekers would be very interested in such offering and believe it would better prepare them. Additionally, the introduction of such resources may alleviate some of the notable issues such as time management and cost. This is due to the courses or learning material being provided through the standard Computer Science curriculum and thus being part of the expected time commitment associated with their degree instead of being extra time which would typically be spent outside of the classroom. additionally though personal experience, we found that university unknowingly was not preparing us for such interviews and only became aware after participating in the interview. Our results which show that majority of students felt their coursework did not adequately prepare them for interviews may provide supporting evidence to these hypotheses.

6.3 Limitations & Future Work

The technical interview process as a whole varies greatly on many different factors including the noted job requirements, company conducting the interview, and the vast amounts of potential preparation resources out there. As a result, the successful analysis and discovery of trends within the technical coding interview process is a challenge best tackled through multiple concurrent research projects. In this section, we will discuss the three broad limitations and discuss both how they impacted our research and also how future work may alleviate some of these limitations.

6.3.1 Growth of Current Services

One of the most notable limitations that we came across was the unforeseen growth of various preparation resources such as “The Blind 75” and “neetcode.io”. “The Blind 75” author expanded his list of original 75 LeetCode problems into a list of 150 problems. Additionally, these problem sets were used to further expand into a full online aid that was organized through the usage of its own personal website [6]. A similar expansion happened with NeetCode as well. NeetCode originally was a YouTube channel which provided guided walkthroughs to all of the blind75 NeetCode problems. This channel eventually expanded into its own website which contained not only a new unique list of LeetCode problems but also both a section dedicated to teaching core data structure & algorithm fundamentals and a general practice problem road map. These expansions limited the value associated with the data collected on the original resources as the currently offered versions provide both more material and reach a wider audience.

Future work which re-evaluates these resources and further expands on the number of resources analyzed would provide a better evaluation on the popularity hierarchy of such platforms. Additionally, these resources could be further grouped into general groupings which may highlight which types of resources are more popular than others.

An additional limitation which acts as motivation for future research is the immense amount of preparation resources currently out there. We focused on 8 randomly chosen resources currently out there. This limited scope prevented a full evaluation of the preparation process of all of our participants. We attempted to alleviate some of the limitations by providing a free response question which asked the participants to provide any additional resources they used but through our analysis, we discovered the use of many more resources that were not originally noted. This may provide motivation for future work which focuses on various

different areas such as looking into new and emerging resources, other popular resources we did not discuss, or focusing on a single popular resources such as LeetCode.

6.3.2 Technical Interview Styles

Technical coding interviews are designed in a variety of ways and given through various mediums. A challenge we faced was properly accounting or the various ways such interviews are given. As discussed earlier, the technical interview process as a whole is designed by the hiring company themselves. Additionally, the various levels of interviews associated with equivalent levels of positions plays a significant role in the material presented in such interviews. This lack of general consistency causes difficulty when researching the technical interview process. We specifically focused on one commonality shared between many technical interview processes which was the technical coding interview portion. Future work which accounts for such differences such as system design interviews, Object Oriented Programming (OOP) interviews, and various position levels would further support current research on the technical interview process.

6.3.3 Participants do not Represent all SWE job Seekers

Our final limitation was due to the lack of representation of all SWE job seekers. We analyzed the results of 138 participants who were either students or self identified software engineers. The field of computer science supports a wide variety of specialities such as cyber security, software engineering, and machine learning just to name a few. Although our main focus was software engineers, we believe it is important to provide further support towards all areas of computer science which may require a technical coding interview. Additionally, we feel that some distinction between individuals seeking SWE internships vs full time positions is

required to properly evaluate the preparation process. The preparation needs is completely dependent on their general goals. Future work which focuses on such areas would provide additional understanding of the technical interview process as a whole.

6.3.4 The Design of University Specific Resources

As discussed within the results 5 and discussion 6 sections, university offered resources could potentially alleviate many issues associated with the technical coding interview preparation process. Future work which develops multiple styles of resources and records user reviews on such resources would provide further support towards the idea that university specific resources may benefit SWE job seekers. Some examples of such resources would include an accredited course, study guides, clubs, and workshops. A diverse range of mediums would also indicate which types of studying work best for both current and future SWE job seekers.

6.3.5 Continued Interview Research

As discussed in the methodology section 4, our interviews were finalized as pilot interviews due to the ongoing status of this data collection process. These interviews, although only including 3 participants for this research, continue to provide insightful data behind the preparation processes experienced by SWE job seekers. Future work will continue within this medium as interviews are still taking place under the advisory of Dr. Sang W. Lee. These results may provide supporting data for future works which revolve around the technical coding interview preparation process.

Chapter 7

Conclusion

Technical coding interviews are known to be both a socially and cognitively demanding means of evaluating candidates. Thus leaving SE job seekers with elevated levels of stress. With the number of SWE jobs expected to grow by 5% in 2022-2023 [9], it is now more important than ever to better understand how SE job seekers prepare for interviews and what improvements could be made in the future. To better understand the preparation process of such job seekers, we distributed a survey which allowed us to analyze how these participants approached the technical coding interview preparation process and better understand their overall opinions.

Our results provide further evidence of the negative traits of the technical interview process as a whole in addition to showcasing the confusion often associated with preparing for such interviews. The technical coding interview is designed to analyze both the technical and soft skills of an applicant but we found lacks the necessary consistency that is needed to insure applicants feel well prepared. This inconsistency in addition to both the diverse range of preparation services and material that may be used also negatively impacts SWE job seekers during their preparation process. Additionally, future SWE applicants would benefit from supplemental preparation resources provided by their respective universities. Our unique look into the preparation phase of the technical interview provide a unique insight on the resources used, time allocated to studying, and general opinions felt by current SWE job seekers. Additionally, our noted limitations and suggested future work may provide

additional interests in expanding such research areas and further support the area of software engineering education.

Bibliography

[1] URL https://news.ycombinator.com/.

[2] Glassdoor job search: You deserve a job that loves you back. URL https://www.glassdoor.com/index.htm.

[3] Leetcode. https://leetcode.com, . Accessed: 2023-03-01.

[4] Two sum, . URL https://leetcode.com/problems/two-sum/.

[5] Is blind 75 enough for big tech? URL https://www.reddit.com/r/cscareerquestions/comments/s0x7bz/is_blind_75_enough_for_big_tech/.

[6] Technical interview guide for busy engineers: Tech interview handbook. URL https://www.techinterviewhandbook.org/.

[7] How much help should i give during technical interviews?, May 1959. URL https://softwareengineering.stackexchange.com/questions/159267/how-much-help-should-i-give-during-technical-interviews.

[8] Software engineer interviews: Everything you need to prepare: Tech interview handbook, Apr 2023. URL https://www.techinterviewhandbook.org/software-engineering-interview-guide/.

[9] Software developers, quality assurance analysts, and testers : Occupational outlook handbook, Feb 2023. URL https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm#tab-6.

[10] Anonymous. New year gift - curated list of top 75 leetcode questions to save your time, Dec 2018. URL https://www.teamblind.com/post/New-Year-Gift---Curated-List-of-Top-75-LeetCode-Questions-to-Save-Your-Time-OaM1orE

[11] Mahnaz Behroozi, Chris Parnin, and Titus Barik. Hiring is broken: What do developers say about technical interviews? In *2019 IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC)*, pages 1–9, 2019. doi: 10.1109/VLHCC.2019.8818836.

[12] Mahnaz Behroozi, Shivani Shirolkar, Titus Barik, and Chris Parnin. Does stress impact technical interview performance? In *Proceedings of the 28th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, ESEC/FSE 2020, page 481–492, New York, NY, USA, 2020. Association for Computing Machinery. ISBN 9781450370431. doi: 10.1145/3368089.3409712. URL https://doi.org/10.1145/3368089.3409712.

[13] Mahnaz Behroozi, Shivani Shirolkar, Titus Barik, and Chris Parnin. Debugging hiring: What went right and what went wrong in the technical interview process. In *2020 IEEE/ACM 42nd International Conference on Software Engineering: Software Engineering in Society (ICSE-SEIS)*, pages 71–80, 2020.

[14] CodeSubmit. The 20 best online coding interview tools (2022). https://codesubmit.io/blog/online-coding-interview-tools/, 2022.

[15] Lindsay Gellman. The workers who say 'thanks, but no thanks' to jobs, Jul 2015. URL https://www.wsj.com/articles/the-workers-who-say-thanks-but-no-thanks-to-jobs-1436868001.

[16] GitLab. Hiring. https://about.gitlab.com/handbook/hiring/, 2020.

[17] Phillip Hall Jr. and Kinnis Gosha. The effects of anxiety and preparation on performance in technical interviews for hbcu computer science majors. In *Proceedings of the 2018 ACM SIGMIS Conference on Computers and People Research*, SIGMIS-CPR'18, page 64–69, New York, NY, USA, 2018. Association for Computing Machinery. ISBN 9781450357685. doi: 10.1145/3209626.3209707. URL https://doi.org/10.1145/3209626.3209707.

[18] Amanda Holpuch. How to pass a google interview: Busting the brain teaser myth, Oct 2012. URL https://www.theguardian.com/technology/us-news-blog/2012/oct/03/google-interview-brain-teaser-myth.

[19] Xinpei Jin, Yulong Bian, Wenxiu Geng, Yeqing Chen, Ke Chu, Hao Hu, Juan Liu, Yuliang Shi, and Chenglei Yang. Developing an agent-based virtual interview training system for college students with high shyness level. In *2019 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, pages 998–999, 2019. doi: 10.1109/VR.2019.8797764.

[20] Sara Kassabian. The trouble with technical interviews? they aren't like the job you're interviewing for, Mar 2020. URL https://about.gitlab.com/blog/2020/03/19/the-trouble-with-technical-interviews/.

[21] Yiren Lu. Silicon valley's youth problem, Mar 2014. URL https://www.nytimes.com/2014/03/16/magazine/silicon-valleys-youth-problem.html.

[22] Gayle Laakmann McDowell. *Cracking the coding interview: 189 programming questions and solutions*. CareerCup, LLC, 2015.

[23] Gayle Laakmann McDowell. *Cracking the coding interview: 189 programming questions and solutions*. CareerCup, LLC, 2021.

[24] Marvin Wyrich, Daniel Graziotin, and Stefan Wagner. A theory on individual characteristics of successful coding challenge solvers. *PeerJ Computer Science*, 5, 2019. doi: 10.7717/peerj-cs.173.

Appendices

Appendix A

Appendix

A.1 Survey - VT

Technical Interview Preparation Survey

Purpose: This survey is to learn more about how both current students and working professionals prepare for technical interviews.

NOTE: Technical interviews in our case are referring to interviews focusing on Data Structure & Algorithms questions and that involve writing code and performing a think-aloud.

* Required

1. What is your gender? *

Mark only one oval.

- ◯ Male
- ◯ Female
- ◯ Prefer not to say
- ◯ Other: _____

Untitled Section

2. Do you identify as Hispanic/Latino? *

Mark only one oval.

- ◯ Yes
- ◯ No

3. Please identify your race. *

Check all that apply.

- [ ] American Indian or Alaskan Native
- [ ] Asian
- [ ] Black or African American
- [ ] White
- [ ] Native Hawaiian or Other Pacific Islander
- [ ] Two or More Races

4. Have you obtained a degree in Computer Science or plan to in the near future? *

Mark only one oval.

- ◯ Yes
- ◯ No

5. Are you currently a working professional? *

Mark only one oval.

- ◯ Yes *Skip to question 7*
- ◯ No

Student Specific Section

Contains questions for current CS students.

6. What year/program are you currently in? *

Mark only one oval.

- ◯ Freshman
- ◯ Sophomore
- ◯ Junior
- ◯ Senior
- ◯ Masters
- ◯ PhD

Skip to question 13

Non-Student Specific Section

7. Where did you attend for your undergraduate studies? *

_____

8. When did you graduate? *

_____

Example: January 7, 2019

9. How many years of professional experience do you have? *

_____

10. Are you currently employed as a Software Engineer? *

Mark only one oval.

- Yes
- No

11. If Yes, where are you currently working?

Pre General Technical Background

12. Have you completed at least one technical interview which involved data structure and/or algorithm based problems before?

Mark only one oval.

- Yes *Skip to question 13*
- No *Skip to question 18*

Skip to question 13

General Technical Background

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

13. How many technical interviews have you completed? [Please enter your answer in numerical form Ex.0, 1, 2, 3, etc]

14. Do you have in person interviewing experience? *

Mark only one oval.

- Yes
- No

15. I am comfortable with performing whiteboard-styled technical interviews. Please leave empty you have no experience. (Note: Whiteboard-styled interviews are an in-person method of evaluating candidates by having them write their solution on a whiteboard in front of their interviewer)

Mark only one oval.

	1	2	3	4	5	
Stro						Strongly Agree

16. I am comfortable with asking my interviewer clarifying questions in regards to the given problem.

Mark only one oval.

	1	2	3	4	5	
Stro						Strongly Agree

17. Have your interviewers ever offered you advice/suggestions when you have appeared stuck?

Mark only one oval.

- Yes
- No
- Unsure

Preparation for Technical Interviews

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

18. How many hours do you study a week in preparation for technical interviews? [Please enter your answer in numerical form Ex. 0, 1, 3, etc]

_____

19. How many mock interviews have you done? (Note: A mock interview is a simulated technical interview which provides job seekers with an opportunity to practice for real interviews. These interviews consist of a mock “interviewer” supplying a technical problem which you, the “interviewee” , is then tasked with solving.)

_____

20. Have you sought after one-on-one tutoring for technical prep? *

Mark only one oval.

- Yes
- No

21. If so, have you ever paid for the tutoring session(s)?

Mark only one oval.

- Yes
- No

22. Has your technical prep ever consisted of studying with others? (friends, family, study groups etc)

Mark only one oval.

- Yes
- No

23. If Yes, what did your group studying consist of?

_____

24. How often do you practice your communication skills during your technical interview prep session? (Ex. speech, asking questions, thinking out loud)

Mark only one oval.

- Never
- Occasionally
- Often
- Always

25. Evaluate the importance of the following components to succeed in technical interviews. *

Mark only one oval per row.

	Not Important	Slightly Important	Moderately Important	Important	Very Importan
Problem solving ability					
Nonverbal communication					
Oral and verbal clarity					
Providing clear and concrete examples					
Attitude (Enthusiasm, confidence, etc)					

26. Please rank your confidence level in the previously mentioned skills. *

Mark only one oval per row.

	Not at all confident	Slightly confident	Somewhat confident	Fairly confident	Completely confident
Problem Solving ability					
Nonverbal communication					
Oral and verbal clarity					
Ability to provide clear and concrete examples					
Attitude (Enthusiasm, confidence, etc)					

27. I would benefit or have benefited from a structured study plan provided by my university whic focuses on the previously mentioned skills.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

Resources Used for Interview Preparation

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

28. Which of the following resources have you used for technical interview preparation? *

Check all that apply.

- [ ] Leetcode
- [ ] Blind75
- [ ] Sean Prashad's List
- [ ] Neetcode.io
- [ ] Cracking the Coding Interview
- [ ] Grokking the Coding Interview
- [ ] Youtube
- [ ] GeeksforGeeks
- [ ] Exponent
- [ ] Pramp
- [ ] None
- [ ] Other: _____

29. Are there any other resources you have used which were not previously listed?

_____

30. How often do you use the previously mentioned resources? *

Mark only one oval per row.

	Never	Rarely	Sometimes	Often	Frequently
Leetcode					
Blind75					
Sean Prashad's List					
Neetcode.io					
Cracking the Coding Interview					
Grokking The Coding Interview					
Youtube					
GeeksforGeeks					
Exponent					
Pramp					
Other Resources					

31. Which of the previously mentioned premium services have you bought or have been subscribed to for at least a month?

Check all that apply.

- [ ] Leetcode (Website Premium)
- [ ] Grokking the Coding Interview (Website Premium)
- [ ] Cracking the Coding Interview (Book)
- [ ] Exponent (Website Premium)
- [ ] None
- [ ] Other: _____

32. How likely are you to purchase the following resources? (leave empty if you have no experier and/or knowledge)

Mark only one oval per row.

	1 - Not Likely	2	3	4	5 - Very Likely
Leetcode Premium (Cost: $39 monthly)	◯	◯	◯	◯	◯
Grokking the Coding Interview (Cost: $79 Yearly)	◯	◯	◯	◯	◯
Cracking the Coding Interview (Cost: Avg $20 one time purchase)	◯	◯	◯	◯	◯
Exponent (Cost: $79 monthly)	◯	◯	◯	◯	◯

33. What are the benefits of using these resources/platforms?

Check all that apply.

- [ ] These services offer solutions to commonly asked problems
- [ ] These services provide me with identical problems which may be asked during an interview
- [ ] These services allow for an organized approach to studying for technical interviews
- [ ] These services teach me the required material that is asked during interviews
- [ ] These services teach me various patterns which allow for problems to be organized in specific groups
- [ ] Other

34. What has/would prevent you from using any of the previously mentioned services?

_____

Pre Leetcode Specific

35. Have you used Leetcode before? *

Mark only one oval.

- ◯ Yes
- ◯ No *Skip to question 44*

Leetcode Specific

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

36. I am comfortable with Leetcode 'Easy' problems. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

37. I am comfortable with Leetcode 'Medium' problems. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

38. I am comfortable with Leetcode 'Hard' problems. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

39. When do you prefer to begin preparing for technical interviews? (EX: a month out, week out, etc)

40. How many hours do you practice Leetcode a day while preparing technical interviews? [Please enter your answer in numerical form Ex. 0, 1, 3, etc]

_____

41. Please enter on average how many days you practice Leetcode a week. [Please enter your answer in numerical form Ex. 0, 1, 3, etc]

_____

42. Which of the following choices relates closest to your approach in solving Leetcode problems

Mark only one oval.

- ◯ Attempt the problem without aid, then look up solutions after a set amount of time if unsuccessful.
- ◯ Attempt problem without aid until you arrive at a solution.
- ◯ Study and fully understand the solution before attempting the problem.
- ◯ Try and memorize the solution.
- ◯ Other: _____

43. Are you able to differentiate patterns between Leetcode problems? (Ex. Dynamic Programming, Sliding Window, Depth-First Search, etc.)

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Unsure

Associated Challenges

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

44. What stresses you out most about the preparation phase of technical interviews? *

45. I feel that I am well-prepared on the day of my technical interview. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

46. I feel very anxious when studying for a technical interview. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

47. I feel very anxious when participating in a mock interview. [leave empty if you have not participated in one]

Mark only one oval.

1	2	3	4	5
◯	◯	◯	◯	◯

48. Has the preparation for technical interviews negatively affected your anxiety? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Unsure

49. If you answered yes to the previous question, please explain how it has affected you.

50. My anxiety is noticeably higher when preparing for technical interviews. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

51. I found it difficult to balance my technical interview preparation with my other daily tasks. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

52. Which of the following statements do you feel to be true? *

Check all that apply.

- [ ] Poor performance in past interviews is what causes me to struggle in future interviews.
- [ ] There are too many topics to master in regards to Data Structures & Algorithms.
- [ ] Not knowing what will be asked during these interviews is the most stressful part.
- [ ] The CS curriculum did not adequately prepare me for the current style of interviews.
- [ ] Balancing interview prep time with other commitments is too time consuming.
- [ ] None

53. What has personally been the most difficult thing you have faced during your studying proces
This could include certain topics such as time complexity analysis or things such as the actua
amount of time required to study for the interview.

Benefits From Your Education

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

54. Do you feel that your undergraduate courses helped you prepare for technical interviews? *

Mark only one oval.

- Yes
- No
- Unsure

55. What was the course number and name of the course(s) that helped you the most? [leave bla
if unsure]

56. My university's Data Structures & Algorithms courses prepared me for technical interview questions involving Data Structures.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

57. My university's Data Structures & Algorithms courses prepared me for technical interview questions involving Algorithms.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

58. My university's Data Structures & Algorithms courses prepared me for technical interview questions involving Time Complexities.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

59. Would you be interested in a course that is designed specifically to aid in technical interview preparation?

Mark only one oval.

- Yes
- No
- Unsure

Personal Goals Section

60. Is a MAANG(Meta, Amazon, Apple, Netflix, Google) company your goal? *

Mark only one oval.

- Yes
- No
- Unsure

61. What specific company are you looking to work for?

62. Which of the following is the most important to you? *

Mark only one oval.

- Work-life balance
- Income & Benefits
- Prestige
- Company culture
- Personal growth
- Professional growth
- Leadership opportunities
- Other

Appendix B

Appendix

B.1 Survey - Exponent

Exponent Technical Interview Preparation Survey

Purpose: This survey is to learn more about how both current students and working professionals prepare for Data structure & Algorithm - focused technical interviews.

* Required

1. What is your gender? *

Mark only one oval.

- ◯ Male
- ◯ Female
- ◯ Prefer not to say
- ◯ Other: _____

2. Do you identify as Hispanic/Latino? *

Mark only one oval.

- ◯ Yes
- ◯ No

3. Please identify your race. *

Check all that apply.

- [ ] America India or Alaskan Native
- [ ] Asian
- [ ] Black or African American
- [ ] White
- [ ] Native Hawaiian or Other Pacific Islander
- [ ] Two or More Races

4. Have you obtained a degree in Computer Science or plan to in the near future? *

Mark only one oval.

- ◯ Yes
- ◯ No

5. Are you currently a working professional? *

Mark only one oval.

- ◯ Yes *Skip to question 7*
- ◯ No

Student Specific Section

Contains questions for current CS students.

6. What year/program are you currently in? *

Mark only one oval.

- ◯ Freshman
- ◯ Sophomore
- ◯ Junior
- ◯ Senior
- ◯ Masters
- ◯ PhD

Skip to question 13

Non-Student Specific Section

7. Where did you attend for your undergraduate studies? *

_____

8. When did you graduate? *

_____

Example: January 7, 2019

9. How many years of professional experience do you have? *

_____

10. Are you currently employed as a Software Engineer? *

Mark only one oval.

- Yes
- No

11. If Yes, where are you currently working?

_____

Pre General Technical Background

12. Have you completed at least one technical interview which involved data structure and/or algorithm based problems before?

Mark only one oval.

- Yes *Skip to question 13*
- No *Skip to question 18*

Skip to question 13

General Technical Background

13. How many technical interviews have you completed? [Please enter your answer in numerical form Ex. 1, 3 5, etc]

_____

14. Do you have in person interviewing experience? *

Mark only one oval.

- Yes
- No

15. I am comfortable with performing whiteboard-styled technical interviews. Please leave empty you have no experience. (Note: Whiteboard-styled interviews are an in-person method of evaluating candidates by having them write their solution on a whiteboard in front of their interviewer)

Mark only one oval.

	1	2	3	4	5	
Stro						Strongly Agree

16. I am comfortable with asking my interviewer clarifying questions in regards to the given problem.

Mark only one oval.

	1	2	3	4	5	
Stro						Strongly Agree

17. Have your interviewers ever offered you advice/suggestions when you have appeared stuck?

Mark only one oval.

- Yes
- No
- Unsure

Preparation for Technical Interviews

18. How many hours per week do you study in preparation for technical interviews? [Please ente your answer in numerical form Ex. 0, 1, 3, etc]

19. How many mock interviews have you done? (Note: A mock interview is a simulated technical interview which provides job seekers with an opportunity to practice for real interviews. These interviews consist of a mock “interviewer” supplying a technical problem which you, the “interviewee” , is then tasked with solving.)

20. Have you sought after one-on-one tutoring for technical prep? *

Mark only one oval.

- Yes
- No

21. If so, have you paid for the tutoring session(s)?

22. Has your technical prep ever consisted of studying with others? (friends, family, study groups etc)

Mark only one oval.

- Yes
- No

23. If yes, what did your group studying consist of?

_____

24. I would have benefited from a structured study plan provided by my university which focuses on the previously mentioned skills.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

25. How often do you practice your communication skills during your technical interview prep session? (Ex. speech, asking questions, thinking out loud)

Mark only one oval.

- Never
- Occasionally
- Often
- Always

26. Evaluate the importance of the following components to succeed in technical interviews. *

Mark only one oval per row.

	Not Important	Slightly Important	Moderately Important	Important	Very Importan
Problem solving ability					
Nonverbal Communication					
Oral and verbal clarity					
Providing clear and concrete examples					
Enthusiasm					
Confidence					

27. Please rank your confidence level in the previously mentioned skills. *

Mark only one oval per row.

	Not at all confident	Slightly confident	Somewhat confident	Fairly confident	Completely confident
Problem Solving ability					
Nonverbal communication					
Oral and verbal clarity					
Ability to provide clear and concrete examples					
Attitude (Enthusiasm, confidence, etc)					

Resources Used for Interview Preparation

28. Which of the following resources have you used for technical interview preparation? *

Check all that apply.

- [ ] Leetcode
- [ ] Blind75
- [ ] Sean Prashad's List
- [ ] Neetcode.io
- [ ] Cracking the Coding Interview
- [ ] Grokking the Coding Interview
- [ ] Youtube
- [ ] GeeksforGeeks
- [ ] Exponent
- [ ] Pramp
- [ ] None
- [ ] Other: _____

29. Are there any other resources you have used which were not previously listed?

_____

30. How often do you use the previously mentioned resources? *

Mark only one oval per row.

	Never	Rarely	Sometimes	Often	Frequently
Leetcode					
Blind75					
Sean Prashad's List					
Neetcode.io					
Cracking the Coding Interview					
Grokking The Coding Interview					
Youtube					
GeeksforGeeks					
Exponent					
Pramp					
Other Resources					

31. Which of the previously mentioned services have you bought or subscribed to for at least a month?

Check all that apply.

- [ ] Leetcode
- [ ] Grokking the Coding Interview
- [ ] Cracking the Coding Interview
- [ ] Exponent
- [ ] None
- [ ] Other: _____

32. How likely are you to purchase the following resources? (leave empty if you have no experier with either)

Mark only one oval per row.

	1 - Not Likely	2	3	4	5 - Very Likely
Leetcode Premium (Cost: $39 monthly)	◯	◯	◯	◯	◯
Grokking the Coding Interview (Cost: $79 Yearly)	◯	◯	◯	◯	◯
Cracking the Coding Interview (Cost: Avg $20 one time purchase)	◯	◯	◯	◯	◯
Exponent (Cost: $79 monthly)	◯	◯	◯	◯	◯

33. What are the benefits of using these paid resources/platforms?

Check all that apply.

- [ ] These services offer solutions to commonly asked problems
- [ ] These services provide me with identical problems which may be asked during an interview
- [ ] These services allow for an organized approach to studying for technical interviews
- [ ] These services teach me the required material that is asked during interviews
- [ ] These services teach me various patterns which allow for problems to be organized in specific groups
- [ ] Other: _____

34. What has/would prevent you from using any of the previously mentioned services?

_____

35. When do you prefer to begin preparing for Data Structure & Algorithm interviews? *

_____

36. How many hours do you practice leetcode a day while preparing for Data structure & Algorithm coding interviews? [Please enter your answer in numerical form Ex. 0, 1, 3, etc]

_____

37. Please enter on average how many days you practice leetcode a week. [Please enter your answer in numerical form Ex. 0, 1, 3, etc]

_____

Pre Exponent/Pramp Specific

38. Have you ever used Exponent or Pramp to prepare for technical interviews? *

Mark only one oval.

- Yes
- No *Skip to question 51*

Exponent/Pramp Specific

39. How often do you use Exponent to prepare for technical interviews? *

Mark only one oval.

	1	2	3	4	5	
Nev	◯	◯	◯	◯	◯	Daily

40. Which Exponent features have you used? *

Check all that apply.

- [ ] Practice Interview Questions
- [ ] Courses
- [ ] Peer Interviews
- [ ] Expert Coaching
- [ ] Job Board
- [ ] Explonent Blog
- [ ] Company Guides
- [ ] Other: _____

41. Which features do you find the most helpful? *

Mark only one oval per row.

	Not at All Helpful	Rarely Helpful	Moderately Helpful	Helpful	Very Helpful	N/A
Practice Questions						
Courses						
Peer Interviews						
Expert Coaching						
Job Board						
Exponent Blog						
Company Guide						

42. When utilizing Exponent, how often do you use each of these features? *

Mark only one oval per row.

	Never	Rarely	Occasionally	Frequently	Always
Practice Questions	◯	◯	◯	◯	◯
Courses	◯	◯	◯	◯	◯
Peer Interviews	◯	◯	◯	◯	◯
Expert Coaching	◯	◯	◯	◯	◯
Job Board	◯	◯	◯	◯	◯
Exponent Blog	◯	◯	◯	◯	◯
Company Guide	◯	◯	◯	◯	◯

43. Which of the following choices relates closest to your approach in solving Leetcode problems

Mark only one oval.

- ◯ Attempt problem without aid, look up solution after set amount of time if unsuccesful.
- ◯ Attempt problem without aid until you arrive at a solution.
- ◯ Study and fully understand the solution before attempting the problem.
- ◯ Try and memorize the solution.
- ◯ Other: _____

44. How often do you use Pramp to prepare for technical interviews?

Mark only one oval.

	1	2	3	4	5	
Nev	◯	◯	◯	◯	◯	Daily

45. Approximately how many mock interviews have you completed using Pramp? [Please enter your answer in numerical form Ex. 0, 1, 3, etc]

_____

46. Which Pramp mock interview types have you completed?

Check all that apply.

- [ ] Data Structures and Algorithms
- [ ] Product Management
- [ ] Behavioral
- [ ] System Design
- [ ] Front End
- [ ] Data Science
- [ ] Other: _____

47. Which mock interview type do you find the most helpful? *

Mark only one oval per row.

	Not at All Helpful	Rarely Helpful	Moderately Helpful	Helpful	Very Helpful	N/A
Data Structures and Algorithms						
Product Management						
Behavioral						
System Design						
Front End						
Data Science						

48. What are the strengths of Exponent and/or Pramp compared to other resources you have use for technical interview preparation?

49. What are the weaknesses of Exponent and/or Pramp compared to other technical interview prep resources?

50. How can these platforms be improved to facilitate better technical interview preparation?

Associated Challenges

51. What stresses you out most about the preparation phase of 'Leetcode-styled' technical interviews?

52. I feel that I am well prepared the day of my technical interview. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

53. I feel very anxious when studying for a technical interview. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

54. I feel very anxious when participating in a mock interview. [leave empty if you have not participated in one]

Mark only one oval.

1	2	3	4	5
◯	◯	◯	◯	◯

55. Has the preparation for technical interviews negatively affected your anxiety? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Unsure

56. If you answered yes to the previous question, please explain how it has affected you.

57. My anxiety is noticeably higher when preparing for technical interviews. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

58. I found it difficult to balance my technical interview preparation with my other daily tasks. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

59. Which of the following statements do you feel to be true? *

Check all that apply.

- [ ] Poor performance in past interviews is what causes me to struggle in future interviews.
- [ ] There are too many topics to master in regards to Data Structures & Algorithms.
- [ ] Not knowing what will be asked during these interviews is the most stressful part.
- [ ] The CS curriculum did not adequately prepare me for the current style of interviews.
- [ ] Balancing interview prep time with other commitments is too time consuming.
- [ ] None

60. What has personally been the most difficult thing you have faced during your studying proces
This could include certain topics such as time complexity analysis or things such as the actua
amount of time required to study for the interview.

Benefits From Your Education

61. Do you feel that your undergraduate courses helped you prepare for Data Structure & Algorithm coding technical interviews?

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Unsure

62. What was the course number and name of the course(s) that helped you the most? [leave bla if unsure]

63. My university's Data Structures & Algorithms courses prepared me for technical interview questions involving Data Structures.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

64. My university's Data Structures & Algorithms courses prepared me for technical interview questions involving Algorithms.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

65. My university's Data Structures & Algorithms courses prepared me for technical interview questions involving Time Complexities.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

66. Would you be interested in a course that is designed specifically to aid in technical interview preparation?

Mark only one oval.

- Yes
- No
- Unsure

Appendix C

Appendix

C.1 Survey - Pramp

Pramp Technical Interview Preparation Survey

Purpose: This survey is to learn more about how both current students and working professionals prepare for technical interviews.

NOTE: Technical interviews in our case are referring to interviews focusing on Data Structure & Algorithms questions and that involve writing code and performing a think-aloud.

* Required

1. What is your gender? *

Mark only one oval.

- ◯ Male
- ◯ Female
- ◯ Prefer not to say
- ◯ Other: _____

2. Do you identify as Hispanic/Latino? *

Mark only one oval.

- ◯ Yes
- ◯ No

3. Please identify your race. *

Check all that apply.

- [ ] America India or Alaskan Native
- [ ] Asian
- [ ] Black or African American
- [ ] White
- [ ] Native Hawaiian or Other Pacific Islander
- [ ] Two or More Races

4. Have you obtained a degree in Computer Science or plan to in the near future? *

Mark only one oval.

- ◯ Yes
- ◯ No

5. Are you currently a working professional? *

Mark only one oval.

- ◯ Yes *Skip to question 7*
- ◯ No

Student Specific Section

Contains questions for current CS students.

6. What year/program are you currently in? *

Mark only one oval.

- ◯ Freshman
- ◯ Sophomore
- ◯ Junior
- ◯ Senior
- ◯ Masters
- ◯ PhD

Skip to question 13

Non-Student Specific Section

7. Where did you attend for your undergraduate studies? *

_____

8. When did you graduate? *

_____

Example: January 7, 2019

9. How many years of professional experience do you have? *

_____

10. Are you currently employed? *

Mark only one oval.

- Yes
- No

11. If so, where are you currently working?

_____

Pre General Technical Background

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

12. Have you completed at least one technical interview before? *

Mark only one oval.

- Yes *Skip to question 13*
- No *Skip to question 18*

Skip to question 13

General Technical Background

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

13. How many technical interviews have you completed? [Please enter your answer in numerical form Ex. 0, 1, 3, etc]

_____

14. Do you have in person interviewing experience? *

Mark only one oval.

- Yes
- No

15. I am comfortable with performing whiteboard-styled technical interviews. Please leave empty you have no experience. (Note: Whiteboard-styled interviews are an in-person method of evaluating candidates by having them write their solution on a whiteboard in front of their interviewer)

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

16. I am comfortable with asking my interviewer clarifying questions in regards to the given problem.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

17. Have your interviewers ever offered you advice/suggestions when you have appeared stuck?

Mark only one oval.

- Yes
- No
- Unsure

Preparation for Technical Interviews

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

18. How many hours per week do you study in preparation for technical interviews? [Please ente your answer in numerical form Ex. 0, 1, 3, etc]

_____

19. How many mock interviews have you done? (Note: A mock interview is a simulated technical interview which provides job seekers with an opportunity to practice for real interviews. These interviews consist of a mock “interviewer” supplying a technical problem which you, the “interviewee” , is then tasked with solving.)

_____

20. Have you sought after one-on-one tutoring for technical prep? *

Mark only one oval.

- Yes
- No

21. If so, have you ever paid for the tutoring session(s)?

Mark only one oval.

- Yes
- No

22. Has your technical prep ever consisted of studying with others? (friends, family, study groups etc)

Mark only one oval.

- Yes
- No

23. If Yes, what did your group studying consist of?

_____

24. How often do you practice your communication skills during your technical interview prep session? (Ex. speech, asking questions, thinking out loud)

Mark only one oval.

- Never
- Rarely
- Sometimes
- Often
- Always

25. Evaluate the importance of the following components to succeed in technical interviews. *

Mark only one oval per row.

	Not Important	Slightly Important	Moderately Important	Important	Very Importan
Problem solving ability					
Nonverbal Communication					
Oral and verbal clarity					
Providing clear and concrete examples					
Attitude (Enthusiasm, confidence, etc)					

26. Please rank your confidence level in the previously mentioned skills. *

Mark only one oval per row.

	Not at all confident	Slightly confident	Somewhat confident	Fairly confident	Completely confident
Problem Solving ability					
Nonverbal communication					
Oral and verbal clarity					
Ability to provide clear and concrete examples					
Attitude (Enthusiasm, confidence, etc)					

27. I would have benefited from a structured study plan provided by my university which focuses on the previously mentioned skills.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

Resources Used for Interview Preparation

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

28. Which of the following resources have you used for technical interview preparation? *

Check all that apply.

- [ ] Leetcode
- [ ] Blind75
- [ ] Sean Prashad's List
- [ ] Neetcode.io
- [ ] Cracking the Coding Interview
- [ ] Grokking the Coding Interview
- [ ] Youtube
- [ ] GeeksforGeeks
- [ ] Exponent
- [ ] Pramp
- [ ] None
- [ ] Other: _____

29. Are there any other resources you have used which were not previously listed?

_____

30. How often do you use the previously mentioned resources? *

Mark only one oval per row.

	Never	Rarely	Sometimes	Often	Frequently
Leetcode					
Blind75					
Sean Prashad's List					
Neetcode.io					
Cracking the Coding Interview					
Grokking The Coding Interview					
Youtube					
GeeksforGeeks					
Exponent					
Pramp					
Other Resources					

31. Which of the previously mentioned services have you bought or subscribed to for at least a month?

Check all that apply.

- [ ] Leetcode
- [ ] Grokking the Coding Interview
- [ ] Cracking the Coding Interview
- [ ] Exponent
- [ ] None

32. How likely are you to purchase the following resources? (leave empty if you have no experier with either)

Mark only one oval per row.

	1 - Not Likely	2	3	4	5 - Very Likely
Leetcode Premium (Cost: $39 monthly)	◯	◯	◯	◯	◯
Grokking the Coding Interview (Cost: $79 Yearly)	◯	◯	◯	◯	◯
Cracking the Coding Interview (Cost: Avg $20 one time purchase)	◯	◯	◯	◯	◯
Exponent (Cost: $79 monthly)	◯	◯	◯	◯	◯

33. What are the benefits of using these paid resources/platforms?

Check all that apply.

- ☐ These services offer solutions to commonly asked problems
- ☐ These services provide me with identical problems which may be asked during an interview
- ☐ These services allow for an organized approach to studying for technical interviews
- ☐ These services teach me the required material that is asked during interviews
- ☐ These services teach me various patterns which allow for problems to be organized in specific groups
- ☐ Other: _____

34. What has/would prevent you from using any of the previously mentioned services?

_____

35. When do you prefer to begin preparing for technical interviews? *

_____

36. How many hours do you practice Leetcode a day while preparing technical interviews? [Please enter your answer in numerical form Ex. 0, 1, 3, etc]

_____

37. How many hours do you practice Leetcode a day while preparing technical interviews? [Please enter your answer in numerical form Ex. 0, 1, 3, etc]

_____

38. Please enter on average how many days you practice Leetcode a week. [Please enter your answer in numerical form Ex. 0, 1, 3, etc]

_____

39. Are you able to differentiate patterns between Leetcode problems? (Ex. Dynamic Programming, Sliding Window, Depth-First Search, etc.)

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Unsure

Pre Exponent/Pramp Specific

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

40. Have you ever used Exponent or Pramp to prepare for technical interviews? *

Mark only one oval.

- ◯ Yes
- ◯ No *Skip to question 53*

Exponent/Pramp Specific

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

41. How often do you use Exponent to prepare for technical interviews? *

Mark only one oval.

	1	2	3	4	5	
Nev	◯	◯	◯	◯	◯	Daily

42. Which Exponent features have you used? *

Check all that apply.

- ☐ Practice Interview Questions
- ☐ Courses
- ☐ Peer Interviews
- ☐ Expert Coaching
- ☐ Job Board
- ☐ Explonent Blog
- ☐ Company Guides
- ☐ Other: _____

43. Which features do you find the most helpful? *

Mark only one oval per row.

	Not at All Helpful	Rarely Helpful	Moderately Helpful	Helpful	Very Helpful	N/A
Practice Questions						
Courses						
Peer Interviews						
Expert Coaching						
Job Board						
Exponent Blog						
Company Guide						

44. When utilizing Exponent, how often do you use each of these features? *

Mark only one oval per row.

	Never	Rarely	Occasionally	Frequently	Always
Practice Questions	◯	◯	◯	◯	◯
Courses	◯	◯	◯	◯	◯
Peer Interviews	◯	◯	◯	◯	◯
Expert Coaching	◯	◯	◯	◯	◯
Job Board	◯	◯	◯	◯	◯
Exponent Blog	◯	◯	◯	◯	◯
Company Guide	◯	◯	◯	◯	◯

45. Which of the following choices relates closest to your approach in solving Leetcode problems

Mark only one oval.

- ◯ Attempt problem without aid, look up solution after set amount of time if unsuccesful.
- ◯ Attempt problem without aid until you arrive at a solution.
- ◯ Study and fully understand the solution before attempting the problem.
- ◯ Try and memorize the solution.
- ◯ Other: _____

46. How often do you use Pramp to prepare for technical interviews?

Mark only one oval.

	1	2	3	4	5	
Nev	◯	◯	◯	◯	◯	Daily

47. Approximately how many mock interviews have you completed using Pramp? [Please enter your answer in numerical form Ex. 0, 1, 3, etc]

_____

48. Which Pramp mock interview types have you completed?

Check all that apply.

- [ ] Data Structures and Algorithms
- [ ] Product Management
- [ ] Behavioral
- [ ] System Design
- [ ] Front End
- [ ] Data Science
- [ ] Other: _____

49. Which mock interview type do you find the most helpful? *

Mark only one oval per row.

	Not at All Helpful	Rarely Helpful	Moderately Helpful	Helpful	Very Helpful	N/A
Data Structures and Algorithms						
Product Management						
Behavioral						
System Design						
Front End						
Data Science						

50. What are the strengths of Exponent and/or Pramp compared to other resources you have use for technical interview preparation?

51. What are the weaknesses of Exponent and/or Pramp compared to other technical interview prep resources?

52. How can these platforms be improved to facilitate better technical interview preparation?

Associated Challenges

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

53. What stresses you out most about the preparation phase of technical interviews? *

54. I feel that I am well prepared the day of my technical interview. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

55. I feel very anxious when studying for a technical interview. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

56. I feel very anxious when participating in a mock interview. [leave empty if you have not participated in one]

Mark only one oval.

1	2	3	4	5
◯	◯	◯	◯	◯

57. Has the preparation for technical interviews negatively affected your anxiety? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Unsure

58. If you answered yes to the previous question, please explain how it has affected you.

59. My anxiety is noticeably higher when preparing for technical interviews. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

60. I found it difficult to balance my technical interview preparation with my other daily tasks. *

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

61. Which of the following statements do you feel to be true? *

Check all that apply.

- [ ] Poor performance in past interviews is what causes me to struggle in future interviews.
- [ ] There are too many topics to master in regards to Data Structures & Algorithms.
- [ ] Not knowing what will be asked during these interviews is the most stressful part.
- [ ] The CS curriculum did not adequately prepare me for the current style of interviews.
- [ ] Balancing interview prep time with other commitments is too time consuming.
- [ ] None

62. What has personally been the most difficult thing you have faced during your studying proces
This could include certain topics such as time complexity analysis or things such as the actua
amount of time required to study for the interview.

Benefits From Your Education

NOTE: Technical interview in our case is referring to the Data Structure & Algorithms type coding interview(s).

63. Do you feel that your undergraduate courses helped you prepare for technical interviews? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Unsure

64. What was the course number and name of the course(s) that helped you the most? [leave bla if unsure]

_____

65. My university's Data Structures & Algorithms courses prepared me for technical interview questions involving Data Structures.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

66. My university's Data Structures & Algorithms courses prepared me for technical interview questions involving Algorithms.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

67. My university's Data Structures & Algorithms courses prepared me for technical interview questions involving Time Complexities.

Mark only one oval.

	1	2	3	4	5	
Stro	◯	◯	◯	◯	◯	Strongly Agree

68. Would you be interested in a course that is designed specifically to aid in technical interview preparation?

Mark only one oval.

- Yes
- No
- Unsure

Appendix D

Appendix

D.1 Interview

- 15 Question total - 45 minutes - 1 hour
    - 17 Sub questions
    - Zoom/In-Person
- Have you participated in any technical interviews?
    - (sub questions) If so, answer the following questions:
        - How early in the process do you start prep? i.e, as soon as you get notification of the interview or do you continuously prep?
        - How much time do you dedicate to a preparation session?
- How do you prepare for technical interviews?
    - (sub question) Suppose you have a few hours that you can spend to prepare for an interview. Could you walk through what happens during that time?
    - (sub question) What kinds of resources do you use?
    - NEW: How much information do you receive from the company about the technical interviews? Do you know the rough interview format and the topics that may be covered in advance?
    - NEW: How do you use the information to prepare differently per company? Do you research company-specific questions? Why or why not?
    - (sub question) How are the resources you use helpful?
    - (sub question) If they aren't helpful, why not?
    - (sub question) When you prepare for an interview, how do you prepare think-aloud parts? How do you improve the verbal part?
- How do you practice the social aspect of a technical interview such as, thinking aloud and clearly stating your thought process while solving technical problems?
    - (sub question) Are there any resources/tools that you use for this?(e.g., voice recording, screen recording, watching youtube, etc)
- Have you ever worked with your peers/friends to prepare for technical interviews?
    - (sub question) If so, how was that experience?
- What is your biggest fear when going into a technical interview?
    - NEW: Do you get anxious during the technical interview? Why or why not?
    - NEW: Could you share your own interview experience that did not go well and why it did not go well?
- What do you feel the most confident in when going into a technical interview?
- How do you know if you are doing well?
    - (sub question) Did you ask for feedback?
    - (sub question) What are the resources that you utilize for self-assessment?
- How would you prepare for a technical interview differently from your current process ideally?

- NEW: Have you utilized mock interviews before? Why or why not?
- Many companies, both inside and outside of tech, still utilize these 'Leetcode-styled' interviews during their hiring process. What is your honest opinion on these interviews and do you feel that there is a better approach to testing candidates?
- How has studying for 'Leetcode-styled' interviews affected both your academic and general daily life?(edit this to make it more specific)
- What has personally been the most difficult thing you have faced during your studying process?
- Do you feel like the social and behavioral skills aside from the technical skills are easily practiced outside of the interview? If so, how? (depends on person)
- Think back on all of the resources you have used during the preparation phase of the hiring process. Which of them helped you the most with preparing for your interviews and how exactly did they help?
    - NEW: What kind of resources do you wish were available to you to improve your competency in technical interviews?
- NEW: Are there any courses that you have taken that were helpful in preparing you for technical interviews?
    - NEW: Do you think that coursework adequately prepares you for technical interviews? If so, how? If not, do you think there should be adjustments to the curriculum?