



# Automated Exercises

Jacob Mokuvos  
Clayton Cunningham  
Ted Liu  
Mingchi Li  
Shuhao Zhao

CS 4624 Multimedia/Hypertext and Information Access, Dr. Fox  
Virginia Tech, Blacksburg, VA, 24061  
4/25/19

# Outline



- Overview
- Work Completed
- Work to Finalize
- Issues/challenges

# Project Overview

## Goal:

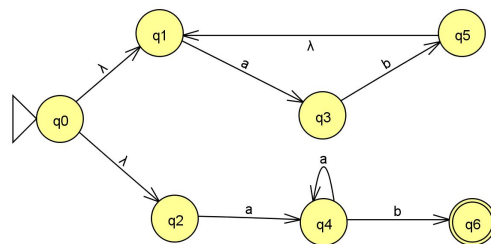
- Create an interactive OpenDSA module
- Help students engage with the Formal Language content.

## Method:

- Build an automated assessment exercises framework
- Allow instructors to build exercises for OpenDSA modules.

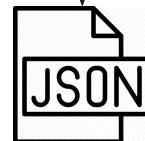
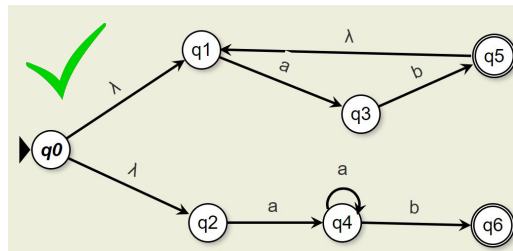
## Deliverables:

- Generate exercises
- Auto-grade exercises
- Create JSON Submission Log



```
["expression": "(a*b | (ab)*)",  
 "testCases": [{"aaab": true}],
```

```
"graph": {"nodes": [], "edges": []}]
```



# Technology in use

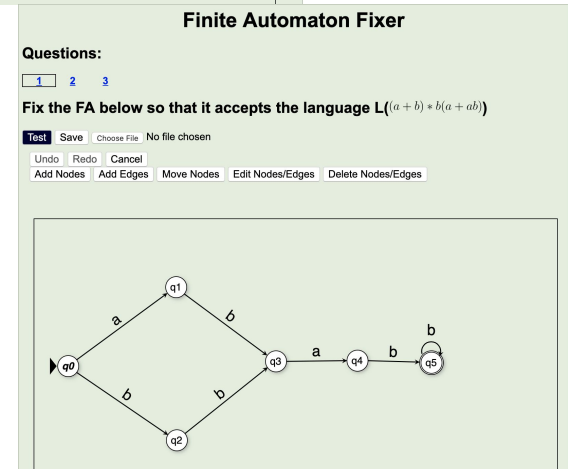
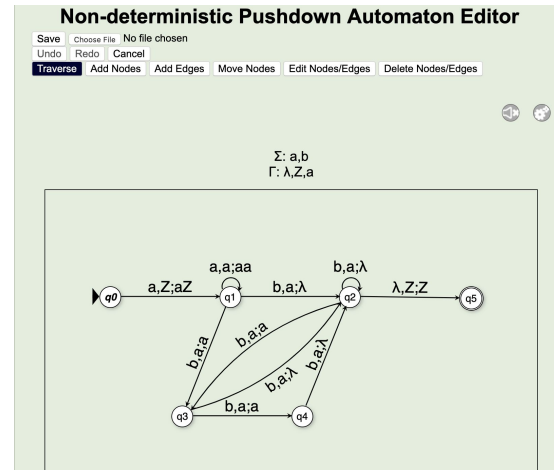
---

- JSON
- JavaScript
- HTML
- CSS
- GitHub



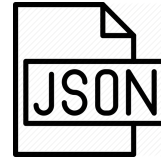
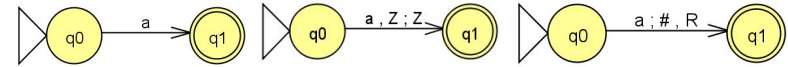
# Generation Breakdown

- Based on Graph JSON generate HTML
- JSON determined by specified machine type
- Each exercises has own auto generated HTML
- Generation page inputs change based on machine type



# Work Completed

- Finished Generation of Exercises
  - DFA
  - PDA
  - Turing Machines
- Allow for external file upload
- Fixed grading bug
- Created Submission Log Format



Correct cases: 3 / 5

Test Case	Standard Result	Your Result
bbbbab	Accept	Reject
baabbaa	Reject	Reject
aaabaa	Reject	Reject
bbab	Accept	Accept
abbab	Accept	Reject

## Exercise Generator

Hint

### Problem 1

- Expression Only  With Wrong Graph  
 PDA  FA  
 Expression:

Description:

Test Case 1:  Accept  Reject

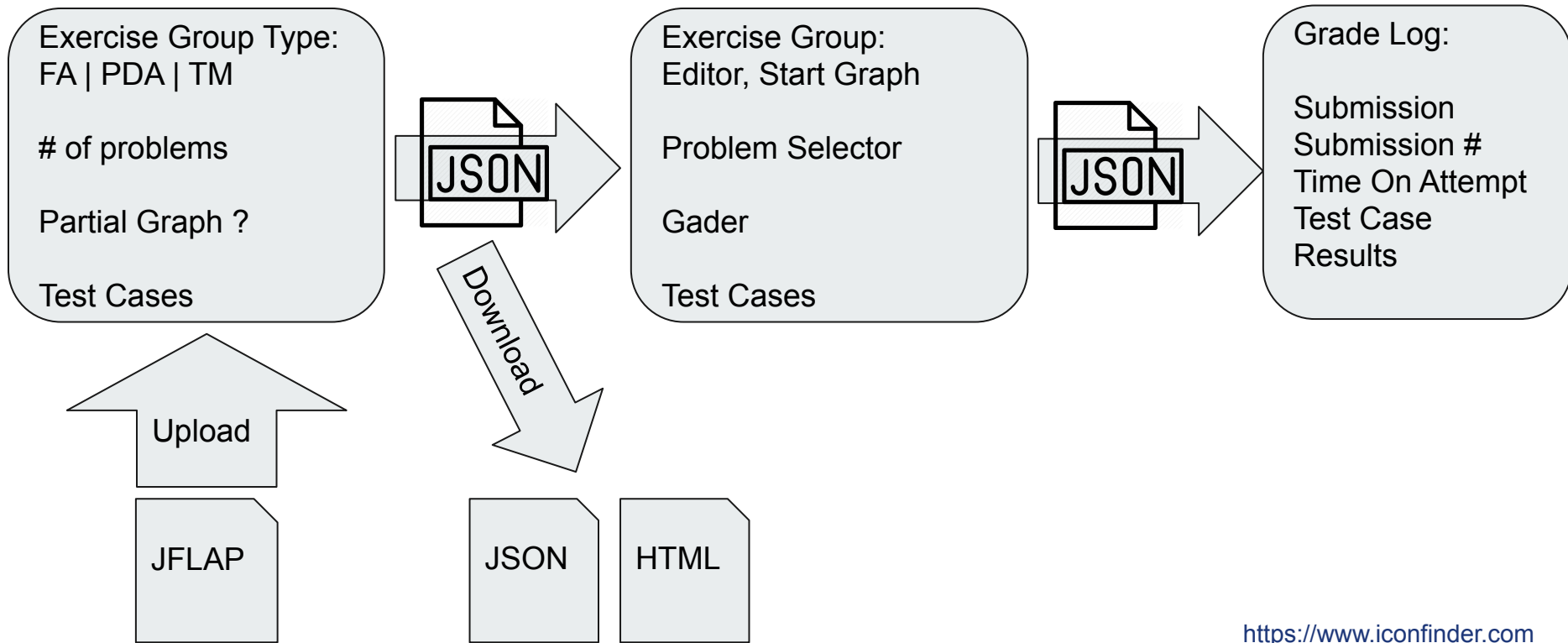
Add another test case

Edit Graph

Upload Graph

Add another problem

# Project Structure

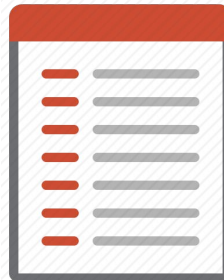
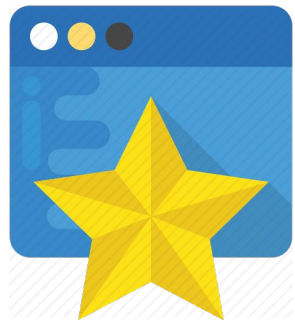


# Work to Complete

- Generate Logs with JSON
- Incorporate updated editors
- Private Finish button
- Final Report Final Touches

```
localhost:63342 says
{"Exercise1":{"Attempt1":
["Test1:Wrong","Test2:Correct","Test3:Correct","Test4:
Correct","Test5:Wrong"]},"Exercise1_Highest":3,"Exercise1_Time":
["2019-04-24T23:48:55.752Z","2019-04-24T23:48:59.243Z"],"Exe
rcise2":{"Attempt2":
["Test1:Correct","Test2:Wrong","Test3:Wrong","Test4:Correct","Test
5
:Correct"]},"Exercise2_Highest":3,"Exercise2_Time":
["2019-04-24T23:49:17.304Z","2019-04-24T23:49:19.300Z"]}
```

OK





# Current Roadmap



2/7

- ✓ Go over and finalize requirements
- ✓ Set up GitHub
- ✓ All members have access to edit code

2/28

- ✓ Add button for JFLAP to JSON conversion
- ✓ Automate a site that accepts input of a DFA/NFA

3/18

- ✓ Upload and generate HTML/JSON for exercises
- ✓ Generation for Finite Automata

3/25

- ✓ Generation for PDA
- ✓ Fix exercise evaluation display

4/8

- ✓ Implement Turing machine generation
- ✓ Ensure test cases evaluate correctly

4/15

- ✓ Create Submission log format

5/1

- Generate Submission Log for JSON
- Incorporate updated editors

Bonus

- Private Finish button

# Issues / Lessons Learned

---

- Have universally compatible code
- Defining clear information
- Collaborating to reach achievable goals



# Acknowledgments



Client - Professor Mostafa Mohammed

Platform - OpenDSA Interactive Textbook



Questions?