CMPT 276 Project Presentation **TEAM 13**

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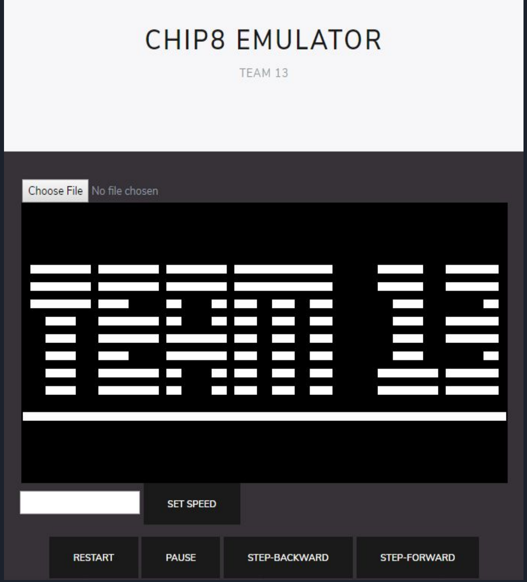
Introduction

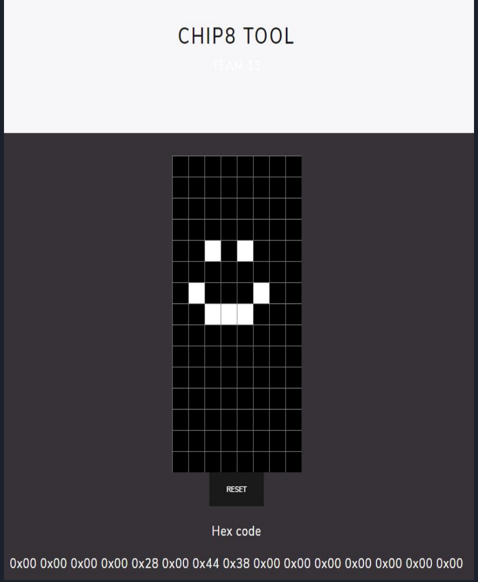
- Create a Chip8 emulator and visualizer that runs Chip8 programs on a modern web browser
- Create a software tool that’s useful for Chip8 developers
- Create at two Chip8 video games

What did we finish?

Chip8 interpreter



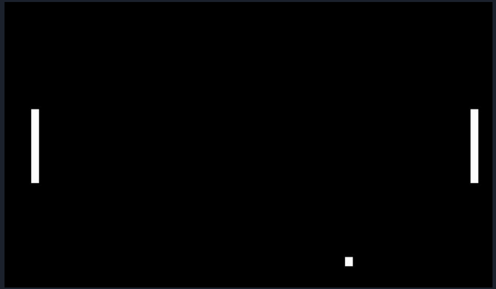
Chip8 Sprite Editor

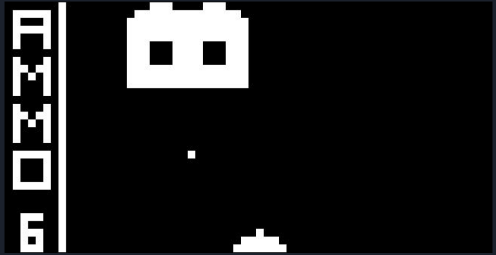


Hex code

0x00 0x00 0x00 0x00 0x28 0x00 0x44 0x38 0x00 0x00 0x00 0x00 0x00 0x00 0x00

Two Chip8 games

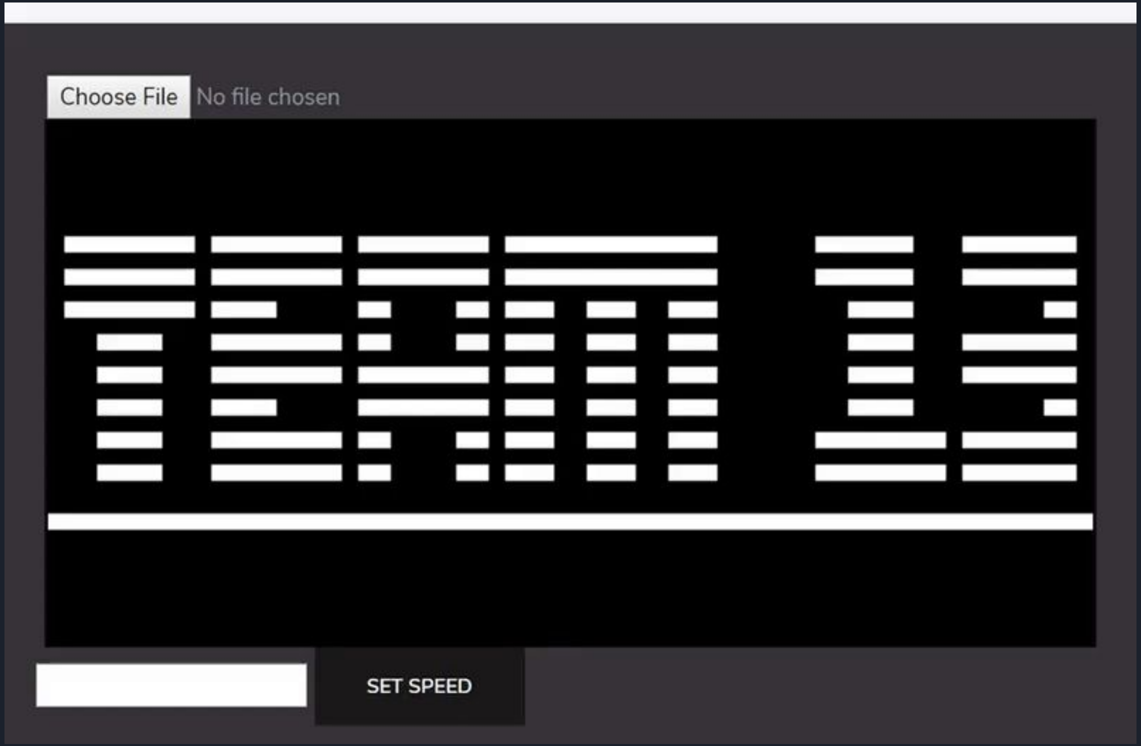




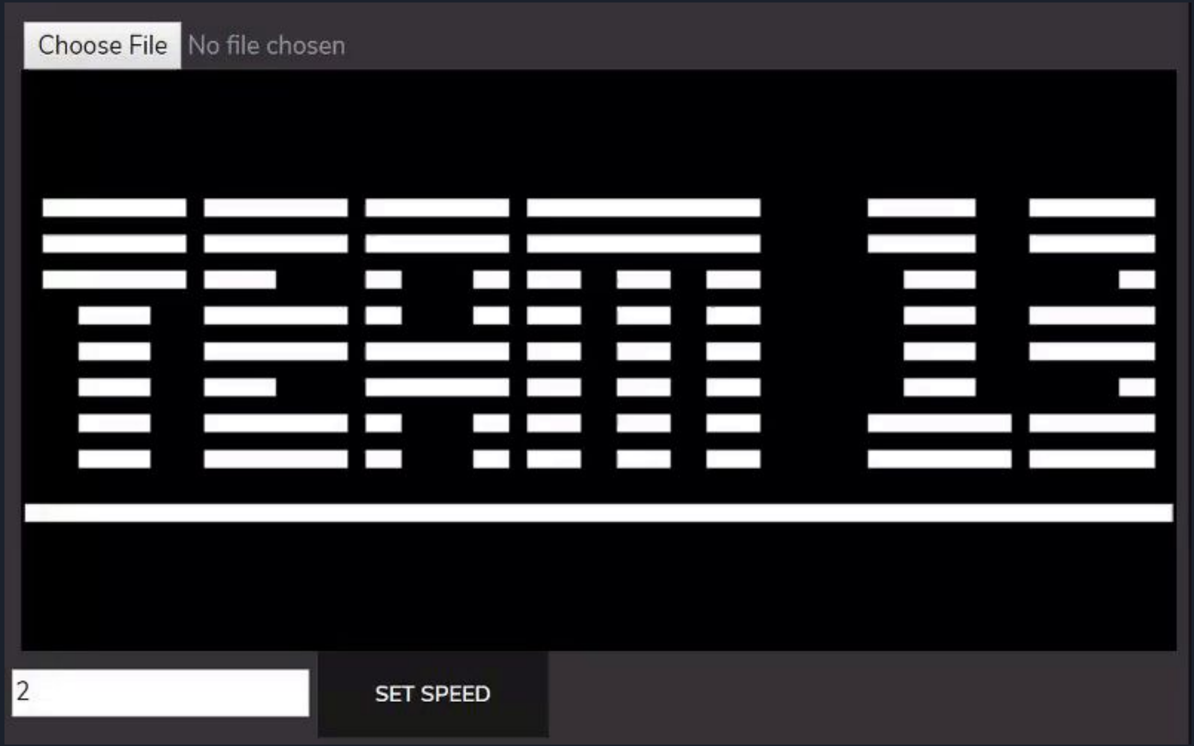
Emulator and Visualizer

- Project runs any Chip8 program on a modern web browser
- Displays Chip8 program information to the user
- Has various ways to manipulate the state of the program
- Developer/Educational Use

Emulator Features - Loading roms

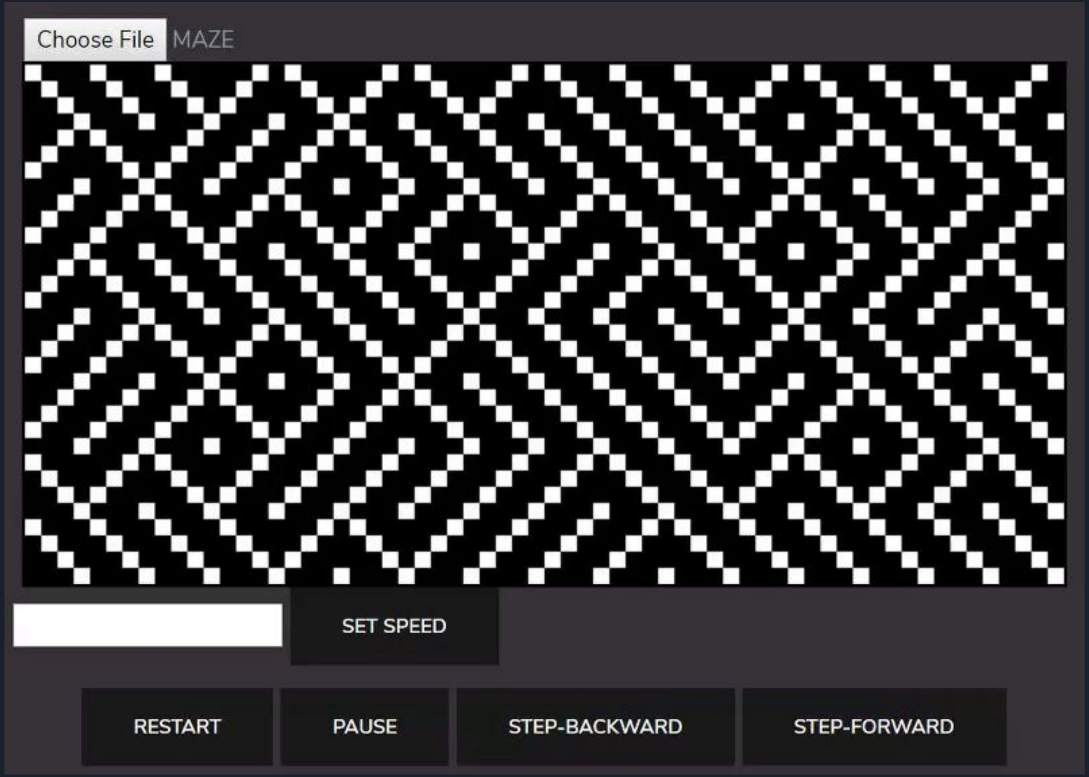


Emulator Features - Settings speed

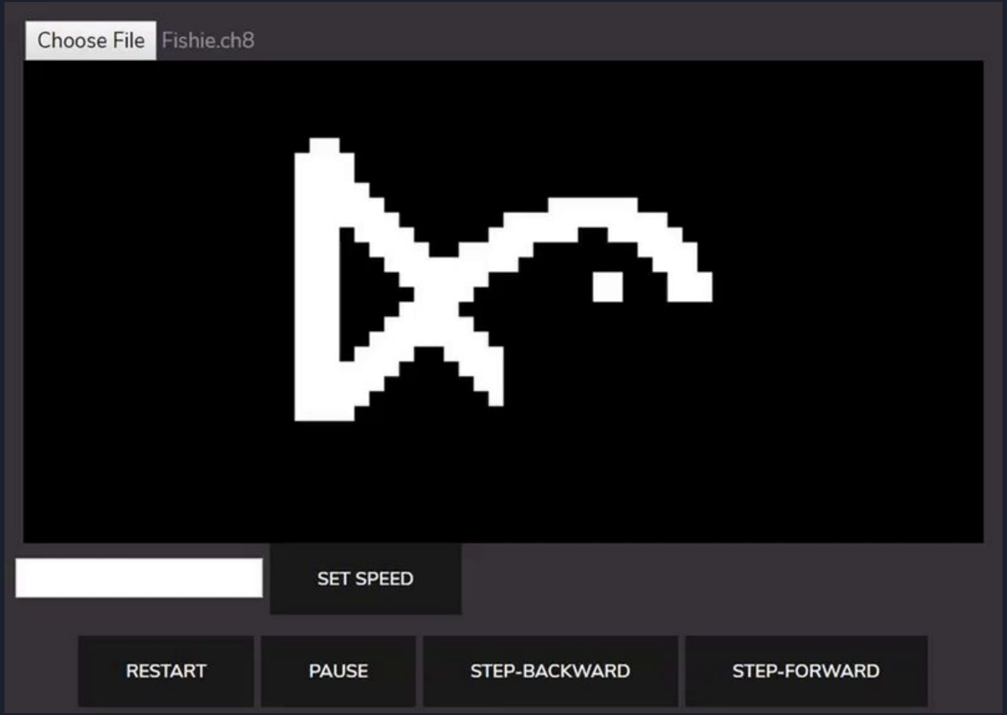


2

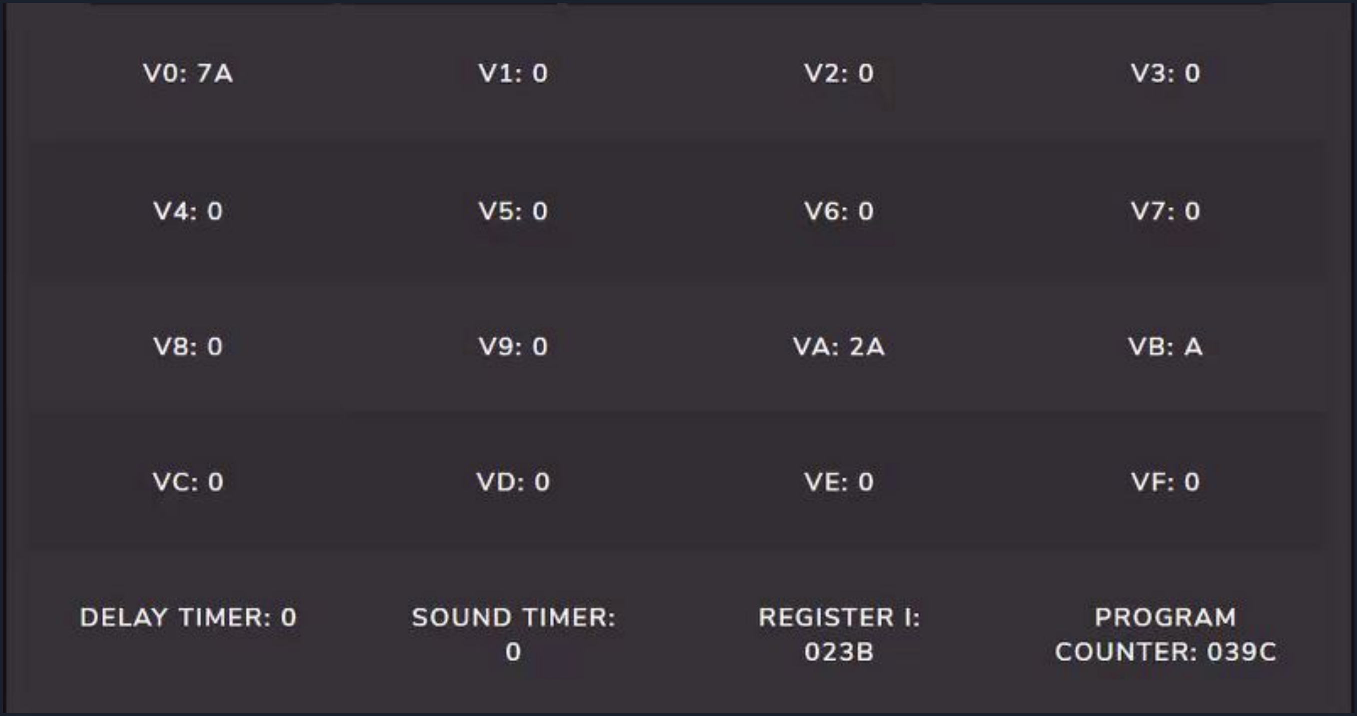
Emulator Features - Restart/Pause



Emulator Features - Step-Forward/Back



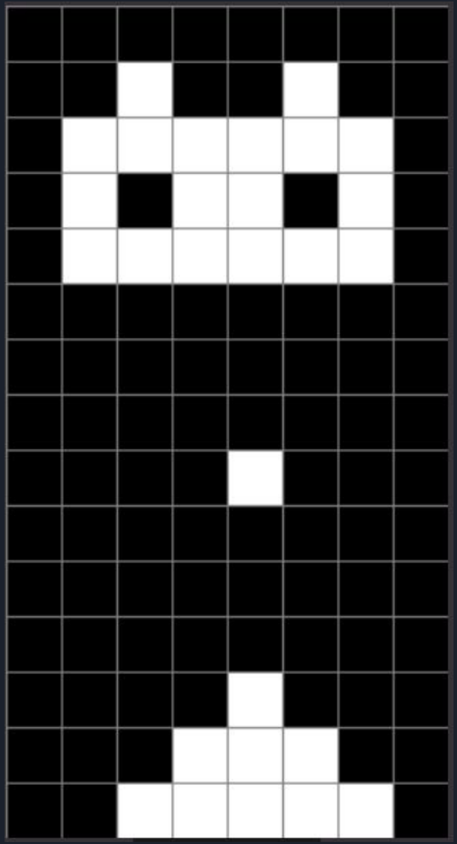
Emulator Features - CPU details



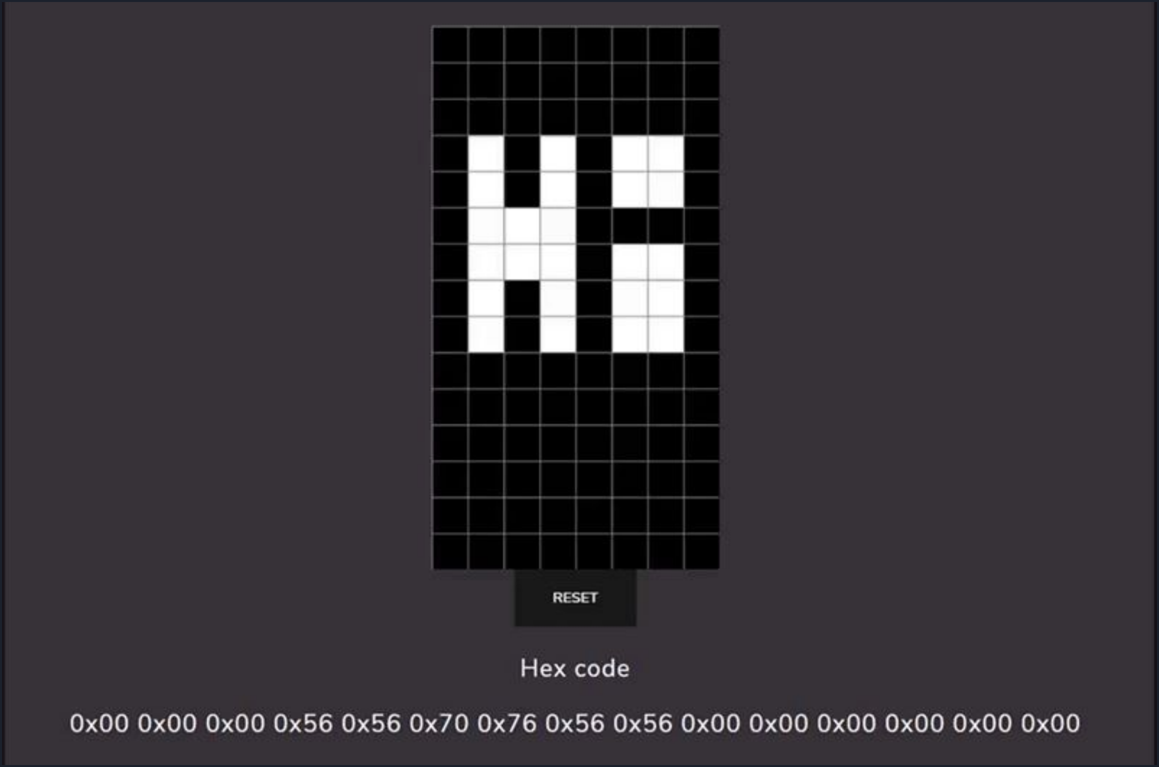
V0: 7A	V1: 0	V2: 0	V3: 0
V4: 0	V5: 0	V6: 0	V7: 0
V8: 0	V9: 0	VA: 2A	VB: A
VC: 0	VD: 0	VE: 0	VF: 0
DELAY TIMER: 0	SOUND TIMER: 0	REGISTER I: 023B	PROGRAM COUNTER: 039C

Sprite Editor | Tool

- Allows users to design sprites for Chip8 programming
- Integrated with the emulator webpage
- Converts sprites into usable hexadecimal



Tool Features - Draw, Reset, Use

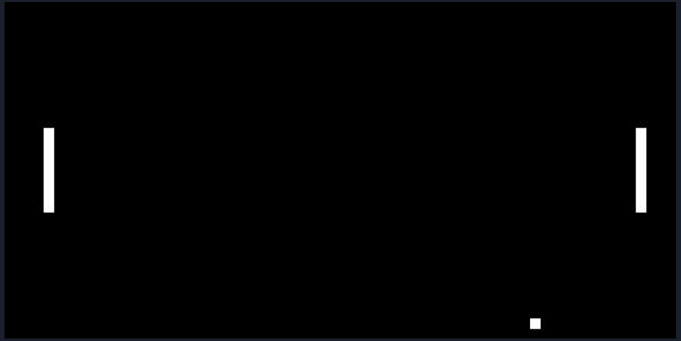


Hex code

```
0x00 0x00 0x00 0x56 0x56 0x70 0x76 0x56 0x56 0x00 0x00 0x00 0x00 0x00 0x00
```

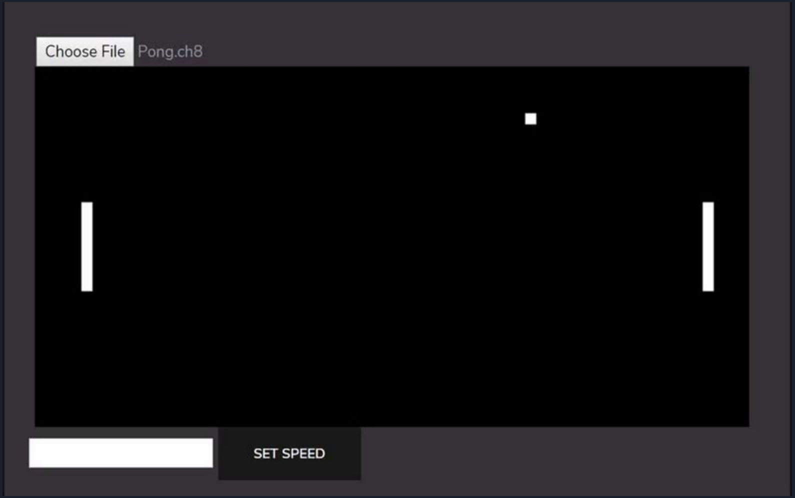
Pong | Game 1

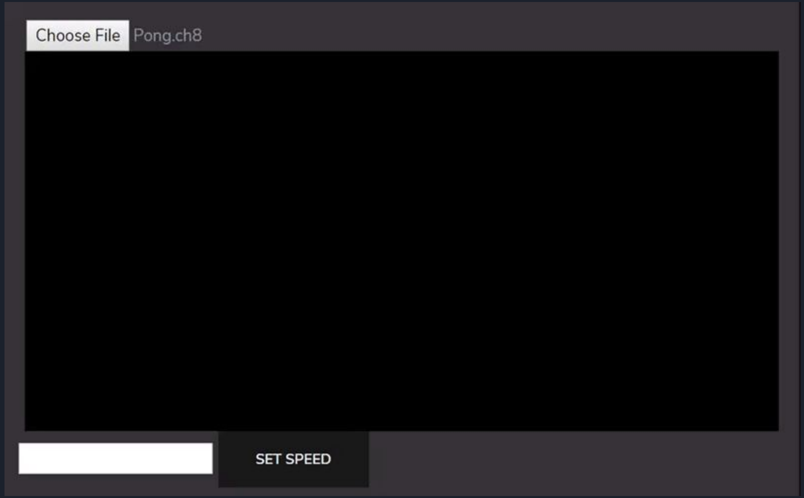
- We re-created the famous game in Chip8
- The game is a first-to-five win condition
- 2 player game



P1 WIN

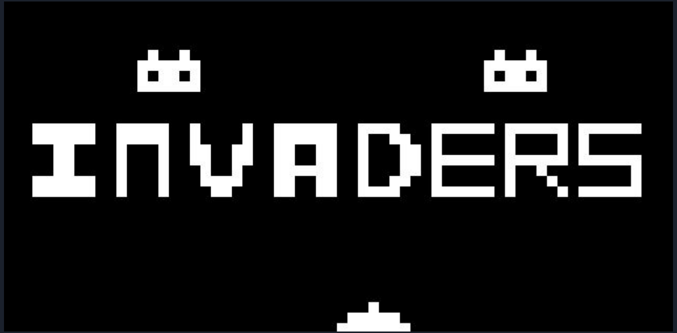
Pong Gameplay

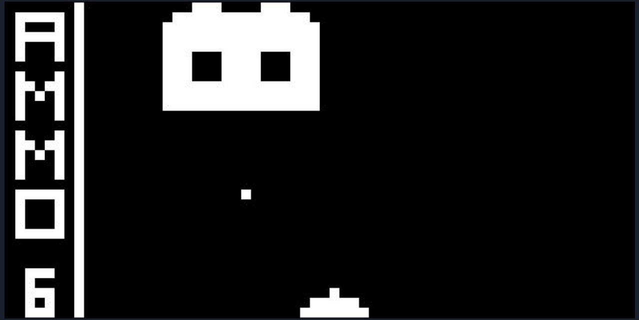




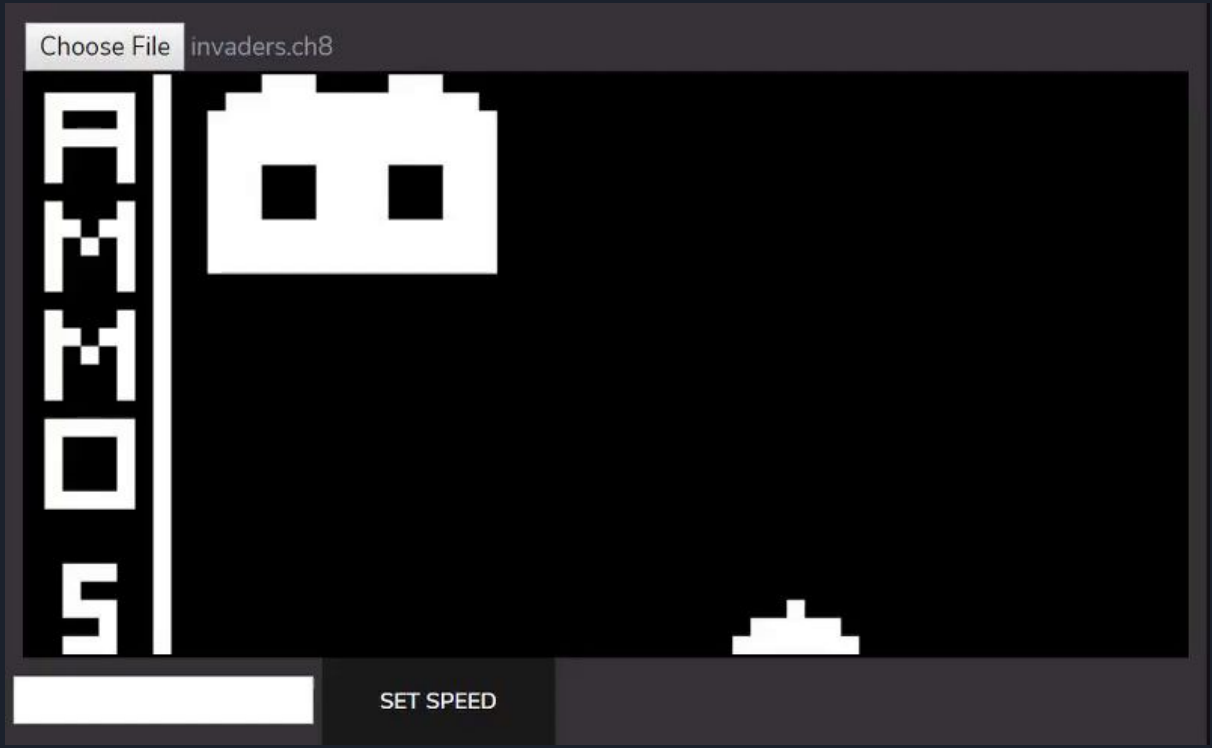
Space Invaders | Game 2

- We re-created Space Invaders with a new twist on the gameplay
- Team originally wanted to create Breakout but didn't due to difficulty





Space Invaders Gameplay

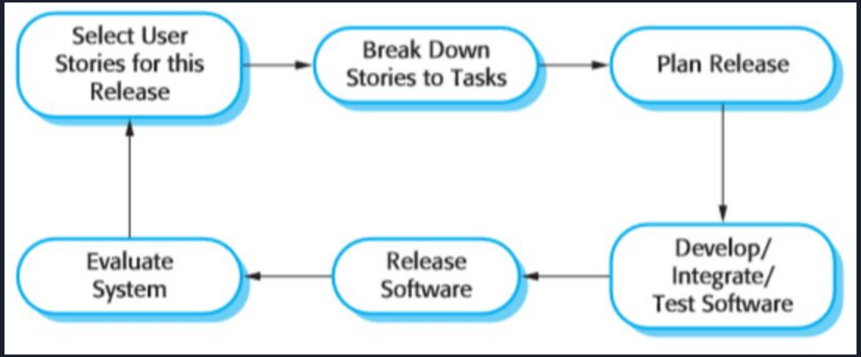


Did we meet our project goals?

- We managed to create a Chip8 interpreter that runs on JavaScript
- Chip8 Tool that allows users to create sprites
- Two Chip8 games
- Implementation could be optimized more

Software Methodology/Techniques

- Used Agile Development/Extreme Programming
- Peer programming was heavily used
- Simple Design with Refactoring
- Continuous Integration/communication

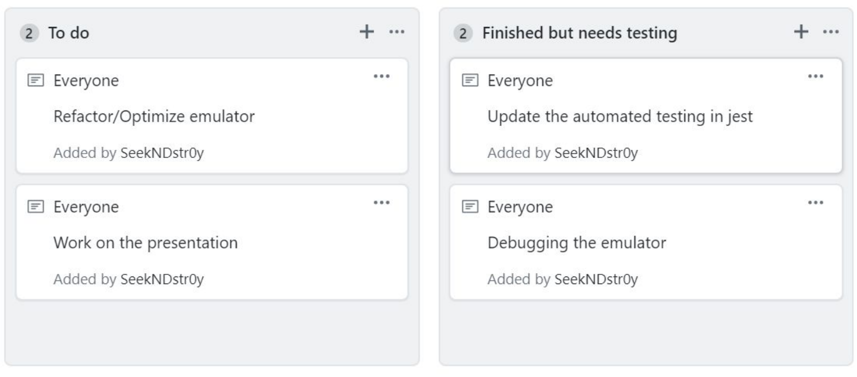

Select User Stories for this Release
Break Down Stories to Tasks
Plan Release
Develop/ Integrate/ Test Software
Release Software
Evaluate System

Peer Programming Importance

- The group struggled to code the emulator in the beginning
- Scheduling extra meetings to program together helped
- Allowed the group to understand each others skill sets

Managing the Project/Group

- Discord was used for general communication
- Github was as our private repository
- Github's project tab also acted as a Kanban Board for tasks
- Weekly meetings in CSIL on Mondays



2 To do

Everyone
Refactor/Optimize emulator
Added by SeekNDstr0y

Everyone
Work on the presentation
Added by SeekNDstr0y

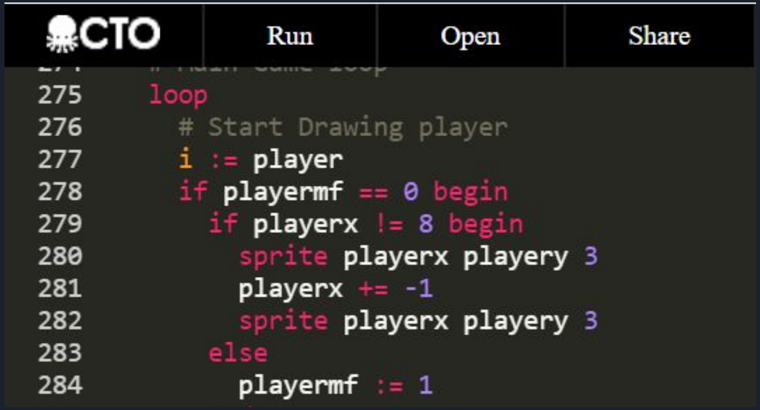
2 Finished but needs testing

Everyone
Update the automated testing in jest
Added by SeekNDstr0y

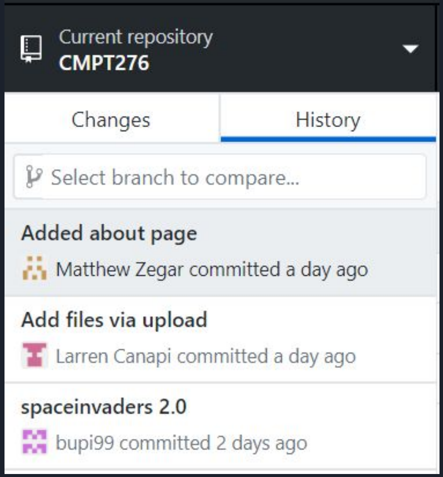
Everyone
Debugging the emulator
Added by SeekNDstr0y

What tools did we try?

- The Octo Assembler for easy to write Chip8 programs
- Sublime Merge was difficult to use, Github Desktop preferred
- Lodash for the step-backwards functionality



```
# Main Game loop
loop
  # Start Drawing player
  i := player
  if playermf == 0 begin
    if playerx != 8 begin
      sprite playerx playery 3
      playerx += -1
      sprite playerx playery 3
    else
      playermf := 1
```



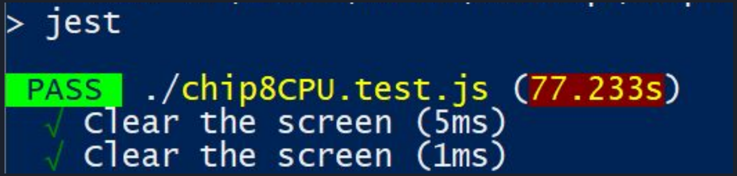
Added about page
Matthew Zegar committed a day ago

Add files via upload
Larren Canapi committed a day ago

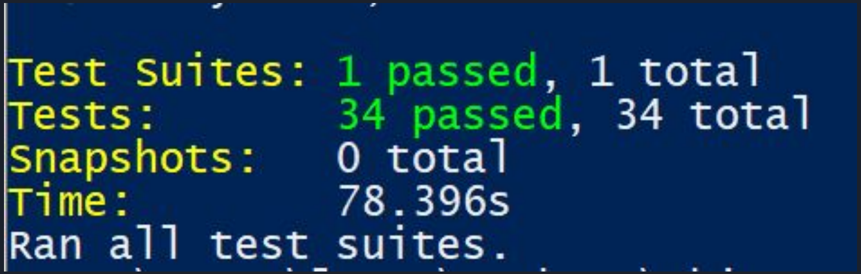
spaceinvaders 2.0
bupi99 committed 2 days ago

Quality Assurance and Testing

- We used Jest for our automated testing
- Mainly tested the opcodes in Chip8
- Unit/System Testing done throughout the term



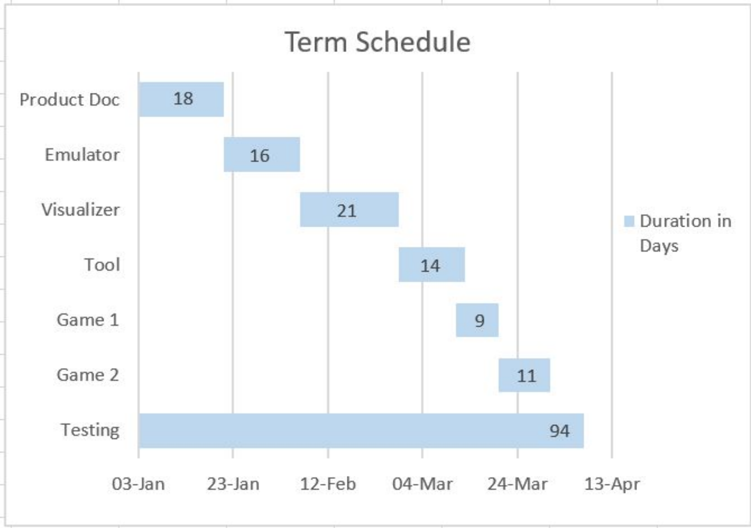
```
> jest

 PASS  ./chip8CPU.test.js (77.233s)
  √ Clear the screen (5ms)
  √ Clear the screen (1ms)
```



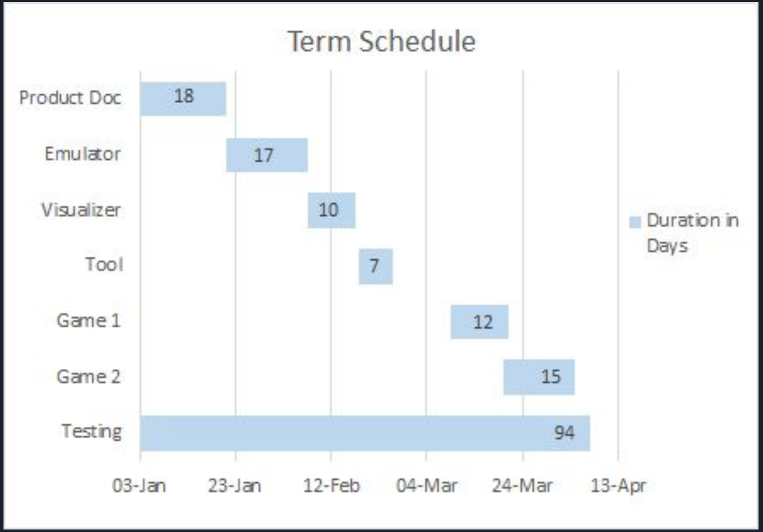
```
Test Suites: 1 passed, 1 total
Tests:       34 passed, 34 total
Snapshots:   0 total
Time:        78.396s
Ran all test suites.
```

Expected Schedule vs. Actual Schedule

Release 0



Release 4

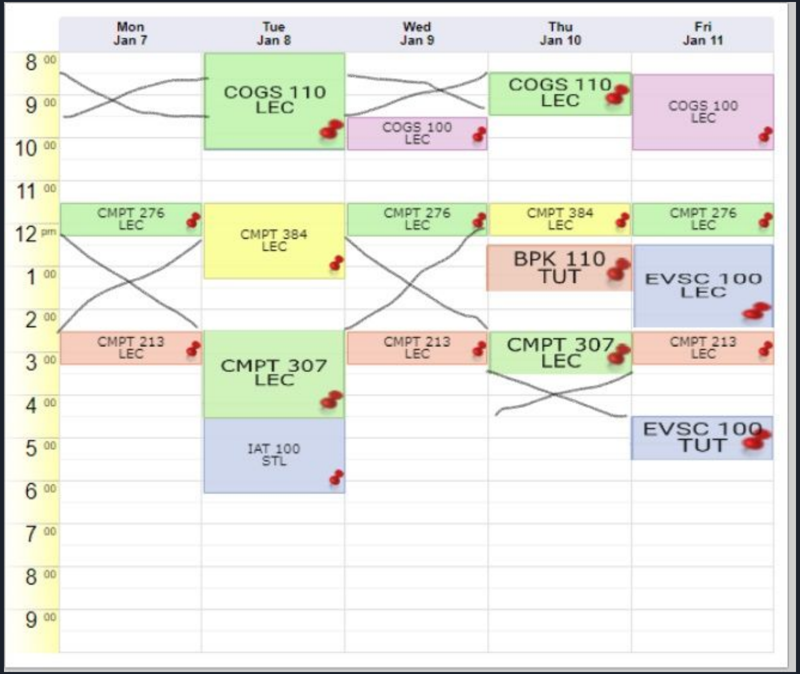


Where things went well

- Constant meetings every single week was helpful
- Our expected timeline was a good basis for planning
- Group coding sessions
- Good communication/cooperation within the group

Where things went wrong

- Some poor task delegation lead to delays
- Group members being busy with other classes



	Mon Jan 7	Tue Jan 8	Wed Jan 9	Thu Jan 10	Fri Jan 11
8 00		COGS 110 LEC		COGS 110 LEC	COGS 100 LEC
9 00			COGS 100 LEC		
10 00					
11 00	CMPT 276 LEC	CMPT 384 LEC	CMPT 276 LEC	CMPT 384 LEC	CMPT 276 LEC
12 pm				BPK 110 TUT	EVSC 100 LEC
1 00					
2 00	CMPT 213 LEC	CMPT 307 LEC	CMPT 213 LEC	CMPT 307 LEC	CMPT 213 LEC
3 00					
4 00		IAT 100 STL			EVSC 100 TUT
5 00					
6 00					
7 00					
8 00					
9 00					

What we learned

- Technical aspects like emulation, Javascript, Git
- Software engineering tactics like
  - Agile Development
  - Management/Communication
  - Various testing techniques

Advice to future CMPT 276 Students

- Schedule meetings where the group codes together
- Expect the time it takes to complete tasks to change rapidly
- Communicate and understand each group members strengths/weaknesses

Citations and Resources | IEEE

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Questions?

TEAM 13

Thank you