**Release 4**

**What’s Changed?**

The Emulator has now been fully completed and thoroughly tested for bugs and errors. With the Emulator, users can choose from a selection of ready-made Chip-8 games and load them into the Emulator. Users are then able to play their selected games in the Emulator and can change the current Chip-8 game to a new, different game. The Emulator is also well-suited for students, programmers, and other enthusiasts. It provides a couple of tools to assist users, who might be interested in learning how Chip-8 works or how the programs run.

The Emulator has an in-built Visualizer installed. Users are able to see most of the Emulator's key variables, including the values in the registers, the memory, and the timers. In addition, users are able to speed up or pause a Chip-8 game at any time. While paused, users can advance the program one opcode at a time, and more advanced users will be able to follow along by looking at the Visualizer. In this way, users can keep track and see how the program works. Advanced users will also be able to write lines of opcodes in order to compile and run them in the Emulator.

**What’s Next?**

This is the final release. We have no more updates planned for this project, and all aspects and features of this project are in their final states. We are done!

**Instructions for Running the Emulator**

1. Double-click on “Chip8.html”.
2. Choose the desired game to play from the dropdown menu.
3. Click on “Load and Run!” button.
4. Wait for the game to load.
5. Enjoy.
6. Press F12 to open the web console to see the Emulator’s details.

*To pause the current running program,*

1. Press the tilde key to pause/resume the Chip-8 program. Alternatively, click on the "Pause" button.
2. When paused, press F2 to execute the next opcode in order to advance the program line by line.
3. If not paused, click on “Run Faster!” in order to make the Emulator run faster. It is only able to run up to four times as fast as the normal speed.
4. Close the web browser or the tab in order to stop the Emulator.

*To run the mini-compiler,*

1. Type some opcodes (for example, 00E0, 600A, etc.) into the textbox, one opcode per line.
2. Click on “Compile and Run!” in order to run the opcodes.
3. The Emulator will compile and run the set of instructions given by the opcodes.

**Instructions for Automated Testing**

1. Double-click on “Chip8.html”.
2. Press F12 to open up the web console to see the testing in action.
3. Click on the “Run Automated Testing” button.
4. See the results in the console.