Chip-8 Emulator

Technical reference by some dude: http://devernay.free.fr/hacks/chip8/C8TECH10.HTM

Other valuable links:

https://raduangelescu.com/chip8emulatorjavascript.html

http://mattmik.com/files/chip8/mastering/chip8.html

http://blog.alexanderdickson.com/javascript-chip-8-emulator

Here's my simplified version (the way I understand it):

**Memory:**

* Has 4096 bytes of memory; implemented using a JS array that is 4096-elements long and stores 8-bit integers
* Stores a list of opcodes (and other commands that draw sprites/graphics) from memory location 0x0000 to 0x01FF (the "interpreter" section of the memory)
* Stores the program loaded into the emulator from memory location 0x0200 to the end

**Processor**

* Runs at 500 Hz
* For testing purposes, the first release will run at 60 Hz.

**Registers:**

* The emulator has 16 registers that store 8-bit integers; implemented using 16 JS arrays that stores 8-bit integers.
* There is also a special I register.
* The registers are labeled from V0 to VF. VF is a special registers that is used for special stuffs (so we can't use that yet).
* These are used by the opcodes to perform VERY basic operations. For example, store the value in register Vx to register Vy.
* By manipulating the registers and using opcodes, we can do simple math operations and the like (just like in a real processor).

**Program Counter (PC):**

* Shows which opcode we are currently executing when a program is running

**Stack Pointer:**

* Stores the old PC; useful when the PC is "jumping around" in the program and we need to backtrack the program when debugging

**Stack:**

* Honestly, not sure what this is for...

**Timers/Sounds**

* Chip-8 comes with two timers, a delay timer and a sound timer. Both timers hold an 8-bit number and will decrease by 1 at a rate of 60Hz when the value of the timers are non-zero.
* There are opcodes that can manipulate and retrieve the values of the timers.
* The registers can then use the values of the timers to make decisions, branching, and logic-stuffs.
* When the sound timer reaches 0, Chip-8 should make a "beep."

**Keyboard Buffer**

* There are 16 unique keys that can be used for input.
* Normally, each key has a unique hexadecimal value. However, this won't be implemented in this emulator version.

**Display/Sprites**

* Haven't figured that part out yet

**Notes:**

* For keyboard inputs, Vx should not be too large.
* Fix display\_test().
* If PC is out-of-bounds, end the program.
* If the program is too large, the memory won't be big enough to hold all the opcodes.
* No sound from the sound timer
* No way yet of connecting the emulator with inputs from the HTML webpage or the Visualizer.
* PC increases by 2.
* PC should be restricted to values 512 to 4095.