Chip8 Emulator Project Proposal

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1 Abstract

CHIP-8 is an interpreted programming language developed in the mid-1970s. Originally it ran on the COSMAC VIP and Telmac 1800 8-bit microcomputers. It was originally designed to make video games more easily programmed. We intend to implement the CHIP-8 interpreter in SystemVerilog.

2 Technical Specification

The interpreter had a specification of 4KB worth of memory, 16 data registers, 48 bytes of stack memory with 16 levels of nesting, two timers that count down at 60Hz (sound and delay), a hex keyboard with 16 keys 0-F, and a display resolution of 64x32 pixels. The graphics displays is based on a 1-dimensional portion of memory that specifies whether each of the pixels are on or off. It also has 35 opcodes which are all two bytes long and stored as big-endian.

3 Project

Our project plan is to implement the CHIP-8 specification in SystemVerilog and use this to play CHIP-8 games. We intend on fully implementing this specification only utilizing publicly available resources such as games which are in the public domain (Pacman, Tetris, Space Invaders) and the CHIP-8 technical reference[1]. In terms of milestones for our project, we intend on finishing the graphics at 25%, the sound and keyboard drivers at 50%, and the cpu to be operational at 75%. Given the nature of an emulator, it will be difficult to test the operation of each of the components. We will create the specification of each of the components beforehand and then hard code as many test cases as possible to make sure that the different components work as expected.

[1] http://devernay.free.fr/hacks/chip8/C8TECH10.HTM