CSU0049 Analog and Digital Computing Elements, Homework 5

Department of Computer Science and Information Engineering

National Taiwan Normal University

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100 points total. Zip your CPU.hdl and cs.asm into one single zip file. Name the zip file using your student ID and upload it to Moodle.

Task 1 (50 points)

In this task, as we've mentioned in class, you will construct the CPU using some existing hardware modules. Complete the CPU.hdl in Project 5 on the nand2tetris website: `https://www.nand2tetris.org/course`.

Task 2 (50 points)

In this task, you will implement a simple program that prints something on the virtual screen of the nand2tetris IDE. You should watch this video first (link). It will give your some idea of how to do I/Os.

The things you are asked to print on the screen are the International Morse code for characters 'c' and 's' (link to the wiki of Morse code). Specifically, when you press the keyboard key 'c' your program should print the Morse code for 'c'; when you press 's', the Morse code for 's'. Your *dit* should be 2-pixel thick and 1-pixel wide, and your *dah* should be 2-pixel thick and 3-pixel wide. Make one blank pixel as space following each *dit* or *dah* within an encoded character. Add blank padding pixels so that each encoded character will be 16 pixels wide. Print your encoded character at RAM[@SCREEN+128]. Overwrite the previous printing whenever the key-pressing status changes; if no key is pressed, leave the screen blank.