

ECE 414 FINAL PROJECT SAMPLE CODE FOR CPU

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For the final project, you will need to test your CPU design by loading codes into the ROM and having your CPU execute these codes. Below there is a very simple piece of code given as an example. If you were to test your CPU using this code, the expected output on the screen in Putty after the run would be the content of your RAM, with h17 (decimal 23) written on address 3 and the initial values on all other RAM addresses. You can load the codes only by initializing the ROM during CORE generation, which is done using 'coe' files. The coe file for the given code is also uploaded. Please use that file as a template to try different pieces of code. You should write similar (but preferably longer) codes to test the operation of your CPU.

Note on end of execution line: All possible opcodes are assigned to actual operations; so we will use an unused portion of the table to indicate the end of code execution: For JR operation (opcode b1111), use b0000 for the next 4 bits. For end of execution, use the same opcode, followed by b1111 instead. To give an example, hFOXX makes a JR operation, whereas hFFXX shows the end of code execution.

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LI      R0      h06                // Load hex. 06 into register 0
LI      R2      h11                // Load hex. 11 into register 2
ADD     R3      R2      R0         // R3 <- R2 + R0
LI      R1      h03                // Load hex. 03 into register 1
SW      R1      R3                // Write content of register 3 into RAM[R1[5:0]]
END OF EXECUTION                  // Finish code execution
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Corresponding code in binary and hexadecimal:

b(1000 0000 0000 0110)	h(8006)
b(1000 0010 0001 0001)	h(8211)
b(0000 0011 0010 0000)	h(0320)
b(1000 0001 0000 0011)	h(8103)
b(1010 0000 0001 0011)	h(A013)
b(1111 1111 0000 0000)	h(FF00)