CS2323: Computer Architecture, Autumn 2024

Homework-3: RISC-V Assembly Encoding

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1. Write equivalent machine code (in hexadecimal) for the given assembly instructions, by highlighting the various fields in the 32-bits of the instruction: [10 marks]
    a. addi x15, x22, -45
    b. and x23, x8, x9
    c. blt x2, x11, 240
    d. sd x19, -54(x1)
    e. jal x3, -10116

2. For various pseudo instructions shown below, study their equivalent disassembled code using the RIPES simulator (when you type each of these in the simulator, the right pane shows the corresponding code using actual instructions). Briefly explain (1-2 sentences each) why such a translation occurs for each of them. [4 marks]
Note: The instruction li represents the pseudo instruction load immediate.

    a. li x5, 0xFFFFFFFF
    b. li x5, 132
    c. li x5, 2134
    d. li x5, 0x2345abcd

3. Convert the given instructions in hex to their corresponding assembly code [6 marks]
    a. 0x0019F233
    b. 0x06B4D763
    c. 0x0169CF93

Submission instructions:

1. Create a pdf file mentioning the reasoning/observations for the questions asked above.
2. The submission should be entirely your work
3. The pdf file should be named YOUR_ROLLNUM.pdf (e.g., CSYYBTECHXXXXX.pdf)
4. Submit the pdf file