

CS2323: Computer Architecture, Autumn 2024

Homework-1: RISC-V Assembly and Binary Numbers

1. Write an assembly instruction to achieve the given functionality, defined using C-language syntax (only 1 instruction to be used). Explain in brief. [6 marks]

- a. $x8 = x5 - 5$
- b. $x5 = x3 * 8$
- c. $x19 += x10$
- d. $++x15$
- e. $x9 = x15/4$
- f. $x12 = 24$

2. Consider an array M consisting of 8 byte integers. The base address of M is stored in register x5. Write the assembly code that achieves each operation given below. [1+1+1+2+2 marks]

- a. $M[12] = M[20] + 100$
- b. $M[20] ++$
- c. swap M[5] and M[12]
- d. Make the first 32-bits (from MSB side) of M[4] as 0
- e. Swap the most significant 32-bits of M[2] with its least significant 32-bits

3. Write the following decimal numbers in their 2's complement representation, using 8-bits. Show your calculations. [4 marks]

- a. +23
- b. -1
- c. +255
- d. -128

4. Write the equivalent decimal number for given numbers in 2's complement format. Show your calculations. [3 marks]

- a. 11010100
- b. 00101011
- c. 11111110

Submission instructions:

- 1. Create a pdf file (write and scan or type) for the questions asked above. Be to the point without too much of an explanation. Ensure that the scan/picture is readable.
- 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