CS2323: Computer Architecture, Autumn 2025

Homework-1: RISC-V Assembly and Binary Numbers

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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 = x19 + 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. The submission should be entirely your work
2. Create a pdf file for the questions asked above. Be to the point without too much of an explanation.
3. The pdf file should be named YOUR_ROLLNUM.pdf (e.g., CSYYBTECHXXXXX.pdf)
4. Submit the pdf file