# Microprocessor and Embedded Systems Midterm assignment

## Rules:

- **This assignment consists of 30 marks from theory portion of midterm, so do it by yourself. Avoid plagiarism. Assignment should be fully handwritten and individual submission to provided link in MSteams folder named as submission link.**
- **For question no 2,3 and 4 get values of A and B from your ID , XX-XXXAB-X**
- **Save your file as ID.pdf format**
- **Deadline for submission is 11th march 2021. For Per day late one mark will be deducted and after grade publication (not grade lock) assignment submission wont be allowed at all.**

1) A **B** bit processor has 36 bit address bus. This processor uses a single 4MB x **B** RAM chip. To increase the memory capacity to 36MB, how many RAM chips required? Show the memory organization using both Linear and Partial Decoding. Which decoding method is better and why? 10 marks

2) Calculate effective address, logical address, lower range and upper range when segment is 3A8E and offset is 5B15. What is the offset register for stack segment register?

5 marks

3) Write an assembly code for the following arithmetic operation of SAP-1 architecture and translate into equivalent machine language code. Opcodes are given in following table
5 marks

$$|((AH)^2+2)-BH+4H|$$

**Table 1: SAP-1 Opcodes**

| Mnemonics | Opcode |
|---|---|
| LDA | 0100 |
| ADD | 0111 |
| SUB | 1010 |
| OUT | 1110 |
| HLT | 1111 |

4) Determine the contents of different components of a SAP-1 architecture for the 13 T states from the code found. 10 marks