COEN 311 Section W (Computer Organization and Software)
Assignment 2
Due Monday February 14, 2022

8086 Architecture and addressing modes

Submission instructions:

- You have to demonstrate your work for each question, writing final answers is not acceptable.
- Only one **pdf** file is acceptable.
- Submit through Moodle.
- Emails are not accepted. In case you face technical issue with Moodle, you must send a screenshot of the issue and email your assignment **before** the deadline.

8086 Architecture short answer questions (22 points)

1- How large is a memory segment in 8086 architecture**?**
2- What is the function of Instruction Pointer?
3- What two address elements are combined to form a physical address?
4- A data is going to be stored in a memory cell, which registers are required to calculate the memory address that data is stored into?
5- What kind of information is stored in pointer and index registers?
6- What happens to the value of IP each time an instruction is executed?
7- In the previous question, assume that the instruction is 2 bytes, what happens for IP after the instruction execution?
8- What is the purpose of segment registers in 8086 register?
9- Which of the following architectures are found in the 8086 microprocessor? Why? (**6 points**)
   - Harvard architecture
   - Von-Neuman architecture
   - RISC Instruction architecture
   - CISC Instruction architecture

8086 Architecture computational questions (38 points)

10- How many bits are required to address the Memory space of 8086 processor? Why? Show your work. (**8 points**)

11- Calculate the value of each physical addresses that follows. Assume all numbers are hexadecimal:
   a) 1000:1234
   b) 0100:ABCD
   c) A200:12CF

12- Find the unknown value for each of the following physical addresses?
   a) A000 : ? = A0123
   b) ? :14DA = 235DA
   c) D765 : ? = DABC0

8086 addressing mode questions (40 point)

13- In the following instructions identify the addressing mode used for the source and destination operand:
   a) MOV AL, BL
   b) MOV AX, 0FFH
   c) MOV [DI], AX
   d) MOV DI, [SI]
   e) MOV [BX]+ 0400H, CX

14- Compute the **physical address** for the specified operand in each of the instructions below.

Assume the register contents are as follows:
(CS) = 0A00 H, (DS) = 0B00 H, (SI) = 0100 H, (DI) = 0200 H, (BX)=0300 H

a) Destination operand of **MOV [DI], AX**
b) Source operand of instruction **MOV DI, [SI]**
c) Destination operand of the instruction in **MOV [BX]+ 0400H, CX**