INTERNATIONAL ISLAMIC UNIVERSITY OF MALAYSIA
Kulliyyah Of Engineering
Department Of Electrical Engineering

ELECTRICAL AND COMPUTER ENGINEERING LAB II (ECE 2202)

Name: ________________________________
Matric Number: ____________
Group: ______________
Section: ______________
Date: ______________
Due Date: ________________________
Instructor: ________________________

LAB 4: Programming in Assembly Language – Part 2

Objective

1. Practice Assembly Language Programs
2. Understand the use of Logic Instructions and Rotate Instructions
In this lab, you will continue to explore more Instruction Set of Intel 8088. Logic Instructions are instructions to perform logic operations such as AND, OR, XOR and NOT. Their operations are simply by comparing bit by bit and the result will be stored in destination operand except for NOT logic instruction operates on single operand.

- **AND/OR/XOR**: destination operand, source operand
- **NOT**: D (Single Operation)

**SHIFT and ROTATE Instructions**

Step 1. There are 4 types of Shift Instructions. Explain them.

Step 2: What are the difference between ROL and RCL?
Step 3
The following programs disassemble two hexadecimal digits in a byte of data and add them.

Mov al,12
Mov bl,al
Mov cl,04
Ror bl,cl
And al,0f
And bl,0f
Add al,bl

Execute the program. Explain the program. Why rotation and ‘and’ operation is performed on this program. If the program is to be improved to disassemble AX into AH and AL, and add them, what modification will you do?
Step 4. Factorial Program.

Mul is the instruction to perform multiplications. The syntax is

    MUL Reg

If Reg is a 8 bit number, then the operation performed is AL = Al * Reg

If Reg is a 16 bit number, then the operation performed is AX * Reg => (DX)(AX) . Meaning if the result is bigger then 16 bit, MSB will be moved to register DX and the LSB will be moved to register AX.

Write a program to computer factorial of 10H.
Step 5.

Write a program, which finds a largest unsigned 8-bit number in a memory location of your choice, and store the result in a different memory location 200. Draw a flow chart and verify your program.

If the program above is to find the largest unsigned 16-bit number, what changes will you do?
Question:

1. Write a program to \[ \sum 2^{k+1} \]

2. By referring to the block diagram of minimum mode of 8088, explain the functions of the following signal lines
   a. IO/M
   b. SSO
   c. DT/R
   d. RD and WR
   e. DEN

3. List 1 key difference between 8088 and 8086 from point of hardware.

4. List 2 key differences between maximum mode and minimum mode of operation of 8088.