

COE 205, Term 101

Computer Organization & Assembly Programming

HW# 4

Q.1. Suppose that you have the following initial content of registers:

AX=EF73H BX=0156H CX=C6F1H DX=E1F3H

Show the content of the destination operand and the state of the flag bits (O, S, Z, A, P, and C) after the execution of each of the following instructions. Use the initial content of the registers for the execution of each instruction. Suppose that the CF is initially set to 1.

- | | | | |
|----|----------------|-----|------------|
| 1. | NOT DX | 7. | ROL DX, 1 |
| 2. | AND AL, 45h | 8. | ROL DX, CL |
| 3. | OR BX, CX | 9. | ROR DX, CL |
| 4. | XOR AX, CX | 10. | RCR DX, 1 |
| 5. | TEST CX, 8820h | 11. | SAR DX, CL |
| 6. | SAL DX, CL | 12. | SHR DX, 1 |

Q.2. Assume the following 8086 code

```
MOV CX, count
iterate: LOOP iterate
```

How many times is the LOOP instruction executed if count = 5 and count = -5, respectively?

Q.3. Write 8086 code to multiply the signed content of register AL by 43 using the smallest number of instructions possible:

- (i) Without using the multiplication instruction.
- (ii) Without using the multiplication and shift instructions.

Q.4. Consider the following 8086 code:

```
MOV SI, offset Table1
```

```

MOV DI, offset Table2
MOV BX, 0
MOV CX, 100
NEXT: MOV AL, [SI+BX]
      MOV AH, [DI+BX]
      MOV [SI+BX], AH
      MOV [DI+BX], AL
      INC BX
      LOOP NEXT

```

- (i) Analyze the code and determine what it does.
- (ii) Modify the code to implement the same functionality but without using the loop instruction.

Q.5. Write an 8086 assembly program that implements the following C code. Allocate the minimum required memory for the variables.

```

C version:
main()
{
    int I, J, A, B, C, F;
    I=10;
    J=-10;
    F=1;
    A=100;
    B=8;
    C=1000;
    while ( (I>=J) && (F==1) ) {
        I = I-2;
        B = 2* B;
        A = A + B;
        if (A >= 800)
            F=0;
    }
    C = C - A;
}

```