

## COE 205, Term 992

### Computer Organization & Assembly Programming

#### HW# 3

Due date: Saturday, Feb. 26

**Q.1.** Consider a program that has the following data segment:

```
I    EQU 13h
J    DB  '2`
K    DW  FFFFh
```

Indicate whether the following are valid 8086 instructions. If invalid, give the reason:

- |                      |                            |
|----------------------|----------------------------|
| 1. MOV AX, [BX+1]    | 9. MOV [BX], Byte PTR [SI] |
| 2. MOV [BX], I       | 10. INC [BX]               |
| 3. MOV AX, I+1       | 11. MOV ES, DS             |
| 4. MOV AX, J+1       | 12. INC J+1                |
| 5. MOV K, Word PTR J | 13. DEC K                  |
| 6. MOV CL, 270       | 14. ADD [BX], 22H          |
| 7. MOV K, I          | 15. SUB AH, [BX+SI-2]      |
| 8. MOV ES, I         | 16. DIV 20                 |

**Q.2.** Suppose that you have the following initial content of the registers and memory locations:

|           |           |          |          |
|-----------|-----------|----------|----------|
| AX=FE10H  | BX=0011H  | CX=F01FH | DX=00FFH |
| SI =0002H | DI =0012H | DS=4000H |          |

| Memory Address | Contents (hex) |
|----------------|----------------|
| 2000: 0010     | 12             |
| 0011           | 14             |
| 0012           | 16             |
| 0013           | FF             |
| 0014           | FF             |
| 0015           | FC             |

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 the following instructions. Use the initial content of the registers and memory locations for the execution of each instruction. Suppose that the CF is initially set to 1.

- |                         |                           |
|-------------------------|---------------------------|
| 1. ADC AX, CX           | 6. NEG Byte PTR [DI-2]    |
| 2. INC Word PTR [0014]  | 7. MUL DL                 |
| 3. SBB BL, AL           | 8. IMUL DL                |
| 4. SUB AL, [DI]         | 9. DIV Byte PTR [DI+3H]   |
| 5. DEC Word PTR [BX+SI] | 10. IDIV Byte PTR [DI+3H] |

**Q.3.** Give a single 8086 instruction that performs each of the following operations. Use the appropriate type pointer whenever necessary to avoid ambiguity. CF is the value of the carry bit flag.

- |   |   |
|---|---|
| 1. $[C1FE:C1FD] \leftarrow [C1FE:C1FD] + F1h$ | 4. $[BX+1:BX] \leftarrow 0 - [BX+1:BX]$ |
| 2. $BX \leftarrow BX - [DI+1:DI]$             | 5. $DX:AX \leftarrow AX * AX$           |
| 3. $AL \leftarrow AL - BL - CF$               | 6. $BX \leftarrow [SI+BX+5:SI+BX+4]$    |

**Q.4.** Write an 8086 assembly program that implements the following C code. Declare variables I and J as byte variables, while variables K and L as word variables.

```

C version:
Main()
{
    int I, J, K, L;
    I=5;
    J=25;
    K=(2*I)+(3*J)+1;
    L=K/4;
    I=I+1;
    J=J-I;
}

```