COE 205 Computer Organization & Assembly Language – Spring 2008

Assignment 3: Basic Instructions and Addressing Modes

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Due Date: Saturday, March 29, 2008

Q1. (9 pts) Consider a program that has the following data segment:

```
I       EQU         7Fh
J       BYTE        '1234'
K       EQU         250
L       WORD        1234h, 8765h
M       DWORD       1, 2, 3, 4
```

Indicate whether the following instructions are valid or not. If valid, give the result of the operation in hexadecimal. If invalid, give the reason.

```
a. MOV   AL,  I+1                  f. MOV I, L
b. MOV   AL,  J+2                  g. MOV EAX, DWORD PTR J
c. MOVSX EAX, L[1]                 h. MOV L,   WORD  PTR M
d. MOV   EBX, M[2]                 i. MOV ESI, L
e. INC  [ESI]  ;ESI = OFFSET J
```

Q2. (6 pts) Suppose that you have the following initial register content:

```
AX=F2E9H    BX=0002H  CX=08A0H  DX=F1E0H
```

a) Show the contents of *AX* and the flags (*CF*, *OF*, *SF*, *ZF*, *AF*, and *PF*) after executing:

```
ADD AX, BX
```

b) Show the contents of *CX* and the flags (*CF*, *OF*, *SF*, *ZF*, *AF*, and *PF*) after executing:

```
SUB CX, DX
```

c) Show the contents of *BX* and the flags (*CF*, *OF*, *SF*, *ZF*, *AF*, and *PF*) after executing:

```
NEG BX
```

Q3. (5 pts) Write an assembly language program to copy the characters of a string in reverse order. Initialize a source string to: "This is the source string", and write a loop to copy its characters to a target string in reverse order.

Hint: Solve the above problems on a sheet of paper first. Then, to check your answers, write assembly language programs and trace them with the Windows debugger.