**Name: KEY**                                                    **Id#**

## COE 205, Term 032

## Computer Organization & Assembly Programming

## Quiz# 2

Date: Sunday, March 7, 2004

**Q1.** Consider an 8-bit register that has the binary number 11100010. Determine the decimal value of the number if it represents:

    i.   An unsigned number.

       $128 + 64 + 32 + 2 = 226$

    ii.  A signed number in sign-magnitude representation.

       $- (64 + 32 + 2) = - 98$

    iii. A signed number in 1's complement representation.

       The 1's complement is 00011101
       So, the number is  -29

    iv.  A signed number in 2's complement representation.

       The 2's complement is 00011110
       So, the number is  -30

**Q2.** Perform the following arithmetic operations assuming that numbers are represented using 8-bit 2's complement representation. Indicate in your answer when an _overflow_ occurs.

    i.  7F + 01

```
          1
          7   F
    +     0   1
        ---------------
          8   0
```

       There is overflow since the sign bit of the result is negative while it should be positive.

ii. FE – 7F

The 2's complement of 7F is 81

```
    F  E
+   8  1
   ---------------
    7  F
```

There is overflow since the sign bit of the result is positive while it should be negative.

**Q3.** Fill the blanks in the following questions:

(i) The binary number 01000100 represents character _____**D**_____, and uses an _____**Even**_____ parity bit. Note that the ASCII code of character **A** is 41H and that of character **a** is 61H.

(ii) Assuming 7-bit 2`s complement representation, the smallest (negative) number is _____**1000000**_____ in binary and _____**-64**_____ in decimal and the largest (positive) number is ___**0111111**____ in binary and _____**+63**_____ in decimal.

(iii) If you type the phrase Abc2 on your keyboard, the binary sequence sent to the computer using 8-bit ASCII code with the $8^{th}$ bit being an even parity bit is ___**01000001 11100010__01100011__10110010__**. Note that the ASCII code for character 0 is 30H.