Name: KEY   **Id#**

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COE 205, Term 061

Computer Organization & Assembly Programming

Quiz# 2

Date: Sunday, Oct. 8, 2006
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Q1. Consider an **8-bit** register that has the binary number 11100100. Determine the decimal value of the number if it represents:

  i. An **unsigned** number.

  = 128 + 64 + 32 + 4 = 228

  ii. A signed number in **sign-magnitude** representation.

  = -(64 + 32 + 4) = -100

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

  We first take the 1's complement = 00011011=16 + 8 + 2 + 1 = +27
  Then, 11100100 = -27

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

  We first take the 2's complement = 00011100=16 + 8 + 4= +28
  Then, 11100100 = -28

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. Also determine the **decimal** value of the operands and the result

  i.   7F + FF

```
            7F      (+127)
      +     FF      (-1)
      ----------------------------
            7E      (+126)
```

  No overflow since we are adding numbers of opposite sign.

ii. 1E – 90 = 1E + 70

```
        1E      (+30)
   +    70      (+122)
   -----------------------------
        7E      (-114)
```

There is overflow since we are adding two positive numbers and we are getting a negative number.

Q3. Fill the blanks in the following questions:

(i) The binary number 01100111 represents character _____**g**_____, and uses an ____odd____ parity bit. Note that the ASCII code of character **A** is 41H and that of character **a** is 61H.

(ii) Assuming **6-bit 2`s complement** representation, the smallest (negative) number is _____100000___ in binary and __-32____ in decimal and the largest (positive) number is _____011111___ in binary and ___+31____ in decimal.

(iii) If you type the characters **A8c** on your keyboard, the binary sequence sent to the computer using 8-bit ASCII code with the 8th bit being an **even parity** bit is 0100 0001(A) 1011 1000(8) 0110 0011(c). Note that the ASCII code for character 0 is 30H.