Name: KEY **Id#**

COE 205, Term 031

Computer Organization & Assembly Programming

Quiz# 2

Date: Tuesday, Oct. 7, 2003

Q1. Consider an 8-bit register that has the binary number 10001100. Determine the decimal value of the number if it represents:

i. An unsigned number.

= 128 + 8 + 4 = 140

ii. A signed number in sign-magnitude representation.

= - 12

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

The 1's complement of 10001100 is 01110011 = 127-12= 115
So, the number 10001100 represents -115

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

The 2's complement of 10001100 is 01110100 = 127-11= 114
So, the number 10001100 represents -114

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. 1F + 5F

```
      1
      1  F
+     5  F
    ---------
      7  E
```

There is no overflow. We added two positive numbers and got a positive number.

ii. 7F – F0

= 7F + 2's complement of F0 = 7F + 10

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

There is overflow because we are adding two positive numbers and got 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 10-bit 2`s complement representation, the smallest (negative) number is ____1000000000___ in binary and ___-512_____ in decimal and the largest (positive) number is ___0111111111____ in binary and ____+511_____ in decimal**.**

(iii) If you type the phrase COE205 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 ____11000011__11001111__1100101__10110010__00110000__00110101_____ Note that the ASCII code for character 0 is 30H.