Name: **Id#**

COE 205, Term 033

Computer Organization & Assembly Programming

Quiz# 2 Solution

Date: Tuesday, July 6, 2004

Q1. Represent the signed number -111 in sign-magnitude, 1's complement and 2's complement representations using the minimum number of bits possible.

+111 = 1101111

-111 in sign-magnitude will be 11101111

-111 in 1's complement will be 10010000

-111 in 2's complement will be 10010001

Q2. Find the decimal value of the following numbers:

i. $(6A.4)_{16}$

$= 6*16 + 10 + 4 * 16^{-1}$
$= 106.25$

ii. $(0110.0111)_2$

$= 1*2 + 1 * 2^2 + 1 *2^{-2} + 1*2^{-3} + 1*2^{-4}$
$= 6 + 7/16$
$= 6.4375$

Q3. Determine in both binary and decimal the range of values that can be represented in 6 bits for each of the following representations:

i. unsigned representation

range is from 0 to $2^6 - 1$ = 0 to 63
range in binary is from 000000 to 111111

ii. sign-magnitude representation

range is from $-(2^5-1)$ to $+(2^5-1) = -31$ to $+31$
range in binary is from 111111 to 011111

iii. 1's complement representation

range is from $-(2^5-1)$ to $+(2^5-1) = -31$ to $+31$
range in binary is from 100000 to 011111

iv. 2's complement representation

range is from $-(2^5)$ to $+(2^5-1) = -32$ to $+31$
range in binary is from 100000 to 011111

Q4. Assuming even parity show the 8-bit ASCII representation for each of the following characters: (Note that the ASCII code of character A is 41H and that of character 0 is 30H)

C: 11000011

4: 10110100

Q5. Determine whether the following operations will produce correct results or not assuming 8-bit 2's complement representation. Justify your answer.

i. FF + 81 = 80
Result is <u>correct</u> because we added two negative numbers and got a negative number.
-1 + (-127) = -128

ii. 7F + 01 = 80
Result is <u>incorrect</u> because we added two positive numbers and got a negative number.
+127 + 1 = 128 which cannot be represent in 8-bits and is not equal to 80h=-128.

iii. FF + 7F = 7E
Result is <u>correct</u> because we added a positive number with a negative number and overflow can never occur.

-1 + 127 = 126