Name: KEY   **Id#**

ICS 233, Term 081

Computer Architecture & Assembly Language

Quiz# 2

Date: Monday, November 3, 2008

Q1. Consider an 8-bit register that has the binary number 11010101. Determine the decimal value of the number if it represents:

   (i)   An unsigned number.

             $= 128+64+16+4+1=213$

   (ii)   A signed number in 2's complement representation.

             2's complement of 11010101 is 00101011.
             The number $00101011 = 32+8+2+1=43$.
             Thus, the number 11010101 represents -43.

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)   AC + E9

             AC + E9 = 95.
             There is <u>no overflow</u> since we are adding two negative numbers and we got a negative number.

(ii) 7E – 90

7E – 90 = 7E + 70 = EE
There is <u>overflow</u> since we are adding two positive numbers and we got a
negative number.

Q3. Fill the blanks in the following questions:

(i) Assuming unsigned number representation, **(AB)$_{16}$** represents the decimal number
<u>=16*10+11=171</u>.

(ii) The decimal number **500** is represented in binary as <u>111110100</u>.

(iii) The binary number **01101000** represents character <u>h</u>, and uses an <u>odd</u> parity bit.
Note that the ASCII code of character **A** is 41H and that of character **a** is 61H.

(iv) Assuming **6-bit 2`s complement** representation, the smallest (negative) number is
<u>100000</u> in binary and <u>-32</u> in decimal and the largest (positive) number is <u>011111</u>
in binary and <u>+31</u> in decimal**.**