

Name: KEY

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COE 205, Term 082
Computer Organization & Assembly Programming

Quiz# 2

Date: Monday, March 23, 2009

Q1. Consider an 8-bit register that has the binary number 10010110. Determine the decimal value of the number if it represents:

- (i) An unsigned number.

$$= 128+16+4+2=150$$

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

The 2's complement of 10010110 is 01101010.

The number 01101010 = $64+32+8+2 = 106$.

Thus, the number 10010110 represents -106.

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) CB + CA

$$CB + CA = 95.$$

There is no overflow since we are adding two negative numbers and we got a negative number.

(ii) $68 - E0$

$$68 - E0 = 68 + 20 = 88$$

There is overflow 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, the hexadecimal number $(8F)_{16}$ represents the decimal number 143.
- (ii) The decimal number **120** is represented in binary as 1111000.
- (iii) The binary number **11000111** 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.
- (iv) Assuming **8-bit 2's complement** representation, the smallest (negative) number is 10000000 in binary and -128 in decimal and the largest (positive) number is 01111111 in binary and +127 in decimal.