

Name: Key

Id#

COE 205, Term 042
Computer Organization & Assembly Programming
Quiz# 2

Date: Sunday, March 6, 2005

Q1. Consider an 8-bit register that has the binary number 11101110. Determine the decimal value of the number if it represents:

i. An unsigned number.

$$2 + 4 + 8 + 32 + 64 + 128 = 255 - 17 = 238$$

ii. A signed number in sign-magnitude representation.

$$-(127 - 17) = -110$$

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

$$\begin{aligned} \text{1's complement of } 11101110 &= 00010001 = 17 \\ \Rightarrow &-17 \end{aligned}$$

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

$$\begin{aligned} \text{2's complement of } 11101110 &= 00010010 = 18 \\ \Rightarrow &-18 \end{aligned}$$

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. 7F + FF

$$\begin{array}{r} 1 \\ 7F \\ + FF \\ \hline 7E \end{array} \quad \text{No overflow}$$

ii. $FE - 7F = FE + 81$

$$\begin{array}{r} FE \\ + 81 \\ \hline 7F \\ \text{overflow} \end{array}$$

Q3. Fill the blanks in the following questions:

(i) The binary number 01100011 represents character C, and uses an even parity bit. Note that the ASCII code of character A is 41H and that of character a is 61H.

(ii) Assuming 8-bit 2's complement representation, the smallest (negative) number is 1000 0000 in binary and -128 in decimal and the largest (positive) number is 0111 1111 in binary and +127 in decimal.

(iii) If you type the word Ala 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 1011 0001 110 0001.
Note that the ASCII code for character 0 is 30H.