COE 200, Term 042

Fundamentals of Computer Engineering

HW# 2

Q.1. Obtain the 1`s and 2`s complement of the following binary numbers: 01100, 00001, 00000

Q.2. Find the 10`s complement of $(935)_{11}$.

Q.3. Show how the decimal integers +120 and -120 would be represented in signed magnitude, 1's complement, and 2`s complement notation using 8 bits and 10 bits, respectively.

Q.4. Specify the range of positive integers and negative integers (in decimal) for an ***n***-digit integer of base ***r:***

i) Using (r-1)'s complements

ii) Using r's complements

Q.5. Perform the following arithmetic operations using both r's and (r-1)'s complements and using the specified number of digits. Convert the result to sign-magnitude representation. Also, specify when an overflow condition has occurred:

(i) $(821)_{10} + (785)_{10}$ using 3-digits

(ii) $(821)_{10} + (785)_{10}$ using 4-digits

(iii) $(-A2B)_{16} + (-56C)_{16}$ using 4-digits

(iv) $(56C)_{16} - (A2B)_{16}$ using 4-digits

(v) $(10010)_2 - (11011)_2$ using 8-bits

(vi) $(11101)_2 + (10110)_2$ using 6- bits

(vii) $(11010)_2 - (1101)_2$ using 6- bits

(viii) $(11010)_2 - (10000)_2$ using 6- bits

(ix) $(10010)_2 - (10011)_2$ using 6- bits

Q.6. A microcontroller uses 8-bit registers. Give the following in both binary and decimal:

(i) The maximum unsigned integer number that can be stored.

(ii) The smallest (negative) number and the largest (positive) number that can be stored using the sign-magnitude notation.

(iii) The smallest (negative) number and the largest (positive) number that can be stored using the 2`s complement notation.

Q.7. Give the BCD representation of the number 569.