CSC 137, Çokgör, Data Representation Exercises (Solutions are at the back)

1) Convert the following 4-bit binary numbers to decimal numbers:
      0101
      1001

2) Convert the following 8-bit binary numbers to decimal numbers:
      10001010
      01100111

3) Convert the following decimal numbers to binary numbers as represented by 4 bits:
      13
      5

4) Convert the following hexadecimal numbers to decimal numbers:
      0x13
      0x27
      0x3B
      0xEC

5) Convert the following hexadecimal numbers to binary numbers:
      0x13
      0x27
      0x3B
      0xEC

6) Convert the following binary numbers to hexadecimal numbers:
      10001010
      01100111

7) Represent the following numbers in 5-bit 2's complement representation:
      -15
      3
      -2
      -16
      17

8) What is the decimal equivalent of the following numbers that are represented in 5-bit 2's complement representation?
      00100
      11100
      10101
      10000
      01111

9) Complete the following arithmetic operations in two's complement representation. Is there an overflow condition? (Assume a six-bit system)

-7 + (-29)
15 – 19

1) Convert the following 4-bit binary numbers to decimal numbers:

       0101 : 5

       1001 : 9

2) Convert the following 8-bit binary numbers to decimal numbers:

       10001010 : 138

       01100111 : 103

3) Convert the following decimal numbers to binary numbers as represented by 4 bits:

       13 : 1101

       5 : 0101

4) Convert the following hexadecimal numbers to decimal numbers:

       0x13 : 19

       0x27 : 39

       0x3B : 59

       0xEC : 236

5) Convert the following hexadecimal numbers to binary numbers:

       0x13 : 0001 0011

       0x27 : 0010 0111

       0x3B : 0011 1011

       0xEC : 1110 1100

6) Convert the following binary numbers to hexadecimal numbers:

       10001010 : 0x8A

       01100111 : 0x67

7) Represent the following numbers in 5-bit 2's Compliment Representation:

       -15 : 10001

       3   : 00011

       -2 : 11110

       -16: 10000

       17 : Cannot be represented with 5 bits. Requires 6 bits.

8) What is the decimal equivalent of the following numbers that are represented in 5-bit 2's complement representation?

       00100: 4

       11100: -4

       10101: -11

       10000: -16

       01111: 15

9) Complete the following arithmetic operations in two's complement representation. Is there an overflow condition? (Assume a six-bit system)

-7 + (-29) = 111001 + 100011 = 011100 ; There is an overflow condition, because the operation results in one extra bit

15 – 19 = 001111 – 010011 = 111100 ; There is an overflow condition, because we need to borrow from a bit that does not exit.