Exercise 3: Data Representation

1) Determine the 1's complement of each of the following binary numbers:
    a. 11011100
    b. 01101001
    c. 01010010

2) Determine the 2's complement of each of the following binary numbers:
    a. 00111010
    b. 10110011
    c. 01101100

3) Express each of the following decimal numbers as an 8-bit number in the 1's complement form:
    a. -34
    b. +103
    c. -99

4) Express each of the following decimal numbers as an 8-bit number in the 2's complement form:
    a. -68
    b. +101
    c. -109

5) Determine the decimal value of each of the following signed binary numbers in the 1's complement form:
    a. 00010011
    b. 10100010
    c. 11001001

6) Determine the decimal value of each of the following signed binary numbers in the 2's complement form:
    a. 00111001
    b. 11010011
    c. 11001001

7) Convert each of the following pairs of decimal numbers to binary and add using the 2’s complement form (keep your answer in the 2’s complement form, and indicate if an overflow occurs):
    a. 33 and 15
    b. 56 and -27
    c. -46 and 25
    d. -110 and -84
8) Represent the following decimal numbers in binary using 8-bit signed magnitude, one's complement and two's complement:
    a. 77
    b. −42
    c. 119
    d. −107