For the following questions, *show all of your work*. It is not sufficient to provide the answers.

Exercise 1. Convert the following numbers.

    a. 137_{10} to unsigned binary

    b. $7F93_{16}$ to base 2

    c. 23.125_{10} to base 4

    d. 11011.011_2 to base 10

Exercise 2. Convert each of the following numbers to 8-bit signed magnitude, 8-bit one's complement, 8-bit two's complement and 8-bit excess 128 formats.

    a. $(-125)_{10}$

    b. $(-14)_{10}$

    c. $(-37)_{10}$

    d. 126_{10}

Exercise 3. Find the decimal equivalents for the following 8-bit two's complement numbers.

    a. 1111 1101

    b. 0100 0000

    c. 1111 1011

    d. 0111 1011

Exercise 4. Perform two's complement addition on the following pairs of numbers. In each case, indicate whether an overflow has occured.

    a. 1110 1011 + 0111 0110

    b. 1110 1011 + 1111 0100

    c. 1000 1100 + 1001 0010

    d. 0110 0001 + 0011 1000