# Homework Assignment #1 – Number Representations

The purpose of this assignment is to let you be familiar and become comfortable with binary representations which are used in computers.

⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯⎯

**Problem 1 (30 points, 10 points each)** Convert the following decimal numbers into (a) 8-bit, (b) 16-bit, and (c) 32-bit binary numbers. For negative numbers, use the 2’s complement. State “overflow” if a number cannot be represented correctly. Hint: You may want to use the sign extension rule.

1. 67 ten.
2. -53 ten.
3. -3,200 ten.

**Problem 2 (30 points)** What decimal number does each of the following two’s complement binary number represent?

1. 1111 1111 1111 1111 1111 1111 1110 1011 two.
2. 1111 1111 1111 1111 1111 1111 0111 1100 two.
3. 0111 1111 1111 1111 1111 1111 1110 1111 two.

**Problem 3 (40 points, sub-problem 3 is 20 points, others 10 points each)** Show the IEEE 754 binary representation for the following floating-point numbers in single and double precision. Give your results in hexadecimal format.

1. 19 ten.
2. -3.875 ten.
3. 0.9ten.