

CS 180 Problem Solving and OO Programming

Fall 2011 Recitation Week 1

Aug 22-26, 2011

Focus: Primary: Number systems. Secondary: Problem Solving

Readings from the book: 1.4-1.9; 2.1-2.2.

All problems are to be first attempted by the students and then the instructor can provide any necessary explanation regarding how to solve each problem. Note: There will be one question on number systems on Exam 1.

The following problems are for practice only; the solutions are not to be turned in and will not be graded.

Problem 1:

- (a) Convert the following integers to binary: 7, 12, and 19.
- (b) Find the decimal equivalents of the following unsigned binary numbers: 1101; 011001, 1111.
- (c) Represent binary equivalents of the numbers in (a) assuming 6-bit representation of integers with the leftmost bit being the sign bit (0 for positive integers and 1 for negative integers).
- (d) Take the two's complement of each binary number in (c). What are the decimal equivalents of the resulting binary numbers?
- (e) Convert the following decimal numbers to binary assuming that only 5-bits are available to represent a real number: 0.75 and 0.3.
- (f) Find the decimal equivalents of the binary fractions you derived in (e).
- (g) Find the binary equivalents of decimal numbers 7 and 3 and then, assuming 5-bit signed representation, add the binary equivalents. Convert the binary sum to decimal. Do the same for 7 and 8 and convert the result to decimal. Do you observe anything different in this case?

Problem 2:

When solving a problem using a computer, what problem the programmer solves and what does the program written by the programmer solve?

Problem 3 (optional):

Write a Java program that performs the following tasks:

- 1. Inputs two integers, denoted by x and y , from the keyboard.
- 2. Computes and prints the sum and product of x and y .
- 3. Computes and prints the quotient and remainder obtained when x is divided by y .

Use the `Scanner` class to read data from the keyboard.

<End of in-class problems for week 1>