ENCE 200, Fall Semester, 2009 Department of Civil and Environmental Engineering
Last updated: October 21, 2009.

Homework 3

Due 9am, November 6. No extensions!

What to hand in. For each problem, hand in a copy of your java source code and a script file showing input/output from typical program runs. Please make sure that you provide your name and section (0101 or 0201).

Problem 1 (Beginner): It is well known that the formula for converting a temperature in Celsius to Fahrenheit is

$$^oF = \frac{9}{5} \cdot ^oC + 32. \tag{1}$$

Write a Java program that will prompt the user for the temperature in degrees Celsius, and compute and print the equivalent temperature in Fahrenheit.

Hint. The java method `getTextFromConsole()` reads input from the terminal window and stores it in a character string. You can cut-and-paste the code from the java examples web page.

Problem 2 (Beginner): Write a Java program that will prompt a user for five floating point numbers, print each of the numbers, and then compute and print the largest and smallest values, and the average value.

Hint. As with the previous question, read keyboard input with the method `getTextFromConsole()`. Use the methods `Math.min()` and `Math.max()` to compute the smallest and largest values in just one line.

Problem 3 (Beginner): If we list all the natural numbers below 10 that are multiples of 3 or 5, we get 3, 5, 6 and 9. The sum of these multiples is 23.

Write a java program to find and print the sum of all the multiples of 3 or 5 below 1000.

Problem 4 (Beginner): 2520 is the smallest number that can be divided by each of the numbers from 1 to 10 without any remainder.

Write a java program to find and print the smallest number that is evenly divisible by all of the numbers from 1 to 20?

Hint. For a given number `n`, checking that n%2 == 0, n%3 == 0, n%4 == 0, $\cdots$ n%19 == 0, n%20 == 0 is excessive. Recall that all numbers have a unique prime factorization – for example, the 4 can be represented a the product 2 times 2. Similarly, 6 can be represented as the product of 2 and 3, and so forth. Therefore if a number is divisible by 6 then it is automatically divisible by 2 and 3. You should use this fact to minimise the number of modulo evaluations.

Problem 5 (Beginner): Write a computer program that will find and print all positive integer values of x, y and z such that:

$$x^2 + y^2 + z^2 = 377. \tag{2}$$

Compute and print the maximum and minimum values of

$$x + y + z \tag{3}$$

that also satisfy equation 2.