Programming and Data Structures Laboratory, 2018-19 Spring semester, Section 6

January 15, 2019: Tutorial and Assignment 1

Tutorial 1 (for practice – write in a notebook)

1. Consider a triangle ABC. Input lengths of the sides AB, BC, and CA using scanf statements. Compute and print (i) the square of the area and (ii) the perimeter of the triangle ABC. You can use Heron's formula to compute the square of the area: https://www.mathopenref.com/heronsformula.html

Assignment 1 (for evaluation – write on machine and submit to Moodle before end of class)

1. [10 marks] A person takes a loan of Rs. X from a bank. The bank charges <u>compound interest</u> at the rate of R percent per year. Find the total amount that the person has to pay the bank after T=3 years. Your program should take X and R as input, and should print on the terminal the total amount that the person has to pay. You can assume X, R to be integers. Note that the output can be a real value (not only integral).

2. [10 marks] (Derivative of polynomials) In this problem, you will compute the derivative of a degree 5 polynomial of a single variable. Assume that its coefficients are integers. Take in the 6 coefficients as inputs from the keyboard. Print the polynomial, and then compute and print the derivative polynomial. Find a sample input and output below; stick to the format shown below.

Enter coefficient of 1: 5

Enter coefficient of x: 2

Enter coefficient of x^2: -2

Enter coefficient of x^3: 7

Enter coefficient of x^4: 0

Enter coefficient of x^5:3

Polynomial: 3*x^5 + 7*x^3 - 2*x^2 + 2*x + 5

Derivative: 15*x^4 + 21*x^2 - 4*x + 2

3. [20 marks] We are given four points A, B, C and D in the 2d-plane, specified by their x-coordinates and y-coordinates. You can assume all the coordinates to be integers. Write a C program that (i) computes all the six possible distances AB, AC, AD, BC, BD and CD, between the four points, and (ii) computes the areas of triangles ABC, ABD, BCD and ACD.

Submission instructions:

Submit one compressed file, named as **<roll number>_A1.tar.gz** or **<roll number>_A1.zip**

The compressed file should contain three source files:

<roll number>_A1_1.c, <roll number>_A1_2.c, <roll number>_A1_3.c