PDS Lab Section 11

Lab Day 3 – December 16, 2020

For this and all future assignment submissions, the top two lines of your programs must contain the following information:

//Roll No.: <Type in your roll no.>
//Name: <Type in your name>

You have to give different names to your C files and upload them in Moodle. Please read the instructions given below.

1. Read the coordinates of centres and radii of two circles (all are floating point numbers). Print out their point(s) of intersection. Consider that they may intersect at 0, 1 or 2 points. If the circles do not intersect, write NO INTERSECTION. All floating point numbers should be printed up to two places of decimal.

   Name your C program file as LD3_1_<roll_no>.c. **[15 Marks]**

2. Let us assume that the Indian Space Research Organisation (ISRO) wants to build a landing strip for space shuttles. The behavior of the spacecraft while landing is as follows:
   a) The spacecraft starts landing at a speed of 100 m/s.
   b) Once the spacecraft lands, its brakes immediately provide a retardation of 1 m/s^2.
   c) After 3 secs, the spacecraft opens its parachute. The brakes and parachute together provide a retardation of 5 m/s^2.
   d) Both brakes and parachute remain active until the spacecraft stops.

   The runway is to be designed such that 70% of the length of the runway is the stopping distance of the spacecraft. The stopping distance is the distance travelled by the spacecraft while it is landing.

   Write a C program that prints the following:
   Total length of the runway that needs to be built and the time it takes for the spacecraft to stop. All floating point numbers should be printed up to two places of decimal.

   Name your C program file as LD3_2_<roll_no>.c. **[10+5=15 Marks]**

3. Write a program that takes three floating point numbers (f1, f2, f3) and a task t as an integer input. It performs the corresponding task (as given below) on f1, f2 and f3. Both *if else* and *switch case* must be present in the program. All floating point numbers should be printed up to two places of decimal.

Task (t)	**Output**
1	Copy the original value of the original value of f1 into f2, original value of f2 into f3 and original value of f3 into f1. Print the new values of f1, f2 and f3.
2	Find and print the root(s) of the equation: $f1x^2 + f2x + f3 = 0$. Note: one or more of f1, f2 and f3 could be zero (Both f1 and f2 cannot be zero). If the roots are complex, the output should be written in the form a + jb, a - jb.
3	Determine whether the origin (0, 0) lies inside, outside or on the circle with centre at the coordinates (f1, f2) and radius = magnitude of f3. Write your answer as INSIDE, OUTSIDE or ON THE CIRCLE.

4	Determine whether or not a triangle can be formed with the magnitudes of f1, f2 and f3 as its three sides. Write your answer as YES or NO.
Any other input	Print NO SUCH TASK

Name your C program file as LD3_3_<roll_no>.c. **[40 Marks]**

Submit your .c files in Moodle against the assignment submission link for Lab Day 3.