**Programming Laboratory-I**

**Assignment No-3 Due date: 31/10/2023**

**(Virtual functions, Namespace, File handling and Template)**

1. Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get\_data() to initialize base class data members and another member function display\_area() to compute and display the area of figures. Make display\_area() as a virtual function and redefine this function in the derived classes to suit their requirements.

Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively, and display the area. Remember the two values given as input will be treated as lengths of two sides in the case of rectangles, and as base and height in the case of triangles, and used as follows:

Area of rectangle = x \* y

Area of triangle = 1/2 \* x \* y

1. Extend the above program to display the area of circles. This requires addition of a new derived class 'circle' that computes the area of a circle. Remember, for a circle we need only one value, its radius, but the get\_data() function in the base class requires two values to be passed. (Hint: Make the second argument of get\_data() function as a default one with zero value.)
2. Create two namespaces as NMS1 and NMS2, define variable ‘a’ and function seta() and geta () in NMS1 and define variable ‘b’ and function setb() and getb () in NMS2. Write a program to
3. Assign and display data **without using keyword.**
4. Assign and display data **with using keyword.**
5. Create two namespaces as Outer and Inner, add any one variable, any one function in both the namespaces.

Write a program to display members of both Outer and Inner namespace.

1. Write an interactive, menu-driven program that will create a data file containing the First of telephone numbers and names and implement the following tasks.

(a) Determine the telephone number of the specified person.

(b) Determine the name if a telephone number is known.

(c) Update the telephone number, whenever there is a change

1. Write C++ Program for creating a class Numbers which has two generic type variable x and y; create two objects NUM1 and NUM2 which will accept integer and float type data types.
2. Write C++ Program which will demonstrate use of function template overloading.
3. Write a program containing a possible exception. Use a try block to throw it and a catch block to handle it properly.
4. Write a program for user defined exception for

(a) Checking Temperature (if temp reaches certain threshold throw exception)

(b) Validate age (if age is greater than some value)

1. Write a program that reads a text file and creates another file that is identical except that every sequence of consecutive blank spaces is replaced by a single space. (perform write operation on other file)