# Lab # 10

**Computer Programming Spring 2017 Inheritance**

## What is Inheritance and why is itrequired?

A key feature of C++ classes is inheritance.Inheritance helps us to reuse existing code by defining the specialization of the existing generic classes.

**DerivedClass:** When you define one class based on another,the former is referred to as a derived class.A derived class automatically contains all the data members of the class that you used to define it and, with some restrictions,the function members as well.The class is said to **inherit** the data members and function members of the class on which it is based.

**Base Class:** A **base class** is any class that you use as a basis for defining another class. For example,if you define a class B directly in terms of a class A, A is said to be a **direct base class** of B.

## IN-Lab Task #1

Write a program to prepare the result of students by using ***Public--SingleInheritance***.The *baseclass*is“std\_info”and the *derivedclass*is“std\_result”.Attributes of both classes areas under:

|  |  |
| --- | --- |
| **std\_info** | **std\_result** |
| **private:**  intreg\_no;//Tostoreregistration#ofstudentstring name; // To store name of student  string address; // To store address of student  **public:**  voidinput\_info();//Functiontoinputinfovoid print\_info (); //Function to print info | **private:**  floatsub1;//Marksofsubject1floatsub2;//Marksofsubject2float sub3; //Marks of Subject 3  floataverage;//AverageMarks(sub1+sub2+sub3)/3float total; //Total Marks (sub1+sub2+sub3)  **public:**  voidinput\_marks();//Inputmarksofstudentsvoid print\_result(); //Printing result card |

* Inmain,createanobject“student”of“std\_result”.Don’tcreateanyobjectof“std\_info”,asitsallmembers are inherited in class “std\_result”.
* First get information of student, and then inputmarks.
* Now print information and final result card.

## IN-Lab Task #2

Provide the definition of Class Point (definition given below) and write a special class Circle derived from Point to store information and display information about Circle (override the function in circle class to reuse the existing code and extend the functionality) . Also include a new data member area to display the area of circle(**Recallareaofcircle=pi\*r\*r**).Next,derivea“classCylinder”fromcircleclassby

including the “height” datamember. Provide the same functionality in the cylinder class and also override the function area to calculate the surface area of a cylinder.Moreover introduce a function volume to compute the volume of cylinder(**RecallV=pi\*r\*r\*h,SurfaceArea=2(pi\*r2)+2\*pi\*r\*height**).

//point.h

#ifndefPOINT\_H

#definePOINT\_H

#include <iostream>using namespacestd;class Point{

private:intx;inty;

public:Point(int=0,int=0);

voidsetPoint(int,int);

voidGetPoint(int&, int&);

voidprint();

};

#endif

## IN-Lab Task #3

Imagine a publishing company that markets both Book and audio cassettes version of its works.Create a class **Publication** that stores the title and price of a publication in string and float respectively. Suppose that you want to add publication for both books (which adds a page count for type int) and tapes (which adds the playing time in minutes using float data type).From the publication class,drive a new class **Publication2** that includes **Date** member data.

Then create two classes **Book** and **Tape** so that they are derived from Publication 2. Each of these classes should have a GetData() function that gets data from user and PutData() function to display its data.

Note:**Date** should be stored in user defined class Date containing three ints for month, year and day. Also write functions to get and set dates.