

Branch : MCA

Semester : Spring Semester 2019-20

Course Code : CA3205

Laboratory Name : Numerical Computing using C++

Assignment No. : ASSIGNMENT – 8 (GROUP- I & II)

Assignment Title : Inheritance and Polymorphism

1) Implement the following class hierarchy by defining all functions of each class. Demonstrate the call of each function and access to each data member using an object of bottom most class. In addition to all operations, show the order of execution for constructors and destructors for multi-level inheritance.

Class : Point

Members: xco, yco

Functions: constructors, destructors, print()

Class : Circle (inherits Point)

Members : radius

Functions: constructors, destructors, print(), float area()

Class: Cylinder (inherits Circle)

Members : height

Functions: constructors, destructors, print, float surarea(), float volume()

2) Implement and demonstrate the object slicing using each parent object for the Question No. 1.

3) Implement the abstract class and override the functions of the abstract class in the provided derived classes.

Class : Shape2D

Members: type

Functions: area()=0, perimeter()=0

Class: Circle (inherits Shape2D)

Members: center, radius

Functions: area(), perimeter(), print()

Class: Triangle (inherits Shape2D)

Members: base, height

Functions: area(), perimeter(), print()

4) Implement the following multiple-inheritance hierarchy. Demonstrate overriding of printdata() while showing a call to the corresponding version of each parent class.

Class : Student

Member : Rollno, name, branch, institute, cgpa

Function: constructors, destructors, printdata()

Class: Employee

Member : empid, name, organisation, salary

Functions : constructors, destructors, printdata()

Class : WorkingStudent (Inherits Student and Employee)

Members: (all inherited)

Functions: constructors, destructors, printdata()

5) Implement the following class hierarchy using virtual function. Create base class pointers to hold address of base class as well as derived class objects and call the corresponding about() function of the assigned object.

Class : FamilyMember

Members : name, familyname, origin

Functions: constructor, destructor, about() //prints about father object

Class : Citizen

Members : name, country, year

Functions: constructor, destructor, about() //prints about mother object

Class : Employee (inherits FamilyMember and Citizen)

Members : name

Functions: constructor, destructor, about() //prints all about the child including parent info

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