CSE208L Object Oriented Programming Lab

LAB # 5

2020

Submitted to:

Engr. Sumayya Salahuddin

Submitted by:

TAYYABA

Registration No :

19PWCSE1854

Semester: **3rd**

Class Section: **C**

"On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work."

December 31, 2020

Department of Computer Systems Engineering

University of Engineering and Technology, Peshawar

Objectives of the Lab:

Objectives of the lab are to:

1. Understand the concept of inheritance and its different forms.
2. Write derived class from base class using inheritance.
3. Understand the constructor and destructor chaining in inheritance hierarchy.
4. Know how to use base class constructors within derived class.

ACTIVITY # 01

Title:

.Reuse Point class of Lab 1 (Activity 1.4.2) as base class. Make the member data protected. Write all class member functions outside Point class.

Problem analysis:

Create a class called point. This class maintains information about x and y coordinates. Make two sub classes circle and cylinder of point class and use the data member in sub classes as inheritance.

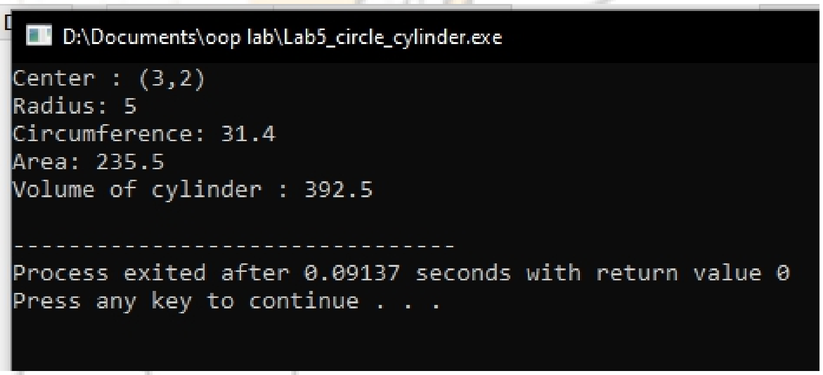
In C++

Source code:

```
#include <iostream>
using namespace std;

class point{
   protected:
      double x, y;
   public:
      point();
      point(double a, double b);
      void setx(double a);
      void sety(double b);
      double getx();
      double gety();
      void show();
   };
point::point(){
      x=0; y=0;
   }
point::point(double a, double b){
      x=a; y=b;
   }
void point::setx(double a){
```

Output:



```
Center : (3,2)
Radius: 5
Circumference: 31.4
Area: 235.5
Volume of cylinder : 392.5

--------------------------------
Process exited after 0.09137 seconds with return value 0
Press any key to continue . . .
```

```
        x=a;
    }
void point::sety(double b){
        y=b;
    }
double point::getx(){
        return x;
    }

double point::gety(){
        return y;
    }

void point::show(){
        cout<<"("<<x<<","<<y<<")"<<endl;
    }

class circle:public point{
    private:
        double radius;
public:
circle();
circle(double r, point p);
circle(double a, double b, double r);
void setter(double r);
double getter();
double display_radius();
        void calculate_circum();
};
circle :: circle(){
                                    x=0; y=0; radius=0;
}
circle :: circle(double r, point p){
                                    x=p.getx();
                                    y=p.gety();
                                    radius=r;
}
circle :: circle(double a, double b, double r){
                                    x=a; y=b; radius=r;
}
void circle :: setter(double r){
                                    radius=r;
}
double circle :: getter(){
                                    return radius;
}
```

```
double circle :: display_radius(){
                                        cout<<"Radius: "<<radius<<endl;
}
void circle :: calculate_circum(){
                                        cout<<"Circumference: "<<2*3.14*radius<<endl;
}
class cylinder : public point{
                                        private:
                                                double radius, height;
                                        public:
                                                cylinder();
                                                cylinder(double h, circle c);
                                                cylinder(double a, double b, double r, double h);
                                                double area();
                                                double volume();
};
cylinder::cylinder(){
        height=0; radius=0; x=0; y=0;
}
cylinder :: cylinder(double h, circle c){
                                        x=c.getx();
                                        y=c.gety();
                                        radius=c.getter();
                                        height=h;
}
cylinder :: cylinder(double a, double b, double r, double h){
                                        x=a;
                                        y=b;
                                        radius=r;
                                        height=h;
}
double cylinder::area(){
                                        cout<<"Area: "<<2*3.14*(radius + height)*radius<<endl;
}
double cylinder::volume(){
                                        cout<<"Volume          of          cylinder          :
"<<2*3.14*radius*radius*height<<endl;
}

int main(){
                                        point p1(3,2);
                                        circle c1(5,p1);
                                        cout<<"Center : ";
                                        c1.show();
                                        c1.display_radius();
                                        c1.calculate_circum();
```

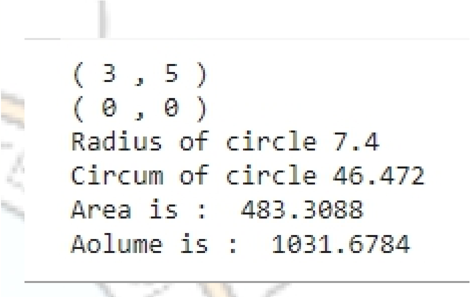
```
                    cylinder cy1(2.5,c1);
                    cy1.area();
                    cy1.volume();
                    return 0;
}
```

In Python

Source code:

Output:

```
class point:
    def __init__(self):
        self.x=0
        self.y=0
    def __init__(self,a,b):
        self.x=a
        self.y=b
    def setx(self,a):
        self.x=a
    def sety(self,b):
        self.y=b
    def getx(self):
        return self.x
    def gety(self):
        return self.y
    def display(self):
        print('(',self.x,',',self.y,')')
class circle(point):
    def __init__(self):
        self.radius=0
        self.x=0
        self.y=0
    def set_values(self,r,p):
```



```
( 3 , 5 )
( 0 , 0 )
Radius of circle 7.4
Circum of circle 46.472
Area is :  483.3088
Aolume is :  1031.6784
```

```
        self.radius=r
        self.x=p.getx()
        self.y=p.gety()
    def set_values_2(self,r,x,y):
        self.radius=r
        self.x=x
        self.y=y
    def setter(self,r):
        self.radius=r
    def getter(self):
        return self.radius
    def get_radius(self):
        return self.radius
    def get_circum(self):
        return (2*3.14*self.radius)
class cylinder(point):
    def __init__(self):
        self.radius=0
        self.height=0
        self.x=0
        self.y=0
    def set_values(self,h,c):
        self.height=h
        self.radius=c.get_radius()
        self.x=c1.getx()
        self.y=c1.gety()
    def setter(self,r):
        self.radius=r
    def getter(self):
        return self.radius
    def get_area(self):
        return (2*3.14*self.radius*(self.radius+self.height))
    def get_volume(self):
        return (2*3.14*self.radius*self.radius*self.height)
p1=point(3,5)
p1.display()
c1=circle()
c1.display()
c1.set_values(7.4,p1)
print('Radius of circle',c1.get_radius())
print('Circum of circle',c1.get_circum())
cy1=cylinder()
cy1.set_values(3,c1)
print("Area is : ",cy1.get_area())
print("Aolume is : ",cy1.get_volume())
```

Conclusion:

This program helps us in understanding the basic concepts of classes and objects in different languages. It acts as a base for us and helps us in preparing ourselves for the higher level of programming. We get to know about inheritance in OOP with the help of this program.