VIT - Vellore

Name: RONIT MEXSON .
Email: ronit.mexson2024@vitstudent.ac.in
Roll no: 24BAI0036
Phone: 9999999999
Branch: ARUMUGA ARUN R_OOPS
Department: admin
Batch: VL2024250502365
Degree: admin

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BCSE102P_Structured and Object Oriented Programming Lab_VL2024250502365

VIT V_Structured and OOP_Lab 6_COD_Easy_Single inheritance

Attempt : 1
Total Mark : 20
Marks Obtained : 20

Section 1 : Coding

1. Problem Statement

Rahul is a skilled sculptor who creates unique cylindrical art pieces. He needs a program to calculate the volume of these sculptures based on their radius and height. Your task is to design and implement this program using object-oriented principles.

Create a base class named Circle with the protected attribute radius representing the radius of a circle. The class should provide a constructor to initialize the radius and a method to retrieve the radius value.

Inherit from the Circle class to create a derived class named Cylinder. The Cylinder class should introduce a private attribute height representing the height of the cylindrical sculpture.

Implement a volume() method inside the Cylinder class to calculate the volume of the cylinder.

Formula: Volume = 3.14 * radius2 * height.

Answer

```
// You are using GCC
#include<iostream>
#include<iomanip>
using namespace std;

class Circle{
    protected:
        double radius;
    public:
        Circle(double r)
        {
            radius = r;
        }
        double getRadius(){
            return radius;
        }
};

class Cylinder : public Circle{
    private:
        double height;
    public:
        Cylinder(double r, double h) : Circle(r) {
            height = h;
        }
        double volume(){
            return 3.14 * radius * radius * height;
        }
};

int main(){
    double r,h;
    cin>>r>>h;
    Cylinder cyl(r,h);
    cout << fixed << setprecision(2) <<cyl.volume()<<endl;
```

```
    return 0;
}
```

Status : Correct **Marks : 10/10**

2. Problem Statement

Arvind is designing a program to calculate electrical power and efficiency, and he needs your help. Create a base class P with voltage and current attributes to compute power. Implement a derived class PE with an efficiency attribute to determine useful and wasted power.

Write a program to help him accomplish the task.

Formulas

Power = Voltage * Current

Useful Power = Power * Efficiency

Wasted Power = Power * (1.0 - Efficiency)

Answer

```
// You are using GCC
#include<iostream>
#include<iomanip>
using namespace std;

class P{
    public:
        float volt;
        float current;
        P(float v,float i){
            volt = v;
            current = i;
        }
};
class PE : public P{
    public:
        float efficiency;
        PE(float v, float i, float n) : P(v,i){
```

```
        efficiency = n;
    }
    float power(){
        return volt * current;
    }
    float useful_power(){
        return volt * current * efficiency;
    }
    float wasted_power(){
        return volt * current * (1 - efficiency);
    }
};

int main(){
    float volt;
    float current;
    float efficiency;

    cin >> volt >> current >> efficiency;
    PE pyp(volt, current, efficiency);
    cout<<"Power: "<< fixed << setprecision(1) << pyp.power() << "W" << endl;
    cout<<"Useful Output Power: " << fixed << setprecision(1) <<
pyp.useful_power() << "W" <<endl;
    cout<<"Wasted Power: "<< fixed << setprecision(1) << pyp.wasted_power() <<
"W" << endl;
    return 0;
}
```

Status : Correct **Marks : 10/10**