

## VIT - Vellore

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### BCSE102P\_Structured and Object Oriented Programming Lab\_VL2024250502365

#### VIT V\_Structured and OOP\_Lab 7\_COD\_Easy\_Pure Virtual Functions

Attempt : 1

Total Mark : 20

Marks Obtained : 20

#### Section 1 : Coding

##### 1. Problem Statement

Rohith is designing a program that consists of a base class Expression with a pure virtual function evaluate().

There are two derived classes PowerAB and PowerBA representing expressions of the form ab and ba respectively, where a and b are real numbers. The program takes the values of a and b as input and calculates and displays the power results for both types of expressions.

Note: Use the pow function from the math library to calculate the power value.

**Answer**

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

```
class Expression{
public:
    double a,b;
    virtual void evaluate() {}
    Expression(double x, double y){
        a=x;
        b=y;
    }
};
```

```
class PowerAB: public Expression{
public:
    using Expression:: Expression;
    void evaluate(){
        cout<<fixed<<setprecision(2)<<pow(a,b)<<endl;
    }
};
```

```
class PowerBA: public Expression{
public:
    using Expression:: Expression;
    void evaluate(){
        cout<<fixed<<setprecision(2)<<pow(b,a)<<endl;
    }
};
```

```
int main(){
    double x,y;
    cin>>x>>y;
    PowerAB obj1(x,y);
    PowerBA obj2(x,y);
    obj1.evaluate();
    obj2.evaluate();
    return 0;
}
```

Status : Correct

Marks : 10/10

## 2. Problem Statement

Imagine you are creating a hotel room pricing system with a class Hotel featuring a pure virtual function calculatePrice() to calculate prices based on nights and guests. Derived classes SingleRoom and DoubleRoom implement this function.

Base cost calculation:

For Single room - Rs. 100 per night  
For Double room - Rs. 150 per night

Additional cost calculation:

If guests stay for more than 5 nights, they avail a 10% discount. If guests stay for 5 or fewer nights, add Rs. 15 service charge.

The program takes user input for nights and guests and then calculates and displays costs for both room types.

### Answer

```
// You are using GCC
#include<iostream>
using namespace std;
class Hotel{
public:
    int n;
    int p;
    virtual int calculatePrice()=0;
};
```

```
class SingleRoom: public Hotel{
public:
    void set(int a, int b){
        n=a;
        p=b;
    }
    int calculatePrice(){
        if(n>5){
            return n*100*0.9;
```

```

    }
    else{
        return (n*100)+15;
    }
}
};

```

```

class DoubleRoom: public Hotel{
public:
    void set(int a, int b){
        n=a;
        p=b;
    }
    int calculatePrice(){
        if(n>5){
            return n*150*0.9;
        }
        else{
            return (n*150)+15;
        }
    }
};

```

```

int main(){
    int a;
    int b;
    cin>>a;
    cin>>b;
    SingleRoom obj1;
    DoubleRoom obj2;
    obj1.set(a,b);
    obj2.set(a,b);
    cout<<"Single Room Cost: "<<obj1.calculatePrice()<<endl;
    cout<<"Double Room Cost: "<<obj2.calculatePrice()<<endl;
    return 0;
}

```

**Status :** Correct

**Marks :** 10/10