

CHANDIGARH UNIVERSITY

UIC

OOPs LAB PRACTICAL

Practical No. – 8

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Practical 8)

WAP to evaluate the area of a particular shape as entered by the user at run time, where shape is the base class in which function area is declared. Various shape classes should be defined derived from shape class and accordingly the area function should be defined. User will give its choice as per the menu to calculate the area.

Ans)

Code :-

```
#include <iostream>

using namespace std;

float pi=3.14;    //global variable

class shape{      //base class
    public:
        virtual void area()=0;    //pure virtual function prototype
};

class square: public shape{
    private:
        int b,r;
    public:
        void area(){    //defining pure virtual function
            cout<<"Enter side of square: "<<endl;
            cin>>b;
            r=b*b;
            cout<<"Area of square is: "<<r;
        }
};

class circle: public shape{
    private:
        float r;
```

```
public:
```

```
void area(){ //defining pure virtual function
```

```
    cout<<"Enter radius of circle: "<<endl;
```

```
    cin>>r;
```

```
    cout<<"Area of circle is: "<<pi*r*r;
```

```
}
```

```
};
```

```
class rectangle: public shape{
```

```
private:
```

```
    int a,b,r;
```

```
public:
```

```
void area(){ //defining pure virtual function
```

```
    cout<<"Enter length and breadth of rectangle: "<<endl;
```

```
    cin>>a>>b;
```

```
    r=a*b;
```

```
    cout<<"Area of rectangle is: "<<r;
```

```
}
```

```
};
```

```
class triangle: public shape{
```

```
private:
```

```
    float r,a,b;
```

```
public:
```

```
void area(){ //defining pure virtual function
```

```
    cout<<"Enter base & height of triangle: "<<endl;
```

```
    cin>>a>>b;
```

```
    r=0.5*a*b;
```

```
    cout<<"Area of triangle is: "<<r;
```

```

    }

};

class trapezium: public shape{
    private:
        float y,a,b,r;
    public:
        void area(){ //defining pure virtual function

            cout<<"Enter length of two parallel sides of trapezium: "<<endl;

            cin>>a>>b;

            cout<<"Enter value of distance between these sides: "<<endl;

            cin>>r;

            y = 0.5*(a+b)*r;

            cout<<"Area of trapezium is: "<<y;

        }

};

```

```

int main() {

    int q; //creating variable to enter shape number to find area

    cout<<"Enter the shape whose area you want to calculate: "<<endl;

    cout<<"List of shapes available: Enter Shape no."<<endl<<"1=square, 2=circle, 3=rectangle, 4= triangle,
5=trapezium: \n";

    cin>>q;

    shape *ptr; //creating pointer object of base class

    if( q == 1){

        ptr= new square; //assigning new memory for derived class

        ptr->area(); //calling pure virtual function

    }
}

```

```

else if( q == 2 ){
    ptr= new circle;    //assigning new memory for derived class
    ptr->area();        //calling pure virtual function
}

else if( q == 3 ){
    ptr= new rectangle;    //assigning new memory for derived class
    ptr->area();            //calling pure virtual function
}

else if( q == 4 ){
    ptr= new triangle;    //assigning new memory for derived class
    ptr->area();            //calling pure virtual function
}

else if( q == 5 ){
    ptr= new trapezium;    //assigning new memory for derived class
    ptr->area();            //calling pure virtual function
}

else{
    cout<<"\n\n\nPlease enter correct value from list\n\n\n"<<endl;
}

delete ptr;    //freed allocated memory

return 0;

}

```

OUTPUT:-

The screenshot shows a C++ IDE with a project named 'area.cpp'. The code in the editor includes a `cout` statement for the triangle area, a `class` definition for a trapezium, and a `main` function. The output window displays the program's execution, showing prompts for shape selection and trapezium dimensions, followed by the calculated area of 75. The compiler window shows zero errors and warnings, and the status bar indicates the file is 1916 characters long.

```
58 cout<<"Area of triangle is: "<<r;
59
60 };
61
62 class
63 {
64     p
65     Enter length of two parallel sides of trapezium:
66     10
67     Enter value of distance between these sides:
68     05
69     Area of trapezium is: 75
70     -----
71     Process exited after 13.01 seconds with return value 0
72     Press any key to continue . . .
73
74 };
75
76
77
78 int m
79 i
80 c
81 c
82 c
83
```

Compilation Summary:

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\hp\Desktop\CPP\area.exe
- Output Size: 1.83884048461914 MiB
- Compilation Time: 0.66s

Line: 1 Col: 1 Sel: 0 Lines: 112 Length: 1916 Insert Done parsing in 0.375 seconds