**Name:- Abitha S**

**Class:-SY-2**

**PRN:-B25CE2015**

**Title: Geometrical Shapes Area calculator**

**Problem Statement**:- Geometrical Shapes Area calculator

Define the base class Shape with two data members of any numeric type that are employed to compute the area of respective shape. Add member functions to input the data members values and display the area in base class only. Derive two classes from base class namely, Triangle & Rectangle. Take the display function as virtual in base class and redefine it in the derived classes. Using above classes , write a program to accept parameters for triangle or rectangle and display the area Using Virtual Functions.

**INPUT:**

#include <iostream>

using namespace std;

// Base class

class Shape {

protected:

double num1, num2;

public:

// Member function to input data - defined only in base class

void getData() {

cout << "Enter two numbers: ";

cin >> num1 >> num2;

}

// Pure virtual function for display - must be redefined in derived classes

virtual void displayArea() = 0;

};

// Triangle class - derived from Shape

class Triangle : public Shape {

public:

// Redefine pure virtual function for triangle

void displayArea() {

double area = 0.5 \* num1 \* num2;

cout << "Triangle Area = 1/2 \* " << num1 << " \* " << num2 << " = " << area << endl;

}

};

// Rectangle class - derived from Shape

class Rectangle : public Shape {

public:

// Redefine pure virtual function for rectangle

void displayArea() {

double area = num1 \* num2;

cout << "Rectangle Area = " << num1 << " \* " << num2 << " = " << area << endl;

}

};

int main() {

int choice;

cout << "=== GEOMETRICAL SHAPES AREA CALCULATOR ===" << endl;

cout << "1. Triangle" << endl;

cout << "2. Rectangle" << endl;

cout << "Enter your choice (1-2): ";

cin >> choice;

// Declare derived class objects

Triangle triangleObj;

Rectangle rectangleObj;

Shape\* shape; // Base class pointer

switch(choice) {

case 1:

shape = &triangleObj; // Assign address of triangle object to base pointer

cout << "\n--- Triangle ---" << endl;

break;

case 2:

shape = &rectangleObj; // Assign address of rectangle object to base pointer

cout << "\n--- Rectangle ---" << endl;

break;

default:

cout << "Invalid choice!" << endl;

return 0;

}

// Get data using base class function

shape->getData();

// Display area using virtual function (calls appropriate derived class function)

shape->displayArea();

return 0;

}

**OUTPUT:**

=== GEOMETRICAL SHAPES AREA CALCULATOR ===

1. Triangle

2. Rectangle

Enter your choice (1-2): 1

--- Triangle ---

Enter two numbers: 10 5

Triangle Area = 1/2 \* 10 \* 5 = 25

=== GEOMETRICAL SHAPES AREA CALCULATOR ===

1. Triangle

2. Rectangle

Enter your choice (1-2): 2

--- Rectangle ---

Enter two numbers: 8 6

Rectangle Area = 8 \* 6 = 48

=== GEOMETRICAL SHAPES AREA CALCULATOR ===

1. Triangle

2. Rectangle

Enter your choice (1-2): 3

Invalid choice!