# SOURCE CODE

#include <iostream>

using namespace std;

/\*\*

Name: Eranus Thompson

\*/

class Polygon {

public:

Polygon(int n = 0) {

numOfSides = n;

sides = new int[n];

for (int i = 0; i < numOfSides; i++)

{

sides[i] = 0;

}

}

virtual void set(int sideNum, int value) {

if (sideNum >= 0 && sideNum < numOfSides && value >= 0)

sides[sideNum] = value;

}

int get(int sideNum) {

if (sideNum >= 0 && sideNum < numOfSides)

return sides[sideNum];

}

virtual int perimeter() {

int perim = 0;

for (int i = 0; i < numOfSides; i++)

perim += sides[i];

return perim;

}

virtual double area() {

return 0;

}

virtual double volume() {

return 0;

}

private:

int numOfSides;

int \*sides;

};

class Rectangle : public Polygon {

public:

Rectangle() :Polygon(4) {

}

void set(int index, int value) {

if (index == 0 || index == 2) {

Polygon::set(0, value);

Polygon::set(2, value);

}

else if (index == 1 || index == 3) {

Polygon::set(1, value);

Polygon::set(3, value);

}

}

double area() {

return get(0) \* get(1);

}

private:

};

class Square : public Rectangle {

public:

Square() {}

void set(int index, int value) {

Rectangle::set(0, value);

Rectangle::set(1, value);

}

private:

};

class RightTri :public Polygon {

public:

RightTri() : Polygon(3) {

}

double area() {

return get(0)\*get(1) / 2.0;

}

};

class RectSolid : public Rectangle {

public:

RectSolid(int ht = 0) {

setHeight(ht);

}

void setHeight(int value) {

if (value >= 0)

height = value;

}

int getHeight() {

return height;

}

double volume() {

return height \*area();

}

private:

int height;

};

int main() {

Polygon \* shapes[5];

shapes[0] = new Rectangle;

shapes[0]->set(0, 4);

shapes[0]->set(1, 10);

shapes[1] = new Square;

shapes[1]->set(0, 4);

shapes[2] = new RightTri;

shapes[2]->set(0, 3);

shapes[2]->set(1, 4);

shapes[2]->set(2, 5);

shapes[3] = new RectSolid(5);

shapes[3]->set(0, 6);

shapes[3]->set(1, 3);

for (int i = 0; i < 3; i++) {

cout << "The perimeter of shape " << i << " is " << shapes[i]->perimeter() << endl;

}

for (int i = 0; i < 3; i++) {

cout << "The area of shape " << i << " is " << shapes[i]->area() << endl;

}

cout << "The volumne of the rectangular solid is " << shapes[3]->volume() << endl;

return 0;

}

# Test Data and Expected Results

|  |  |  |
| --- | --- | --- |
| **Shape** | **Input Data** | **Expected Result** |
| Rectangle | Width = 4  Length = 10 | Perimeter = 28  Area = 40 |
| Square | Length = 5 | Perimeter = 20  Area = 25 |
| Right Triangle | Side1 = 3  Side2 = 4  Side3 = 5 | Perimeter = 12  Area = 6 |
| Solid Rectangle | Width = 6  Length = 3  Height = 5 | Perimeter = 18  Area = 18  Volume = 90 |

# Running Output

