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/*
  File: triangles.cpp
  Created by: Isaiah Green
  Creation Date: 11/27/17
  Synopsis: compute the represent an axis-aligned right triangle
*/

#include <iostream>
#include <cmath>

using namespace std;

class Point
{
private:
      double px;
      double py;

public:
      void setX(const double x);
      void setY(const double y);
      double getX() const;
      double getY() const;
};

class Triangle
{
private:
      Point blPoint;
      double length, height;

public:
      // member functions
      void setBottomLeftX(const double x);
      void setBottomLeftY(const double y);
      void setLength(const double inLength);
      void setHeight(const double inHeight);

      Point getBottomLeft() const;
      Point getBottomRight() const;
      Point getTopLeft() const;
      double getLength() const;
      double getHeight() const;

      double perimeter() const;
      double hypotenuse() const;
      void scaleLength(const double sx);
      void scaleHeight(const double sy);
      void display() const;
};

// FUNCTION PROTOTYPES GO HERE:
void read_triangle(Triangle & tri);
```

```
int main()
{
	// Define local variables
	Triangle tri;
	double sx, sy;

	//Prompt the user for triangle information and fill Class Triangle
object, tri,
	//with this information
	read_triangle(tri);

	// Display triangle information
	tri.display();

	// Prompt and read scale factors to change length and height
	cout << "Enter scale factor in x direction: ";
	cin >> sx;

	cout << "Enter scale factor in y direction: ";
	cin >> sy;

	// Apply scale factors
	tri.scaleLength(sx);
	tri.scaleHeight(sy);

	// Display triangle information
	tri.display();

	return 0;
}

// FUNCTION DEFINITIONS GO HERE:

// CLASS MEMBER FUNCTION DEFINITINOS GO HERE:

void Point::setX(const double x)
{
	px = x;
}

void Point::setY(const double y)
{
	py = y;
}

double Point::getX() const
{
	return (px);
}

double Point::getY() const
{
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      return (py);
}
//this function sets the value x back to blPoint
void Triangle::setBottomLeftX(const double x)
{
  blPoint.setX(x);
}
//This function sets the value y back to blPoint
void Triangle::setBottomLeftY(const double y)
{
  blPoint.setY(y);
}
//This function sets the inlength to the length
void Triangle::setLength(const double inLength)
{
  length = inLength;
}
//This function sets the setheight to the height
void Triangle::setHeight(const double inHeight)
{
  height = inHeight;
}
//This function returns the blPoint to class getBottomLeft
Point Triangle::getBottomLeft() const
{
  return (blPoint);
}
//This function gets the class point to set the x and y for length and
returns it back to the class
Point Triangle::getBottomRight() const
{
  Point p;
  p.setX(blPoint.getX()+length);
  p.setY(blPoint.getY());
  return (p);
}
//This function gets the class point and sets the x and y for height and
returns it back to the class
Point Triangle::getTopLeft() const
{
  Point p;
  p.setX(blPoint.getX());
  p.setY(blPoint.getY()+height);
  return (p);
}
//This function returns length value to getLength
double Triangle::getLength() const
{
  return(length);
}
//This function return the value for height to getHeight
double Triangle::getHeight() const
{
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  return(height);
}
//This function returns the calculated value for the hypotenuse
double Triangle::hypotenuse() const
{
  return(sqrt(length*length+height*height));
}
//This function returns the calculated value for perimeter
double Triangle::perimeter() const
{
  return(length+height+hypotenuse());
}
//This function sets the scale factor to the length
void Triangle::scaleLength(const double scalefact)
{
  length = length * scalefact;
}
//This function sets the scale factor to the height
void Triangle::scaleHeight(const double scalefact)
{
  height = height * scalefact;
  cout << endl;
}
//This function displays how each item is arranged
void Triangle::display() const
{

  for(int i(0); i < 40; i++){
    cout << "-";
  }
  cout << endl;
  Point p = getBottomLeft();
  cout << "Lower Left Vertex (" << p.getX() << ", " << p.getY() << ")" <<
endl;
  p = getTopLeft();
  cout << "Top Left Vertex (" << p.getX() << ", " << p.getY() << ")" <<
endl;
  p = getBottomRight();
  cout << "Bottom Right Vertex (" << p.getX() << ", " << p.getY() << ")"
<< endl;
  cout << "Dimensions (" << getLength() << ", " << getHeight() << ")" <<
endl;
  cout << "Hypotenuse = " << hypotenuse() << endl;
  cout << "Perimeter = " << perimeter() << endl;
  for (int j(0); j < 40; j++){
    cout << "-";
  }
  cout << endl << endl;
}
//This function reads values from the user and sets those values to the
class triangle
void read_triangle(Triangle & tri)
{
```

```
  //These variables were made to hold the values asked by the user
  double x,y,length,height;

  cout << "Enter bottom left x coordinate: ";
  cin >> x;
  cout << "Enter bottom left y coordinate: ";
  cin >> y;
  cout << "Enter length: ";
  cin >> length;
  cout << "Enter height: ";
  cin >> height;
  cout << endl;
  tri.setBottomLeftX(x);
  tri.setBottomLeftY(y);
  tri.setLength(length);
  tri.setHeight(height);

}
```