

## EE 154 – LAB 9

- 1) **Create a class** called “Rectangle” with attributes *length* and *width*, each of which defaults to 1. They are defined as **private**. Provide member functions that calculates the *perimeter* and the *area* of the rectangle. Also, provide *set* and *get* functions for the length and width attributes. The set functions should verify that length and width are each floating-point numbers larger than 0.0 and less than 20.0. They are defined as **public**.

Rectangle.h

```
#ifndef RECTANGLE_H
#define RECTANGLE_H

class Rectangle
{
public:
    Rectangle( double = 1.0, double = 1.0 ); // default constructor
    void setWidth( double w ); // set width
    void setLength( double l ); // set length
    double getWidth(); // get width
    double getLength(); // get length
    double perimeter(); // perimeter
    double area(); // area
private:
    double length; // 1.0 < length < 20.0
    double width; // 1.0 < width < 20.0
}; // end class Rectangle

#endif
```

Rectangle.cpp

```

// Member-function definitions for class Rectangle.

#include "Rectangle.h" // include definition of class Rectangle

Rectangle::Rectangle( double w, double l )
{
    setWidth(w); // invokes function setWidth
    setLength(l); // invokes function setLength
} // end Rectangle constructor

void Rectangle::setWidth( double w )
{
    width = w > 0 && w < 20.0 ? w : 1.0; // sets width
} // end function setWidth

void Rectangle::setLength( double l )
{
    length = l > 0 && l < 20.0 ? l : 1.0; // sets length
} // end function setLength

double Rectangle::getWidth()
{
    return width;
} // end function getWidth

double Rectangle::getLength()
{
    return length;
} // end function getLength

double Rectangle::perimeter()
{
    return 2 * ( width + length ); // returns perimeter
} // end function perimeter

double Rectangle::area()
{
    return width * length; // returns area
} // end function area

```

Solution.cpp

```

#include <iostream>
#include <conio.h>
using namespace std;

#include <iomanip>
using std::setprecision;

#include "Rectangle.h" // include definition of class Rectangle

int main()
{
    Rectangle a, b( 4.0, 5.0 ), c( 67.0, 888.0 );

    cout << fixed;
    cout << setprecision( 1 );

    // output Rectangle a
    cout << "a: length = " << a.getLength() << "; width = "
        << a.getWidth() << "; perimeter = " << a.perimeter()
        << "; area = " << a.area() << '\n';

    // output Rectangle b
    cout << "b: length = " << b.getLength() << "; width = "
        << b.getWidth() << "; perimeter = " << b.perimeter()
        << "; area = " << b.area() << '\n';

    // output Rectangle c; bad values attempted
    cout << "c: length = " << c.getLength() << "; width = "
        << c.getWidth() << "; perimeter = " << c.perimeter()
        << "; area = " << c.area() << endl;

    getch();
    return 0;
} // end main

```

- 1) **Modify** “Rectangle” class. Include a function *square* that determines whether the rectangle is a square by checking its length and width. The output of this square function will be boolean.