Assignment 7

Due Wednesday by 7pm **Points** 120

Project 7.a

Write a class called Rectangle with double fields for its length and width. It should have set methods for both fields. It should have a constructor that takes two double parameters and passes them to the set methods. It should also have a method called *area* that returns the area of the Rectangle and a method called *perimeter* that returns the perimeter of the Rectangle.

Write a class called Square that inherits from Rectangle. It should have a constructor that takes **one** double parameter and passes it to the base class constructor for both parameters (the body of the constructor will be empty). Square will also need to *override* the setLength() and setWidth() functions of its base class such that if either of its dimensions is set to a new value, then both of its dimensions will be set to that new value (so that it remains a square). Hint: you can have the overridden versions call the versions in the base class.

The files must be called: **Rectangle.hpp**, **Rectangle.cpp**, **Square.hpp** and **Square.cpp**

Project 7.b

Create a class called MyInteger. It should have a field of type pointer-to-int called pInteger. It should have a constructor that takes as a parameter an int - the constructor will then dynamically allocate memory for an int, using pInteger, and assign the parameter's value to that memory. The class should have a destructor that will deallocate that memory when the object is destroyed. You should write a copy constructor that will correctly make a separate copy of the memory pInteger points to, and make pInteger in the new object point to it (section 11.5 in the textbook). You should overload the = operator such that each of the two objects involved has its own separate copy of the memory that its own pInteger points to. The =operator should have a return type of MyInteger. There should be methods called setMyInt and getMyInt for getting and setting the value of the int that pInteger points to.

In you have the following code in your main method:

```
MyInteger obj1(17);
MyInteger obj2 = obj1;
std::cout << obj1.getMyInt() << std::endl;
std::cout << obj2.getMyInt() << std::endl;

obj2.setMyInt(9);
std::cout << obj1.getMyInt() << std::endl;
std::cout << obj2.getMyInt() << std::endl;

MyInteger obj3(42);
obj2 = obj3;
std::cout << obj2.getMyInt() << std::endl;
std::cout << obj3.getMyInt() << std::endl;

obj3.setMyInt(1);
std::cout << obj2.getMyInt() << std::endl;
std::cout << obj3.getMyInt() << std::endl;
```

The output should be:

```
17
17
17
9
42
42
```

```
42
1
```

The files must be named **MyInteger.hpp** and **MyInteger.cpp**.