CIS 230 – Spring 2006
Homework #8
Due Wednesday, April 5, 2006 at 10:00 AM

Submit your files using the submission tool on the qs-server:
/class-files/gilden/230submit

Files to Submit:

- all of your .h files for your classes
- all of your .cpp files for your classes
- your .cpp file that contains main()
- all of your .h files for your free functions
- all of your .cpp files for your free functions

Assignment:
In this assignment, you will declare a class *Rectangle*, which will function as a base class for two derived classes *Square* and *Cube*. The declaration of each of the three classes should be placed in a separate .h file, the implementation in a .cpp file. The main used to implement the classes should also be in a .cpp file. Any free[1] function declaration should be placed in .h file, the implementation in a .cpp file.

The class *Rectangle* contains two data members (*length_1, length_2*) which are used to find the area of the *Rectangle* object through a function *getArea*. The derived classes should use the the *getArea* function of the *Rectangle* class to produce the output of the area of the corresponding object.

The constructor for a *Rectangle* object will take two parameters. The constructors for the *Square* and *Cube* objects will only need to take one parameter, since all sides should be equal in these objects. The classes will also require a function *setLength* to input a side length (or lengths) for the data member (s) *length_1* or *length_2*.

The main function should use free functions to manipulate a *Square*, *Rectangle*, or *Cube* object.

The following tasks should be performed by the free functions[2]:

Declare an object (*Square, Rectangle,* or *Cube*)
Input the side(s)
Use the *setLength* function to set the data members
Use the *getArea* function to find the area of the object
Return the area to the main

The main function should perform the following tasks:

State the program purpose
Ask the user what shape they want to use

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[1] Free functions are "normal" functions that we were using prior to getting into classes. Homework #3 has some examples of this.
[2] Remember that a function should have ONE task.

Input the answer
Invoke the appropriate function
Output the returned value (Area) of the object

Use the following information for the execution of the program, and save the results:

Rectangle, side1 = 4, side2 = 5
Square side = 4
Cube side = 3.2

Remember:

All functions, including main, must be documented to explain their purpose using the coding standard. Document a class member function right before the function definition.
You must use meaningful variable/function names.
You must pay attention to the visual presentation of your program. This means:

- indentations must be present and consistent
- no line should wrap around to the next line
- expressions should not be crammed together:
  `a = b + c;` is more suitable than `a=b+c;`
- blank lines should be used to separate code in a vertical direction as needed for readability

Values returned from functions must be *used*. For instance, if a function's declaration is `int f(int);` it must not be invoked as follows: `f(100);`

The compiler allows this, but it is sloppy programming practice.