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|  | Homework #6  Classes (II) including Special Class Members and Inheritance |  |

1. Ensure that you have read the lesson on [cplusplus.com](http://www.cplusplus.com/doc/tutorial/). Your solution should be a Code::Blocks project. All work can be done in one .cpp file; however, you are free to use a header file if you wish. When you are ready to submit (or whenever you would like to save your work), you should “push” your work into your GitHub repository.
2. ([Structure of a program](http://www.cplusplus.com/doc/tutorial/program_structure/)) Write the basic outline of any C++ program. You should print your name followed by “TOOP HW6” at the beginning of the program’s execution. Paste in the following code and thoroughly comment it.

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| #include <iostream>  #include <string>  using namespace std;  class Rectangle {  public:  Rectangle() : length(5), width(5), area(5 \* 5) {  numInstances++;  cout << "There is (are) " << numInstances << " instance(s) of rectangle\n";  }  Rectangle(const int& length\_, const int& width\_) : length(length\_), width(width\_), area(length\_\* width\_) {  numInstances++;  cout << "There is (are) " << numInstances << " instance(s) of rectangle\n";  }  public:  void printInfo() {  cout << "I am a rectangle of length " << length << ", width " << width << ", and area " << area << ".\n";  }  protected:  int length, width, area;  public:  static int numInstances;  };  int Rectangle::numInstances = 0;  class Square : public Rectangle {  // YOUR CODE HERE  };  int main() {  cout << "3/c Hopley Yeaton\n";  cout << "TOOP HW6\n";  Rectangle rect;  Rectangle rect2(5, 10);  Square square;  Square square2(10);  rect.printInfo();  rect2.printInfo();  square.printInfo();  square2.printInfo();  } |

1. ([Classes II](http://www.cplusplus.com/doc/tutorial/classes2/), [Inheritance](http://www.cplusplus.com/doc/tutorial/inheritance/)) Write a class Square.
   1. Square will extend from Rectangle
   2. Square will have the following constructors
      1. A default constructor which calls the Rectangle’s default constructor
      2. A parametrized constructor which calls the Rectangle’s parameterized constructor
   3. Square will overload the printInfo of its parent class Rectangle and only print the square’s edge size and its area.
2. Explain what is happening during execution of this program. You may find it helpful to add print statements to your Square’s constructor in order to explain fully.
   1. An example explanation is the following:

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| The program creates an instance of the Square class called square via the default constructor. square is a Rectangle, so the number of instances of Rectangles increases by one. When square.printInfo() is called, the square instance references a protected variable from its parent class… |