Gebze Institute of Technology
Department of Computer Engineering
CSE 241/501
Object Oriented Programming
Fall 2013
Homework # 5
Due date Nov 15th 2013

This homework is about

- operator overloading
- dynamic memory management
- big three
- and other OO tools

You will write and test two C++ classes

- **`Planet`** class will represent a planet. It will have setters and getters for
  - planet name
  - diameter in kilometer
  - distance from its main star
  - weight in tons
- The **`Planet`** class will also overload
  - << and >> operator
  - prefix and postfix ++ and - - operators to increase and decrease the planet diameter by 1 kilometer
  - == operator for comparing two planets
  - <, >, <=, >= operators that compare planets with respect to their weights
- Your second class **`StarSystem`** will represent a star and a number of planets that orbit the star. For example, our solar system could be a **`StarSystem`** object. This class will have functions for
  - Setter and getter for the main star of the system
  - Overloaded += operator for adding a **`Planet`** to the star system
  - Overloaded -= operator for removing a **`Planet`** from the star system
  - Overloaded [] operator to return the **`Planet`** at the given index
  - Overloaded << operator
  - Big three member functions

You will not use C++ vectors in this homework. You will allocate and deallocate memory yourself with new and delete operators.

Test your classes with the 8 planets of your solar system and also test them with other star systems such as Epsilon Eridani star with its two planets (planet b and planet c). For the details of this star and its planets, see http://en.wikipedia.org/wiki/Epsilon_Eridani#Possible_planets

Do not forget to test each member function your classes separately.

You should also test your class objects by

- making arrays of Planets and StarSystems
- sending Planet and StarSystem object to functions by call by reference and by call by value

Notes:

- Use all object oriented techniques we learned in the class such as information hiding, principle of least privilege
- You may add any number of other functions and data members to the classes as long as it makes sense.
- You should email your homework to the Teaching Assistant (TA) 2013fallcse241@gmail.com.