Comp 282 Project #1 (20 pts)

Due: Sept 11 (upload Table.java file to Moodle by 9:00 am)

(hand in hard copy of all files and test cases in your class on Sept 11)

1. Implement the class Table<K extends Comparable<K> ,T> using the JCF TreeMap<K,T> as the container to hold data items. TreeMap is a binary search tree. See java API docs.

```
public  class Table <K extends Comparable<K>, T>    // K = key,  T = item
{
  public boolean isEmpty();

   public int size();

   public void tableInsert(K key, T item) throws TableException;

   public boolean tableDelete(K key) ;

   public T tableRetrieve(K key);  //return null if not found

   public void printTable();  //print in search key order
}
```

2. Create a Student class with studentID (int), name (string), UnitsEarned (int), and major(String). Use the studentID as the search key.
3. Create a TableTest class to test your code. Insert at least 10 students. Test all table operations. Test the TableException.
4. Notes on the Table class
   a. tableInsert(key, *item*) - if key is already in the table, the item is NOT inserted and a new TableException(*message*) is thrown, with a useful message.
   b. tableDelete(*key*) – returns false if there is no item in table with search key = *key*; otherwise it returns true.
   c. Code for TableException

```
public class TableException extends Exception
{
        public TableException( String message)
        {
                super(message);
        }
}
```

   d. printTable() must not modify the table. Hint: Use the pollFirstEntry() method and the clone() methods for TreeMap
5. Create three java files: Table.java, Student.java, TableTest.java.
   a. Hand in hard copy of all three files plus sample run from TableTest.java.
   b. Submit Table.java (ONLY) to Moodle. Instructor will test this file.