Notes for Assignment # 2

Genric Classes: Your text book (Weiss) gives details on how to implement generic classes in order to deal with situations as needed for Assignment 2. Generic classes are useful because it allows you to reuse code.

What you should not do: Section 1.4 of the text (starting page 12) shows how this was achieve using Pre-Java 5 techniques. In this approach, you can either downcast types to the Object type and then work things out OR you can use wrappers to achieve the task. However, this is not the modern way.

The right approach: Java 5 (and later) supports generic classes that are easy to use. We are now on to Java 8 and have come a long way. Section 1.5 shows how this is done with a generic name such as ¡AnyType¿. A simple example is provided in Section 1.5.1 (page 17). A more detailed example can be found in Figure 3.24 on page 77.

Ideas for your Assignment: As per the above suggestions, here are the steps that I suggest:

Step 1 Define an interface as shown in the assignment handout:

```
package cop3530;

public interface DoubleEndedPriorityQueue<AnyType>
{
    void makeEmpty ( );
    void add (AnyType x);
    AnyType deleteMin ( );
    AnyType deleteMax ( );
    AnyType findMin ( );
    AnyType findMax ( );
    boolean isEmpty ( );
}
```

Step 2 Next, create two classes `ListDoubleEndedPriorityQueue` and `TreeDoubleEndedPriorityQueue` that implement the above interface. For example, the first class would start off as follows:

```
public class ListDoubleEndedPriorityQueue<AnyType
    extends Comparable<? super AnyType>>
    implements DoubleEndedPriorityQueue<AnyType>
{
  // class details
  // should contain the private fields first and last
  // should implement operations in interface DoubleEndedPriorityQueue
}
```

Step 3 Make sure you compile all the above java files you created.

Step 4 Write your own main program `MyMainAssign2` to test the above classes. This could look something like follows. Note that it is not part of the package cop3530 and is in its own directory.

```
import cop3530.*;
public class MyMainForAssign2 {
    public static void main(String[] args) {
        DoubleEndedPriorityQueue<Integer> A =
            new ListDoubleEndedPriorityQueue<Integer>();
        A.add(5);
        // ...
        // any commands you need to test your implementations
        DoubleEndedPriorityQueue<Integer> B =
            new TreeDoubleEndedPriorityQueue<Integer>();
        B.add(5);
        // ...
        DoubleEndedPriorityQueue<Double> C =
            new TreeDoubleEndedPriorityQueue<Double>();
        C.add(5.0);
        // ...
        DoubleEndedPriorityQueue<String> D =
            new TreeDoubleEndedPriorityQueue<String>();
        D.add("Donald");
        D.add("Hillary");
        // ...
    }
}
```

Step 5 Once you have tested your classes exhaustivley and convinced it all works correctly, then download my file `Test2ForAssign2.class`.

Where do you place this file? Since it is not part of the cop3530 package, it should not**NOT** be placed along with the other classes for this assignment (i.e., not in `../build/classes/cop3530`. It should be in its own directory.

How do you run the whole program? One way is to use the command line and type in a command such as

```
java Test2ForAssign2 -classpath <PathFor ../build/classes/cop3530>
```

There should be ways of doing it in NetBeans or Eclipse by either providing the above explicit command in the "run" options or by other means. But that is up to you to figure it out.