Name: Bill Bohling
Date: 27 Feb 2011
Course: 7402 Adv Java Programming
Assignment: HW2

Notes: I'm just not getting the whole hashCode() and equals() thing. My Rectangle class implements both, but my hash still allows duplicate entries. I really missed having a recorded lecture for this one.

****************************** Code ******************************
```
import java.util.*;

class Collections {

  public static void main(String args[]) throws Exception{
    // use Random to generate 1000 Rectangles
    // and store them in an ArrayList
    ArrayList<Rectangle> alist = new ArrayList<Rectangle>(1000);
    Random rgen = new Random();
    for (int i = 0; i<1000; i++) {
      int height = rgen.nextInt(9) + 11;
      int width = rgen.nextInt(9) + 11;
      Rectangle r = new Rectangle(width, height);
      alist.add(r);
    }

    // now put alist into other required collections
    HashSet<Rectangle> hset = new HashSet<Rectangle>();
    TreeSet<Rectangle> tset = new TreeSet<Rectangle>();

   Iterator at = alist.iterator();
   while(at. hasNext()) {
      Rectangle r = (Rectangle)at.next();
      hset.add(r);
      tset.add(r);
   }

    // print some results!
    System.out.println("ArrayList elements: " + alist.size());
    System.out.println("HashSet elements: " + hset.size());
    System.out.println("TreeSet elements: " + tset.size());
    System.out.println();
    Iterator it = alist.iterator();
```

```
     for (int i = 0; i < 5; i++) {
       Rectangle r = (Rectangle)it.next();
       System.out.println("ArrayList Item " + i + " area: " + r.area() + " width:  " +
r.width + " height:  " + r.height);
     }
     System.out.println("\n");
     it = hset.iterator();
     for (int i = 0; i < 5; i++) {
       Rectangle r = (Rectangle)it.next();
       System.out.println("HashSet Item " + i + " area: " + r.area() + " width:  " +
r.width + " height:  " + r.height);
     }
     System.out.println("\n");
     it = tset.iterator();
     for (int i = 0; i < 5; i++) {
     //while(tset.hasNext()) {
       Rectangle r = (Rectangle)it.next();
       System.out.println("TreeSet Item " + i + " area: " + r.area()  + " width:  " +
r.width + " height:  " + r.height);
     }

   }

}

****************************************

import java.util.*;

// Rectangle Shape
class Rectangle  implements Comparable<Rectangle> {

  protected int width = 0;
  protected int height = 0;
  protected static int rectCount = 0;

  Rectangle() {
    rectCount++;
  }

  Rectangle(int width, int height) {
    this.width = width;
    this.height = height;
    rectCount++;
  }

  public static int numRectangles() {
    return rectCount;
  }

  public double area() {
    return this.width * this.height;
  }

  public int compareTo(Rectangle that) {
    if (this.area() < that.area()) {
      return -1;
    }
    else if (this.area() > that.area()) {
      return 1;
    }
    else {
      return 0;
    }
  }

  public int hashCode (){
    return (int)this.area();
  }

  public boolean equals (Rectangle that) {
    return this.area() == that.area();
    //if ((this.width == r.width) && (this.height == r.height)){
    //  return 1;
   // }
    //else {
    //  return 0;
    //}
  }


}
```

****************************** Results ******************************

```
goodeeates:Collections bilbo$ java Collections
```

```
ArrayList elements: 1000
HashSet elements: 1000
TreeSet elements: 45

ArrayList Item 0 area: 210.0 width:  15 height:  14
ArrayList Item 1 area: 324.0 width:  18 height:  18
ArrayList Item 2 area: 221.0 width:  17 height:  13
ArrayList Item 3 area: 198.0 width:  11 height:  18
ArrayList Item 4 area: 252.0 width:  14 height:  18


HashSet Item 0 area: 121.0 width:  11 height:  11
HashSet Item 1 area: 121.0 width:  11 height:  11
HashSet Item 2 area: 121.0 width:  11 height:  11
HashSet Item 3 area: 121.0 width:  11 height:  11
HashSet Item 4 area: 121.0 width:  11 height:  11


TreeSet Item 0 area: 121.0 width:  11 height:  11
TreeSet Item 1 area: 132.0 width:  11 height:  12
TreeSet Item 2 area: 143.0 width:  13 height:  11
TreeSet Item 3 area: 144.0 width:  12 height:  12
TreeSet Item 4 area: 154.0 width:  11 height:  14
```