Programming 1 Practice Final-Exam

Name: _____

Disclaimer: This is a practice exam that cover topics that you seen after the mid-term. However, this is not a clone of the final exam nor is intended to be a full review. You are a 100% responsible to study for the final exam. This practice exam serves the purpose to check some knowledge that you should have by now. The questions are taking from the Big Java book.

(NOTE: Remember to understand Boolean operations. While not in this practice exam, it may be very important. For example b && c …)

1)   [5] By hand sort the following ArrayList
      MyMiniDictionary =
      {"Tom","Tomato","C++","101","1.01","A1","tom","a1","church","Churchill","Car","Carl"}

Sorted List	
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	

2) [10] Using the CompareTo method, write an Insert method a new word that allows you to keep a list sorted in ascending order.

    public MiniDictionary() { MyMiniDictionary = new ArrayList<String>() ;}
    public void insert(String word)
    { …}

3) [5]Repeat Exercise 2 but create insert method that keeps the list sorted in descending order.

4) [15] loops:
   a) Rewrite the following for loop as a while loop.
      int s = 0;
      for (int i =1 ; i <=10; i++) s = s+1;
   b) write the following do loop and a while loop

      n = 1;
      double x = 0;
      double s;
      do
      {
         s = 1.0 / (n * n);
         x = x + s;
         n++;
      }while (s > 0.01);

   c) What is the value of X after the following nested loop?
      int x = 0;
      for(int i = 0; i <= 5; i++)
        for(int j = 0; j < i; j++)
           x = x + j;

5) Fix the bug(s) in the following code

      a) (Hint: 3 problems)
         public removeStartsWithCharFromList(ArrayList<String> list, char c)
         {

           for (int i =0 ; i < list.size() ; i++)
           {
              if (list.get(i).charAt(0) == c)

                    list.remove(i);
           }

         }

b) Considered the following max value algorithm for a set of real numbers . What's wrong with it? (values is ArrayList<double> and it has data)

```
double max = 0;
for (x : values)
{
   If (x > max) max = x;
}
```

6) Implement a class name Mesh. This is a 3D Model with the auxiliary classes Vectors and Faces. A Vertex is constructed via new Vertex(double x, double y, double z) and face via new Face(int f1,int f2,int f3)

The Face object stored an index of a vertex in f1, another one in f2 and another in f3. A vertex stored a value for each coordinate x,y,z. Assume the classes Vertex and Face were already created for you. You can also assume any getter, for example, myFace.getF1() , myVertex.getX() and so on.

If you are unsure, write your assumptions.

With this information, now think of the class Mesh of a Collection that stores vertex and faces. Remember that the face is just an index pointer to a vertex member in your vertexList.

You will need to arraylist.

ArrayList<Vertex> vList; and ArrayList<Face> fList;

Design your entire class with addFace, addVertex, getFace,getVertex, and printFaces.

Print Faces: A method that print each triangle formed by a face. This means that if a face is formed by 1,2,4 , then you have to print the face is form by :

Face
X= 10.5 y=23.2 z=45.1
x=5 y=5.0 z=5.0
x=-5.5 y=-5.5 z=-5.5

and so on…

7) With the previous exercise in mind, please write a parseData method to fill your Mesh class.

Parse a file that will create objects and add it to a collection.

The data looks like this.
comments are determined by a # sign. For example
This is a comment
The first line of data will be
n Red Cube
The second line of data will be the size of the file and its data member
v100 n75 f20

And data will be in the format of member and three numbers.
V 10 10 23.5

MyFile.obj looks like this:

Red Cube File
#
n My Red Cube
#assume that there you will always have v,n,f (vertex,normal,face)
v4 n3 f2
v 10.5 23.2 45.1
v 11 21.2 12.1
v 5 5.0 5.0
v -5.5 -5.5 -5.5
f 1 2 3
f 1 2 4

Notice that the vertex index starts at one. It means that you must subtract one to each number in the face field. F 1 2 3 becomes f 0 1 2

Make sure you use the scanner class

8) From the following text where underscore represents space.

I'm_Ready_For_The_Exam._I_look_forward_to_vacation_to_surf_in_the_water.

From here, please tell me what the following string operation gives you (describe each operation)

```java
String s =
"I'm_Ready_For_The_Exam._I_look_forward_to_vacation_to_surf_in_the_water.";
String x = "forward";
String y = "look";
String n1 = s.substring(s.indexOf(x),s.indexOf(x) + x.length());
String n2 = n1.substring(0,1);
String n3 = s.substring(3, 4);
String n4 = s.substring(0,1);
String n5 = s.substring(s.indexOf('i'),s.indexOf('i') + 1);
String n6 = s.substring(s.length()-6,s.length() - 6 + 1);
String n7 = s.substring(s.indexOf(y),s.indexOf(y) + 2);
String n8 = s.substring(s.indexOf("to")+3,s.indexOf("to")+4);
String n9 = s.substring(s.length()-3,s.length() -3 + 1);
String n10 = s.substring(2,3);
String n11 = s.substring(8,9);

System.out.println(n4 + n3 + n7 + n8 + n9 + n3 + n10 + n11 + n3+ n6+n5+n2+n9 );
```

Print the output of System.out.println nelow: