Georgia State University

Department of Computer Science

CSC 2720 J. L. Bhola

Fall 2017

Programming Assignment #3

Due October 2 th, 2017.

Objectives:
To be able to write and implement the ArrayList Data Structure..

Documentation:

1. Explain the purpose of the program as detail as possible - **8%.**
2. Develop a solution for the problem and mention algorithms to be used -**12%**
3. List data structures to be used in solution. - **5%.**
4. Give a description of how to use the program and expected input/output - **5%**
5. Explain the purpose of each class you develop in the program. - **5%.**

Programming:

1. For each method, give the pre and post conditions and invariant, if any - **10%**
2. Program execution **according to the requirements given 50%**
3. Naming of program as required **5%**

Description of Program

You are to write a program name **ArrayList.java** that create/build the ArrayList data Structure that exist in the java library. The class must be written to accept any type of Objects. The following must be implemented i.e. YOU must write the code (**do not import them from the Java Library**):

1. One default constructor that will create an ArrayList object with a default size (capacity) of 10 ------ **public ArrayList();**
2. **Another** constructor that accepts a parameter of type **int** and sets the size to this parameter ---- **public ArrayList(int n);**
3. A method that allows you to place a value at the end of the ArrayList ---- **public void add(Object x);**
4. A method that allows you to place a value at a given location ---- **public void add(int index, Object x);**

5. A method that allows you to retrieve a value from a given location ---
   - **public Object get(int index);**
6. A method that allows you the number of elements in the the ArrayList ---
   - **public int size();**
7. A method would test to see if the ArrayList is empty ---
   - **public boolean isEmpty();**
8. A method that see if a particular object exist in the ArrayList --
   - **public boolean isIn(Object ob);**
9. A method that will return the location of first occurrence of an Object starting from location 0 ----- **public int find (Object n);**
10. A method that will remove the first occurrence of an Object starting from location 0 ----- **public void remove (Object n);**

Now, write a driver program (**the class with the public static void main(String[] args) method**) name **testarray.java** to test the ArrayList data structure you just created. That is, you must test all **ten (including the default constructor)** of the above methods. For those that are returning a value, print out the returned value to the screen and for those that are not returning a value, print a message that indicate if it successfully completed its task.

To test the ArrayList, you must randomly generate 15 integer numbers ranging from 1 to 25 and add to the two ArrayList you created (One using the no-parameter constructor and the other using the one-parameter constructor). Of course, to use the one-parameter constructor, you must prompt the user for an initial size of the ArrayList.

Remember --- The size function should be based upon the actual number of elements you have in the ArrayList at any given time.

What to turn in

1. All of the .java and the .class/jar files at the D2L(iCollege) website in the Dropbox folder for A3 no later than 11:00 p.m on the respective due date.

2. Make sure that your name is written clearly on your program.