

DSA Week 14 activities

This week, you are required to complete the questionnaire and two labs.

- a. In this print out, answer all Week 14 questions.
- b. Also, in this print out, complete Week 14 lab 1 & 2 using the lab computers.

Note: You can complete the activities in any order, however, make afford to complete and understand everything which prepares you for well for test 2 & Final Exam.

DSA Week 14 Questions

1. What is the list ADT?
 - a) The list is abstract datatype which represents a linear order sequence of elements. The list has support of adding and removing elements. The list data structure is efficient for data storage, data retrieval and where elements are accessed using an index position.
 - b) The List ADT provides a set of operations for managing data in a sequence of adding, removing, accessing and iterating through elements.

2. Discuss the six methods used with the list ADT.

The list abstract data type (ADT) that supports the following index-based methods:

- **size():** returns the number of elements in the list.
- **isEmpty():** Returns a boolean indicating whether the list is empty.
- **get(i):** Returns the element of the list having index i:
- **set(i, e):** Replaces the element at index i with e and returns the old element that was replaced.
- **add(i, e):** Inserts a new element e into the list so that it has index i, moving all subsequent elements one index later in the list.
- **Remove(i):** Removes and returns the element at index i, moving all subsequent elements one index earlier in the list.

3. A list has the elements (940, 880, 830).
 - a. What happens to the list when you add(790)?
The list now has the elements (940, 880, 830, 790)
 - b. What happens to the list when you remove(0) and add(750)?
The list elements are now (880, 830, 790, 750)
 - c. What happens to the list when you get(2)?
Prints (790)

4. What is an iterator?

An iterator is a software design pattern that abstracts the process of scanning through a sequence of elements, one element at a time. Iterating is the technical term for looping

An iterator is an object that can be used to loop through collections like ArrayList and LinkedList.

5. In your opinion, which looping technique is easier to learn and understand – iterators, traditional for loop or advanced for-each loop? Discuss why you chose one technique over the others.

N/A, based on preference each programmer will use one technique over another. Two main factors to consider; 1, master some of looping techniques and 2, learn how to change between implementing loop techniques (Example: change the advanced for-each loop syntax into a for loop syntax or vice versa).

DSA Week 14 Lab Activity (Week10Lab1)

Using the lab computers create the following Java program using jGrasp!

Step 1: Login to your lab computer and create a new java file in jGrasp.



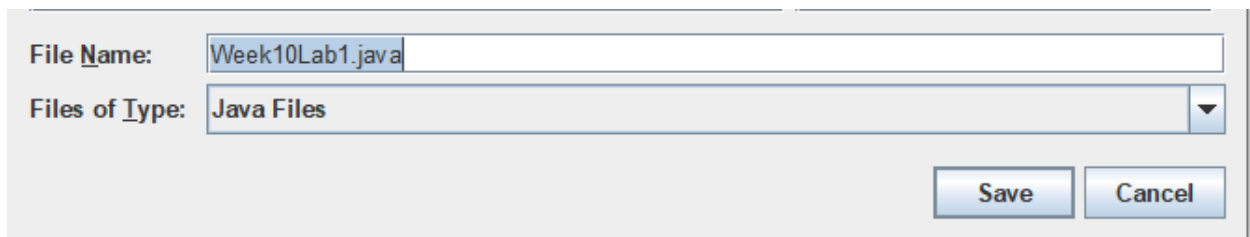
Step 2: When the window below appears. Type the following code into jGrasp.

```

1  /* DSA Week 10 Lab 1 */
2
3  import java.util.ArrayList; //import the ArrayList class
4
5  public class Week10Lab1 {
6
7      public static void main(String []args) {
8          ArrayList<Integer> intArray = new ArrayList<Integer>();
9          intArray.add(940);
10         intArray.add(880);
11         intArray.add(830);
12         intArray.add(790);
13         intArray.add(750);
14         intArray.add(660);
15         intArray.add(650);
16         intArray.add(590);
17         intArray.add(510);
18         intArray.add(440);
19
20         //print element 0 of the Arraylist
21         System.out.println("First element of the Arraylist is " + intArray.get(0));
22
23         //print the size of the ArrayList
24         System.out.println("Size of the Arraylist is " + intArray.size());
25
26         intArray.remove(0);
27
28         //loop through the element of the Arraylist
29         for(int i =0; i<intArray.size(); i++){
30             System.out.println(intArray.get(i));
31         }
32     }
33 }

```

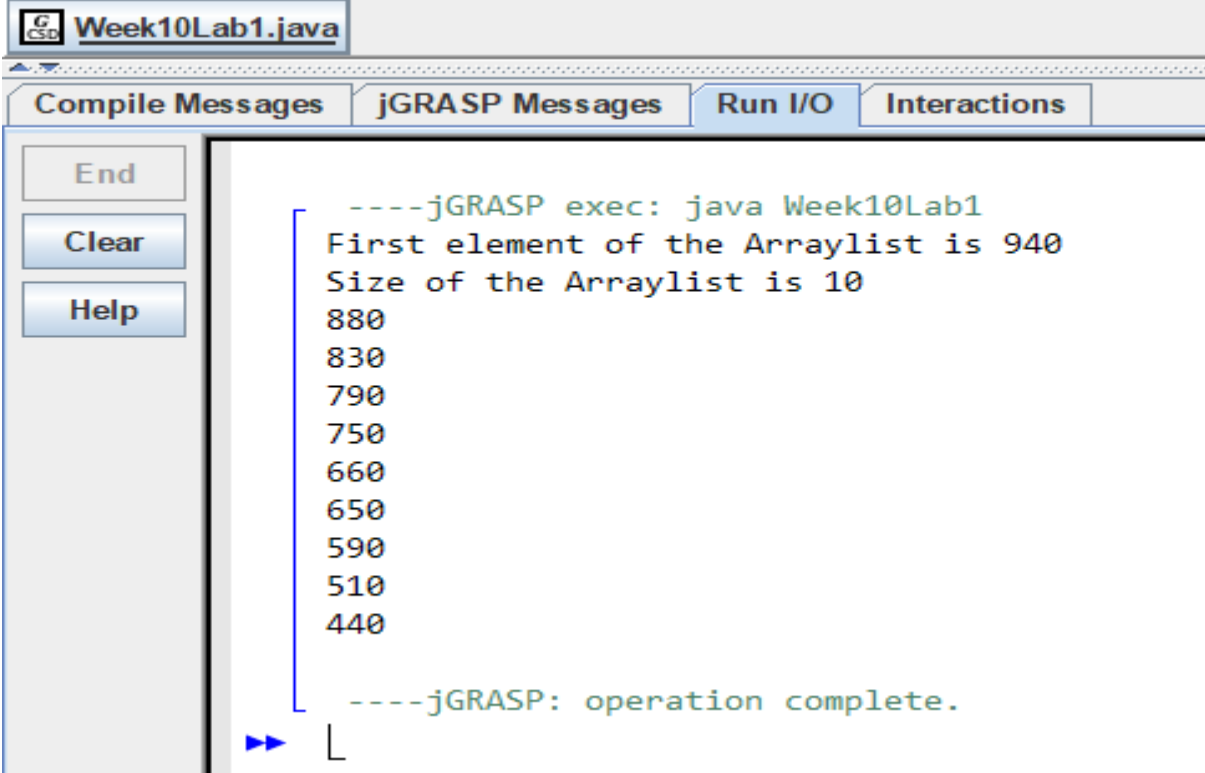
Step 3: Go to **file/save** to save your java program as **Week10Lab1**



Step 4: After saving, compile (click on compile icon or on your keyboard hold **Ctrl + B**) to check for syntax errors.

Step 5: If compiling is successfully then run (click on the find and run main method icon or on your keyboard hold **Ctrl + R**) your program.

Step 6: If run is successful then you should see the following output in the console



```
Week10Lab1.java
Compile Messages  jGRASP Messages  Run I/O  Interactions

End
Clear
Help

----jGRASP exec: java Week10Lab1
First element of the ArrayList is 940
Size of the ArrayList is 10
880
830
790
750
660
650
590
510
440

----jGRASP: operation complete.
▶▶ L
```

Step 7: Week10Lab1 Completed! Save your file for future Java lab activities.