Seminar 3 Homework. Collections

ECE 318 Programming Principles for Engineers

Prof. Angelos Marnerides

University of Cyprus
Department of Electrical and Computer Engineering

Overview

- The purpose of this seminar is for you to:
  - Go first through the slides on Collections and experiments with the concepts
  - Attend the seminar to ask questions related to how you should implement the specified program.

Task (ArrayList):

Exercise:

- Develop a program Main.java that will
  - Create an ArrayList of 2 elements
  - Add items to the ArrayList
    - Try to insert strings (i.e., String() object) as well as integers (i.e., Integer())
      - E.g., list.add(new String("x")); , list.add(2, new Integer(10));
      - And print the list
    - Remove item and print the list and check if the item you removed exists
    - Using contains() check if the list contains a specified element of your choice and print the output (tip: should be a Boolean true or false)
  - Using the ListIterator use a while loop and print every element of your list
    - Try also if you can do that using any other type of a loop (e.g., for)
  - Create an object array from the ArrayList you have.

Task (LinkedList):

Exercise:

- Develop a program IntegerList.java that will create a linked list and add 4 Integer objects to it
  - Print the size of the linkedlist
  - Add integer objects at the beginning and the end of the linkedlist and print them
    - Tip, you might have to use a getFirst() and getLast() methods of the linkedlist class – check the documentation
  - Remove the first and last elements of the list and print the list
  - Remove the first instance of Integer(1) object and print the list
  - Add a String named as “NewYork” and Long objects to the LinkedList and print the list
  - Get the index of the ”New York" String object and print it
  - Remove the 3rd object in the Linked List and print the list
  - Set the value of the second item to "one” and print the list
  - Clone the LinkedList object (tip: using list.clone()) and print it.

Task (Set):

Exercise:

- Develop a program Main.java that will create a linked list and add 4 Integer objects to it
  - Print the size of the linkedlist
  - Add integer objects at the beginning and the end of the linkedlist and print them
    - Tip, you might have to use a getFirst() and getLast() methods of the linkedlist class – check the documentation
  - Remove the first and last elements of the list and print the list
  - Remove the first instance of Integer(1) object and print the list
  - Add a String named as “NewYork” and Long objects to the LinkedList and print the list
  - Get the index of the ”New York" String object and print it
  - Remove the 3rd object in the Linked List and print the list
  - Set the value of the second item to "one” and print the list
  - Clone the LinkedList object (tip: using list.clone()) and print it.

Possible solution

```
import java.util.HashSet;
import java.util.Set;

public class Main {

    public static void main(String[] args) {

        // Set up test data
        String name[] = {
            new String("Sang"),
            new String("Shin"),
            new String("Boston"),
            new String("Shin")
        };

        Set uniques = new HashSet();
        Set dups = new HashSet();

        for (int i=0; i<name.length; i++)
            if (!uniques.add(name[i]))
                dups.add(name[i]);

        // Remove items that duplicates
        uniques.removeAll(dups);

        System.out.println("Unique words:    " + uniques);
        System.out.println("Duplicate words: " + dups);
    }

}
```


University of Cyprus
Department of Electrical and Computer Engineering