Tutorial 1 - ArrayList

The purpose of this exercise is for you to familiarize yourself with several very useful resources for programming in Java, **the ArrayList class**, and the **Java API documentation** which can be consulted to understand the purpose of a class and it's methods.

The ArrayList documentation, for Java 8, at `https://docs.oracle.com/javase/8/docs/api/java/util/ArrayList.html`. This details all the constructors and methods of an ArrayList.

1 Code Basis

Listing 1 is provided as a basis for exploring the ArrayList class, firstly you should type out this code, try to understand it, and then compile and run the code as is. The method *print()* is a static method just like *main()*, this means that it does not need an instance of the class to be utilized. Instead it is called via *ClassName.methodName()*. I have included this so that you can call this method whenever you want to print out that ArrayList to see any modifications. *print()* uses a for each loop and this can be contrasted with the traditional for loop at the bottom of *main()*;

Listing 1: Basis for your exploration of an ArrayList

```
import java.util.*;

public class Test {

  public static void print(List<String> arr){
    for(String current : arr){
      System.out.println(current);
    }
  }

  public static void main(String[] args){

    List<String> list = new ArrayList<>();

    list.add("Hello");
    list.add("World");
```

```
    list.add("bye");

    Test.print(list);

    // normal for loop
    for(int i =0; i < list.size(); i++){
      System.out.println(list.get(i));
    }
  }
}
```

2 Tasks

Complete the following tasks, you should print the ArrayList whenever you want to understand how your changes have modified the list. You comments to mark the meaning of the additions you have made to the code.

- Add a String to the list
- Try to add an Integer to the list, you will get an error, try to understand this error.
- Remove the item at index 0 (*remove(int index)*) would be the method look at in the API
- Insert an item at index 1 (*add(int index, E element)*
- Remove the first occurrence of a String (choose one that is already in the list), look at the *remove(Object o)* method.
- Use *set(int index, E element)*, discern the difference between *set()* and the previously used *add()*
- What method would allow us to test if an object is to be found in the list? (you should look for a method which returns a boolean)
- Create a new ArrayList to store strings, add 4 strings to the new ArrayList. Thereafter, utilize the *addAll(Collection c)* to add all of the second list to the first one.
- Call *clear()* on one of your ArrayList instances and then try to print it.
- Create a class to represent a Person with a name and an age. Create an ArrayList which stores Person instances. You should observe that all the methods of the ArrayList stay the same, the only difference is that now it is a container for Person objects rather than String objects.

There are many methods to the ArrayList class. Some of these come from specifications, called interfaces, which ArrayList is said to **implement**. The most important is *List*<*T*> which will discuss more next week, it's documentation can be found at `https://docs.oracle.com/javase/8/docs/api/java/util/List.html`.