Collection Framework in Core JAVA

Abstract

In this article I am explaining the basics of collection framework in Core JAVA and JAVA ArrayList class.

Introduction

Group of objects is called collection. Standard techniques are called Framework (Guidelines).
It provides organization of Objects (Data Structures) and operations on data structures.

Data Structures in JAVA collection framework

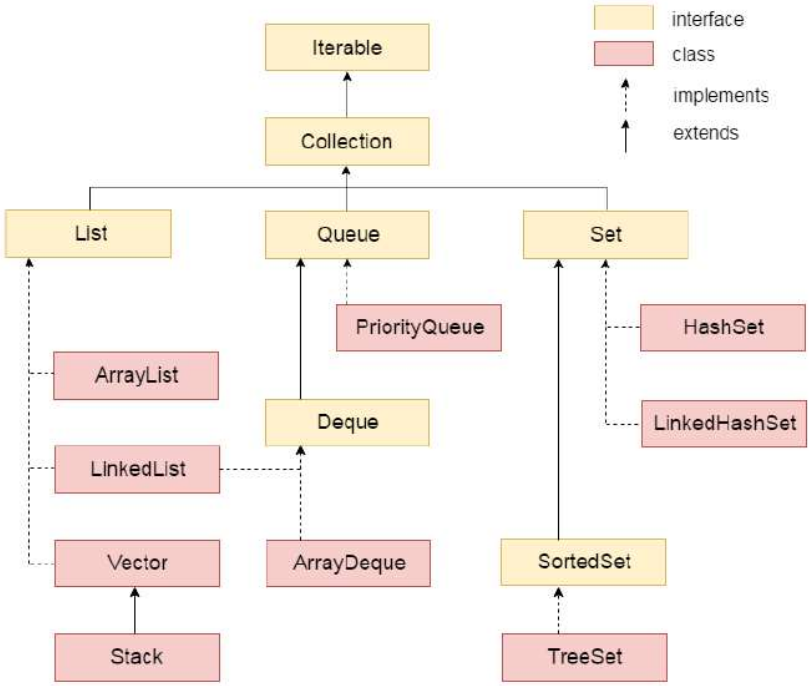
- Array
- Stack
- LinkedList
- Map(Key-Value)
- Tree

Operations on data structures

- Insert
- Delete
- Traverse
- Add
- Edit
- Find
- Duplicate
- Shuffle
- Max
- Min
- Sort
- Search
- Merge

Hierarchy of Collection Framework

Let us see the hierarchy of collection framework. The famous **java.util** package covers all the interfaces and classes for collection framework in JAVA.



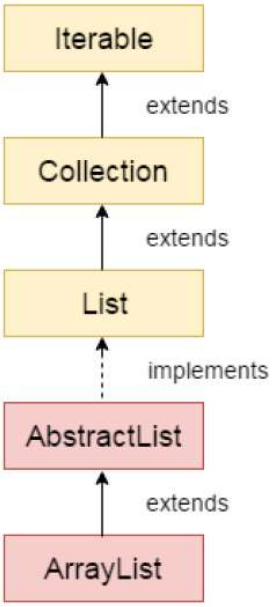
Some behaviour of Collection:

1. All are resizable, No issue of size, flexible. Auto grow and shrink.
2. Allow multiple type of objects
3. Ordered/unordered
4. Sorted/Unsorted
5. Allow Unique/Duplicate
6. Allow null or not
7. Synchronous/Asynchronous
8. Key Value(K-V) pair (in only map)

Java ArrayList class

Java ArrayList class can use as a dynamic array for storing the elements stored. It can inherit AbstractList class and can implements List interface.

- Java ArrayList class contains duplicate elements.
- Java ArrayList class maintains insertion order.
- Java ArrayList class is non-synchronized.
- Java ArrayList can allow random access because array can work at the index basis.
- ArrayList is Duplicate, Ordered, Unsorted, Asynchronous, Allow Null



Syntex of ArrayList class declaration

```
public class ArrayList<E> extends AbstractList<E> implements List<E>
```

Java Non-generic v/s Generic Collection

Java collection framework was non-generic before JDK 1.5. Since 1.5, it is generic.

Java new generic collection is allowing us to have **only one type of object** in collection. Now we can say this is type safe so typecasting does not require at run time.

In the generic java collection, we can specify the type in **angular braces**. Here ArrayList can forced to have only specified type of objects contains in it. If we try to add any other type of object, it will give compile time error.

Older type of syntex

```
ArrayList al=new ArrayList ( ) ; // creating old non-generic arraylist
```

Newer type of syntex

```
ArrayList<String> al=new ArrayList<String>();//creating new generic arraylist
```

Constructors of Java ArrayList

Constructor	Description
ArrayList()	It is used to build an empty array list.
ArrayList(Collection c)	It is used to build an array list that is initialized with the elements of the collection c.
ArrayList(int capacity)	It is used to build an array list that has the specified initial capacity.

Example: Simple JAVA code to create a arraylist and show the stored data.

```
import java.util.*;
class TestCollection1
{
  public static void main(String args[])
  {
    //Creating array list
    ArrayList<String> list=new ArrayList<String>();

    //Adding object in array list
    list.add("Ravi");
    list.add("Vijay");
    list.add("Ravi");
    list.add("Ajay");

    //Traversing list through Iterator
    Iterator itr=list.iterator();

    // This while loop returns true if iterator has more elements
    while(itr.hasNext())
    System.out.println(itr.next());
  }
}
```

Output