

Course Name: A Level (2nd Sem)
Topic: Util package in Java

Subject: JAVA
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util Package in Java:

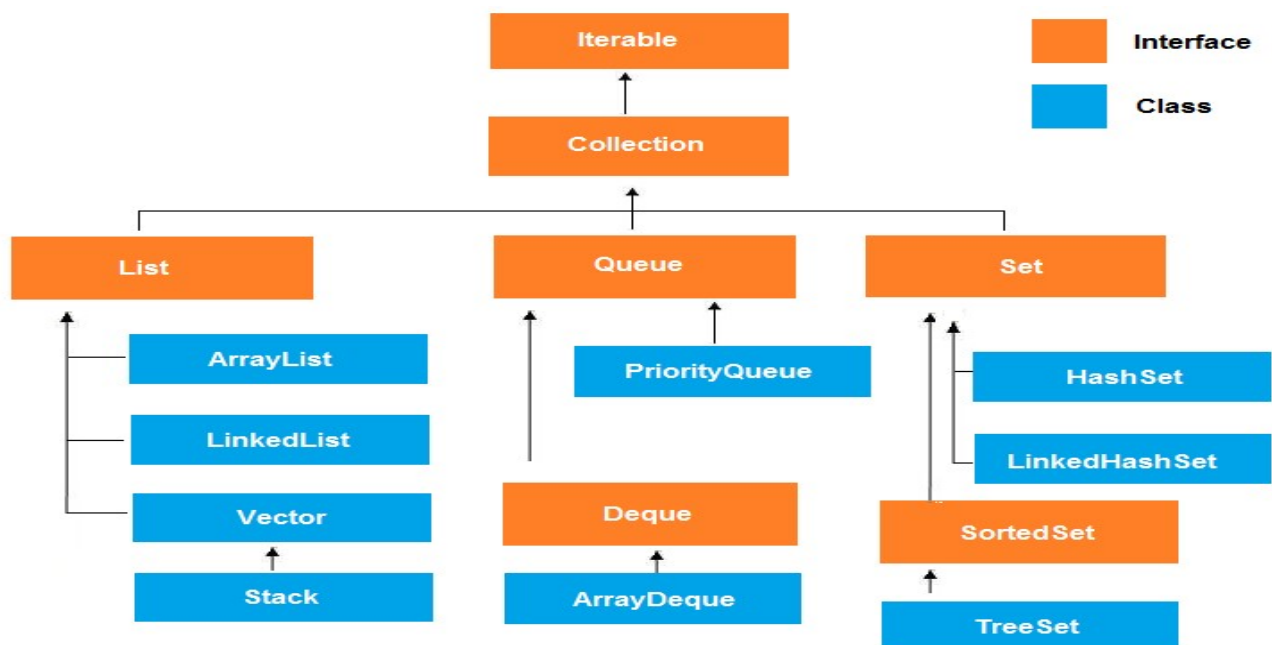
“java.util” package contains classes related to Collection Framework, Date and Time Classes, internationalization related classes and many other Utility Classes. That means if we want to use Collection Framework (Set, List, Map etc) or If we want to use Date Class, or If we want to Generate Random number then we have to Import java.util.* or Specific classes (Preferred way), e.g. java.util.Date, java.util.Set. Java util package is a package which contains **Java collections framework classes**.

Data structure in Java is implemented with the help of util package.

Collections Framework in Java:

- Java Collections Framework provides a set of interfaces and classes for storing and manipulating groups of data as a single unit, a collection.
- The framework provides a convenient API to many of the abstract data types maps, sets, lists, trees, arrays, hash tables, and other collections.
- With the Java Collections Framework the programmer easily define higher level data abstractions, such as stacks, queues, and thread safe collections.

Hierarchy of Collection Framework:



Iterable Interface:

The Iterable interface is the root interface for all the collection classes. The Collection interface extends the Iterable interface and therefore all the subclasses of Collection interface also implement the Iterable interface.

Iterator interface:

Iterator interface provides the facility of iterating the elements in a forward direction only.

Main interfaces of collection framework:

Set (Interface):

Set is an un-ordered collection which doesn't allow duplicate (no-duplicate) elements. We can iterate the values by calling iterator() method.

List (Interface):

List is an ordered collection which allows duplicate elements. We can iterate the value by calling iterator() method.

Map (Interface):

In Map we use to store the data in key and value pairs, we may have duplicate values but no duplicate keys. In Map we don't have iterator() method, but we can get the keys by calling the method keySet().

Now we will discuss some important classes of List interface:

1)ArrayList:

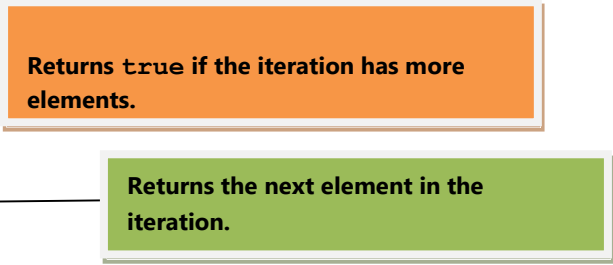
The java.util.ArrayList class provides resizable-array and implements the List. ArrayList class can contain duplicate elements. Java ArrayList class maintains insertion order. We can add or remove elements anytime. So, it is much more flexible than the normal array. Java ArrayList class is non-synchronized.

```

import java.util.*;
class Al{
    public static void main(String args[]){
        ArrayList<String> list=new ArrayList<String>();//Creating arraylist
        list.add("James");    //Adding object in arraylist
        list.add("Richard");
        list.add("Dennis");
        list.add("Alen");

        Iterator itr=list.iterator();
        while(itr.hasNext()){
            System.out.println(itr.next());
        }
    }
}

```



The diagram consists of two colored boxes with arrows pointing to specific lines of code. The first box is orange and contains the text "Returns true if the iteration has more elements." with an arrow pointing to the `itr.hasNext()` call in the `while` loop. The second box is green and contains the text "Returns the next element in the iteration." with an arrow pointing to the `itr.next()` call in the `System.out.println` statement.

2)vector

The `java.util.Vector` class implements a growable array of objects. `Vector` is synchronized. `Vector` is slow because it is synchronized. `Vector` implements a dynamic array that means it can grow or shrink as required. It is a legacy class.

```

import java.util.*;
class V{
    public static void main(String args[]){
        Vector<String> v=new Vector<String>();

        v.add("JAMES");
        v.addElement("RICHARD");
        v.addElement("GLENN");

        System.out.println("the elements are " +v);
    }
}

```

Exercise:

1. What is the benefit of util package?
2. What is the difference between arraylist and vector class?