

## Ch 18 Collections

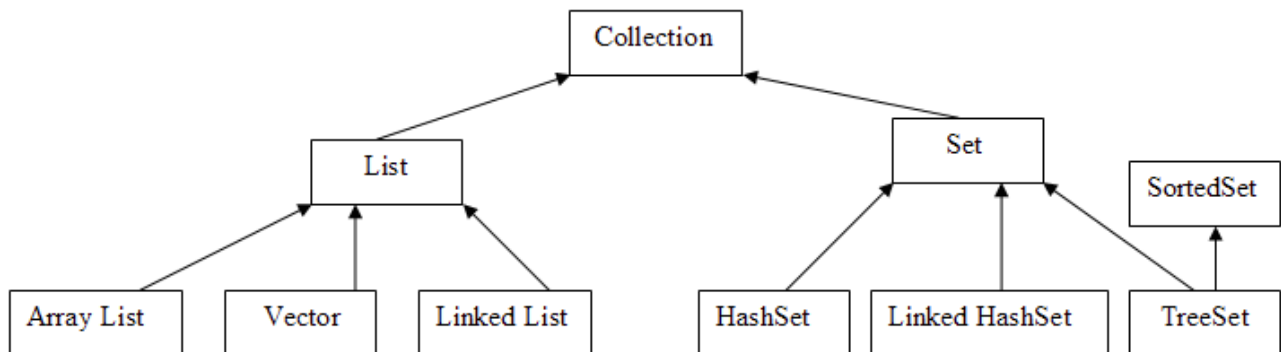
Definitions:

- **Java Collections Framework (JCF)** - Java standard library classes for collections
- **collection** - container used to store a group of objects
- **element** - an object in a collection
- **Iterator** - an object that can be used to retrieve the elements in a collection

JCF has 3 interfaces, each implements a foundational data structure:

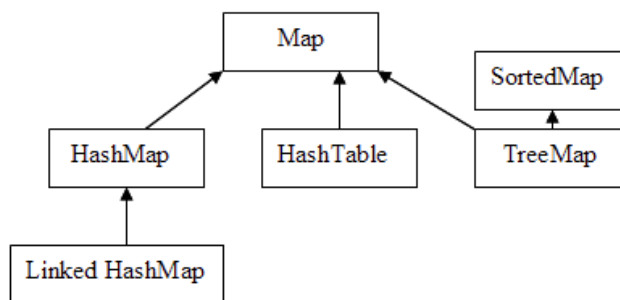
1. List - ordered sequence of elements, duplicates allowed, can insert elements anywhere
2. Set - optimized for faster searching, unordered, no duplicates (like a set in Math)
3. Map - <key, value> pairs, given “key” find associated “value, also optimized for searching, usually unordered

JCF Collection class hierarchy:



*[This diagram is cleaner than page 1053; it removes all abstract classes. Why are we cool with that? What role do abstract classes play in the JCF?]*

The Map hierarchy: (again, without abstract classes)



Map is too different from Set and List to be included under Collection.

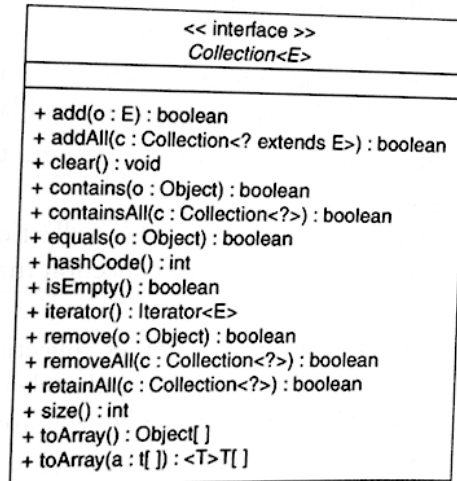
JCF is part of `java.util` package.

All interfaces and classes in JCF support generic types.

`Vector` has been replaced by `ArrayList`. `HashTable` is out, `HashMap` is in.

Collection methods: `add()`, `remove( obj)`, `contains( obj)` `clear()`, `isEmpty()`, `size()`.

From page 1055:



`AbstractCollection` implements all methods except `iterator()` and `size()`.

## 18.5 Collections class

Don't forget the `Collections` class: [docs.oracle.com/javase/7/docs/api/java/util/Collections.html](https://docs.oracle.com/javase/7/docs/api/java/util/Collections.html)

It's a group of useful static methods, including:

- **sort** using `Comparable` or a `Comparator`
- **binary search** using `Comparable` or `Comparator`
- **copy** all elements from one list to another
- **reverse** order of elements in a list
- Return **min** or **max** element in a collection
- **shuffle** to randomize order in list

And more.

The `Arrays` class has a similar set of static methods for use with arrays.

[docs.oracle.com/javase/7/docs/api/java/util/Arrays.html](https://docs.oracle.com/javase/7/docs/api/java/util/Arrays.html)

Nice link here for more examples... search on "Collections - Generic":

[www.leepoint.net/notes-java/index.html](http://www.leepoint.net/notes-java/index.html)