Java Collection Framework – Complete Notes

What is Java Collection Framework?

The Java Collection Framework (JCF) is a set of interfaces and classes in java.util package used to store and manipulate groups of objects efficiently.

Main Interfaces

1. Iterable – Root interface
2. Collection – Parent of List, Set, Queue
3. List – Allows duplicates, maintains order
4. Set – Does not allow duplicates
5. Queue – FIFO structure
6. Map – Key-value pairs (not child of Collection)

Collection Hierarchy

Iterable → Collection → List / Set / Queue
Map is separate hierarchy

List Implementations

ArrayList, LinkedList, Vector, Stack
• Allows duplicates
• Maintains insertion order
• Index based access

Set Implementations

HashSet, LinkedHashSet, TreeSet
• No duplicates
• TreeSet stores sorted data

Map Implementations

HashMap, LinkedHashMap, TreeMap, Hashtable, ConcurrentHashMap
• Stores key-value pairs
• Duplicate keys not allowed

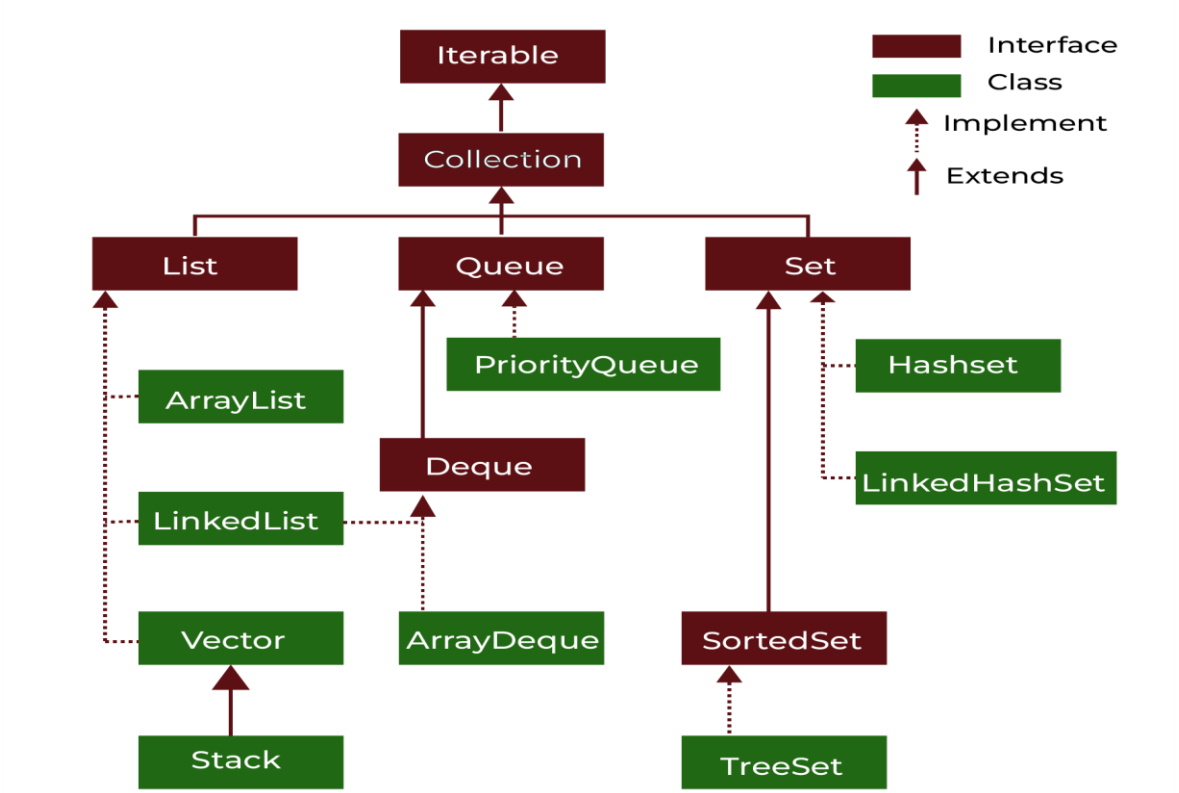
Thread Safety

Vector, Hashtable, ConcurrentHashMap are thread-safe.
ArrayList, HashMap, HashSet are not thread-safe.

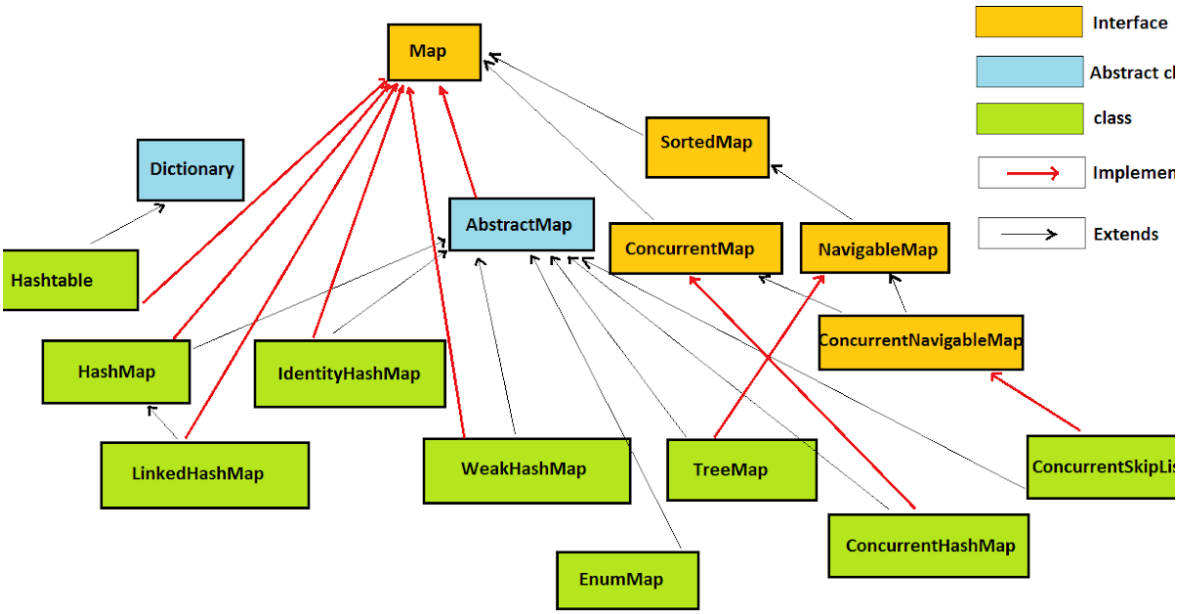
Fail-Fast vs Fail-Safe

Fail-Fast: ArrayList, HashMap (throws exception) Fail-Safe: ConcurrentHashMap (no exception)

Collection framework hierarchy in java



Map Hierarchy in JAVA



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