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## Differences between HashMap, Hashtable, LinkedHashMap and TreeMap in java

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In this post we'll be discussing Differences between HashMap, Hashtable, LinkedHashMap and TreeMap

### Differences between HashMap vs Hashtable vs LinkedHashMap vs TreeMap >

	Property	HashMap	Hashtable	LinkedHashMap	TreeMap
1	Insertion order	HashMap does not maintain insertion order.	Hashtable does not maintain insertion order.	LinkedHashMap maintains insertion order.	TreeMap is sorted by natural order of keys.
2	Performance	HashMap is not synchronized, hence its operations are <b>faster</b> as compared to Hashtable.	Hashtable is synchronized, hence its operations are <b>slower</b> as compared to HashMap.  If we are working not working in multithreading environment jdk recommends us to use HashMap.	LinkedHashMap must be used only when we want to maintain insertion order. <b>Time and space overhead</b> is there because for maintaining order it internally uses <b>Doubly Linked list</b> .	TreeMap must be used only when we want sorting based on natural order. Otherwise sorting operations cost performance. (Comparator is called for sorting purpose)
3	Null keys and values	It allows to store <b>one null key</b> and <b>many null values</b> i.e. many keys can have null value.	It does <b>not allow to store null key or null value</b> . Any attempt to store null key or value throws <b>runtimeException (NullPointerException)</b> .	It allows to store <b>one null key</b> and <b>many null values</b> i.e. any key can have null value.	It does <b>not allow to store null key but allow many null values</b> . Any attempt to store null key throws <b>runtimeException (NullPointerException)</b> .

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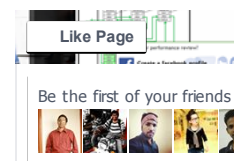
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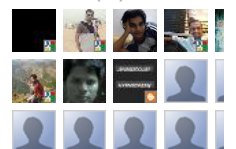
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	Implements which interface	<a href="#">Map</a>	Map	Map	Map SortedMap NavigableMap
	Implementation	use <a href="#">buckets</a>	use <b>buckets</b>	Uses <a href="#">doubly linked lists</a>	Uses <b>Red black tree</b>
	Complexity of put, get and remove methods	O(1)	O(1)	O(1) <b>overhead</b> of updating <b>Doubly Linked list</b> for maintaining order it internally uses.	O(log(n))
4	Extends Dictionary (Abstract class, which is obsolete)	No	Extends Dictionary (which maps non-null keys to values. In a given Dictionary we can look up value corresponding to key)	No	No
6	Introduced in	It was introduced in second version of java i.e. <b>JDK 2.0</b>	It was introduced in first version of java i.e. <b>JDK 1.0</b>  But it was refactored in java 2 i.e. JDK 1.2 to implement the Map interface, hence making it a member of member of the <a href="#">Java Collections Framework</a> .	It was introduced in fourth version of java i.e. <b>JDK 4.0</b>	It was introduced in second version of java i.e. <b>JDK 2.0</b>

## Similarity between *HashMap* vs *Hashtable* vs *LinkedHashMap* vs *TreeMap* >

	Property	<i>HashMap</i> and <i>Hashtable</i>
1	synchronization	All are <b>not synchronized</b> .
2	iterators are <a href="#">fail-fast</a>	The iterators returned by the iterator() method of the collections returned by all Map's "collection view methods" are <i>fail-fast</i> >  1. <i>map.keySet().iterator()</i> 2. <i>map.values().iterator()</i> 3. <i>map.entrySet().iterator()</i>  all three iterators are <i>fail-fast</i>

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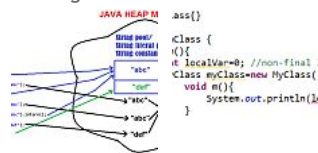
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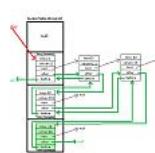
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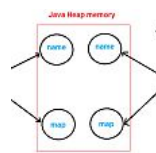
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            void m(){
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            }
        }
    }
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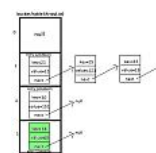
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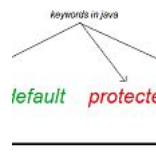
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