

Difference between HashSet and HashMap in Java? Answer

HashSet and HashMap in Java

`HashSet` vs `HashMap` is a classical **Java Collection** interview question that focuses on What are **differences between HashSet and HashMap** in terms of features, usage, and performance. If you are in Java programming even for a year or so, you are likely to be familiar with What is HashSet in Java and **What is HashMap in Java**, these two are the most popular collection classes. Despite being hash-based collections `HashSet` and `HashMap` are different from each other because the underlying interface is different.

`HashSet` implements `Set` interface via extending `AbstractSet` class and `HashMap` implements `Map` interface. Before seeing differences between let's see what is *common between HashSet and HashMap in Java*:

HashMap and HashSet in Java

Here are some of the common stuff between both of them:

1. Common Underlying Data Structure

Both `HashMap` and `HashSet` are a hash-based collection in Java.

2. Synchronization

Both `HashMap` and `HashSet` are not **synchronized** and can not be shared between multiple threads.

3. Fail-Safe

Iterator returned by `HashMap`'s `keySet()` and `HashSet` are **fail-fast** and they **throw** `ConcurrentModificationException` if they detect any structural change in Collection.

4. Performance

Both `HashMap` and `HashSet` provided constant time performance for basic operations like `put()`, `get()`, etc.

5. Nulls

Both `HashSet` and `HashMap` allows null values.

Differences between HashSet and HashMap in Java

After seeing similarities on `HashMap` and `HashSet`, now let's see some differences between them :

1. Data Structure

The first and most significant difference between `HashMap` and `HashSet` is that `HashMap` is an implementation of `Map` interface while `HashSet` is an implementation of `Set` interface, which means `HashMap` is a key value-based data-structure and `HashSet` guarantees uniqueness by not allowing duplicates.

In reality, HashSet is a wrapper around HashMap in Java, if you look at the code of add(E e) method of HashSet.java you will see the following code :

```
public boolean add(E e) {  
    return map.put(e, PRESENT)!=null;  
}
```

where it's putting Object into a map as key and value is a final object PRESENT which is a dummy.

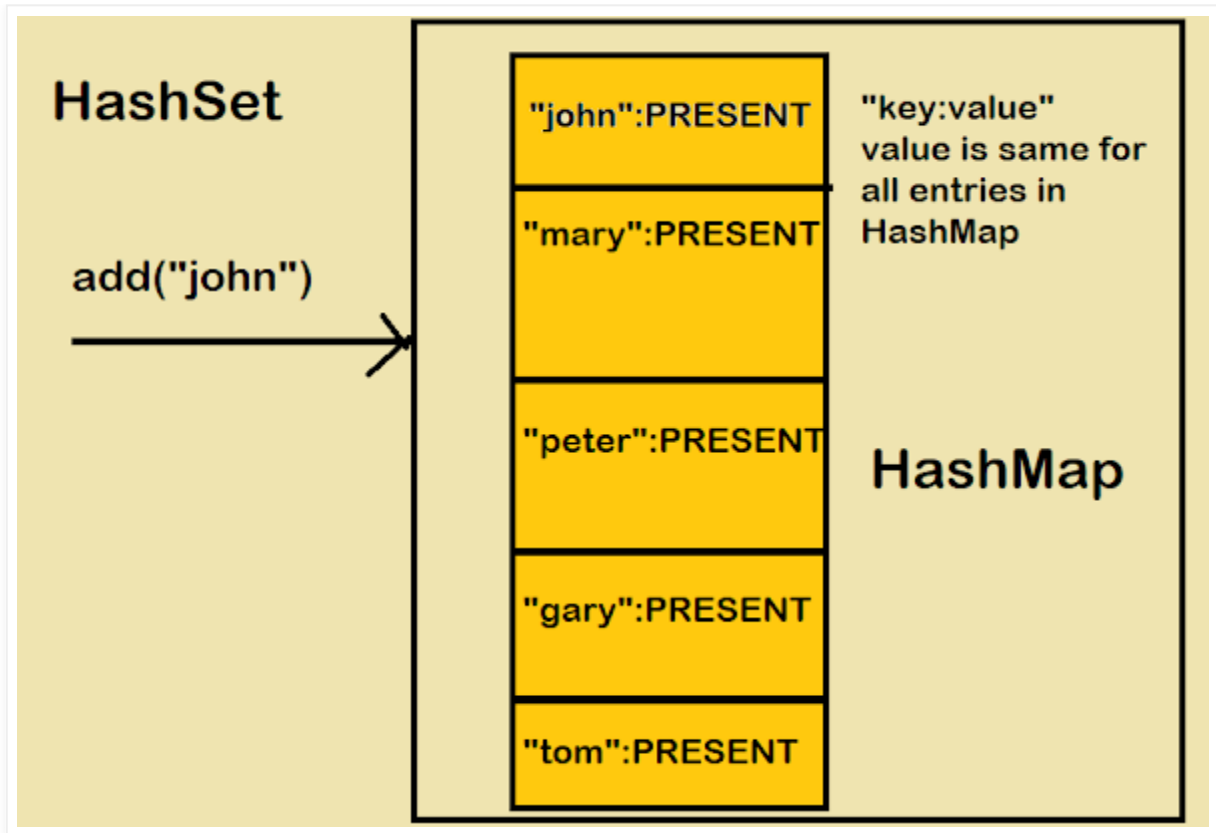
2. Storing function

The second difference between `HashMap` and `HashSet` is that we use `add()` method to put elements into Set but we use the `put()` method to insert key and value into HashMap in Java.

3. Null Values

HashSet allows only one null key, but HashMap can allow one null key + multiple null values.

And, if you are wondering **how HashSet works in Java** then here is a nice diagram that explains how it is backed up by a HashMap and how it stores elements in form of key-value pair, where values are always the same.



That's all on the **difference between HashSet and HashMap in Jav**