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HashMap vs WeakHashMap in Java

HashMap

Java.util.HashMap class is a Hashing based implementation. In HashMap, we have a key and a value pair. Even though the object is specified as key in hashmap, it does not have any reference and it is not eligible for garbage collection if it is associated with HashMap i.e. HashMap dominates over Garbage Collector.

```
// Java program to illustrate
// HashMap
import java.util.*;
class HashMapDemo
{
    public static void main(String args[])throws Exception
    {
        HashMap m = new HashMap();
        Demo d = new Demo();

        // puts an entry into HashMap
        m.put(d," Hi ");

        System.out.println(m);
        d=null;
        System.gc();

        //thread sleeps for 4 sec
        Thread.sleep(4000);

        System.out.println(m);
    }
}
class Demo
{
    public String toString()
    {
        return "demo";
    }

    // finalize method
    public void finalize()
    {
        System.out.println("Finalize method is called");
    }
}
```

Output:

```
{demo=Hi}
{demo=Hi}
```

WeakHashMap

WeakHashMap is an implementation of the Map interface. WeakHashMap is almost same as HashMap except in case of WeakHashMap, if object is specified as key doesn't contain any references- it is eligible for garbage collection even though it is associated with WeakHashMap. i.e Garbage Collector dominates over WeakHashMap.

```
// Java program to illustrate
// WeakHashMap
import java.util.*;
class WeakHashMapDemo
{
    public static void main(String args[])throws Exception
    {
        WeakHashMap m = new WeakHashMap();
        Demo d = new Demo();

        // puts an entry into WeakHashMap
        m.put(d," Hi ");
        System.out.println(m);

        d = null;

        // garbage collector is called
        System.gc();

        // thread sleeps for 4 sec
        Thread.sleep(4000);

        System.out.println(m);
    }
}
class Demo
{
    public String toString()
    {
        return "demo";
    }

    // finalize method
    public void finalize()
    {
        System.out.println("finalize method is called");
    }
}
```

Output:

```
{demo = Hi}
finalize method is called
{ }
```

Some more important differences between Hashmap and WeakHashmap:

- Strong vs Weak References:** Weak Reference Objects are not the default type/class of Reference Object and they should be explicitly specified while using them. This type of reference is used in WeakHashMap to reference the entry objects. Strong References: This is the default type/class of Reference Object. Any object which has an active strong reference are not eligible for garbage collection. In HashMap, key objects have strong reference.
- Role of Garbage Collector:** Garbage Collected : In HashMap , entry object(entry object stores key-value pairs) is not eligible for garbage collection i.e HashMap is dominant over Garbage Collector. In WeakHashMap, wWhen a key is discarded then its entry is automatically removed from the map , in other words, garbage collected.
- Clone method Implementation:** HashMap implements Cloneable interface . WeakHashMap does not implement Cloneable interface , it only implements Map interface. Hence , there is no clone() method in the WeakHashMap class.

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