

Summary

I compiled the class „HashMapTest“ using OpenJDK's javac and then used „dx“ to transform into a DEX bytecode file. Finally, I „dexdump“ to print out the DEX instructions created by dx. I marked the instructions relevant to the statements of „map.get()“ and „map.put()“ with numbers printed before the „|“ character. The **worst case** result is that „map.get()“ and „map.put()“ both need 7 additional DEX instructions.

HashMapTest.java

```
import java.util.HashMap;

public class HashMapTest {
    public static void main(String argv[]) {
        HashMap<Integer, Integer> map = new HashMap<Integer, Integer>();
        map.put(0, 1);
        int a = map.get(0);
    }
}
```

dexdump -h -d HashMapTest.dex (with both „map.get()“ and „map.put“)

```
|[000194] HashMapTest.main:([Ljava/lang/String;)V
1 |0000: const/4 v3, #int 0 // #0
|0001: new-instance v0, Ljava/util/HashMap; // type@0004
|0003: invoke-direct {v0}, Ljava/util/HashMap;.<init>:()V // method@0005
2 |0006: invoke-static {v3}, Ljava/lang/Integer;.valueOf:(I)Ljava/lang/Integer; //
method@0003
3 |0009: move-result-object v1
4 |000a: invoke-static {v3}, Ljava/lang/Integer;.valueOf:(I)Ljava/lang/Integer; //
method@0003
5 |000d: move-result-object v2
6 |000e: invoke-virtual {v0, v1, v2}, Ljava/util/HashMap;.put:
(Ljava/lang/Object;Ljava/lang/Object;)Ljava/lang/Object; // method@0007
7 |0011: invoke-static {v3}, Ljava/lang/Integer;.valueOf:(I)Ljava/lang/Integer; //
method@0003
8 |0014: move-result-object v1
9 |0015: invoke-virtual {v0, v1}, Ljava/util/HashMap;.get:
(Ljava/lang/Object;)Ljava/lang/Object; // method@0006
10 |0018: move-result-object v0
11 |0019: check-cast v0, Ljava/lang/Integer; // type@0002
12 |001b: invoke-virtual {v0}, Ljava/lang/Integer;.intValue:()I // method@0002
|001e: return-void
```

only „map.get()“ → Worst case: 7 additional instructions

```
|[000178] HashMapTest.main:([Ljava/lang/String;)V
|0000: new-instance v0, Ljava/util/HashMap; // type@0004
|0002: invoke-direct {v0}, Ljava/util/HashMap;.<init>:()V // method@0005
1 |0005: const/4 v1, #int 0 // #0
2 |0006: invoke-static {v1}, Ljava/lang/Integer;.valueOf:(I)Ljava/lang/Integer; //
method@0003
3 |0009: move-result-object v1
4 |000a: invoke-virtual {v0, v1}, Ljava/util/HashMap;.get:
(Ljava/lang/Object;)Ljava/lang/Object; // method@0006
5 |000d: move-result-object v0
6 |000e: check-cast v0, Ljava/lang/Integer; // type@0002
7 |0010: invoke-virtual {v0}, Ljava/lang/Integer;.intValue:()I // method@0002
|0013: return-void
```

only „map.put()“ → Worst case: 7 additional instructions

```
|[000160] HashMapTest.main:([Ljava/lang/String;)V
|0000: new-instance v0, Ljava/util/HashMap; // type@0004
|0002: invoke-direct {v0}, Ljava/util/HashMap;.<init>:()V // method@0004
1 |0005: const/4 v1, #int 0 // #0
2 |0006: invoke-static {v1}, Ljava/lang/Integer;.valueOf:(I)Ljava/lang/Integer; //
method@0002
3 |0009: move-result-object v1
4 |000a: const/4 v2, #int 1 // #1
5 |000b: invoke-static {v2}, Ljava/lang/Integer;.valueOf:(I)Ljava/lang/Integer; //
method@0002
6 |000e: move-result-object v2
7 |000f: invoke-virtual {v0, v1, v2}, Ljava/util/HashMap;.put:
(Ljava/lang/Object;Ljava/lang/Object;)Ljava/lang/Object; // method@0005
|0012: return-void
```