| Level 5 | Go To Problems (/courses/programming/topics/hashing/#problems) |
| Hashing | |

TUTORIAL

1. Introduction To Hashing

2. Key Terms In Hashing

3. Hashing Techniques

4. Hashing Implementation Details

Hashing Implementation Details

| C | C++ | Java | Python |

C++ :

> 66   *C++ has unordered_map which is implemented via hashing. We will discuss treemaps in C++ as well later, which in practice seem to behave faster in C++.* 99

Declaration

> unordered_map**<int**, **int>** A; *// declares an empty map. O(1)*

Adding an key, value pair :

> A.insert({key, value}); *// O(1) time on average*

Find the value for key = K:

> **if** (A.find(K) **==** A.end()) **return** null; *// means that K does not exist in A.*
> **else return** A[K];   *// O(1) average case. Rare worst case O(n).*

Size (number of elements) of the vector :

> A.size()   *// O(1)*

Erase from the map :

```
if (A.find(K) != A.end()) A.erase(A.find(K));
 OR  A.erase(K);
```

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