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map vs unordered_map in C++ - GeeksforGeeks

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map vs unordered_map in C++

unordered_map in C++ STL

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Map in C++ Standard Template Library (STL)

map insert() in C++ STL

Inserting elements in std::map (insert, emplace and operator[])

Searching in a map using std::map functions in C++

map find() function in C++ STL

Unordered Sets in C++ Standard Template Library

Set in C++ Standard Template Library (STL)

What are the default values of static variables in C?

Understanding "volatile" qualifier in C | Set 2 (Examples)

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Understanding "register" keyword in C

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map vs unordered_map in C++

Difficulty Level : Easy

Last Updated : 10 Jan, 2023

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Pre-requisite : [std::map](#), [std::unordered_map](#)

When it comes to efficiency, there is a huge difference between maps and unordered maps. We must know the internal working of both to decide which one is to be used.

Difference :

	map	unordered_map
Ordering	increasing order (by default)	no ordering
Implementation	Self balancing BST like Red-Black Tree	Hash Table
search time	log(n)	O(1) -> Average O(n) -> Worst Case
Insertion time	log(n) + Rebalance	Same as search
Deletion time	log(n) + Rebalance	Same as search

Use std::map when

- You need ordered data.
- You would have to print/access the data (in sorted order).
- You need predecessor/successor of elements.
- See [advantages of B+I over Hash Table](#) for more cases.

CPP

```
// CPP program to demonstrate use of std::map
#include <bits/stdc++.h>

int main()
{
    // Ordered map
    std::map<int, int> order;

    // Mapping values to keys
    order[5] = 10;
    order[3] = 5;
    order[20] = 100;
    order[1] = 1;

    // Iterating the map and
    // printing ordered values
    for (auto i = order.begin(); i
        != order.end(); i++) {
        std::cout << i->first
                    << " : "
                    << i->second << '\n';
    }
}
```

Output

```
1 : 1
3 : 5
5 : 10
20 : 100
```

Use std::unordered_map when

- You need to keep count of some data (Example – strings) and no ordering is required.
- You need single element access i.e. no traversal.

CPP

```
// CPP program to demonstrate use of
// std::unordered_map
#include <bits/stdc++.h>

int main()
{
    // Unordered map
    std::unordered_map<int, int> order;

    // Mapping values to keys
    order[5] = 10;
    order[3] = 5;
    order[20] = 100;
    order[1] = 1;

    // Iterating the map and
    // printing unordered values
    for (auto i = order.begin();
        i != order.end(); i++)
    {
        std::cout << i->first
                    << " : "
                    << i->second << '\n';
    }
}
```

Output

```
1 : 1
20 : 100
5 : 10
3 : 5
```

Let us see the differences in a tabular form :-

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	map	unordered_map
1.	map is define in #include <map> header file	unordered_map is defined in #include <unordered_map> header file
2.	It is implemented by red-black tree .	It is implemented using hash table.
3.	It is slow.	It is fast.
4.	Time complexity for operations is O(log N)	Time complexity for operations is O(1)
5.	map is used to store elements as key,value pairs in sorted order.	unordered_map is used to store elements as key,value pairs in non-sorted order.

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Current difficulty : **Easy**

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