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Difference between set, multiset, unordered_set, unordered_multiset

1. Set

- (i) Stores the values in sorted order.
- (ii) Stores only unique values.
- (iii) Elements can only be inserted or deleted but cannot be modified.
- (iv) We can erase more than 1 element by giving start iterator and end iterator position.
- (v) Traversal using iterators.
- (vi) Sets are implemented as [Binary Search Tree](#).

```
// CPP program to demonstrate insert and
// delete in set
#include <bits/stdc++.h>
using namespace std;
int main()
{
    // set declare
    set<int> s;

    // Elements added to set
    s.insert(12);
    s.insert(10);
    s.insert(2);
    s.insert(10); // duplicate added
    s.insert(90);
    s.insert(85);
    s.insert(45);

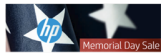
    // Iterator declared to traverse
    // set elements
    set<int>::iterator it, it1, it2;
    cout << "Set elements after sort and "
          "removing duplicates:\n";
    for (it = s.begin(); it != s.end(); it++)
        cout << *it << ' ';
    cout << '\n';

    it1 = s.find(10);
    it2 = s.find(90);

    // elements from 10 to elements before
    // 90 erased
    s.erase(it1, it2);
    cout << "Set Elements after erase:\n";
    for (it = s.begin(); it != s.end(); it++)
        cout << *it << ' ';

    return 0;
}
```





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Set elements after sort and removing duplicates.

2 10 12 45 85 90

Set Elements after erase:

2 90

2. Multiset

(i) Stores elements in sorted order.

(ii) It allows storage of multiple elements.

(iii) We can erase more than 1 element by giving start iterator and end iterator.

Note:- All other properties similar to set.

```
// CPP program to demonstrate insert and
// delete in set
#include <bits/stdc++.h>
using namespace std;
int main()
{
    // multiset declare
    multiset<int> s;

    // Elements added to set
    s.insert(12);
    s.insert(10);
    s.insert(2);
    s.insert(10); // duplicate added
    s.insert(90);
    s.insert(85);
    s.insert(45);

    // Iterator declared to traverse
    // set elements
    multiset<int>::iterator it, it1, it2;
    cout << "Multiset elements after sort\n";
    for (it = s.begin(); it != s.end(); it++)
        cout << *it << ' ';
    cout << '\n';

    it1 = s.find(10);
    it2 = s.find(90);

    // elements from 10 to elements before 90
    // erased
    s.erase(it1, it2);

    cout << "Multiset Elements after erase:\n";
    for (it = s.begin(); it != s.end(); it++)
        cout << *it << ' ';

    return 0;
}
```

OUTPUT:

Multiset elements after sort

2 10 10 12 45 85 90

Multiset Elements after erase:

2 90

3. Unordered_set

(i) Elements can be stored in any order. (no sorted order)

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(iv) we can erase only the element for which iterator position is given.

Note:- All other properties similar to set.

```
// CPP program to demonstrate insert and
// delete in unordered_set
#include <bits/stdc++.h>
using namespace std;
int main()
{
    // unordered_set declare
    unordered_set<int> s;

    // Elements added to set
    s.insert(12);
    s.insert(10);
    s.insert(2);
    s.insert(10); // duplicate added
    s.insert(90);
    s.insert(85);
    s.insert(45);
    s.insert(12);
    s.insert(70);

    // Iterator declared to traverse
    // set elements
    unordered_set<int>::iterator it, it1;
    cout << "Unordered_set elements after sort:\n";
    for (it = s.begin(); it != s.end(); it++)
        cout << *it << ' ';
    cout << '\n';

    it1 = s.find(10);

    // element 10 erased
    s.erase(it1);
    cout << "Unordered_set Elements after erase:\n";
    for (it = s.begin(); it != s.end(); it++)
        cout << *it << ' ';

    return 0;
}
```

OUTPUT:

```
Unordered_set elements after sort:
70 85 45 12 10 2 90
Unordered_set Elements after erase:
70 85 45 12 2 90
```

4. Unordered_multiset

- (i) Elements can be stored in any order.
- (ii) Duplicate elements can be stored.
- (iii) Hash-table used to store elements.
- (iv) We can erase only the element for which iterator position is given.

Note:- All other properties similar to set.

```
// CPP program to demonstrate insert and
// delete in unordered_multiset
#include <bits/stdc++.h>
using namespace std;
```





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```

// Elements added to set
s.insert(12);
s.insert(10);
s.insert(2);
s.insert(10); // duplicate added
s.insert(90);
s.insert(85);
s.insert(45);

// Iterator declared to traverse
// set elements
unordered_multiset<int>::iterator it, it1;
cout << "Unordered-Multiset elements after sort:\n";
for (it = s.begin(); it != s.end(); it++)
    cout << *it << ' ';
cout << '\n';

it1 = s.find(10);

// element 10 trained
s.erase(it1);

cout << "Unordered-Multiset Elements after "
      << "erase:\n";
for (it = s.begin(); it != s.end(); it++)
    cout << *it << ' ';

return 0;
}

```

OUTPUT:

Unordered-Multiset elements after sort:

85 45 12 90 2 10 10

Unordered-Multiset Elements after erase:

85 45 12 90 2 10

Conclusion :

In simple words, **set** is a container that stores **sorted and unique** elements. If **unordered** is added means elements are **not sorted**. If **multiset** is added means **duplicate elements** storage is allowed.

This article is contributed by **SHAURYA UPPAL**. If you like GeeksforGeeks and would like to contribute, you can also write an article using contribute.geeksforgeeks.org or mail your article to contribute@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.

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