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# Multimap

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*This article is about the data type. For the mathematical concept, see [Multivalued function](#). For the mapping website, see [Multimap.com](#).*

In [computer science](#), a **multimap** (sometimes also **multihash**) is a generalization of a [map](#) or [associative array](#) [abstract data type](#) in which more than one value may be associated with and returned for a given key. Both map and multimap are particular cases of [containers](#) (for example, see [C++ Standard Template Library containers](#)). Often the multimap is implemented as a map with [lists](#) or [sets](#) as the map values.

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## Examples [\[ edit \]](#)

- In a student enrollment system, where students may be enrolled in multiple classes simultaneously, there might be an association for each enrollment of a student in a course, where the key is the student ID and the value is the course ID. If a student is enrolled in three courses, there will be three associations containing the same key.
- The index of a book may report any number of references for a given index term, and thus may be coded as a multimap from index terms to any number of reference locations.
- [Querystings](#) may have multiple values associated with a single field. This is commonly generated when a [web form](#) allows multiple [check boxes](#) or selections to be chosen in response to a single form element.

## Language support [\[ edit \]](#)

### C++ [\[ edit \]](#)

C++'s [Standard Template Library](#) provides the `multimap` [container](#) for the sorted multimap using a [self-balancing binary search tree](#),<sup>[1]</sup> and SGI's STL extension provides the `hash_multimap` container, which implements a multimap using a [hash table](#).<sup>[2]</sup>

### Dart [\[ edit \]](#)

Quiver provides a Multimap for [Dart](#).<sup>[3]</sup>

### Java [\[ edit \]](#)

[Apache Commons Collections](#) provides a MultiMap interface for [Java](#).<sup>[4]</sup> It also provides a MultiValueMap implementing class that makes a MultiMap out of a Map object and a type of Collection.<sup>[5]</sup>

[Google Guava](#) provides an interface Multimap and implementations.<sup>[6]</sup>

### OCaml [\[ edit \]](#)

[OCaml](#)'s standard library module `Hashtbl` implements a hash table where it's possible to store multiple values for a key.

### Scala [\[ edit \]](#)

The [Scala](#) programming language's API also provides Multimap and implementations<sup>[7]</sup>

See also [\[ edit \]](#)

- [Abstract data type](#) for the concept of type in general
- [Associative array](#) for the more fundamental abstract data type
- [Multiset](#) for the case where same item can appear several times

References [\[ edit \]](#)

1. <sup>^</sup> ["multimap<Key, Data, Compare, Alloc>"](#) [↗](#). *Standard Template Library Programmer's Guide*. [Silicon Graphics International](#).
2. <sup>^</sup> ["hash\\_multimap<Key, HashFcn, EqualKey, Alloc>"](#) [↗](#). *Standard Template Library Programmer's Guide*. [Silicon Graphics International](#).
3. <sup>^</sup> ["Multimap"](#) [↗](#). *Quiver API docs*.
4. <sup>^</sup> ["Interface MultiMap"](#) [↗](#). *Commons Collections 3.2.1 API*, [Apache Commons](#).
5. <sup>^</sup> ["Class MultiValueMap"](#) [↗](#). *Commons Collections 3.2.1 API*, [Apache Commons](#).
6. <sup>^</sup> ["Interface Multimap<K,V>"](#) [↗](#). *Guava Library 2.0*.
7. <sup>^</sup> ["Scala.collection.mutable.MultiMap"](#) [↗](#). *Scala stable API*.

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