STL

The Standard Template Library (STL) is a set of C++ template classes to provide common programming data structures and functions such as lists, stacks, arrays, etc.

Some of the key components of the STL include:

1. **Containers**: The STL provides a range of containers, such as vector, list, map, set, and stack, which can be used to store and manipulate data.
2. **Algorithms**: The STL provides a range of algorithms, such as sort, find, and binary_search, which can be used to manipulate data stored in containers.
3. **Iterators**: Iterators are objects that provide a way to traverse the elements of a container. The STL provides a range of iterators, such as forward_iterator, bidirectional_iterator, and random_access_iterator, that can be used with different types of containers.
4. **Function Objects**: Function objects, also known as functors, are objects that can be used as function arguments to algorithms. They provide a way to pass a function to an algorithm, allowing you to customize its behavior.
5. **Adapters**: Adapters are components that modify the behavior of other components in the STL. For example, the reverse_iterator adapter can be used to reverse the order of elements in a container.

Algorithms

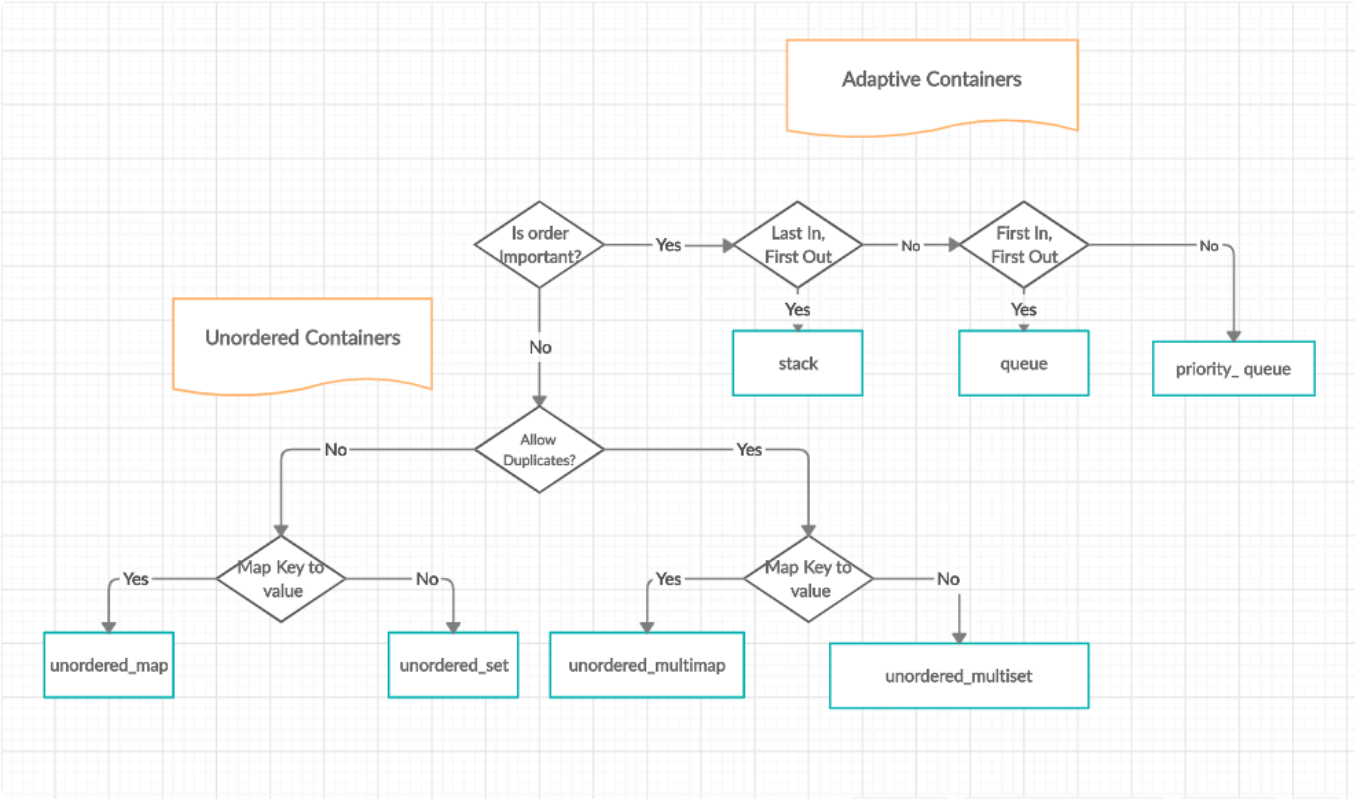
The header algorithm defines a collection of functions specially designed to be used on a range of elements. They act on containers and provide means for various operations for the contents of the containers.

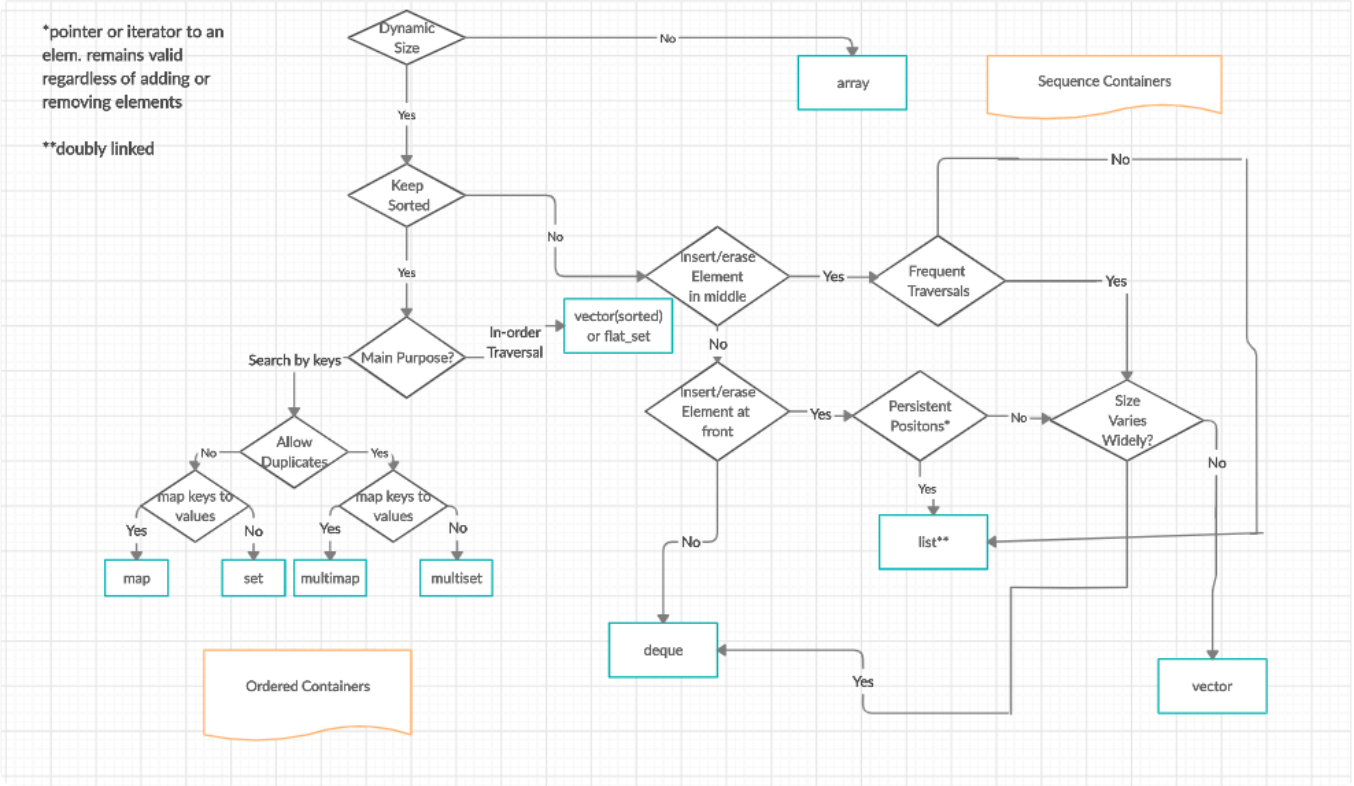
Containers

Containers or container classes store objects and data. There are in total seven standards “first-class” container classes and three container adaptor classes and only seven header files that provide access to these containers or container adaptors.

- **Sequence Containers**: implement data structures tat can be accessed in a sequential manner.

    - Vectors
    - List
    - Deque
    - arrays
    - forward_list(Introduced in C++11)
- **Container Adaptors**: provide a different interface for sequential containers.
    - Queue
    - Priority queue
    - Stack
- **Associative Containers**: implement sorted data structures that can be quickly searched (O(log n) complexity).
    - Sets
    - Multiset
    - Map
    - Multimap
- **Unordered Associative Containers**: implement unordered data structures that can be quickly searched
    - Unordered Set (Introduced in C++11)
    - unordered_multiset (Introduced in C++11)
    - Unordered Map (Introduced in C++11)
    - unordered_multimap (Introduced in C++11)





There are also Pairs in the utility library which are often used with other stl containers.

Functors

The STL includes classes that overload the function call operator. Instances of such classes are called function objects or functors. Functors allow the working of the associated function to be customized with the help of parameters to be passed.

Iterators

As the name suggests, iterators are used for working on a sequence of values. They are the major feature that allows generality in STL.