KEEP CALM AND LOVE CONTAINERS

Container Types

- Sequence containers
- Associative containers
  - Ordered
  - Unordered [C++11]
- Container adaptors

Sequence containers

- std::vector
- std::list
- std::forward_list [C++11]
- std::deque
- std::array [C++11]

std::vector

- #include <vector>
- Complexity:
  - Random access - *O(1)*
  - Insertion / removal:
    - At the end – *amortized O(1)*
    - Elsewhere – *O(N)*

std::list

- #include <list>
- Complexity:
  - Random access – *not supported*
  - Insertion / removal – *O(1)*

std::forward_list [C++11]

- #include <forward_list>
- Complexity:
  - Random access - *not supported*
  - Insertion / removal – *O(1)*
- More space efficient storage than **std::list**
  - Forward iterators only

std::deque

- #include <deque>
- Complexity:
  - Random access – *O(1)*
  - Insertion / removal:
    - At the end / beginning – *amortized O(1)*
    - Elsewhere – *O(N)*

std::array [C++11]

- #include <array>
- Wrapper for fixed-size arrays
- Complexity:
  - Random access – *O(1)*
  - Insertion / removal – *not supported*

Associative containers [ordered]

- std::set
- std::map
- std::multiset
- std::multimap

std::set

- #include <set>
- Unique values
- Complexity:
  - Search, insertion and removal – logarithmic

std::map

- #include <map>
- Unique keys
- Every key is associated with a value
- Complexity:
  - Search, insertion and removal - logarithmic

std::multiset

- The same as std::set, but
  - Allows equal values

std::multimap

- The same as std::map, but
  - Every key is associated with a list of values

Associative containers [unordered] [C++11]

- std::unoreded_set
- std::unordered_map
- std::unordered_multiset
- std::unordered_multimap

Differences

- Does not order sequence
- Search, insertion and removal has *constant average* complexity
  - But the worst case has *O(N)* complexity

Container adaptors

- std::stack
- std::queue
- std::priority_queue

std::stack

- #include <stack>
- FILO data structure

std::queue

- #include <queue>
- FIFO data structure

std::priority_queue

- #include <queue>
- Orders the elements by given predicate