

The Standard Template Library Algorithms

Lecture 37

Sections 16.5, 17.6, 18.3, 18.6

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1 The STL Algorithms

2 Assignment

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The STL Algorithms

- The STL algorithms are divided into categories.
 - Sequence-non-modifying algorithms.
 - Sequence-modifying algorithms.
 - Partitions
 - Sorting
 - Searching
 - Merging
 - Heap (priority queue)
 - Min/max
 - Miscellaneous

The STL Algorithms

- Visit the web site

`http://www.cplusplus.com/reference/algorithm/`
to see a full list of the algorithms available.

Some Sequence-Modifying Algorithms

Some Sequence-Modifying Algorithms

- `copy(first, last, result);`
 - `replace_if(first, last, bool pred(T), T value);`
 - `reverse(first, last);`
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- `copy();` – Copy range `[first, last)` to `result`.
 - `replace_if();` – Over range `[first, last)` replace with `value` if `pred()` is true.
 - `reverse();` – Reverse the order of elements in range `[first, last)`.

Some Sequence-Modifying Algorithms

Some Sequence-Modifying Algorithms

- `rotate(first, middle, last);`
 - `random_shuffle(first, last);`
 - `iterator partition(first, last, bool pred(T));`
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- `rotate()` – Rotate elements in range `[first, last)`, `middle` becomes `first`.
 - `random_shuffle()` – Rearrange elements in range `[first, last)` randomly.
 - `partition()` – Over range `[first, last)`, elements for which `pred()` is true precede the others.

Some Sequence-Non-Modifying Algorithms

Some Sequence-Non-Modifying Algorithms

- `for_each(first, last, void f(T));`
- `iterator find_if(first, last, bool pred(T));`
- `for_each()` – Apply `f()` to range `[first, last)`.
- `find_if()` – Find first element in `[first, last)` for which `pred()` is true.

Some Sequence-Non-Modifying Algorithms

Some Sequence-Non-Modifying Algorithms

- `int count_if(first, last, bool pred(T));`
- `iterator search(first1, last1, first2, last2);`
- `count_if()` – Count elements in range `[first, last)` for which `pred()` is true.
- `search()` – Search range `[first1, last1)` for first occurrence of sequence in range `[first2, last2)`

Some Other Algorithms

Some Other Algorithms

- `sort();`
- `binary_search();`
- `merge();`
- `inplace_merge();`
- `next_permutation();`
- `prev_permutation();`

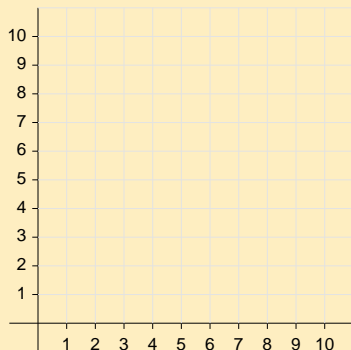
Applying Algorithms to Containers

- These algorithms may be applied to any container (or adaptor) class, including arrays.
- If the container class is an array, then the indexes of the array elements as well as pointers to the elements qualify as iterators.

Traveling Salesman (brute force)

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- Run the program `TravelingSalesmanSTL.cpp`.



Outline

1 The STL Algorithms

2 Assignment

Assignment

Assignment

- Read Sections 16.5, 17.6, 18.3, 18.6.