Josuttis' Summary of STL Algorithms

Prepared by Scott Meyers for his *Effective STL* Course, http://www.aristeia.com/estl/.

Name	Effect	Page
for_each()	Performs an operation for each element	334
count()	Returns the number of elements	338
count_if()	Returns the number of elements that match a criterion	338
min_element()	Returns the element with the smallest value	340
max_element()	Returns the element with the largest value	340
find()	Searches for the first element with the passed value	341
find_if()	Searches for the first element that matches a criterion	341
search_n()	Searches for the first *n* consecutive elements with certain properties	344
search()	Searches for the first occurrence of a subrange	347
find_end()	Searches for the last occurrence of a subrange	350
find_first_of()	Searches the first of several possible elements	352
adjacent_find()	Searches for two adjacent elements that are equal (by some criterion)	354
equal()	Returns whether two ranges are equal	356
mismatch()	Returns the first elements of two sequences that differ	358
lexicographical_compare()	Returns whether a range is lexicographically less than another range.	360

Table 9.1. Nonmodifying Algorithms

Name	Effect	Page
for_each()	Performs an operation for each element	334
copy()	Copies a range starting with the first element	363
copy_backward()	Copies a range starting with the last element	363
transform()	Modifies (and copies) elements; combines elements of two ranges	367 368
merge()	Merges two ranges	416
swap_ranges()	Swaps elements of two ranges	370
fill()	Replaces each element with a given value	372
fill_n()	Replaces *n* elements with a given value	372
generate()	Replaces each element with the result of an operation	373
generate_n()	Replaces *n* elements with the result of an operation	373
replace()	Replaces elements that have a special value with another value	375
replace_if()	Replaces elements that match a criterion with another value	375
replace_copy()	Replaces elements that have a special value while copying the whole range	376
replace_copy_if()	Replaces elements that match a criterion while copying the whole range	376

Table 9.3. Modifying Algorithms

Name	Effect	Page
remove()	Removes elements with a given value	378
remove_if()	Removes elements that match a given criterion	378
remove_copy()	Copies elements that do not match a given value	380
remove_copy_if()	Copies elements that do not match a given criterion	380
unique()	Removes adjacent duplicates (elements that are equal to their predecessor)	381
unique_copy()	Copies elements while removing adjacent duplicates	384

Table 9.4. Removing Algorithms

Name	Effect	Page
reverse()	Reverses the order of the elements	386
reverse_copy()	Copies the elements while reversing their order	386
rotate()	Rotates the order of the elements	388
rotate_copy()	Copies the elements while rotating their order	389
next_permutation()	Permutes the order of the elements	391
prev_permutation()	Permutes the order of the elements	391
random_shuffle()	Brings the elements into a random order	393
partition()	Changes the order of the elements so that elements that match a criterion are at the front	395
stable_partition()	Same as partition(), but preserves the relative order of matching and nonmatching elements	395

Table 9.5. Mutating Algorithms

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Name	Effect	Page
sort()	Sorts all elements	397
stable_sort()	Sorts while preserving order of equal elements	397
partial_sort()	Sorts until the first *n* elements are correct	400
partial_sort_copy()	Copies elements in sorted order	402
nth_element()	Sorts according to the *n*th position	404
partition()	Changes the order of the elements so that elements that match a criterion are at the front	395
stable_partition()	Same as partition(), but preserves the relative order of matching and nonmatching elements	395
make_heap()	Converts a range into a heap	406
push_heap()	Adds an element to a heap	406
pop_heap()	Removes an element from a heap	407
sort_heap()	Sorts the heap (it is no longer a heap after the call)	407

Table 9.6. Sorting Algorithms

Name	Effect	Page
binary_search()	Returns whether the range contains an element	410
includes()	Returns whether each element of a range is also an element of another range	411
lower_bound()	Finds the first element greater than or equal to a given value	413
upper_bound()	Finds the first element greater than a given value	413
equal_range()	Returns the range of elements equal to a given value	415
merge()	Merges the elements of two ranges	416
set_union()	Processes the sorted union of two ranges	418
set_intersection()	Processes the sorted intersection of two ranges	419
set_difference()	Processes a sorted range that contains all elements of a range that are not part of another	420
set_symmetric_difference()	Processes a sorted range that contains all elements that are in exactly one of two ranges	421
inplace_merge()	Merges two consecutive sorted ranges	423

Table 9.7. Algorithms for Sorted Ranges

Name	Effect	Page
accumulate()	Combines all element values (processes sum, product, and so forth)	425
inner_product()	Combines all elements of two ranges	427
adjacent_difference()	Combines each element with its predecessor; converts absolute values to relative values	431
partial_sum()	Combines each element with all of its predecessors; converts relative values to absolute values	429

Table 9.8. Numeric Algorithms

Search For	STL Algorithm	String Function
First occurrence of one element	find()	find()
Last occurrence of one element	find() with reverse iterators	rfind()
First occurrence of a subrange	search()	find()
Last occurrence of a subrange	find_end()	rfind()
First occurrence of several elements	find_first_of()	find_first_of()
Last occurrence of several elements	find_first_of() with reverse iterators	find_last_of()
First occurrence of *n* consecutive elements	search_n()	(None)

Table 9.2. Comparison of Searching String Operations and Algorithms