

Index

*₂₉
++, _{5, 29}
!=, _{20, 29}
<, ₂₃
<=, ₂₁
==, _{21, 29}
>, ₂₁
>=, ₂₁
[] [], matrix class, ₁₉₇
3-way sorting, ₂₂₃

A
abstract data types, _{4, 45, 69}
accumulate(), ₁₅₃
adapter
 function, ₂₄
adaptor
 container, ₆₉
 iterator, ₃₅
 vector, ₁₉₇
adjacency list, ₂₃₄
adjacency matrix, ₂₃₄
adjacent_difference(), ₁₅₇
adjacent_find(), ₉₃
advance(), ₃₃
aggregation, ₆₉
algorithm, ₆
 accumulate(), ₁₅₃
 adjacent_difference(), ₁₅₇
 adjacent_find(), ₉₃
 binary_search(), ₁₂₈
 copy(), ₁₀₂
 copy_backward(), ₁₀₂
 copy_if(), ₁₀₄
 copying, ₈₅
 count(), ₉₄
 count_if(), ₉₄

equal(), ₉₈
equal_range(), ₁₂₉
fill(), ₁₁₁
fill_n(), ₁₁₁
find(), ₈₉
find_end(), ₉₀
find_first_of(), ₉₂
find_if(), ₈₉
for_each(), ₈₇
generate(), ₁₁₂
generate_n(), ₁₁₂
includes(), ₁₃₄
inner_product(), ₁₅₄
inplace_merge(), ₁₃₃
iota(), ₁₀₁
iter_swap(), ₁₀₅
lexicographical_compare(), ₁₅₁
lower_bound(), ₁₂₈
make_heap(), ₁₄₇
max(), ₁₅₀
max_element(), ₁₅₀
merge(), ₁₃₀
mergesort(), ₁₃₂
min(), ₁₅₀
min_element(), ₁₅₀
mismatch(), ₉₅
next_permutation(), ₁₅₂
nth_element(), ₁₂₆
partial_sort(), ₁₂₅
partial_sort_copy(), ₁₂₅
partial_sum(), ₁₅₆
partition(), ₁₂₁
pop_heap(), ₁₄₃
prev_permutation(), ₁₅₂
push_heap(), ₁₄₅
random_shuffle(), ₁₁₉

- remove(), 113
 - remove_copy(), 113
 - remove_copy_if(), 113
 - remove_if(), 113
 - replace(), 109
 - replace_copy(), 109
 - replace_copy_if(), 109
 - replace_if(), 109
 - reverse(), 116
 - reverse_copy(), 116
 - rotate(), 117
 - rotate_copy(), 117
 - search(), 99
 - search_n(), 101
 - set_difference(), 137
 - set_intersection(), 136
 - set_symmetric_difference(), 138
 - set_union(), 135
 - showSequence(), 56
 - sort(), 122
 - sort_heap(), 148
 - stable_partition(), 121
 - stable_sort(), 123
 - swap(), 105
 - swap_ranges(), 106
 - transform(), 107
 - unique(), 115
 - unique_copy(), 115
 - upper_bound(), 129
 - with binary predicate, 87
 - with predicate, 86
 - allocator, 28
 - arithmetic with iterators, 9
 - array, *see* vector, matrices
 - associative container, 73, 169
 - at(), 53, 57
- B**
- back(), 50
 - back_insert_iterator, 64
 - base(), 35
 - begin(), 30
 - bidirectional iterator, 34
 - bidirectional_iterator_tag, 37
 - binary predicates, 87
 - binary search, 17
 - binary_function, 22
 - binary_negate, 26
 - binary_search(), 128
 - bind1st, 26
 - bind2nd, 26, 105
 - binder1st, 26
 - binder2nd, 27
 - breadth-first search, 240
- C**
- C memory layout for matrices, 204
 - capacity(), 53
 - changeKeyAt(), 249
 - checkedVector, 195
 - checkvec.h, 196
 - clear(), 48
 - collision handling, 170
 - complexity, 14
 - component of a graph, 242
 - computing time, 14
 - connection, 239
 - container, 5, 45
 - adaptor, 69
 - associative, 73
 - data type interface, 45
 - fast associative, 169
 - relational operators, 46
 - reverse_iterator, 47
 - reversible, 46
 - container method, 46
 - begin(), 47
 - empty(), 47
 - end(), 47
 - max_size(), 47
 - operator<(), 47
 - operator<=(), 47
 - operator>(), 47
 - operator>=(), 47
 - rbegin(), 47
 - rend(), 47
 - size(), 47
 - swap(), 47
 - container types

A
 const_iterator, 46
 const_pointer, 49
 const_reference, 46
 difference_type, 46
 iterator, 46
 pointer, 49
 reference, 46
 size_type, 46
 value_type, 46
 control abstraction, 5
 copy(), 102
 copy_backward(), 102
 copy_if(), 104
 copying algorithms, 85
 _copy, 86
 count()
 algorithm, 94
 Set, 76
 count_if(), 94
 cross-reference, 185
 <cstddef>, 32
 <cstdlib>, 113
 cycle, 239

D
 DAG, directed acyclic graph, 259
 Delaunay triangulation, 268
 delegation, 69
 depth-first search, 240
 deque, 56
 deque method, *see also* sequence method
 assign(), 50
 at(), 57
 back(), 50
 front(), 50
 operator[](), 57
 pop_back(), 50
 pop_front(), 57
 push_back(), 50
 push_front(), 57
 rbegin(), 50
 rend(), 50
 resize(), 50
 Difference(), 164

E
 Empty (class), 236
 empty(), 47
 end(), 30
 equal(), 98
 equality vs. equivalence, 21
 equal_range(), 76, 129
 equal_to, 22
 equivalence vs. equality, 21
 erase()
 sequence, 48
 set, 76
 Euclidian space, 155
 exclusive or (set), 138, 182
 execution time of an algorithm, 15

F
 Fibonacci, 158
 fill(), 111
 fill_n(), 111
 find()
 set, 76
 algorithm, 89
 find_end(), 90
 find_first_of(), 92
 find_if(), 89
 first, 19, 79
 for_each(), 87

FORTRAN memory layout for matrices, 205
 forward iterator, 34
`forward_iterator_tag`, 37
`front()`, 50
`front_insert_iterator`, 66
 function adapter, 24
 function objects, 21
`<functional>`, 22, 23, 25, 27, 90
 functor, *see* function objects

G

`generate()`, 112
`generate_n()`, 112
 generating strings out of numbers, 267
 generator, 112
 generic programming, 4
`gra_algo.h`, 256, 261
 graph, 233
 as L^AT_EX file, 269
 output, 242
 read, 243, 266
 Graph (class), 236
 Graph method, *see also* container method
 `check()`, 239
 `CountEdges()`, 239
 `CyclesAndConnectivity()`, 240
 greater, 22
 greater_equal, 22

H

hash function, 170
 index pairs, 214
 hash function object, 180
 hash table, 170
 header files, 28
 heap, 141, 249
`Heapsort()`, 149
 HMap
 class, 171
 iterator, 172
 HMap method
 `begin()`, 175
 `clear()`, 176
 `end()`, 175
 `erase()`, 178
 `find()`, 177
 `insert()`, 177
 `max_size()`, 179
 `operator[]()`, 177
 `swap()`, 180
`hmap.h`, 172
 HSet (class), 181
 HSet methods, *see also* HMap methods
 `operator+()`, 182
 `operator+=()`, 182
 `operator*()`, 183
 `operator*=()`, 183
 `operator-()`, 183
 `operator-=()`, 183
 `operator^()`, 183
 `operator^=()`, 183
`hset.h`, 181

I

identifier, 40
`_if`, 87
 implicit data types, 4, 45, 69
 Includes() (also for unsorted sets), 162
 includes() (STL), 134
 index check, 195
 index operator, 195
 inheritance and STL, 196
 inner product, 154
 `inner_product()`, 154
 inplace_merge(), 133
 input iterator, 33
 `input_iterator_tag`, 36
 insert()
 `multiset`, 78
 `sequence`, 48
 `set`, 76
 insert iterator, 64
 and set operations, 140
 insert_iterator, 66
 intersection

- algorithm, 163
 HSet, 183
 of sorted structures, 136
`Intersection()`, 163
 interval notation, 47
`iota()`, 101
 istream iterator, 37
 iterator, 5, 29
 - adaptor, 35
 - `back_insert`, 64
 - bidirectional, 34, 36
 - category, 33, 58
 - derivation of value and distance types, 61
 - distance, 32
 - forward, 34
 - `front_insert`, 66
 - inheriting properties, 63
 - input, 33
 - `insert`, 64, 66
 - istream, 37
 - ostream, 40
 - output, 34
 - random access, 34
 - reverse random access, 36
 - state, 30
 iterator, 46
`iterator_traits`, 32
`IterGreater`, 247
`iter_swap()`, 105
- K**
`key_compare`, 75
`key_type`, 75
- L**
`\LaTeX` and graphs, 269
 length of a vector, 155
`less`, 22, 23
`less_equal`, 22
`lexicographical_compare()`, 151
`<limits>`, 256
 linear search, 17
`list`, 52
 list method, *see also* sequence method
`assign()`, 50
`back()`, 50
`front()`, 50
`merge()`, 55
`pop_back()`, 50
`pop_front()`, 55
`push_back()`, 50
`push_front()`, 55
`rbegin()`, 50
`remove()`, 55
`remove_if()`, 55
`rend()`, 50
`resize()`, 50
`reverse()`, 55
`sort()`, 55
`splice()`, 55
`unique()`, 55
 list, singly-linked, 9
`logical_and`, 25
`logical_not`, 25
`logical_or`, 25
`lower_bound()`, 76, 128
- M**
`make_heap()`, 147
`make_pair()`, 20
 map, 78
 - as hash map, 171
 - as sorted map, 74
 - multi-, 81
 map methods, *see* set methods
 - `operator[]()`, 79
 - `value_comp()`, 79
 map types, *see also* set types
 - `key_compare`, 78
 - `value_compare`, 78
 matrix, 197
 - memory models, 204
 - sparse, 210
 - symmetric, 205
 - three-dimensional, 201
 - two-dimensional, 198`max()`, 150
`max_element()`, 150
`max_size()`, 46

memory models for matrices, 204
 merge, 130
 merge(), 54, 55, 130
 mergesort(), 132
 min(), 150
 min_element(), 150
 minus, 25
 mismatch(), 95
 modulus, 25
 multi-pass, 34
 multimap, 81
 multiplies, 25
 multiset, 78

N

NDEBUG, 197
 negate, 25
 neighboring vertices, 268
 next_permutation(), 152
 not1, 24
 not2, 26
 not_equal_to, 22
 nth_element(), 126
 number of edges, 239
 numeric_limits, 256

O

O notation, 15
 occupation rate, 170, 179
 Ω notation, 18
 open addressing, 170
 operator()(), 21
 operator*(), 29, 64
 operator*() (HSet), 183
 operator+() (HSet), 182
 operator++(), 29, 64
 operator-() (HSet), 183
 operator^() (HSet), 183
 operator!=(), 20, 29
 operator<=(), 21
 operator=(), 64
 operator==(), 21, 29
 operator>(), 21
 operator>=(), 21
 operator[](), 34, 53, 201, 204
 checkedVector, 196

 map, 79
 ostream iterator, 40
 output iterator, 34
 output_iterator_tag, 36

P

pairs, pair, 19
 partial template specialization, 31
 partial_sort(), 125
 partial_sort_copy(), 125
 partial_sum(), 156
 partition(), 121
 path, shortest, 254
 permuted index, 187
 Place, 252
 plus, 25
 pointer, 49
 pointer_to_binary_function,
 27
 pointer_to_unary_function, 27
 polymorphism and STL, 196
 pop_back(), 50
 pop_front(), 55
 pop_heap(), 143
 predicates, 86
 prev_permutation(), 152
 priority queue, 72
 and external sorting, 228
 dynamic, 245
 ptrdiff_t, 32
 ptr_fun, 27
 push_back(), 50
 push_front(), 55
 push_heap(), 145

Q

queue, 70

R

random coordinates, 267
 random numbers, generator for, 112,
 119
 random access iterator, 34
 random_access_iterator_tag,
 37
 random_shuffle(), 119

rbegin(), 35, 47, 50
red-black trees, 45
reference, 46
rel_ops, 20
remove()
 algorithm, 113
 list, 55
remove_copy(), 113
remove_copy_if(), 113
remove_if(), 55, 113
rend(), 35, 47, 50
replace(), 109
replace_copy(), 109
replace_copy_if(), 109
replace_if(), 109
reserve(), 53
resize(), 50
reverse bidirectional iterator, 36
reverse iterator, 35
reverse random access iterator, 36
reverse()
 algorithm, 116
 list, 55
reverse_copy(), 116
reverse_iterator, 51
reversible container, 46
rotate(), 117
rotate_copy(), 117
run (external sorting), 222

S

search(), 99
search_n(), 101
second, 19
sequence, 47
sequence method, *see also* container method
 clear(), 48
 erase(), 48
 insert(), 48
set, 74
 as hash set, 181
 as sorted set, 74
 difference, 164
 intersection, 163

multi-, 78
operations on sorted structures, 134
subset of a, 162
symmetric difference, 164
union, 162
set method, *see also* container method
 clear(), 76
 count(), 76
 equal_range(), 76
 erase(), 76
 find(), 76
 insert(), 76
 key_comp(), 76
 lower_bound(), 76
 upper_bound(), 76
 value_comp(), 76
set operations, 161
set types, *see also* container types
 key_compare, 75
 key_type, 75
 value_compare, 75
 value_type, 75
setalgo.h, 162
set_difference(), 137
set_intersection(), 136
set_symmetric_difference(), 138
set_union(), 135
shortest path, 254
showseq.h, 57
showSequence(), 56
simple list, 9
single pass, 34
size(), 46
size_type, 46
slist (class), 9
sort()
 algorithm, 122
 list, 55
sorted subsequences, 222
sort_heap(), 148
sorting
 external, 221
 external (accelerated), 228

- stable, 123
 - sparse matrix, 210
 - sparseMatrix, class, 217
 - splice(), 55, 56
 - stable sorting, 123
 - stable_partition(), 121
 - stable_sort(), 123
 - stack, 69
 - Stanford graphBase, 271
 - state of an iterator, 30
 - std::rel_ops, 20
 - stream iterator, 37
 - SubsequenceIterator (class), 224
 - subsequences, sorted, 222
 - subset, 162
 - swap()
 - algorithm, 105
 - vector, 47, 51
 - swap_ranges(), 106
 - symmetric difference
 - algorithm, 164
 - HSet, 183
 - of sorted structures, 138
 - symmetric matrix, memory layout, 205
 - Symmetric_Difference(), 164
- T**
- thesaurus, 190
 - time complexity, 14, 15
 - topological sorting, 258
 - traits, 30
 - traits, 32
 - transform(), 107
 - transposed matrix, 205
 - travelling salesman problem (TSP), 17
 - typename, 26
- U**
- unary_function, 22
 - unary_negate, 25
 - union
 - algorithm, 162
 - Hset, 182
 - of sorted structures, 135
- Union(), 162
 - unique()
 - algorithm, 115
 - list, 55
 - unique_copy(), 115
 - upper_bound(), 76, 129
 - <utility>, 19
- V**
- value semantics, 5
 - value type (derivation from iterator), 61
 - value_compare, 75
 - value_type, 46, 75
 - map, 79
 - vector
 - length of a, 155
 - with index check, 195
 - vector, 49
 - vector adaptor, 197
 - vector method, *see also* sequence method
 - assign(), 50
 - at(), 53
 - back(), 50
 - capacity(), 53
 - front(), 50
 - operator[](), 53
 - pop_back(), 50
 - push_back(), 50
 - rbegin(), 50
 - rend(), 50
 - reserve(), 53
 - resize(), 50
- W**
- wrapper
 - for iterator, 35
 - for vector, 197
- X**
- XOR (set), 164