

# Index

, —see comma operator  
! —see logical negation operator  
!= —see inequality operator  
# operator 16–5  
## operator 16–6  
% —see modulus operator  
%= operator 5–27  
&  
  —see address-of operator  
  —see bitwise AND operator  
  reference declarator 8–6  
&& —see logical AND operator  
&= operator 5–27  
( )  
  —see function call operator  
  function declarator 8–9  
\*  
  —see indirection operator  
  —see multiplication operator  
  pointer declarator 8–5  
\*= operator 5–27  
+  
  —see addition operator  
  —see unary plus operator  
++ —see increment operator  
+= operator 5–15, 27  
–  
  —see subtraction operator  
  —see unary minus operator  
-- —see decrement operator  
-= operator 5–27  
-> —see class member access operator  
->\* —see pointer to member operator  
. —see class member access operator  
.\* —see pointer to member operator  
... —see ellipsis  
/ —see division operator  
/\* \*/ comment 2–5  
// comment 2–5  
/= operator 5–27  
:  
  field declaration 9–11  
  label specifier 6–1  
::  
  —see scope resolution operator  
  scope resolution operator 3–15  
::\*, pointer to member declarator 8–7  
<

  —see less than operator  
  template and 14–5  
<< —see left shift operator  
<<= operator 5–27  
<= —see less than or equal to operator  
= —see assignment operator  
== —see equality operator  
> —see greater than operator  
>= —see greater than or equal operator  
>> —see right shift operator  
>>= operator 5–27  
?: —see conditional expression operator  
[ ]  
  —see subscripting operator  
  array declarator 8–8  
\  
  —see backslash  
^ —see bitwise exclusive OR operator  
^= operator 5–27  
\_, underscore in identifier 2–6  
{ }  
  block statement 6–1  
  class declaration 9–1  
  class definition 9–1  
  enum declaration 7–10  
  initializer list 8–18  
| —see bitwise inclusive OR operator  
|= operator 5–27  
|| —see logical OR operator  
~  
  —see destructor  
  —see one's complement operator  
0  
  2–11 —see also zero, null  
  null character 2–11  
  string terminator 2–11

## A

abort 3–26, 6–5, 17–10, 18–10, 16, 21  
abs 26–22, 34  
  complex 26–9  
abstract  
  class 10–10  
  class, constructor and 10–11  
  class, pointer to 10–10  
*abstract-declarator* 8–2  
access  
  adjusting base class member 11–5

- ambiguity, member 10-4
- and friend, class 11-7
- and friend function 11-6
- base class 11-3
- base class member 10-1
- checking and default argument 11-2
- class member 5-7
- control 11-1
- control, anonymous union 9-11
- control default 11-1
- control, member function and 12-1
- control, overloading resolution and 10-5
- declaration 11-5
- example, member name 11-5
- member name 11-1
- overloading and 13-4
- specifier 11-2/3
- specifier and friend 11-8
- specifier and object layout 11-3
- struct default member 9-1
- union default member 9-1
- virtual function 11-10
- access-specifier* 10-1
- accumulate 26-31
- acos 26-22, 34
- addition operator 5-22
- additive operator 5-22
- additive-expression* 5-22
- address 3-36, 5-25
  - of bit-field 9-11
  - of bit-field restriction 9-11
  - of constructor 12-2
  - of cv-qualified name 5-14
  - of member function, unspecified 17-15
  - of overloaded function 5-14, 13-19
- address-of operator 5-14
- adjacent\_find 25-11
- adjusting base class member access 11-5
- adjustment
  - array parameter 8-10
  - function parameter 8-10
- advance 24-11
- aggregate 8-18
- alert 2-9
- <algorithm> 25-1
- alias 7-15
- alignment
  - of bit-field 9-11
  - of bit-field, implementation defined 9-11
  - requirement, implementation-defined 3-33
  - storage allocation 5-17
- allocation
  - alignment storage 5-17
  - function 3-28, 5-17
  - implementation defined bit-field 9-11
  - new, storage 5-16
  - unspecified 9-5, 11-3
- allocator 20-16
- Allocator requirements 20-2
- allowing an exception 15-8
- alternate definition 17-13
- always\_noconv, codecvt 22-20
- ambiguity
  - base class member 10-4
  - class conversion 10-6
  - declaration type 7-2
  - declaration versus cast 8-3
  - declaration versus expression 6-7
  - detection, overloaded function 13-4
  - function declaration 8-17
  - member access 10-4
  - parentheses and 5-16
  - resolution, scoping 10-5
- ambiguous conversion sequence 13-15
- Amendment 1 17-12
- AND
  - operator, bitwise 5-25
  - operator, logical 5-26
  - operator, side effects and logical 5-26
- and pointer to member type, multi-level mixed pointer 4-3
- anonymous
  - union 9-10
  - union access control 9-11
  - union at namespace scope 9-11
  - union, global 9-11
  - union restriction 9-11
- any, bitset 23-50
- append, basic\_string 21-17
- apply, valarray 26-19
- arbitrary-positional stream 17-1
- arg, complex 26-10
- argc 3-24
- argument 1-1, 17-14/15, 19-3
  - access checking and default 11-2
  - and name hiding, default 8-14
  - and virtual function, default 8-14
  - binding of default 8-13
  - conversion 8-9
  - declaration, default 8-12
  - evaluation of default 8-13/14
  - evaluation, order of 5-6
  - evaluation, unspecified order of 5-6
  - example of default 8-12/13
  - list, empty 8-9
  - list, variable 8-10
  - matching —see overload resolution
  - overloaded operator and default 13-21
  - passing 5-5
  - passing, reference and 8-22
  - reference 5-5
  - scope of default 8-14
  - specification, template 14-48
  - substitution 16-5
  - template 14-6
  - to constructor, unspecified 5-19
  - type checking 5-5
  - type checking of default 8-13
  - type, unknown 8-10
- argument-dependent lookup 3-13
- arguments, implementation-defined order of evaluation of
  - function 8-14
- argv[] 3-24
- arithmetic
  - constant expression 5-29
  - conversions, usual 5-2
  - exception 5-1
  - exception, undefined 5-1
  - pointer 5-22
  - type 3-35
  - unsigned 3-34
- array
  - bound 8-8
  - const 3-36
  - declaration 8-8
  - declarator[] 8-8
  - declarator, multidimensional 8-8
  - delete 5-19
  - example 8-8
  - initialization 8-18
  - member 9-4
  - multidimensional 8-9
  - new 5-16

- of class objects and constructor 12–12
- of class objects and new 5–18
- of class objects initialization 8–21, 12–12
- order of execution, constructor and 12–12
- order of execution, destructor and 12–8
- overloading and pointer versus 13–2
- parameter adjustment 8–10
- pointer conversion 4–2
- size, default 8–8
- sizeof 5–15
- storage of 8–9
- type 3–35, 8–10
- array-to-pointer conversion 4–2
- arrow operator —see class member access operator
- as-if rule 1–5
- asin 26–22, 34
- asm
  - declaration 7–24
  - implementation-defined 7–24
- assembler 7–24
- <assert.h> 17–11/D–1
- assign
  - basic\_string 21–18
  - deque 23–15
  - list 23–19
  - vector 23–28
- Assignable requirements 23–1
- assignment
  - and initialization, overloaded 12–12
  - and lvalue 5–27
  - conversion by 5–28
  - expression 5–27
  - operator 5–27, 17–8
  - operator, copy 12–21
  - operator, overloaded 13–22
  - operator restriction, copy 12–22
  - reference 8–22
  - to class object 5–28
  - to reference 5–28
- assignment-expression* 5–27
- assignment-operator* 5–28
- at, basic\_string 21–17
- atan 26–22, 34
- atan2 26–22, 34
- atexit 3–26, 17–10, 18–10
- auto 7–3
  - destruction of 6–5/6
  - initialization 6–7
  - object initialization 8–16
  - restriction 7–3
  - specifier 7–3
  - storage duration 3–27
- automatic initialization 6–6/7
- ~auto\_ptr, auto\_ptr 20–21
- auto\_ptr 20–20
  - ~auto\_ptr 20–21
  - auto\_ptr 20–21
  - auto\_ptr 20–21
  - get 20–21
  - operator\* 20–21
  - operator-> 20–21
  - operator= 20–21
  - release 20–21/22

## B

- back\_inserter 24–18
- back\_insert\_iterator 24–17
- back\_insert\_iterator 24–17
- back\_insert\_iterator 24–17

- operator\* 24–17
- operator++ 24–17
- operator= 24–17
- backslash character 2–9
- backspace 2–9
- bad, basic\_ios 27–20
- bad\_alloc 5–17, 18–12, 16
  - bad\_alloc 18–15
  - bad\_alloc 18–15
  - operator= 18–15
  - what 18–15
- bad\_alloc::what, implementation-defined 18–15
- bad\_cast 5–9, 18–17
  - bad\_cast 18–17
  - bad\_cast 18–17
  - operator= 18–17
  - what 18–17
- bad\_cast::what, implementation-defined 18–17
- bad\_exception 15–10, 18–19
  - bad\_exception 18–20
  - bad\_exception 18–20
  - operator= 18–20
  - what 18–20
- bad\_exception::what, implementation-defined 18–20
- bad\_typeid 5–9, 18–18
  - bad\_typeid 18–18
  - bad\_typeid 18–18
  - operator= 18–18
  - what 18–18
- bad\_typeid::what, implementation-defined 18–18
- base
  - class 17–13, 16
  - class 10–1/2
  - class access 11–3
  - class cast 5–11
  - class constructor order of execution 12–2
  - class destructor order of execution 12–8
  - class, direct 10–1
  - class, indirect 10–1
  - class initialization 12–13/14
  - class initialization, order of 12–14
  - class initializer 8–15
  - class member access 10–1
  - class member access, adjusting 11–5
  - class member ambiguity 10–4
  - class, private 11–3
  - class, public 11–3
  - class virtual —see virtual base class
  - of integer literal 2–8
- base-specifier* 10–1
- base-specifier-list* 10–1
- basic
  - execution character set 1–4
  - source character set 2–2
- ~basic\_filebuf, basic\_filebuf 27–64
- basic\_filebuf 27–3, 63
  - ~basic\_filebuf 27–64
  - basic\_filebuf 27–64
  - basic\_filebuf 27–64
  - close 27–65, 72
  - imbue 27–68
  - is\_open 27–64, 72
  - open 27–64, 72
  - overflow 27–66
  - pbackfail 27–66
  - rdbuf 27–72
  - seekoff 27–67
  - seekpos 27–67
  - setbuf 27–67
  - showmanyc 27–65
  - sync 27–68

- uflow 27-66
- underflow 27-65
- basic\_filebuf<char> 27-62
- basic\_filebuf<wchar\_t> 27-62
- basic\_fstream 27-3, 71
  - basic\_fstream 27-71
  - basic\_fstream 27-71
- basic\_ifstream 27-3, 68
- basic\_ifstream 27-69
- basic\_ifstream 27-69
- close 27-69
- is\_open 27-69
- open 27-69
- rdbuf 27-69
- basic\_ifstream<char> 27-62
- basic\_ifstream<wchar\_t> 27-62
- basic\_ios 27-3, 16
  - bad 27-20
  - basic\_ios 27-17
  - basic\_ios 27-17
  - clear 27-19
  - copyfmt 27-19
  - eof 27-20
  - exceptions 27-20
  - fail 27-20
  - fill 27-19
  - good 27-20
  - imbue 27-18
  - init 27-35, 47
  - narrow 27-18
  - operator bool 27-19
  - operator! 27-19
  - rdbuf 27-18
  - rdstate 27-19
  - setstate 27-19
  - tie 27-18
  - widen 27-19
- basic\_ios<char> 27-6
- basic\_ios::failure argument, implementation-defined 27-19
- ~basic\_iostream, basic\_iostream 27-44
- basic\_iostream 27-44
  - ~basic\_iostream 27-44
  - basic\_iostream 27-44
  - basic\_iostream 27-44
- basic\_ios<wchar\_t> 27-6
- basic\_istream 27-3, 33
  - ~sentry 27-36
  - basic\_istream 27-35
  - basic\_istream 27-35
  - gcount 27-39
  - get 27-39
  - getline 27-40/41
  - ignore 27-41
  - operator bool() 27-36
  - operator>> 27-37
  - peek 27-42
  - putback 27-42
  - read 27-42
  - readsome 27-42
  - seekg 27-43
  - sentry 27-35
  - sync 27-43
  - tellg 27-43
  - unget 27-42
- basic\_istreambuf\_iterator 27-3
- basic\_istream<char> 27-32
- basic\_istream<wchar\_t> 27-32
- basic\_istreamstream 27-3, 58
  - basic\_istreamstream 27-59
- basic\_istreamstream 27-59
  - rdbuf 27-59
  - str 27-59
- basic\_istreamstream<char> 27-54
- basic\_istreamstream<wchar\_t> 27-54
- basic\_ofstream 27-3, 69
  - basic\_ofstream 27-70
  - basic\_ofstream 27-70
  - close 27-70
  - is\_open 27-70
  - open 27-70
  - rdbuf 27-70
- basic\_ofstream<char> 27-62
- basic\_ofstream<wchar\_t> 27-62
- ~basic\_ostream, basic\_ostream 27-47
- basic\_ostream 27-3
  - ~basic\_ostream 27-47
  - ~sentry 27-47
- basic\_ostream 27-46
- basic\_ostream 27-46
  - flush 27-51
- operator bool() 27-47
- operator<< 27-48/49
- put 27-51
- seekp 27-47
- sentry 27-47
- tellp 27-47
- write 27-51
- basic\_ostreambuf\_iterator 27-3
- basic\_ostream<char> 27-32
- basic\_ostream<wchar\_t> 27-32
- basic\_ostringstream 27-3, 59
  - basic\_ostringstream 27-60
  - basic\_ostringstream 27-60
  - rdbuf 27-60
  - str 27-60
- basic\_ostringstream<char> 27-54
- basic\_ostringstream<wchar\_t> 27-54
- basic\_streambuf 27-3, 23
  - basic\_streambuf 27-25
  - basic\_streambuf 27-25
  - eback 27-27
  - egptr 27-27
  - epptr 27-28
  - gbump 27-27
  - getloc 27-26
  - gptr 27-27
  - imbue 27-28
  - in\_avail 27-26
  - overflow 27-31
  - pbackfail 27-30
  - pbase 27-28
  - pbump 27-28
  - pptr 27-28
  - pubimbue 27-26
  - pubseekoff 27-26
  - pubseekpos 27-26
  - pubsetbuf 27-26
  - pubsync 27-26
  - sbumpc 27-26
  - seekoff 27-28
  - seekpos 27-28
  - setbuf 27-28
  - setg 27-27
  - setp 27-28
  - sgetc 27-27
  - sgetn 27-27
  - showmanyc 27-29, 65
  - snextc 27-26
  - sputbackc 27-27
  - sputc 27-27
  - sputn 27-27

- sungetc 27-27
- sync 27-29
- uflow 27-30
- underflow 27-29
- xsgetn 27-29
- xspn 27-31
- basic\_streambuf<char> 27-22
- basic\_streambuf<wchar\_t> 27-22
- basic\_string 21-8, 27, 27-54
  - append 21-17
  - assign 21-18
  - at 21-17
  - basic\_string 21-12
  - basic\_string 21-12
  - begin 21-15
  - c\_str 21-22
  - capacity 21-16
  - clear 21-17
  - compare 21-26
  - copy 21-22
  - data 21-22
  - empty 21-17
  - end 21-15
  - erase 21-20
  - find 21-23
  - find\_first\_not\_of 21-24
  - find\_first\_of 21-24
  - find\_last\_not\_of 21-25
  - find\_last\_of 21-24
  - getline 21-30
  - insert 21-19
  - max\_size 21-16
  - operator!= 21-28
  - operator+ 21-27
  - operator+= 21-17
  - operator< 21-28
  - operator<< 21-30
  - operator<= 21-29
  - operator= 21-15
  - operator== 21-28
  - operator> 21-29
  - operator>= 21-29
  - operator>> 21-30
  - operator[] 21-17
  - rbegin 21-15
  - rend 21-15
  - replace 21-20
  - reserve 21-16
  - resize 21-16
  - rfind 21-23
  - size 21-16
  - substr 21-25
  - swap 21-22, 30
- basic\_stringbuf 27-3, 54
- basic\_stringbuf 27-55
- basic\_stringbuf<wchar\_t> 27-54
- basic\_stringstream 27-3, 61
  - basic\_stringstream 27-61
  - basic\_stringstream 27-61
  - rdbuf 27-62
  - str 27-62
- before, type\_info 18-17
- begin, basic\_string 21-15
- behavior
  - default 17-2, 5
  - implementation-defined 1-2, 22-40
  - locale-specific 1-2
  - reentrancy, implementation-defined 17-15
  - required 17-3, 5
  - undefined 1-2
  - unspecified 1-3
- Ben 13-3
- bidirectional\_iterator\_tag 24-10
- binary
  - operator, interpretation of 13-22
  - operator, overloaded 13-22
- binary\_function 20-9
- binary\_negate 20-11
- binary\_search 25-22
- bind1st 20-12
- bind2nd 20-13
- binder1st 20-12
- binder2nd 20-12
- binding
  - see virtual function, dynamic
  - of default argument 8-13
  - reference 8-22
- bit-field 9-11
  - address of 9-11
  - alignment of 9-11
  - allocation, implementation defined 9-11
  - declaration 9-11
  - implementation defined alignment of 9-11
  - implementation-defined sign of 9-11
  - layout 9-11
  - restriction 9-11
  - restriction, address of 9-11
  - restriction, pointer to 9-11
  - type of 9-11
  - unnamed 9-11
  - zero width of 9-11
- bit-fields, Boolean 9-11
- bitmask type 17-6/7
- <bitset> 23-46
- bitset 23-46
  - any 23-50
  - bitset 23-48
  - bitset 23-48
  - count 23-50
  - flip 23-50
  - none 23-50
  - operator!= 23-50
  - operator& 23-51
  - operator&= 23-48
  - operator<< 23-51
  - operator<= 23-49
  - operator== 23-50
  - operator>> 23-51
  - operator>= 23-49
  - operator^ 23-51
  - operator^= 23-49
  - operator| 23-51
  - operator|= 23-49
  - operator~ 23-49
  - reset 23-49
  - set 23-49
  - size 23-50
  - test 23-50
  - to\_string 23-50
  - to\_ulong 23-50
- bitwise
  - AND operator 5-25
  - exclusive OR operator 5-25
  - inclusive OR operator 5-26

- operator 5–25
- block
  - initialization in 6–6
  - scope —see local scope
  - statement { } 6–1
  - structure 6–6
- body, function 8–15
- bool
  - increment 5–8, 15
  - type-specifier 7–8
- bool()
  - basic\_istream operator 27–36
  - basic\_ostream operator 27–47
- bool promotion to int 4–3
- boolalpha 27–20
- Boolean
  - bit-fields 9–11
  - conversion 4–5
  - literal 2–12
  - type 3–34
  - type 3–34
- boolean-literal 2–12
- bound array 8–8
- bound, of array 8–8
- break statement 6–5/6
- built-in type —see fundamental type
- byte 5–15
  - string, null-terminated 17–7

## C

- C
  - header 17–11/12, 17–15/D–1
  - library, Standard 17–1, 7, 17–10/C–10, C–12
  - linkage to 7–25
  - summary, compatibility with ISO C–1
- call
  - 5–5 —see also function call, member function call, overloaded function call, virtual function call
  - by reference 5–5
  - by value 5–5
  - operator function 13–21
  - pseudo destructor 5–6
- calloc 20–22/C–13
- candidate functions 14–35
- capacity
  - basic\_string 21–16
  - vector 23–28
- carriage return 2–9
- case label 6–1, 3
- <cassert> 17–11, 19–4
- cast
  - ambiguity, declaration versus 8–3
  - base class 5–11
  - const 5–12
  - derived class 5–11
  - dynamic 5–8, 18–17
  - integer to pointer 5–12
  - lvalue 5–10/11
  - operator 5–14, 20, 8–2
  - pointer to function 5–12
  - pointer to integer 5–11
  - pointer to member 5–11/12
  - reference 5–10, 12
  - reinterpret 5–11
  - reinterpret\_cast, lvalue 5–11
  - reinterpret\_cast, reference 5–12
  - static 5–10
  - static\_cast, lvalue 5–10
  - static\_cast, reference 5–10
  - to incomplete class 5–20
  - undefined pointer to function 5–12
- cast-expression 5–20
- casting 5–6, 20
- catch 15–1
- category, locale 22–4
- c-char 2–8
- c-char-sequence 2–8
- <cctype> 21–31
- ceil 26–34
- cerr 27–5
- <cerrno> 17–12, 19–4
- <cfloat> 18–9
- C++
  - headers 17–9
  - Standard Library 17–1, 13/14, 16
  - Standard library 17–13
  - Standard Library exception specifications 17–16
- change
  - to const object, undefined 7–7
  - to string literal, undefined 2–11
- char
  - implementation-defined sign of 3–34
  - literal, implementation-defined value of 2–10
  - type 3–34
  - type, signed 3–34
  - type specifier 7–8
  - type, unsigned 3–34
- character 17–1
  - array initialization 8–21
  - container type 17–2
  - decimal-point 17–7
  - literal 2–9
  - literal, type of 2–9
  - multibyte 1–2
  - set, basic execution 1–4
  - set, basic source 2–2
  - signed 3–34
  - string 2–11
  - type 3–34
  - type string, null-terminated 17–2
  - underscore 17–12
- character-literal 2–8
- char\_traits
  - eq 21–23/25
  - length 21–14/15, 17/19, 21, 23/25, 27/28
- checking
  - and default argument, access 11–2
  - point of error 14–26
  - syntax 14–26
- cin 27–5
- <ciso646> C–13
- class
  - type specifier 9–1
  - versus struct 9–1
  - versus union 9–1
- class 3–35, 9–1
  - abstract 10–10
  - access and friend 11–7
  - and type 9–1
  - base 17–13, 16
  - base —see base class
  - cast to incomplete 5–20
  - constructor and abstract 10–11
  - conversion 12–4
  - conversion ambiguity 10–6
  - declaration { } 9–1
  - declaration, forward 9–2
  - definition 9–1, 4
  - definition 3–2
  - definition { } 9–1

- definition, empty 9-1
- definition example 9-4
- definition name hiding 9-2
- definition, scope of 9-2
- derived 17-16
- derived —see derived class
- gslice 26-24
- linkage of 3-22
- linkage specification 7-25
- local —see local class
- member 9-3 —see also member
- member access 5-7
- member access operator 5-7
- member declaration 9-3
- member function 9-5
- member initialization 8-17
- member semantics 5-7
- member, static 3-27
- member storage duration 3-29
- member syntax 5-7
- name 8-2
- name as type definition 9-2
- name declaration 3-1
- name, elaborated 7-9, 9-2/3
- name, point of declaration 9-3
- name, scope of 9-2
- name, typedef 7-6, 9-3
- nested —see nested class
- object, assignment to 5-28
- object, const 3-36
- object copy 12-19
- object copy 12-3 —see also copy constructor
- object initialization 8-18, 12-11/12
- object initialization 8-18 —see also constructor
- object layout 9-5, 10-2
- object, member 9-4
- object, operations on 9-1
- object, sizeof 5-15
- objects and constructor, array of 12-12
- objects and new, array of 5-18
- objects initialization, array of 8-21, 12-12
- pointer to abstract 10-10
- polymorphic 10-6
- scope 3-8
- scope of enumerator 7-12
- sizeof, empty 9-1
- template 23-48
- template partial specializations 14-17
- template specialization 14-6
- unnamed 7-6
- classes
  - narrow-oriented iostream 17-2
  - wide-oriented iostream 17-3
- classic, locale 22-9
- classic\_table, ctype<char> 22-17
- class-key 9-1
- class-name 9-1
- class-specifier 9-1
- clear
  - basic\_ios 27-19
  - basic\_string 21-17
- <climits> 18-9, 23-48/D-6
- <locale> 17-7, 22-54/C-13
- clog 27-5
- close
  - basic\_filebuf 27-65, 72
  - basic\_ifstream 27-69
  - basic\_ofstream 27-70
  - messages 22-48
- <cmath> 26-33
- codecvt 22-18
- always\_noconv 22-20
- do\_always\_noconv 22-22
- do\_encoding 22-22
- do\_in 22-20
- do\_length 22-22
- do\_max\_length 22-22
- do\_out 22-20
- do\_unshift 22-21
- encoding 22-20
- in 22-20
- length 22-20
- max\_length 22-20
- out 22-20
- unshift 22-20
- codecvt\_byname 22-23
- collate 22-34
- compare 22-35
- do\_compare 22-35
- do\_hash 22-35
- do\_transform 22-35
- hash 22-35
- transform 22-35
- collate\_byname 22-36
- combine, locale 22-8
- comma
  - operator 5-28
  - operator, side effects and 5-28
- comment 2-3
  - /\* \*/ 2-5
  - // 2-5
- compare
  - basic\_string 21-26
  - collate 22-35
- comparison
  - function 17-2
  - pointer 5-24/25
  - pointer to function 5-24/25
  - undefined pointer 5-23/24
  - unspecified pointer 5-24
  - void\* pointer 5-24
- compatibility with ISO C summary C-1
- compilation, separate 2-1
- compiler control line —see preprocessing directive
- complete object 1-5
- completely defined object type 9-4
- <complex> 26-2
- complex 26-4
  - abs 26-9
  - arg 26-10
  - complex 26-7
  - complex 26-7
  - conj 26-10
  - cos 26-10
  - cosh 26-10
  - exp 26-10
  - imag 26-9
  - log 26-10
  - log10 26-10
  - norm 26-10
  - operator!= 26-9
  - operator\* 26-8
  - operator\*= 26-7/8
  - operator+ 26-8
  - operator+= 26-7
  - operator- 26-8
  - operator-= 26-7/8
  - operator/= 26-7/8
  - operator<< 26-9
  - operator== 26-8
  - operator>> 26-9
  - polar 26-10

- pow 26-10
- real 26-9
- sin 26-10
- sinh 26-10
- sqrt 26-11
- tan 26-11
- tanh 26-11
- component 17-2
- compound
  - statement 6-1
  - type 3-35
- compound-statement* 6-1
- concatenation
  - string 2-11
  - undefined string literal 2-11
- condition* 6-2
- conditional
  - expression operator 5-26
  - inclusion 16-2
- conditional-expression, throw-expression in 5-26
- conditions*, rules for 6-2
- conj, complex 26-10
- consistency
  - example, linkage 7-3
  - linkage 7-3
  - linkage specification 7-26
  - type declaration 3-24
- \*const example 8-5
- const 3-36
  - array 3-36
  - class object 3-36
  - constructor and 9-8, 12-1
  - destructor and 9-8, 12-7
  - example 8-5
  - initialization 7-7, 8-18
  - linkage of 3-22, 7-3
  - member function 9-8
  - object, undefined change to 7-7
  - overloading and 13-2
  - reference 8-22
  - type 7-6
- const
  - cast 5-12
  - member initialization 12-14
- constant 2-7, 5-2
  - enumeration 7-10
  - expression 5-28
  - expression, arithmetic 5-29
  - expression, pointer to member 5-14
  - initializer 9-4
  - null pointer 4-4/5
  - pointer declaration 8-5
  - pointer example 8-5
- constant-expression* 5-28
- constant-initializer* 9-4
- const\_mem\_fun1\_ref\_t 20-15
- const\_mem\_fun1\_t 20-15
- const\_mem\_fun\_ref\_t 20-15
- const\_mem\_fun\_t 20-15
- constructor 12-1
  - address of 12-2
  - and abstract class 10-11
  - and array order of execution 12-12
  - and const 9-8, 12-1
  - and initialization 12-11/12
  - and initialization example 12-12
  - and member function 12-2
  - and new 5-18
  - and new, unspecified 5-19
  - and return 6-6
  - and static objects order of execution 12-13
  - and virtual function call 12-17
  - and volatile 9-8, 12-1
  - array of class objects and 12-2
  - call, explicit 12-2
  - conversion by 12-5
  - conversion by 12-4 —see also user-defined conversion
  - copy 12-2/3, 19, 17-8
  - default —see default constructor
  - definition 8-15
  - elision, copy 12-23
  - example 12-2
  - exception handling 15-4
  - for temporary 12-3
  - inheritance of 12-2
  - non-trivial 12-2
  - order of execution, base class 12-2
  - order of execution, member 12-2
  - restriction 12-1/2
  - restriction, copy 12-21
  - type of 12-2
  - union 9-10
  - unspecified argument to 5-19
- container
  - requirements 23-1
  - type, character 17-2
- context, nondeduced 14-54
- continue
  - in for statement 6-5
  - statement 6-5/6
- control line —see preprocessing directive
- convention 17-6
- conversion
  - ambiguity, class 10-6
  - and name hiding, user-defined 12-5
  - argument 8-9
  - array pointer 4-2
  - array-to-pointer 4-2
  - Boolean 4-5
  - by assignment 5-28
  - by constructor 12-5
  - class 12-4
  - derived-to-base 13-15
  - explicit type —see casting
  - floating point 4-4
  - floating-integral 4-4
  - function 12-6
  - function 12-4 —see also user-defined conversion
  - function-to-pointer 4-2
  - implementation defined pointer integer 5-11/12
  - implementation-defined floating point 4-4
  - implicit 4-1, 12-4
  - implicit user-defined 12-5
  - inheritance of user-defined 12-7
  - integer 4-4
  - lvalue-to-rvalue 4-2/C-4
  - operator —see conversion function
  - overload resolution and 13-12
  - overload resolution and pointer 13-20
  - pointer 4-4
  - pointer to function 4-2
  - pointer to member 4-5
  - pointer to member void\* 4-5
  - rank 13-16
  - return type 6-6
  - reverse\_iterator 24-13
  - sequence, ambiguous 13-15
  - sequence, implicit 13-14
  - sequence, standard 4-1
  - signed unsigned integer 4-4
  - standard 4-1
  - to enumeration type 5-11



- to enumeration type, `static_cast`, 5–11
- to rvalue, lvalue 4–2
- to rvalue, lvalue C–4
- type of 12–6
- undefined floating point 4–4
- user-defined 12–4/6
- virtual user-defined 12–7
- conversion-function-id* 12–6
- conversions
  - qualification 4–2
  - usual arithmetic 5–2
- copy 25–13
  - `basic_string` 21–22
- copy
  - assignment operator 12–21
  - assignment operator 12–19
  - assignment operator, implicitly-declared 12–21
  - assignment operator restriction 12–22
  - class object 12–19
  - constructor 12–2/3, 19, 17–8
  - constructor elision 12–23
  - constructor, implicitly-declared 12–20
  - constructor restriction 12–21
  - initialization 8–17
- `copy_backward` 25–13
- CopyConstructible requirements 20–2
- `copyfmt`, `basic_ios` 27–19
- `cos` 26–22, 34
  - complex 26–10
- `cosh` 26–22, 34
  - complex 26–10
- count 25–11
  - bitset 23–50
- `count_if` 25–11
- `cout` 27–5
- `__cplusplus` 16–9
- `<csetjmp>` 17–12, 18–22
- `cshift`, `valarray` 26–19
- `<csignal>` 18–22
- `<cstdarg>` 8–10, 17–12, 18–21
- `<cstddef>` 5–15, 23, 18–1/C–13
- `<cstdio>` 27–4/5, 62, 65, 27–72/C–13
- `<cstdlib>` 3–24, 26, 17–10, 18–10, 22, 20–22, 21–32, 25–28, 26–33/C–13
- `c_str`, `basic_string` 21–22
- `<cstring>` 17–7, 20–23, 21–31/D–6, D–11/C–13
- `<ctime>` 18–22, 20–23, 22–2/C–13
- ctor-initializer* 12–13
- `ctype` 22–11
  - `do_is` 22–13
  - `do_narrow` 22–14
  - `do_scan_is` 22–13
  - `do_scan_not` 22–13
  - `do_tolower` 22–13
  - `do_toupper` 22–13
  - `do_widen` 22–13
  - `is` 22–12
  - `narrow` 22–12
  - `scan_is` 22–12
  - `scan_not` 22–12
  - `tolower` 22–12
  - `toupper` 22–12
  - `widen` 22–12
- `ctype_byname` 22–14
- `ctype_byname<char>` 22–18
- `~ctype<char>`, `ctype<char>` 22–16
- `ctype<char>`
  - `~ctype<char>` 22–16
  - `classic_table` 22–17
  - `ctype<char>` 22–16
  - `ctype<char>` 22–16

- `is` 22–16
- `narrow` 22–17
- `scan_is` 22–16
- `scan_not` 22–17
- `table` 22–17
- `tolower` 22–17
- `toupper` 22–17
- `widen` 22–17
- `<ctype.h>` D–1
- cv-qualified name, address of 5–14
- cv-qualifier* 8–2
- cv-qualifier 3–36
- `<wchar>` 17–8, 12, 21–32/C–13
- `<cwctype>` 17–12, 21–31

## D

- DAG
  - multiple inheritance 10–3
  - nonvirtual base class 10–3
  - virtual base class 10–3
- `data`, `basic_string` 21–22
- `data`
  - member —see member
  - member, `static` 9–8
- `date_order`, `time_get` 22–37
- deallocation
  - see delete
  - function 3–28, 5–20, 12–10
- `dec` 27–22, 49
- decimal literal 2–8
- decimal-literal* 2–7
- `decimal_point`, `num_punct` 22–33
- decimal-point character 17–7
- declaration* 7–1
- declaration 3–1, 7–1
  - `:`, field 9–11
  - `{}`, class 9–1
  - `{}`, enum 7–10
  - access 11–5
  - ambiguity, function 8–17
  - array 8–8
  - as definition 7–2
  - `asm` 7–24
  - bit-field 9–11
  - class member 9–3
  - class name 3–1
  - class name, point of 9–3
  - consistency, type 3–24
  - constant pointer 8–5
  - default argument 8–12
  - definition versus 3–1
  - ellipsis in function 5–6, 8–10
  - enumerator point of 3–5
  - example 3–2, 8–11
  - example, function 8–10
  - `extern` 3–1
  - extern reference 8–22
  - forward 7–4
  - forward class 9–2
  - function 3–1, 8–9
  - hiding —see name hiding
  - in `for`, scope of 6–5
  - in `for` statement 6–5
  - in `switch` statement 6–3
  - matching, overloaded function 13–3
  - member 9–3
  - multiple 3–24
  - name 3–1
  - name, point of 3–5

- overloaded 13-1
- overloaded name and friend 11-7
- parameter 8-9
- parentheses in 8-3, 5
- pointer 8-5
- reference 8-6
- register 7-3
- specifier 7-2
- statement 6-6
- static member 3-1
- storage class 7-3
- type 8-4
- type ambiguity 7-2
- typedef 3-1
- typedef as type 7-5
- versus cast ambiguity 8-3
- versus expression ambiguity 6-7
- declaration-statement* 6-6
- declarative region 3-1, 4
- declarator* 8-1
- declarator 7-1, 8-1
  - &, reference 8-6
  - ( ), function 8-9
  - \*, pointer 8-5
  - ::\*, pointer to member 8-7
  - [ ], array 8-8
  - example 8-2
  - initializer, temporary and 12-4
  - meaning of 8-4
  - multidimensional array 8-8
- declarator-id* 8-2
- decl-specifier* 7-2
- decrement
  - operator 5-8, 14/15
  - operator, overloaded 13-23
- default label 6-1, 3
- default
  - access control 11-1
  - argument, access checking and 11-2
  - argument and name hiding 8-14
  - argument and virtual function 8-14
  - argument, binding of 8-13
  - argument declaration 8-12
  - argument, evaluation of 8-13/14
  - argument, example of 8-12/13
  - argument, overload resolution and 13-12
  - argument, overloaded operator and 13-21
  - argument, scope of 8-14
  - argument, type checking of 8-13
  - array size 8-8
  - behavior 17-2, 5
  - constructor 12-2
  - constructor and initialization 12-11
  - constructor and new 5-18
  - destructor 12-7
  - initialization 8-16
  - initializers, overloading and 13-3
  - member access, struct 9-1
  - member access, union 9-1
- default-initialization 8-16
- #define* 16-5
- definition 3-1, 17-1
  - { }, class 9-1
  - alternate 17-13
  - and initialization 7-2
  - class 3-2
  - class 9-1, 4
  - class name as type 9-2
  - constructor 8-15
  - declaration as 7-2
  - empty class 9-1
  - enumerator 3-2
  - enumerator point of 7-11
  - example 3-2
  - example, function 8-15
  - example, nested class 9-12, 11-10
  - function 3-2
  - function 8-15
  - local class 9-13
  - member function 9-5
  - name hiding, class 9-2
  - namespace 7-12
  - nested class 9-12
  - object 3-2
  - of template 14-1
  - pure virtual function 10-10
  - scope, macro 16-6
  - scope of class 9-2
  - static member 9-9
  - versus declaration 3-1
  - virtual function 10-8
- definitions, implementation-generated 3-2
- delete 3-27, 5-19/20, 12-10
  - destructor and 5-19, 12-8
  - example 12-10
  - example, destructor and 12-11
  - example, scope of 12-11
  - operator 17-13, 18-13, 20-22
  - overloading and 3-29
  - type of 12-10
  - undefined 5-19
- delete[], operator 17-13, 18-14
- delete
  - array 5-19
  - object 5-19
- deleted object, undefined 3-29
- delete-expression* 5-19
- dependent name 14-31, 34
- deprecated features 5-8, 15
- <deque> 23-10
- deque 23-13
  - assign 23-15
  - erase 23-16
  - insert 23-16
  - resize 23-16
- dereferencing 5-14 —see also indirection
- derivation —see inheritance
- derived
  - class 17-16
  - class 10-1
  - class cast 5-11
  - class example 10-1
  - class, most 1-5
  - class, overloading and 13-3
  - object, most 1-5
- derived-to-base conversion 13-15
- destination type 8-18
- destruction
  - of auto 6-5/6
  - of local static 6-7
  - of local variable 6-5/6
  - of temporary 12-3
  - of temporary, order of 12-4
- destructor 12-7, 17-8
  - and array order of execution 12-8
  - and const 9-8, 12-7
  - and delete 5-19, 12-8
  - and delete example 12-11
  - and exception, explicit 12-10
  - and exit from scope 6-5
  - and fundamental type 12-9
  - and member function 12-8

- and placement of object 12-9
  - and virtual function call 12-17
  - and volatile 9-8, 12-7
  - call example, explicit 12-9
  - call, explicit 12-8
  - call, implicit 12-8
  - call, pseudo 5-6
  - default 12-7
  - exception handling 15-4
  - for temporary 12-3
  - non-trivial 12-7
  - order of execution 12-8
  - order of execution, base class 12-8
  - order of execution, member 12-8
  - program termination and 12-8
  - pure virtual 12-8
  - restriction 12-7/8
  - static object 3-26
  - union 9-10
  - virtual 12-8
  - diagnostic message 1-2
  - digit* 2-6
  - digit-sequence* 2-10
  - digraph 2-4
  - direct
    - base class 10-1
    - binding of reference 8-22
    - initialization 8-17
  - direct-abstract-declarator* 8-2
  - direct-declarator* 8-1
  - directed acyclic graph —see DAG
  - directive
    - error 16-8
    - null 16-9
    - pragma 16-8
    - preprocessing 16-1
  - direct-new-declarator* 5-16
  - distance 24-11
  - distinct string 2-11
  - div 26-34
  - divides 20-9
  - division
    - by zero, undefined 5-1, 22
    - implementation defined 5-22
    - operator 5-21
  - djacent\_difference* 26-33
  - do statement 6-3, 5
  - do\_always\_noconv*, *codecvt* 22-22
  - do\_close*, messages 22-49
  - do\_compare*, *collate* 22-35
  - do\_curr\_symbol*, *money\_punct* 22-47
  - do\_date\_order*, *time\_get* 22-38
  - do\_decimal\_point*
    - money\_punct* 22-46
    - num\_punct* 22-33
  - do\_encoding*, *codecvt* 22-22
  - do\_falsename*, *num\_punct* *do\_truename* 22-34
  - do\_frac\_digits*, *money\_punct* 22-47
  - do\_get*
    - messages 22-48/49
    - money\_get* 22-42
    - num\_get* 22-25
  - do\_get\_date*, *time\_get* 22-38
  - do\_get\_monthname*, *time\_get* 22-38
  - do\_get\_time*, *time\_get* 22-38
  - do\_get\_weekday*, *time\_get* 22-38
  - do\_get\_year*, *time\_get* 22-38
  - do\_grouping*
    - money\_punct* 22-46
    - num\_punct* 22-33
  - do\_hash*, *collate* 22-35
  - do\_in*, *codecvt* 22-20
  - do\_is*, *ctype* 22-13
  - do\_length*, *codecvt* 22-22
  - domain\_error* 19-2
    - domain\_error* 19-2
  - do\_max\_length*, *codecvt* 22-22
  - dominance, virtual base class 10-5
  - do\_narrow*, *ctype* 22-14
  - donarrow* 22-17
  - do\_negative\_sign*, *money\_punct* 22-47
  - do\_neg\_format*, *money\_punct* 22-47
  - do\_open*, messages 22-49
  - do\_out*, *codecvt* 22-20
  - do\_pos\_format*, *money\_punct* 22-47
  - do\_positive\_sign*, *money\_punct* 22-47
  - do\_put*
    - money\_put* 22-44
    - num\_put* 22-29
    - time\_put* 22-40
  - do\_scan\_is*, *ctype* 22-13
  - do\_scan\_not*, *ctype* 22-13
  - dot operator —see class member access operator
  - do\_thousands\_sep*
    - money\_punct* 22-46
    - num\_punct* 22-33
  - do\_tolower*, *ctype* 22-13
  - do\_toupper*, *ctype* 22-13
  - do\_transform*, *collate* 22-35
  - do\_truename* *do\_falsename*, *num\_punct* 22-34
  - double
    - literal 2-11
    - type 3-35
    - type specifier 7-8
  - double quote 2-9
  - do\_unshift*, *codecvt* 22-21
  - do\_widen*, *ctype* 22-13
  - dowiden* 22-17
  - dynamic
    - binding —see virtual function
    - cast 5-8, 18-17
    - initialization 3-25
    - storage duration 3-27, 5-16
    - type 1-2
- ## E
- E suffix 2-11
  - eback*, *basic\_streambuf* 27-27
  - effect, side 1-6
  - egptr*, *basic\_streambuf* 27-27
  - elaborated
    - class name 7-9, 9-2/3
    - enum name 7-9
    - type specifier —see elaborated class name
  - elaborated-type-specifier* 7-9
  - #elif* 16-2
  - elimination of temporary 12-3, 23
  - elision, copy constructor 12-23
  - ellipsis
    - example 8-10
    - in function declaration 5-6, 8-10
    - overload resolution and 13-12
  - #else* 16-3
  - else* 6-2
  - empty 24-10
    - basic\_string* 21-17
  - empty
    - argument list 8-9
    - class definition 9-1

- class sizeof 9-1
- statement 6-1
- encoding, codecvt 22-20
- encoding, multibyte 2-12
- end, basic\_string 21-15
- #endif 16-3
- endl 27-49, 51
- end-of-file 23-51
- ends 27-51
- entity 3-1
- enum 3-35
  - declaration { } 7-10
  - name, elaborated 7-9
  - overloading and 13-2
  - type of 7-10/11
  - type specifier 7-9
- enum name, typedef 7-6
- enumerated type 3-35, 17-6
- enumeration 7-10
  - constant 7-10
  - example 7-11
  - linkage of 3-22
  - type, conversion to 5-11
  - type, static\_cast, conversion to 5-11
  - underlying type 7-11
- enumerator 7-10
- enumerator
  - class, scope of 7-12
  - definition 3-2
  - member 7-12
  - point of declaration 3-5
  - point of definition 7-11
  - redefinition 7-11
  - restriction 7-11
  - value of 7-10
- environment, program 3-24
- eof, basic\_ios 27-20
- eptr, basic\_streambuf 27-28
- eq, char\_traits 21-23/25
- equal 25-12
  - istreambuf\_iterator 24-26
- equality operator 5-24
- EqualityComparable requirements 20-1
- equality-expression 5-24
- equal\_range 25-22
- equal\_to 20-10
- equivalence
  - template type 14-11
  - type 7-5, 9-2
- equivalent
  - parameter declarations 13-2
  - parameter declarations, overloading and 13-2
- erase
  - basic\_string 21-20
  - deque 23-16
  - list 23-20
  - vector 23-29
- <errno.h> D-1
- #error 16-8
- error
  - checking, point of 14-26
  - directive 16-8
- escape
  - character —see backslash
  - sequence 2-9
  - sequence, undefined 2-10
- escape-sequence 2-9
- evaluation
  - new, unspecified order of 5-19
  - of default argument 8-13/14
  - of expression, order of 1-7
  - order of argument 5-6
  - unspecified order of 3-25, 5-1
  - unspecified order of argument 5-6
  - unspecified order of function call 5-6
- example
  - \*const 8-5
  - array 8-8
  - class definition 9-4
  - const 8-5
  - constant pointer 8-5
  - constructor 12-2
  - constructor and initialization 12-12
  - declaration 3-2, 8-11
  - declarator 8-2
  - definition 3-2
  - delete 12-10
  - derived class 10-1
  - destructor and delete 12-11
  - ellipsis 8-10
  - enumeration 7-11
  - explicit destructor call 12-9
  - explicit qualification 10-5
  - friend 9-3
  - friend function 11-6
  - function declaration 8-10
  - function definition 8-15
  - linkage consistency 7-3
  - local class 9-13
  - member function 9-7, 11-6
  - member name access 11-5
  - nested class 9-12
  - nested class definition 9-12, 11-10
  - nested class forward declaration 9-13
  - nested type name 9-14
  - of default argument 8-12/13
  - of incomplete type 3-33
  - of overloading 13-1
  - pointer to member 8-7
  - pure virtual function 10-10
  - scope of delete 12-11
  - scope resolution operator 10-5
  - static member 9-9
  - subscripting 8-8
  - type name 8-2
  - typedef 7-5
  - unnamed parameter 8-15
  - variable parameter list 8-10
  - virtual function 10-8
- <exception> 18-18
- ~exception, exception 18-19
- exception
  - ~exception 18-19
  - exception 18-19
  - exception 18-19
  - operator= 18-19
  - what 18-19
- exception
  - allowing an 15-8
  - and new 5-18
  - arithmetic 5-1
  - declaration scope 3-6
  - explicit destructor and 12-10
  - handler 15-5, 17-16
  - handler, incomplete type in 15-5
  - handling 15-1
  - handling constructor 15-4
  - handling destructor 15-4
  - object 15-3
  - specifications, C++ Standard Library 17-16
  - specifications, implementation-defined 17-16
  - specifications, Standard C library 17-16

- throwing 15-3
- types, implementation-defined 17-16
- undefined arithmetic 5-1
- exception-declaration* 15-1
- exceptions, `basic_ios` 27-20
- exception-specification* 15-7
- `exception::what` message, implementation-defined 18-19
- execution character set, `basic` 1-4
- `exit` 3-24, 26, 6-5, 17-10, 18-10, 16
- exit from scope, destructor and 6-5
- `exp` 26-22, 34
  - complex 26-10
- explanation, subscripting 8-9
- explicit specifier 7-5
- explicit
  - constructor call 12-2
  - destructor and exception 12-10
  - destructor call 12-8
  - destructor call example 12-9
  - instantiation 14-40
  - qualification 3-14
  - qualification example 10-5
  - specialization, template 14-41
  - type conversion —see casting
- explicit-specialization* 14-41
- exponent-part* 2-10
- `export` 14-1
- expression* 5-28
- expression 5-1
  - ambiguity, declaration versus 6-7
  - arithmetic constant 5-29
  - assignment 5-27
  - constant 5-28
  - order of evaluation of 1-7
  - parenthesized 5-3
  - pointer to member constant 5-14
  - postfix 5-4
  - primary 5-2
  - reference 5-1
  - statement 6-1
  - unary 5-14
- expression-list* 5-4
- expression-statement* 6-1
- `extern` 7-3
  - "C" 17-11/12
  - "C++" 17-11/12
  - declaration 3-1
  - linkage of 7-3
  - linkage specification 7-24
  - reference declaration 8-22
  - restriction 7-3
- external linkage 3-22, 17-11/12

## F

- F suffix 2-11
- f suffix 2-11
- facet, locale 22-6
- fail, `basic_ios` 27-20
- failed, `ostreambuf_iterator` 24-27
- failure, `ios_base::failure` 27-9
- `falsename`, `numpunct` `truename` 22-33
- `fclose` 27-65
- field declaration : 9-11
- file 2-1
  - source 2-1, 17-11, 13
- `filebuf` 27-3, 62
  - implementation-defined 27-68
- `fill` 25-15

- `basic_ios` 27-19
- `gslice_array` 26-27
- `indirect_array` 26-31
- `mask_array` 26-29
- `slice_array` 26-24
- `fill_n` 25-15
- final override 10-7
- `find` 25-10
  - `basic_string` 21-23
- `find_end` 25-10
- `find_first_not_of`, `basic_string` 21-24
- `find_first_of` 25-11
  - `basic_string` 21-24
- `find_if` 25-10
- `find_last_not_of`, `basic_string` 21-25
- `find_last_of`, `basic_string` 21-24
- floctal-digit* 2-8
- fixed 27-22
- flags, `ios_base` 22-10, 27-12
- `flip`, `bitset` 23-50
- float
  - literal 2-11
  - type 3-35
  - type specifier 7-8
- <float.h> D-1
- floating
  - point conversion 4-4
  - point conversion, implementation-defined 4-4
  - point conversion, undefined 4-4
  - point literal 2-11
  - point literal, type of 2-11
  - point promotion 4-4
  - point type 3-34
  - point type 3-35
  - point type, implementation-defined 3-35
- floating-integral conversion 4-4
- floating-literal* 2-10
- floating-suffix* 2-11
- `float_round_style` 18-7
- `floor` 26-34
- `flush` 27-12, 35, 47, 52
  - `basic_ostream` 27-51
- `fmtflags`
  - `ios` 27-52
  - `ios_base` 27-9
- `fopen` 27-64/65
- for
  - scope of declaration in 6-5
  - statement 6-3, 5
  - statement, continue in 6-5
  - statement, declaration in 6-5
- `for_each` 25-10
- form feed 2-9
- formal argument —see parameter
- forward
  - class declaration 9-2
  - declaration 7-4
  - declaration example, nested class 9-13
- `forward_iterator_tag` 24-10
- `fpos` 27-6, 15
  - state 27-15
- fractional-constant* 2-10
- `free` 20-22
- free store 5-16 —see also `new`, `delete`
- freestanding implementation 17-10
- `freeze`
  - `ostream` D-11
  - `strstream` D-13
  - `strstreambuf` D-7
- `frexp` 26-34
- friend

- access specifier and 11–8
  - class access and 11–7
  - declaration, overloaded name and 11–7
  - example 9–3
  - function, access and 11–6
  - function example 11–6
  - function, inline 11–7
  - function, linkage of 11–7
  - function, member function and 11–6
  - function, nested class 9–13
  - inheritance and 11–8
  - local class and 11–8
  - member function 11–7
  - specifier 7–6
  - template and 14–15
  - virtual and 10–8
  - friend
    - local class 11–8
    - specifier 17–15
  - front\_inserter 24–19
  - front\_insert\_iterator 24–18
    - front\_insert\_iterator 24–18
    - front\_insert\_iterator 24–18
  - operator\* 24–18
  - operator++ 24–19
  - operator= 24–18
  - fseek 27–65
  - <fstream> 27–62
  - fstream 27–3
  - full-expression 1–6
  - function
    - 7–4 —see also friend function, member function, inline function, virtual function
    - allocation 3–28, 5–17
    - argument —see argument
    - arguments, implementation-defined order of evaluation of 8–14
    - body 8–15
    - call 5–5
    - call evaluation, unspecified order of 5–6
    - call operator 5–5, 13–21
    - call operator, overloaded 13–22
    - call, recursive 5–6
    - call, undefined 5–12
    - cast, pointer to 5–12
    - cast, undefined pointer to 5–12
    - comparison 17–2
    - comparison, pointer to 5–24/25
    - conversion 12–6
    - conversion, pointer to 4–2
    - deallocation 3–28, 5–20, 12–10
    - declaration 3–1, 8–9
    - declaration ambiguity 8–17
    - declaration, ellipsis in 5–6, 8–10
    - declaration example 8–10
    - declaration matching, overloaded 13–3
    - declarator ( ) 8–9
    - definition 8–15
    - definition 3–2
    - definition example 8–15
    - global 17–12, 15
    - handler 17–2
    - linkage specification overloaded 7–26
    - modifier 17–2
    - name hiding 13–3
    - name, overloaded 13–1
    - observer 17–2
    - operator 13–21
    - overloaded 13–1 —see also overloading
    - parameter —see parameter
    - parameter adjustment 8–10
    - plain old 18–23
    - pointer to member 5–21
    - prototype scope 3–6
    - replacement 17–2
    - reserved 17–3
    - return —see return
    - return type —see return type
    - scope 3–7
    - specifier 7–4
    - template 14–48
    - template overload resolution 14–59
    - template partial ordering 14–23
    - type 3–35, 8–9/10
    - typedef 8–11
    - viable 13–5
    - virtual —see virtual function
    - virtual member 17–13, 15
  - <functional> 20–7
  - function-body 8–15
  - function-definition 8–15
  - function-like macro 16–4
  - functions, candidate 14–35
  - function-specifier 7–4
  - function-to-pointer conversion 4–2
  - function-try-block 15–1
  - fundamental
    - type 3–34
    - type conversion —see conversion, user-defined conversion
    - type, destructor and 12–9
- ## G
- gbump, basic\_streambuf 27–27
  - gcount, basic\_istream 27–39
  - generate 25–15
  - generated destructor —see default destructor
  - generate\_n 25–15
  - get
    - auto\_ptr 20–21
    - basic\_istream 27–39
    - money\_get 22–42
    - num\_get 22–25
  - get\_date, time\_get 22–37
  - getline
    - basic\_istream 27–40/41
    - basic\_string 21–30
  - getloc
    - basic\_streambuf 27–26
    - ios\_base 27–13
  - get\_monthname, time\_get 22–37
  - get\_temporary\_buffer 20–19
  - get\_time, time\_get 22–37
  - get\_weekday, time\_get 22–37
  - get\_year, time\_get 22–38
  - global, locale 22–9
  - global
    - anonymous union 9–11
    - function 17–12, 15
    - name 3–8
    - namespace 17–12
    - namespace scope 3–7
    - scope 3–7
  - good, basic\_ios 27–20
  - goto
    - initialization and 6–6
    - statement 6–1, 5/6
  - gptr, basic\_streambuf 27–27
  - grammar A–1
  - greater 20–10
  - greater

- than operator 5–23
- than or equal to operator 5–23
- greater\_equal 20–10
- grouping, numpunct 22–33
- gslice
  - class 26–24
  - gslice 26–25
  - gslice 26–25
  - size 26–26
  - start 26–26
  - stride 26–26
- gslice\_array 26–26
  - fill 26–27
- gslice\_array 26–27
- gslice\_array 26–27
- operator%= 26–27
- operator&= 26–27
- operator\*= 26–27
- operator+= 26–27
- operator-= 26–27
- operator/= 26–27
- operator<= 26–27
- operator= 26–27
- operator>= 26–27
- operator^= 26–27
- operator|= 26–27

## H

- handler* 15–1
- handler
  - exception 15–5, 17–16
  - function 17–2
  - incomplete type in exception 15–5
- handler-seq* 15–1
- hasfacet, locale 22–10
- hash, collate 22–35
- header, C 17–11/12, 17–15/D–1
- header-name* 2–5
- headers, C++ 17–9
- hex 27–22
- hex number 2–10
- hexadecimal literal 2–8
- hexadecimal-digit* 2–8
- hexadecimal-escape-sequence* 2–9
- hexadecimal-literal* 2–7
- hex-quad* 2–2
- hiding —see name hiding
- horizontal tab 2–9
- hosted implementation 17–10

## I

- id, locale 22–7
- id, qualified 5–3
- identifier* 2–6
- identifier 2–6, 5–3, 7–1
  - \_, underscore in 2–6
- identities and overloading, operator 13–21
- id-expression* 5–2
- id-expression 5–3
- #if 16–2, 17–15
- if statement 6–2/3
- #ifdef 16–3
- #ifndef 16–3
- ifstream 27–3, 62
- ignore, basic\_istream 27–41
- ill-formed program 1–2
- imag 26–8
  - complex 26–9

- imbue
  - basic\_filebuf 27–68
  - basic\_ios 27–18
  - basic\_streambuf 27–28
  - ios\_base 27–12
- immolation, self 14–43
- implementation
  - defined alignment of bit-field 9–11
  - defined bit-field allocation 9–11
  - defined division 5–22
  - defined modulus 5–22
  - defined pointer integer conversion 5–11/12
  - defined pointer subtraction 5–23
  - defined right shift 5–23
  - defined type of ptrdiff\_t 5–23
  - freestanding 17–10
  - hosted 17–10
  - limits 1–2
- implementation-defined 4–4, 8–23, 17–10, 13, 18–2, 11, 15, 17/20, 27–13, 58, 27–67/C–13
  - \_\_STDC\_\_ 16–9
- alignment requirement 3–33
- asm 7–24
- bad\_alloc::what 18–15
- bad\_cast::what 18–17
- bad\_exception::what 18–20
- bad\_typeid::what 18–18
- basic\_ios::failure argument 27–19
- behavior 1–2, 22–40
- behavior reentrancy 17–15
- exception specifications 17–16
- exception types 17–16
- exception::what message 18–19
- filebuf 27–68
- floating point conversion 4–4
- floating point type 3–35
- generation of temporary 12–3
- linkage of main() 3–24
- linkage specification 7–25
- object linkage 7–27
- order of evaluation of function arguments 8–14
- parameters to main() 3–24
- sign of bit-field 9–11
- sign of char 3–34
- sizeof integral type 3–34
- sizeof type 3–34
- streambuf 27–1
- streamoff 27–7/D–2
- streampos D–2
- string literal 2–11
- type of integer literal 2–8
- type\_info::name 18–17
- types 17–6
- value of char literal 2–10
- value of multicharacter literal 2–9
- volatile 7–8
- wchar\_t 3–34
- implementation-dependent 27–36, 47
- implementation-generated definitions 3–2
- implementation-specified smanip 27–52
- implicit
  - conversion 4–1, 12–4
  - conversion sequence 13–14
  - conversion sequences implied object parameter 13–6
  - destructor call 12–8
  - instantiation, template 14–37
  - object argument 13–5
  - user-defined conversion 12–5
- implicitly-declared
  - copy assignment operator 12–21
  - copy constructor 12–20

- default constructor 12–2
- default constructor —see default constructor
- implied
  - object parameter 13–5
  - object parameter, implicit conversion sequences 13–6
- in, `codecv` 22–20
- `in_avail`, `basic_streambuf` 27–26
- `#include` 16–3, 17–11
- `includes` 25–23
- inclusion
  - conditional 16–2
  - source file 16–3
- incomplete
  - class, cast to 5–20
  - type 3–2/3, 6, 33, 4–2, 5–4/9, 14/16, 19, 22, 28, 10–1
  - type, example of 3–33
  - type in exception handler 15–5
- increment
  - `bool` 5–8, 15
  - operator 5–8, 14/15
  - operator, overloaded 13–23
- indeterminate uninitialized variable 8–16
- indirect base class 10–1
- `indirect_array` 26–29
  - fill 26–31
- `indirect_array` 26–30
- `indirect_array` 26–30
- `operator%=>` 26–30
- `operator&=>` 26–30
- `operator*=>` 26–30
- `operator+=>` 26–30
- `operator-=>` 26–30
- `operator/=` 26–30
- `operator<=>` 26–30
- `operator=` 26–30
- `operator>=>` 26–30
- `operator^=>` 26–30
- `operator|=>` 26–30
- indirection 5–14
  - operator 5–14
- inequality operator 5–24
- inheritance 10–1
  - 10–1 —see also multiple inheritance
  - and friend 11–8
  - of constructor 12–2
  - of overloaded operator 13–21
  - of user-defined conversion 12–7
- `~Init, ios_base::Init` 27–12
- `init, basic_ios` 27–35, 47
- `Init, ios_base::Init` 27–11
- init-declarator* 8–1
- init-declarator-list* 8–1
- initialization 8–15
  - and `goto` 6–6
  - and `new` 5–18
  - array 8–18
  - array of class objects 8–21, 12–12
  - `auto` 6–7
  - `auto` object 8–16
  - automatic 6–6/7
  - base class 12–13/14
  - character array 8–21
  - class member 8–17
  - class object 8–18, 12–11/12
  - class object 8–18 —see also constructor
  - `const` 7–7, 8–18
  - const member 12–14
  - constructor and 12–11/12
  - copy 8–17
  - default 8–16
  - default constructor and 12–11
  - definition and 7–2
  - direct 8–17
  - dynamic 3–25
  - example, constructor and 12–12
  - in block 6–6
  - jump past 6–3, 6
  - local static 6–7
  - member 12–13
  - member object 12–14
  - order of 3–25, 10–2
  - order of base class 12–14
  - order of member 12–14
  - order of virtual base class 12–14
  - overloaded assignment and 12–12
  - parameter 5–5
  - reference 8–7, 21
  - reference member 12–14
  - run-time 3–25
  - static member 9–9
  - static object 3–25, 8–16
  - struct 8–18
  - union 8–21, 9–10
  - virtual base class 12–15, 21
- initializer* 8–15
- initializer* 8–16
  - base class 8–15
  - constant 9–4
  - list { } 8–18
  - member 8–15
  - scope of member 12–15
  - temporary and declarator 12–4
- initializer-clause* 8–16
- initializer-list* 8–16
- injected-class-name* 9–1
- inline*
  - linkage of 3–22
  - specifier 7–5
- inline* 17–15
  - friend function 11–7
  - function 7–5
  - member function 9–5
- `inner_product` 26–32
- `inplace_merge` 25–23
- `input_iterator_tag` 24–10
- `insert`
  - `basic_string` 21–19
  - `deque` 23–16
  - list 23–20
  - vector 23–29
- `inserter` 24–20
- `insert_iterator` 24–19
- `insert_iterator` 24–19
- `insert_iterator` 24–19
- `operator*` 24–20
- `operator++` 24–20
- `operator=` 24–19
- instantiation
  - explicit 14–40
  - point of 14–34
  - template implicit 14–37
  - unit 2–2
- int*
  - type 3–34
  - type specifier 7–8
  - type, unsigned 3–34
- int*, bool promotion to 4–3
- integer
  - cast, pointer to 5–11
  - conversion 4–4
  - conversion, implementation defined pointer 5–11/12
  - conversion, signed unsigned 4–4



- literal 2–8
- literal, base of 2–8
- literal, implementation-defined type of 2–8
- literal, type of 2–8
- to pointer cast 5–12
- type 3–35
- integer-literal* 2–7
- integer-suffix* 2–8
- integral
  - promotion 4–3
  - type 3–34
  - type 3–35
  - type, implementation-defined sizeof 3–34
  - value, undefined unrepresentable 4–4
- internal 27–21
- internal linkage 3–22
- interpretation
  - of binary operator 13–22
  - of unary operator 13–22
- invalid\_argument 19–2, 23–48
  - invalid\_argument 19–2
  - invalid\_argument 19–2
- invocation, macro 16–5
- <iomanip> 27–32
- <ios> 27–6
- ios 27–3, 6
  - fmtflags 27–52
- ios\_base 27–7
  - flags 22–10, 27–12
  - fmtflags 27–9
  - getloc 27–13
  - imbue 27–12
  - ios\_base 27–14
  - ios\_base 27–14
  - iostate 27–10
  - iword 27–13
  - openmode 27–11
  - precision 22–10, 27–12
  - pwd 27–14
  - register\_callback 27–14
  - seekdir 27–11
  - setf 27–12
  - sync\_with\_stdio 27–13
  - unsetf 27–12
  - width 22–10, 27–12
  - xalloc 27–13
- ios\_base::failure 27–9
  - failure 27–9
  - what 27–9
- ios\_base::Init 27–11
  - ~Init 27–12
  - Init 27–11
- <iosfwd> 27–1
- iostate, ios\_base 27–10
- <iostream> 27–4
- iostream
  - classes, narrow-oriented 17–2
  - classes, wide-oriented 17–3
- is
  - ctype 22–12
  - ctype<char> 22–16
- isalnum 22–10
- isalpha 22–10
- iscntrl 22–10
- isdigit 22–10
- isgraph 22–10
- islower 22–10
- ISO C summary, compatibility with C–1
- <iso646.h> D–1/C–13
- is\_open
  - basic\_filebuf 27–64, 72

- basic\_ifstream 27–69
- basic\_ofstream 27–70
- isprint 22–10
- ispunct 22–10
- isspace 22–10
- <istream> 27–32
- istream 27–3, 32
  - operator>> 27–37
- istreambuf\_iterator 24–24
  - equal 24–26
- istreambuf\_iterator 24–25
- istreambuf\_iterator 24–25
  - operator!= 24–26
  - operator\* 24–25
  - operator++ 24–25
  - operator== 24–26
  - proxy 24–25
- istream\_iterator 24–20
  - operator== 24–22
- istream\_iterator 27–3, 54
- istream D–10
- istream D–10
- istream D–10
- rdbuf D–10
- str D–10
- isupper 22–10
- isxdigit 22–10
- iteration statement 6–3
- iteration-statement 6–3, 6
  - scope 6–4
- <iterator> 24–6
- iterator requirements 24–1
- iter\_swap 25–14
- iword, ios\_base 27–13

## J

- Jessie 12–6
- jump
  - past initialization 6–3, 6
  - statement 6–5
- jump-statement* 6–5

## K

- keyword A–1
- list 2–6

## L

- L
  - prefix 2–9, 11
  - suffix 2–8, 11
- l suffix 2–8, 11
- label 6–6
  - case 6–1, 3
  - default 6–1, 3
  - name space 6–1
  - scope of 3–7, 6–1
  - specifier : 6–1
- labeled statement 6–1
- lattice —see DAG, sub-object
- layout
  - access specifier and object 11–3
  - bit-field 9–11
  - class object 9–5, 10–2
- layout-compatible type 3–34
- left 27–21
- left

- shift operator 5-23
- shift, undefined 5-23
- length
  - char\_traits 21-14/15, 17/19, 21, 23/25, 27/28
  - codecvt 22-20
  - valarray 26-18
- length of name 2-6
- length\_error 19-2, 21-8
  - length\_error 19-2
  - length\_error 19-2
- less 20-10
- less
  - than operator 5-23
  - than or equal to operator 5-23
- less\_equal 20-10
- LessThanComparable requirements 20-1
- lexical conventions 2-1
- lexicographical\_compare 25-27
- Library, C++ Standard 17-1, 13/14, 16
- library
  - C++ Standard 17-13
  - Standard C 17-1, 7, 17-10/C-10, C-12
- <limits> 18-2
- limits, implementation 1-2
- <limits.h> D-1
- #line 16-8
- linkage 3-1, 22
  - consistency 7-3
  - consistency example 7-3
  - external 3-22, 17-11/12
  - implementation-defined object 7-27
  - internal 3-22
  - of class 3-22
  - of const 3-22, 7-3
  - of enumeration 3-22
  - of extern 7-3
  - of friend function 11-7
  - of inline 3-22
  - of main(), implementation-defined 3-24
  - of static 3-22, 7-3
  - of template name 14-1
  - specification 7-24
  - specification class 7-25
  - specification consistency 7-26
  - specification, extern 7-24
  - specification, implementation-defined 7-25
  - specification object 7-27
  - specification overloaded function 7-26
  - to C 7-25
- linkage-specification* 7-24
- <list> 23-11
- list 23-17
  - assign 23-19
  - erase 23-20
  - insert 23-20
  - merge 23-21
  - remove 23-21
  - resize 23-20
  - reverse 23-21
  - sort 23-22
  - splice 23-20
  - unique 23-21
- list
  - {}, initializer 8-18
  - keyword 2-6
  - operator 2-7, 13-21
- literal* 2-7
- literal 2-7, 5-2
  - base of integer 2-8
  - character 2-9
  - decimal 2-8
  - double 2-11
  - float 2-11
  - floating point 2-11
  - hexadecimal 2-8
  - implementation-defined type of integer 2-8
  - implementation-defined value of char 2-10
  - implementation-defined value of multicharacter 2-9
  - integer 2-8
  - long 2-8
  - long double 2-11
  - multicharacter 2-9
  - narrow-character 2-9
  - octal 2-8
  - type of character 2-9
  - type of floating point 2-11
  - type of integer 2-8
  - unsigned 2-8
- local
  - class and friend 11-8
  - class definition 9-13
  - class example 9-13
  - class, friend 11-8
  - class member function 9-13
  - class, member function in 9-6
  - class nested class 9-14
  - class restriction 9-14
  - class restriction, static member 9-10
  - class, scope of 9-13
  - object, static 3-27
  - object storage duration 3-27
  - scope 3-6
  - static, destruction of 6-7
  - static initialization 6-7
  - variable, destruction of 6-5/6
- <locale> 22-1
- ~locale(), locale 22-8
- locale
  - ~locale() 22-8
  - category 22-4
  - classic 22-9
  - combine 22-8
  - facet 22-6
  - global 22-9
  - hasfacet 22-10
  - id 22-7
  - locale() 22-7
  - name 22-8
  - operator!= 22-9
  - operator() 22-9
  - operator== 22-9
  - usefacet 22-9
- locale(), locale 22-7
- <locale.h> D-1
- locale-specific behavior 1-2
- log 26-22, 34
  - complex 26-10
- log10 26-22, 34
  - complex 26-10
- logical
  - AND operator 5-26
  - AND operator, side effects and 5-26
  - negation operator 5-14/15
  - OR operator 5-26
  - OR operator, side effects and 5-26
- logical\_and 20-11
- logical\_not 20-11
- logical\_or 20-11
- logic\_error 19-1
  - logic\_error 19-2
  - logic\_error 19-2
- long

- double literal 2-11
- double type 3-35
- literal 2-8
- type 3-34
- type specifier 7-8
- type, unsigned 3-34
- typedef and 7-2
- longjmp 18-23
- long-suffix* 2-8
- lookup
  - argument-dependent 3-13
  - member name 10-4
  - name 3-1, 9
  - template name 14-24
- lower\_bound 25-21
- lowercase 17-7
- lvalue 3-37/C-4
  - assignment and 5-27
  - cast 5-10/11
  - cast, reinterpret\_cast, 5-11
  - cast, static\_cast, 5-10
  - conversion to rvalue 4-2
  - conversion to rvalue C-4
  - modifiable 3-37
- lvalue-to-rvalue conversion 4-2/C-4

## M

- macro
  - definition scope 16-6
  - function-like 16-4
  - invocation 16-5
  - masking 17-15
  - name 16-5
  - name, predefined 16-9
  - object-like 16-4
  - parameters 16-5
  - preprocessor 16-1
  - replacement 16-4
- main() 3-24
  - implementation-defined linkage of 3-24
  - implementation-defined parameters to 3-24
  - parameters to 3-24
  - return from 3-24, 26
- make\_heap 25-26
- make\_pair 20-7
- malloc 20-22/C-13
- <map> 23-31
- map 23-34
  - operator< 23-36
  - operator== 23-36
  - operator[] 23-36
- mask\_array 26-27
  - fill 26-29
- mask\_array 26-28
- mask\_array 26-28
- operator%= 26-29
- operator&= 26-29
- operator\*= 26-29
- operator+= 26-29
- operator-= 26-29
- operator/= 26-29
- operator<= 26-29
- operator= 26-28
- operator>= 26-29
- operator^= 26-29
- operator|= 26-29
- masking macro 17-15
- <math.h> D-1
- max 25-26
  - valarray 26-19
- max\_element 25-27
- max\_length, codecvt 22-20
- max\_size, basic\_string 21-16
- meaning of declarator 8-4
- member
  - 9-3 —see also base class member
  - access operator, overloaded 13-23
  - access ambiguity 10-4
  - access, base class 10-1
  - access, class 5-7
  - access, struct default 9-1
  - access, union default 9-1
  - array 9-4
  - cast, pointer to 5-11/12
  - class object 9-4
  - constructor order of execution 12-2
  - declaration 9-3
  - declaration, class 9-3
  - declaration, static 3-1
  - definition, static 9-9
  - destructor order of execution 12-8
  - enumerator 7-12
  - example, static 9-9
  - function and access control 12-1
  - function and friend function 11-6
  - function call, undefined 9-7
  - function, class 9-5
  - function, const 9-8
  - function, constructor and 12-2
  - function definition 9-5
  - function, destructor and 12-8
  - function example 9-7, 11-6
  - function, friend 11-7
  - function in local class 9-6
  - function, inline 9-5
  - function, local class 9-13
  - function, nested class 11-10
  - function, overload resolution and 13-5
  - function, static 9-8/9
  - function template 14-12
  - function, union 9-10
  - function, virtual 17-13, 15
  - function, volatile 9-8
  - initialization 12-13
  - initialization, const 12-14
  - initialization, order of 12-14
  - initialization, reference 12-14
  - initialization, static 9-9
  - initializer 8-15
  - initializer, scope of 12-15
  - local class restriction, static 9-10
  - name access 11-1
  - name access example 11-5
  - name lookup 10-4
  - name, overloaded 9-4
  - object initialization 12-14
  - pointer to —see pointer to member
  - pointer value, null 4-5
  - static 9-8
  - static class 3-27
  - storage duration, class 3-29
  - template and static 14-13
  - type of static 5-14
  - use, static 9-8
- member-declaration 9-3
- member-declarator 9-3
- member-specification 9-3
- memchr 21-33
- mem\_fun 20-14/15
- mem\_fun1\_ref\_t 20-14

- mem\_fun1\_t 20-14
- mem\_fun\_ref 20-14/15
- mem\_fun\_ref\_t 20-14
- mem\_fun\_t 20-14
- mem-initializer 12-13
- mem-initializer-id 12-13
- <memory> 20-16
- memory
  - management 5-16 —see also new, delete
  - model 1-4
- merge 25-22
  - list 23-21
- message, diagnostic 1-2
- messages 22-48
  - close 22-48
  - do\_close 22-49
  - do\_get 22-48/49
  - do\_open 22-49
  - open 22-48
- messages\_byname 22-49
- min 25-26
  - valarray 26-19
- min\_element 25-26
- minus 20-9
- mismatch 25-12
- missing storage class specifier 7-3
- mixed pointer and pointer to member type, multi-level 4-3
- mod 26-34
- modf 26-34
- modifiable lvalue 3-37
- modifier function 17-2
- modulus 20-10
- modulus
  - implementation defined 5-22
  - operator 5-21
  - zero, undefined 5-1
- money\_get 22-41
  - do\_get 22-42
  - get 22-42
- money\_punct 22-44
  - do\_curr\_symbol 22-47
  - do\_decimal\_point 22-46
  - do\_frac\_digits 22-47
  - do\_grouping 22-46
  - do\_neg\_format 22-47
  - do\_negative\_sign 22-47
  - do\_pos\_format 22-47
  - do\_positive\_sign 22-47
  - do\_thousands\_sep 22-46
- money\_punct\_byname 22-47
- money\_put 22-43
  - do\_put 22-44
  - put 22-44
- most
  - derived class 1-5
  - derived object 1-5
- multibyte
  - character 1-2
  - encoding 2-12
  - string, null-terminated 17-8
- multicharacter
  - literal 2-9
  - literal, implementation-defined value of 2-9
- multidimensional
  - array 8-9
  - array declarator 8-8
- multi-level
  - mixed pointer and pointer to member type 4-3
  - pointer to member type 4-3
- multimap 23-37
  - operator< 23-40

- operator== 23-40
- multiple
  - declaration 3-24
  - inheritance 10-1/2
  - inheritance DAG 10-3
  - inheritance, virtual and 10-8
- multiplication operator 5-21
- multiplicative operator 5-21
- multiplicative-expression* 5-21
- multiset 23-43
  - operator< 23-45
  - operator== 23-45
- mutable 7-3

## N

- name
  - locale 22-8
  - type\_info 18-17
- name 2-6, 3-1, 5-3
  - address of cv-qualified 5-14
  - and translation unit 3-1
  - class —see class name
  - declaration 3-1
  - dependent 14-31, 34
  - elaborated enum 7-9
  - global 3-8
  - hiding 3-5, 9, 5-3, 6-6
  - hiding, class definition 9-2
  - hiding, function 13-3
  - hiding, overloading versus 13-3
  - hiding, user-defined conversion and 12-5
  - length of 2-6
  - lookup 3-1, 9
  - lookup, member 10-4
  - lookup, template 14-24
  - macro 16-5
  - overloaded function 13-1
  - overloaded member 9-4
  - point of declaration 3-5
  - predefined macro 16-9
  - qualified 3-14
  - reserved 17-11
  - resolution, template 14-24
  - scope of 3-4
  - space, label 6-1
  - unqualified 3-9
- namespace 17-9/D-1
  - definition 7-12
  - global 17-12
  - scope 3-7
  - scope, anonymous union at 9-11
  - scope, global 3-7
  - unnamed 7-13
- namespaces 7-12
- narrow
  - basic\_ios 27-18
  - ctype 22-12
  - ctype<char> 22-17
  - narrow string literal 2-11
  - narrow-character literal 2-9
  - narrow-oriented istream classes 17-2
- NDEBUG 17-11
- negate 20-10
- negation operator, logical 5-14/15
- nested
  - class definition 9-12
  - class definition example 9-12, 11-10
  - class example 9-12
  - class forward declaration example 9-13

- class friend function 9–13
- class, local class 9–14
- class member function 11–10
- class, scope of 9–12
- type name 9–14
- type name example 9–14
- type name, scope of 9–14
- nested-name-specifier* 5–3
- <new> 17–13, 18–11
- new 3–27, 5–16/17
  - array 5–16
  - array of class objects and 5–18
  - constructor and 5–18
  - default constructor and 5–18
  - exception and 5–18
  - initialization and 5–18
  - operator 17–13, 18–12, 14/15, 20–22
  - placement syntax 5–17
  - scoping and 5–16
  - storage allocation 5–16
  - type of 12–10
  - unspecified constructor and 5–19
  - unspecified order of evaluation 5–19
- new[], operator 17–13, 18–13/15
- new-declarator* 5–16
- new-expression* 5–16
- new\_handler* 3–28, 18–16
- new-initializer* 5–16
- new-line 2–9
- new-placement 5–16
- new-type-id* 5–16
- next\_permutation* 25–28
- noboolalpha 27–20
- nondeduced context 14–54
- nondigit* 2–6
- none, bitset 23–50
- non-trivial
  - constructor 12–2
  - destructor 12–7
- nonvirtual base class DAG 10–3
- nonzero-digit* 2–7
- norm, complex 26–10
- noshowbase 27–20
- noshowpoint 27–21
- noshowpos 27–21
- noskipws 27–21
- not1 20–11
- not2 20–12
- notation, syntax 1–4
- not\_equal\_to 20–10
- nounitbuf 27–21
- nouppercase 27–21
- NTBS 17–7/8, 27–64/D–11
  - static 17–8
- NTCTS 17–2
- nth\_element* 25–20
- NTMBS 17–8
  - static 17–8
- NTWCS 17–8
  - static 17–8
- NULL 18–2
- null
  - character 0 2–11
  - directive 16–9
  - member pointer value 4–5
  - pointer constant 4–4/5
  - pointer value 4–4
  - reference 8–7
  - statement 6–1
- null-terminated
- byte string 17–7

- character type string 17–2
- multibyte string 17–8
- wide-character string 17–8
- number
  - hex 2–10
  - octal 2–10
- <numeric> 26–31
- numeric type requirements 26–1
- numeric\_limits 3–35, 18–3
- num\_get 22–24
  - do\_get 22–25
  - get 22–25
- num\_punct 22–32
- decimal\_point 22–33
- do\_decimal\_point 22–33
- do\_grouping 22–33
- do\_thousands\_sep 22–33
- do\_truename do\_falsename 22–34
- grouping 22–33
- thousands\_sep 22–33
- truename falsename 22–33
- num\_punct\_byname 22–34
- num\_put 22–28
  - do\_put 22–29
- put 22–29

## O

- object 1–4, 3–1, 37
  - class 9–1 —see also class object
  - complete 1–5
  - definition 3–2
  - delete 5–19
  - destructor and placement of 12–9
  - destructor static 3–26
  - initialization, auto 8–16
  - initialization, static 3–25, 8–16
  - layout, access specifier and 11–3
  - lifetime 3–29
  - linkage, implementation-defined 7–27
  - linkage specification 7–27
  - representation 3–33
  - state 17–2
  - static local 3–27
  - storage duration, local 3–27
  - temporary —see temporary
  - type 1–4
  - type 3–34
  - type, completely defined 9–4
  - undefined deleted 3–29
  - unnamed 12–2
- object-expression 5–1
- object-like macro 16–4
- observer function 17–2
- oct 27–22
- octal
  - literal 2–8
  - number 2–10
- octal-escape-sequence* 2–9
- octal-literal* 2–7
- of
  - overloading, example 13–1
  - reference, direct binding 8–22
- offsetof 18–2/C–13
- ofstream 27–3, 62
- old function, plain 18–23
- one-definition rule 3–2
- one's complement operator 5–14/15
- open
  - basic\_filebuf 27–64, 72

- basic\_ifstream 27-69
- basic\_ofstream 27-70
- messages 22-48
- openmode, ios\_base 27-11
- operations on class object 9-1
- operator
  - bool, basic\_ios 27-19
  - bool(), basic\_istream 27-36
  - bool(), basic\_ostream 27-47
  - delete 17-13, 18-13, 20-22
  - delete 5-17, 20, 12-10
  - delete —see delete
  - delete[] 17-13, 18-14
  - delete[] 5-17, 20, 12-10
  - function 13-21
  - new 17-13, 18-12, 14/15, 20-22
  - new 5-17
  - new[] 17-13, 18-13/15
  - new[] 5-17
  - overloaded 13-21
- operator!
  - basic\_ios 27-19
  - valarray 26-17
- operator!= 20-6
  - basic\_string 21-28
  - bitset 23-50
  - complex 26-9
  - istreambuf\_iterator 24-26
  - locale 22-9
  - reverse\_iterator 24-15
  - type\_info 18-17
  - valarray 26-21
- operator%, valarray 26-20
- operator%=
  - gslice\_array 26-27
  - indirect\_array 26-30
  - mask\_array 26-29
  - slice\_array 26-24
  - valarray 26-18
- operator&
  - bitset 23-51
  - valarray 26-20
- operator&&, valarray 26-20/21
- operator&=
  - bitset 23-48
  - gslice\_array 26-27
  - indirect\_array 26-30
  - mask\_array 26-29
  - slice\_array 26-24
  - valarray 26-18
- operator(), locale 22-9
- operator\*
  - auto\_ptr 20-21
  - back\_insert\_iterator 24-17
  - complex 26-8
  - front\_insert\_iterator 24-18
  - insert\_iterator 24-20
  - istreambuf\_iterator 24-25
  - ostreambuf\_iterator 24-27
  - reverse\_iterator 24-14
  - valarray 26-20
- operator\*=
  - complex 26-7/8
  - gslice\_array 26-27
  - indirect\_array 26-30
  - mask\_array 26-29
  - slice\_array 26-24
  - valarray 26-18
- operator+
  - basic\_string 21-27
  - complex 26-8
  - reverse\_iterator 24-14, 16
  - valarray 26-17, 20
- operator++
  - back\_insert\_iterator 24-17
  - front\_insert\_iterator 24-19
  - insert\_iterator 24-20
  - istreambuf\_iterator 24-25
  - ostreambuf\_iterator 24-27
  - reverse\_iterator 24-14
- operator+=
  - basic\_string 21-17
  - complex 26-7
  - gslice\_array 26-27
  - indirect\_array 26-30
  - mask\_array 26-29
  - reverse\_iterator 24-14
  - slice\_array 26-24
  - valarray 26-18
- operator-
  - complex 26-8
  - reverse\_iterator 24-15/16
  - valarray 26-17, 20
- operator--, reverse\_iterator 24-14
- operator-=
  - complex 26-7/8
  - gslice\_array 26-27
  - indirect\_array 26-30
  - mask\_array 26-29
  - reverse\_iterator 24-15
  - slice\_array 26-24
  - valarray 26-18
- operator->
  - auto\_ptr 20-21
  - reverse\_iterator 24-14
- operator/, valarray 26-20
- operator/=
  - complex 26-7/8
  - gslice\_array 26-27
  - indirect\_array 26-30
  - mask\_array 26-29
  - slice\_array 26-24
  - valarray 26-18
- operator<
  - basic\_string 21-28
  - map 23-36
  - multimap 23-40
  - multiset 23-45
  - pair 20-7
  - queue 23-23
  - reverse\_iterator 24-15
  - set 23-43
  - valarray 26-21
  - vector 23-28
  - vector<bool> 23-31
- operator<< 27-22
  - basic\_ostream 27-48/49
  - basic\_string 21-30
  - bitset 23-51
  - complex 26-9
  - valarray 26-20
- operator<=
  - bitset 23-49
  - gslice\_array 26-27
  - indirect\_array 26-30
  - mask\_array 26-29
  - slice\_array 26-24
  - valarray 26-18
- operator<= 20-6
  - basic\_string 21-29
  - reverse\_iterator 24-16
  - valarray 26-21

operator=  
   auto\_ptr 20-21  
   back\_insert\_iterator 24-17  
   bad\_alloc 18-15  
   bad\_cast 18-17  
   bad\_exception 18-20  
   bad\_typeid 18-18  
   basic\_string 21-15  
   exception 18-19  
   front\_insert\_iterator 24-18  
   gslice\_array 26-27  
   indirect\_array 26-30  
   insert\_iterator 24-19  
   mask\_array 26-28  
   ostreambuf\_iterator 24-27  
   slice\_array 26-24  
   type\_info 18-17  
   valarray 26-16  
 operator==  
   basic\_string 21-28  
   bitset 23-50  
   complex 26-8  
   istream\_iterator 24-22  
   istreambuf\_iterator 24-26  
   locale 22-9  
   map 23-36  
   multimap 23-40  
   multiset 23-45  
   pair 20-6  
   queue 23-23  
   reverse\_iterator 24-15  
   set 23-43  
   type\_info 18-16  
   valarray 26-21  
   vector 23-28  
   vector<bool> 23-31  
 operator> 20-6  
   basic\_string 21-29  
   reverse\_iterator 24-15  
   valarray 26-21  
 operator>= 20-6  
   basic\_string 21-29  
   reverse\_iterator 24-16  
   valarray 26-21  
 operator>>  
   basic\_istream 27-37  
   basic\_string 21-30  
   bitset 23-51  
   complex 26-9  
   istream 27-37  
   valarray 26-20  
 operator>>=  
   bitset 23-49  
   gslice\_array 26-27  
   indirect\_array 26-30  
   mask\_array 26-29  
   slice\_array 26-24  
   valarray 26-18  
 operator[]  
   basic\_string 21-17  
   map 23-36  
   reverse\_iterator 24-15  
   valarray 26-17  
 operator^  
   bitset 23-51  
   valarray 26-20  
 operator^=  
   bitset 23-49  
   gslice\_array 26-27  
   indirect\_array 26-30  
   mask\_array 26-29  
   slice\_array 26-24  
   valarray 26-18  
 operator|  
   bitset 23-51  
   valarray 26-20  
 operator|=  
   bitset 23-49  
   gslice\_array 26-27  
   indirect\_array 26-30  
   mask\_array 26-29  
   slice\_array 26-24  
   valarray 26-18  
 operator||, valarray 26-20/21  
 operator~  
   bitset 23-49  
   valarray 26-17  
*operator* 13-21  
*operator*  
   —see conversion function, conversion  
   %= 5-27  
   &= 5-27  
   \*= 5-27  
   += 5-15, 27  
   -= 5-27  
   /= 5-27  
   <=<= 5-27  
   >=>= 5-27  
   ^= 5-27  
   |= 5-27  
   additive 5-22  
   address-of 5-14  
   assignment 5-27, 17-8  
   bitwise 5-25  
   bitwise AND 5-25  
   bitwise exclusive OR 5-25  
   bitwise inclusive OR 5-26  
   cast 5-14, 20, 8-2  
   class member access 5-7  
   comma 5-28  
   conditional expression 5-26  
   copy assignment 12-19  
   decrement 5-8, 14/15  
   division 5-21  
   equality 5-24  
   example, scope resolution 10-5  
   function call 5-5, 13-21  
   function call 13-21  
   greater than 5-23  
   greater than or equal to 5-23  
   identities and overloading 13-21  
   increment 5-8, 14/15  
   indirection 5-14  
   inequality 5-24  
   left shift —see left shift operator  
   less than 5-23  
   less than or equal to 5-23  
   list 2-7, 13-21  
   logical AND 5-26  
   logical negation 5-14/15  
   logical OR 5-26  
   modulus 5-21  
   multiplication 5-21  
   multiplicative 5-21  
   new —see new  
   one's complement 5-14/15  
   overloaded 5-1  
   overloading 13-21 —see also overloaded operator  
   overloading restrictions 13-21  
   pointer to member 5-21  
   precedence of 1-7  
   relational 5-23

- right shift; right shift operator 5-23
  - scope resolution 5-3, 17, 9-6, 10-1, 10
  - shift—see left shift operator, right shift operator
  - side effects and comma 5-28
  - side effects and logical AND 5-26
  - side effects and logical OR 5-26
  - sizeof 5-14/15
  - subscripting 5-4, 13-21
  - unary 5-14
  - unary minus 5-14/15
  - unary plus 5-14
  - use, scope resolution 9-9
  - operator-function-id* 13-21
  - optimization of temporary—see elimination of temporary
  - OR
    - operator, bitwise exclusive 5-25
    - operator, bitwise inclusive 5-26
    - operator, logical 5-26
    - operator, side effects and logical 5-26
  - order
    - of argument evaluation 5-6
    - of argument evaluation, unspecified 5-6
    - of base class initialization 12-14
    - of destruction of temporary 12-4
    - of evaluation new, unspecified 5-19
    - of evaluation of expression 1-7
    - of evaluation of function arguments, implementation-defined 8-14
    - of evaluation, unspecified 3-25, 5-1
    - of execution, base class constructor 12-2
    - of execution, base class destructor 12-8
    - of execution, constructor and array 12-12
    - of execution, constructor and static objects 12-13
    - of execution, destructor 12-8
    - of execution, destructor and array 12-8
    - of execution, member constructor 12-2
    - of execution, member destructor 12-8
    - of function call evaluation, unspecified 5-6
    - of initialization 3-25, 10-2
    - of member initialization 12-14
    - of virtual base class initialization 12-14
  - ordering, function template partial 14-23
  - <ostream> 27-32
  - ostream 27-3, 32
  - ostreambuf\_iterator 24-26
    - failed 24-27
    - operator\* 24-27
    - operator++ 24-27
    - operator= 24-27
    - ostreambuf\_iterator 24-27
    - ostreambuf\_iterator 24-27
  - ostream\_iterator 24-22
  - ostringstream 27-3, 54
  - ostream D-10
    - :pcount D-11
    - freeze D-11
  - ostream D-11
  - ostream D-11
  - rdbuf D-11
  - str D-11
  - out, codecvt 22-20
  - out\_of\_range 19-3, 21-8, 23-48/50
    - out\_of\_range 19-3
    - out\_of\_range 19-3
  - output\_iterator\_tag 24-10
  - overflow
    - basic\_filebuf 27-66
    - basic\_streambuf 27-31
    - basic\_stringbuf 27-56
    - strstreambuf D-7
  - overflow 5-1
    - undefined 5-1
  - overflow\_error 19-4, 23-48, 50
    - overflow\_error 19-4
    - overflow\_error 19-4
  - overload
    - resolution 13-4
    - resolution and conversion 13-12
    - resolution and default argument 13-12
    - resolution and ellipsis 13-12
    - resolution and member function 13-5
    - resolution and pointer conversion 13-20
    - resolution contexts 13-4
    - resolution, function template 14-59
    - resolution, template 14-23
  - overloaded
    - assignment and initialization 12-12
    - assignment operator 13-22
    - binary operator 13-22
    - declaration 13-1
    - decrement operator 13-23
    - function, address of 5-14, 13-19
    - function ambiguity detection 13-4
    - function call operator 13-22
    - function call resolution 13-4—see also argument matching, overload resolution
    - function declaration matching 13-3
    - function, linkage specification 7-26
    - function name 13-1
    - increment operator 13-23
    - member access operator 13-23
    - member name 9-4
    - name and friend declaration 11-7
    - operator 13-21
    - operator 5-1
    - operator 13-21
    - operator and default argument 13-21
    - operator, inheritance of 13-21
    - subscripting operator 13-23
    - unary operator 13-22
  - overloading 8-10, 9-2, 13-1, 14-21
    - and access 13-4
    - and const 13-2
    - and default initializers 13-3
    - and delete 3-29
    - and derived class 13-3
    - and enum 13-2
    - and equivalent parameter declarations 13-2
    - and pointer versus array 13-2
    - and return type 13-1
    - and scope 13-3
    - and static 13-1
    - and typedef 13-2
    - and volatile 13-2
    - operator identities and 13-21
    - postfix ++ and -- 13-23
    - prefix ++ and -- 13-23
    - resolution and access control 10-5
    - restriction 13-21
    - subsequence rule 13-18
    - versus name hiding 13-3
  - overloader, final 10-7
- ## P
- pair 20-6
    - operator< 20-7
    - operator== 20-6
  - parameter type list* 8-10
  - parameter 1-2
    - adjustment, array 8-10



- adjustment, function 8–10
- declaration 8–9
- example, unnamed 8–15
- initialization 5–5
- list example, variable 8–10
- list, variable 5–6, 8–10
- reference 8–6
- scope of 3–6
- void 8–9
- parameter-declaration* 8–9
- parameterized type —see template
- parameters
  - macro 16–5
  - to `main()` 3–24
  - to `main()`, implementation-defined 3–24
- parentheses
  - and ambiguity 5–16
  - in declaration 8–3, 5
- parenthesized expression 5–3
- partial
  - ordering, function template 14–23
  - specializations, class template 14–17
- `partial_sort` 25–20
- `partial_sort_copy` 25–20
- `partial_sum` 26–32
- partition 25–18
- `pbackfail`
  - `basic_filebuf` 27–66
  - `basic_streambuf` 27–30
  - `basic_stringbuf` 27–56
  - `strstreambuf` D–7
- `pbase`, `basic_streambuf` 27–28
- `pbump`, `basic_streambuf` 27–28
- `:pcount`, `ostrstream` D–11
- `pcount`
  - `strstream` D–13
  - `strstreambuf` D–7
- `peek`, `basic_istream` 27–42
- period 17–7
- phases, translation 2–1
- placement
  - of object, destructor and 12–9
  - syntax, new 5–17
- plain old function 18–23
- plus 20–9
- pm-expression* 5–21
- POD
  - class type 5–18
  - type 3–34
  - type 5–18
- POD-struct 9–1
- POF 18–23
- point
  - of declaration class name 9–3
  - of declaration, enumerator 3–5
  - of declaration name 3–5
  - of definition, enumerator 7–11
  - of error checking 14–26
  - of instantiation 14–34
  - promotion, floating 4–4
  - type, floating 3–34
- pointer
  - 3–36 —see also `void*`
  - and pointer to member type, multi-level mixed 4–3
  - arithmetic 5–22
  - cast, integer to 5–12
  - comparison 5–24/25
  - comparison, undefined 5–23/24
  - comparison, unspecified 5–24
  - comparison, `void*` 5–24
  - constant, null 4–4/5
  - conversion 4–4
  - conversion, array 4–2
  - conversion, overload resolution and 13–20
  - declaration 8–5
  - declarator `*` 8–5
  - example, constant 8–5
  - integer conversion, implementation defined 5–11/12
  - subtraction, implementation defined 5–23
  - terminology 3–35
  - to abstract class 10–10
  - to bit-field restriction 9–11
  - to function cast 5–12
  - to function cast, undefined 5–12
  - to function comparison 5–24/25
  - to function conversion 4–2
  - to integer cast 5–11
  - to member 3–35, 5–21
  - to member cast 5–11/12
  - to member constant expression 5–14
  - to member conversion 4–5
  - to member declarator `::*` 8–7
  - to member example 8–7
  - to member function 5–21
  - to member operator 5–21
  - to member type, multi-level 4–3
  - to member type, multi-level mixed pointer and 4–3
  - to member `void*` conversion 4–5
  - type 3–35
  - value, null 4–4
  - value, null member 4–5
  - versus array, overloading and 13–2
  - zero 4–4
- `pointer_to_binary_function` 20–13
- `pointer_to_unary_function` 20–13
- polar, complex 26–10
- polymorphic
  - class 10–6
  - type 10–6
- `pop`, `priority_queue` 23–24
- `pop_heap` 25–26
- postfix
  - `++` and `--` 5–8
  - `++` and `--`, overloading 13–23
  - expression 5–4
- potential scope 3–4
- `pow` 26–22, 34
- complex 26–10
- pp-number* 2–5
- `pptr`, `basic_streambuf` 27–28
- `#pragma` 16–8
- pragma directive 16–8
- precedence of operator 1–7
- precision, `ios_base` 22–10, 27–12
- predefined macro name 16–9
- prefix
  - `++` and `--` 5–15
  - `++` and `--`, overloading 13–23
  - `L` 2–9, 11
- preprocessing 16–1
  - directive 16–1
- preprocessing-op-or-punc* 2–7
- preprocessing-token* 2–3
- preprocessor, macro 16–1
- `prev_permutation` 25–28
- primary
  - expression 5–2
  - template 14–17
- `priority_queue` 23–23
- `pop` 23–24
- `priority_queue` 23–24
- `priority_queue` 23–24

- push 23–24
- private 11–1
  - base class 11–3
- program 3–22
  - environment 3–24
  - ill-formed 1–2
  - start 3–24/25
  - startup 17–11, 13
  - termination 3–24, 26
  - termination and destructor 12–8
  - well-formed 1–3
- promotion
  - floating point 4–4
  - integral 4–3
  - to int, bool 4–3
- protected 11–1
- protection 17–15
  - see access control
- proxy, istreambuf\_iterator 24–25
- pseudo destructor call 5–6
- pseudo-destructor-name* 5–4
- pseudo-destructor-name 5–6
- ptrdiff\_t 5–23
  - implementation defined type of 5–23
- ptr\_fun 20–13
- ptr-operator* 8–1
- pubimbue, basic\_streambuf 27–26
- public 11–1
  - base class 11–3
- pubseekoff, basic\_streambuf 27–26
- pubseekpos, basic\_streambuf 27–26
- pubsetbuf, basic\_streambuf 27–26
- pubsync, basic\_streambuf 27–26
- punctuators 2–7
- pure
  - specifier 9–4
  - virtual destructor 12–8
  - virtual function 10–10/11
  - virtual function call, undefined 10–11
  - virtual function definition 10–10
  - virtual function example 10–10
- pure-specifier* 9–4
- push, priority\_queue 23–24
- push\_heap 25–25
- put
  - basic\_ostream 27–51
  - money\_put 22–44
  - num\_put 22–29
  - time\_put 22–40
- putback, basic\_istream 27–42
- pword, ios\_base 27–14

## Q

- qualification
  - conversions 4–2
  - explicit 3–14
- qualified
  - id 5–3
  - name 3–14
- qualified-id* 5–3
- question mark 2–9
- <queue> 23–11
- queue 23–22
  - operator< 23–23
  - operator== 23–23
- quote
  - double 2–9
  - single 2–9

## R

- random\_access\_iterator\_tag 24–10
- random\_shuffle 25–18
- range\_error 19–3
  - range\_error 19–3
  - range\_error 19–3
- rank, conversion 13–16
- rbegin, basic\_string 21–15
- rdbuf
  - basic\_filebuf 27–72
  - basic\_ifstream 27–69
  - basic\_ios 27–18
  - basic\_istream 27–59
  - basic\_ofstream 27–70
  - basic\_ostream 27–60
  - basic\_stringstream 27–62
  - istream D–10
  - ostream D–11
  - stringstream D–13
- rdstate, basic\_ios 27–19
- read, basic\_istream 27–42
- readsome, basic\_istream 27–42
- real 26–8
  - complex 26–9
- realloc 20–22
- recursive function call 5–6
- redefinition
  - enumerator 7–11
  - typedef 7–5
- reentrancy 17–15
  - implementation-defined behavior 17–15
- reference 3–35
  - and argument passing 8–22
  - and return 8–22
  - argument 5–5
  - assignment 8–22
  - assignment to 5–28
  - binding 8–22
  - call by 5–5
  - cast 5–10, 12
  - cast, reinterpret\_cast, 5–12
  - cast, static\_cast, 5–10
  - const 8–22
  - declaration 8–6
  - declaration, extern 8–22
  - declarator & 8–6
  - direct binding of 8–22
  - expression 5–1
  - initialization 8–7, 21
  - member initialization 12–14
  - null 8–7
  - parameter 8–6
  - restriction 8–7
  - sizeof 5–15
- reference-compatible 8–22
- reference-related 8–22
- region, declarative 3–1, 4
- register 7–3
  - declaration 7–3
  - restriction 7–3
- register\_callback, ios\_base 27–14
- reinterpret cast 5–11
- reinterpret\_cast
  - lvalue cast 5–11
  - reference cast 5–12
- relational operator 5–23
- relational-expression* 5–23
- release, auto\_ptr 20–21/22
- rel\_ops 20–5
- remainder operator —see modulus operator

- remove 25–15
  - list 23–21
- remove\_copy 25–16
- remove\_copy\_if 25–16
- remove\_if 25–15
- rend, basic\_string 21–15
- replace 25–14
  - basic\_string 21–20
- replace\_copy 25–14
- replace\_copy\_if 25–14
- replace\_if 25–14
- replacement
  - function 17–2
  - macro 16–4
- repositional stream 17–3
- representation
  - object 3–33
  - value 3–33
- required behavior 17–3, 5
- requirements 17–4
  - Allocator 20–2
  - Assignable 23–1
  - container 23–1
  - CopyConstructible 20–2
  - EqualityComparable 20–1
  - iterator 24–1
  - LessThanComparable 20–1
  - numeric type 26–1
- reraise 15–4
- rescanning and replacement 16–6
- reserve
  - basic\_string 21–16
  - vector 23–28
- reserved
  - function 17–3
  - identifier 2–6
  - name 17–11
  - word —see keyword
- reset, bitset 23–49
- resetiosflags 27–52
- resize
  - basic\_string 21–16
  - deque 23–16
  - list 23–20
  - valarray 26–19
  - vector 23–29
- resolution
  - and conversion, overload 13–12
  - and default argument, overload 13–12
  - and ellipsis, overload 13–12
  - and member function, overload 13–5
  - and pointer conversion, overload 13–20
  - argument matching —see overload
  - function template overload 14–59
  - overload 13–4
  - overloaded function call resolution 13–4 —see also
    - argument matching, overload
  - overloading —see overload resolution
  - resolution overloading —see overload
  - scoping ambiguity 10–5
  - template name 14–24
  - template overload 14–23
- restriction 17–14/16
  - address of bit-field 9–11
  - anonymous union 9–11
  - auto 7–3
  - bit-field 9–11
  - constructor 12–1/2
  - copy assignment operator 12–22
  - copy constructor 12–21
  - destructor 12–7/8
  - enumerator 7–11
  - extern 7–3
  - local class 9–14
  - overloading 13–21
  - pointer to bit-field 9–11
  - reference 8–7
  - register 7–3
  - static 7–3
  - static member local class 9–10
  - union 9–10, 12–2
- restrictions, operator overloading 13–21
- rethrow 15–4
- return 6–5/6
  - constructor and 6–6
  - from main() 3–24, 26
  - reference and 8–22
  - statement 6–5 —see also return
- return
  - type 8–10
  - type conversion 6–6
  - type, overloading and 13–1
- reverse 25–17
  - list 23–21
- reverse\_copy 25–17
- reverse\_iterator 24–12
  - conversion 24–13
  - operator!= 24–15
  - operator\* 24–14
  - operator+ 24–14, 16
  - operator++ 24–14
  - operator+= 24–14
  - operator- 24–15/16
  - operator-- 24–14
  - operator-= 24–15
  - operator-> 24–14
  - operator< 24–15
  - operator<= 24–16
  - operator== 24–15
  - operator> 24–15
  - operator>= 24–16
  - operator[] 24–15
  - reverse\_iterator 24–13
  - reverse\_iterator 24–13
- rfind, basic\_string 21–23
- right 27–21
- right
  - shift, implementation defined 5–23
  - shift operator 5–23
- rotate 25–17
- rotate\_copy 25–17
- rounding 4–4
- rule
  - as-if 1–5
  - one-definition 3–2
- rules
  - for *conditions* 6–2
  - summary, scope 3–9
- run-time initialization 3–25
- runtime\_error 19–3
  - runtime\_error 19–3
  - runtime\_error 19–3
- rvalue 3–37
  - lvalue conversion to 4–2
  - lvalue conversion to C–4

## S

- sbumpc, basic\_streambuf 27–26
- scalar type 3–34
- scan\_is

- ctype 22–12
- ctype<char> 22–16
- scan\_not
  - ctype 22–12
  - ctype<char> 22–17
- s-char 2–11
- s-char-sequence 2–11
- scientific 27–22
- scope 3–1, 4
  - anonymous union at namespace 9–11
  - class 3–8
  - destructor and exit from 6–5
  - exception declaration 3–6
  - function 3–7
  - function prototype 3–6
  - global 3–7
  - global namespace 3–7
  - iteration-statement 6–4
  - local 3–6
  - macro definition 16–6
  - namespace 3–7
  - of class definition 9–2
  - of class name 9–2
  - of declaration in for 6–5
  - of default argument 8–14
  - of delete example 12–11
  - of enumerator class 7–12
  - of label 3–7, 6–1
  - of local class 9–13
  - of member initializer 12–15
  - of name 3–4
  - of nested class 9–12
  - of nested type name 9–14
  - of parameter 3–6
  - overloading and 13–3
  - potential 3–4
  - resolution operator 5–3, 17, 9–6, 10–1, 10
  - resolution operator :: 3–15
  - resolution operator example 10–5
  - resolution operator use 9–9
  - rules summary 3–9
  - selection-statement 6–2
- scoping
  - ambiguity resolution 10–5
  - and new 5–16
- search 25–12
- seekdir, ios\_base 27–11
- seekg, basic\_istream 27–43
- seekoff
  - basic\_filebuf 27–67
  - basic\_streambuf 27–28
  - basic\_stringbuf 27–57
  - strstreambuf D–8
- seekp, basic\_ostream 27–47
- seekpos
  - basic\_filebuf 27–67
  - basic\_streambuf 27–28
  - basic\_stringbuf 27–57
  - strstreambuf D–9
- selection statement 6–2
- selection-statement 6–2
  - scope 6–2
- self immolation 14–43
- semantics, class member 5–7
- ~sentry
  - basic\_istream 27–36
  - basic\_ostream 27–47
- sentry
  - basic\_istream 27–35
  - basic\_ostream 27–47
- separate
  - compilation 2–1
  - translation 2–1
- sequence
  - ambiguous conversion 13–15
  - implicit conversion 13–14
  - point 1–6, 5–1
  - standard conversion 4–1
  - statement 6–1
- sequencing operator —see comma operator
- <set> 23–32
- set 23–41
  - bitset 23–49
  - operator< 23–43
  - operator== 23–43
- set, basic source character 2–2
- setbase 27–52
- setbuf
  - basic\_filebuf 27–67
  - basic\_streambuf 27–28
  - streambuf D–10
  - strstreambuf D–9
- set\_difference 25–24
- setf, ios\_base 27–12
- setfill 27–53
- setg, basic\_streambuf 27–27
- set\_intersection 25–24
- setiosflags 27–52
- setjmp 17–12
- <setjmp.h> D–1
- setlocale 17–7
- set\_new\_handler 17–13, 18–16
- setp, basic\_streambuf 27–28
- setprecision 27–53
- setstate, basic\_ios 27–19
- set\_symmetric\_difference 25–25
- set\_terminate 17–13, 18–21
- set\_unexpected 17–13, 18–20
- set\_union 25–23
- setw 27–53
- sgetc, basic\_streambuf 27–27
- sgetn, basic\_streambuf 27–27
- shift, valarray 26–19
- shift operator —see left shift operator, right shift operator
- shift-expression 5–23
- short
  - type 3–34
  - type specifier 7–8
  - type, unsigned 3–34
  - typedef and 7–2
- showbase 27–20
- showmanyc
  - basic\_filebuf 27–65
  - basic\_streambuf 27–29, 65
- showpoint 27–20
- showpos 27–21
- side
  - effect 1–6
  - effects 5–1
  - effects and comma operator 5–28
  - effects and logical AND operator 5–26
  - effects and logical OR operator 5–26
- sign 2–10
- sign
  - of bit-field, implementation-defined 9–11
  - of char, implementation-defined 3–34
- <signal.h> D–1
- signature 1–2
- signed
  - char type 3–34
  - character 3–34
  - typedef and 7–2

- unsigned integer conversion 4–4
- simple-escape-sequence* 2–9
- simple-type-specifier* 7–8
- sin* 26–22, 34
  - complex 26–10
- single quote 2–9
- sinh* 26–22, 34
  - complex 26–10
- size
  - basic\_string* 21–16
  - bitset 23–50
  - gslice* 26–26
  - slice* 26–23
- sizeof
  - array 5–15
  - class object 5–15
  - empty class 9–1
  - integral type, implementation-defined 3–34
  - operator 5–14/15
  - reference 5–15
  - string 2–12
  - type, implementation-defined 3–34
- size\_t* 5–15
- skipws* 27–21
- slice* 26–22
  - size 26–23
  - slice* 26–22
  - slice* 26–22
  - start 26–23
  - stride 26–23
- slice\_array* 26–23
  - fill 26–24
  - operator%= 26–24
  - operator&= 26–24
  - operator\*= 26–24
  - operator+= 26–24
  - operator-= 26–24
  - operator/= 26–24
  - operator<= 26–24
  - operator= 26–24
  - operator>= 26–24
  - operator^= 26–24
  - operator|= 26–24
  - slice\_array* 26–24
  - slice\_array* 26–24
- smanip*, implementation-specified 27–52
- snextc*, *basic\_streambuf* 27–26
- sort* 25–19
  - list 23–22
- sort\_heap* 25–26
- source
  - character set, basic 2–2
  - file 2–1, 17–11, 13
  - file inclusion 16–3
- space, white 2–3
- special member function 12–1 —see also *constructor*, *destructor*, *inline function*, *user-defined conversion*, *virtual function*
- specialization
  - class template 14–6
  - template 14–36
  - template explicit 14–41
- specializations, class template partial 14–17
- specification, template argument 14–48
- specifications
  - C++ Standard Library exception 17–16
  - implementation-defined exception 17–16
  - Standard C library exception 17–16
- specifier
  - access —see *access specifier*
  - auto* 7–3
  - declaration 7–2
  - explicit* 7–5
  - friend* 7–6
  - friend* 17–15
  - function 7–4
  - inline* 7–5
  - missing storage class 7–3
  - static* 7–3
  - storage class 7–3
  - type —see *type specifier*
  - typedef* 7–5
  - virtual* 7–5
- splice*, list 23–20
- sputbackc*, *basic\_streambuf* 27–27
- sputc*, *basic\_streambuf* 27–27
- sputn*, *basic\_streambuf* 27–27
- sqrt* 26–22, 34
  - complex 26–11
- <*sstream*> 27–54
- stable\_partition* 25–18
- stable\_sort* 25–19
- <*stack*> 23–12
- stack 23–25
- stack unwinding 15–5
- Standard
  - C library 17–1, 7, 17–10/C–10, C–12
  - C library exception specifications 17–16
- standard
  - conversion 4–1
  - conversion sequence 4–1
- Standard
  - Library, C++ 17–1, 13/14, 16
  - library, C++ 17–13
- standard, structure of 1–4
- start
  - gslice* 26–26
  - slice* 26–23
- start, program 3–24/25
- startup, program 17–11, 13
- state, *fpos* 27–15
- state, object 17–2
- statement* 6–1
- statement 6–1
  - 6–5 —see also *return*, *return*
  - {}, block 6–1
  - break 6–5/6
  - compound 6–1
  - continue 6–5/6
  - continue in for 6–5
  - declaration 6–6
  - declaration in for 6–5
  - declaration in switch 6–3
  - do 6–3, 5
  - empty 6–1
  - expression 6–1
  - for 6–3, 5
  - goto 6–1, 5/6
  - if 6–2/3
  - iteration 6–3
  - jump 6–5
  - labeled 6–1
  - null 6–1
  - selection 6–2
  - sequence 6–1
  - switch 6–2/3, 6
  - while 6–3/4
- static* 7–3
  - class member 3–27
  - data member 9–8
  - destruction of local 6–7
  - initialization, local 6–7

- linkage of 3–22, 7–3
- local object 3–27
- member 9–8
- member declaration 3–1
- member definition 9–9
- member example 9–9
- member function 9–8/9
- member initialization 9–9
- member local class restriction 9–10
- member, template and 14–13
- member, type of 5–14
- member use 9–8
- object, destructor 3–26
- object initialization 3–25, 8–16
- objects order of execution, constructor and 12–13
- overloading and 13–1
- restriction 7–3
- specifier 7–3
- static
  - cast 5–10
  - NTBS 17–8
  - NTMBS 17–8
  - NTWCS 17–8
  - type 1–2
- `static_cast`
  - conversion to enumeration type 5–11
  - lvalue cast 5–10
  - reference cast 5–10
- `<stdarg.h>` D–1
- `__STDC__` 16–9
  - implementation-defined 16–9
- `<stddef.h>` 2–9, 2–11/D–1
- `<stdexcept>` 19–1
- `<stdio.h>` D–1
- `<stdlib.h>` D–1/2
- storage
  - allocation new 5–16
  - class 3–1
  - class declaration 7–3
  - class specifier 7–3
  - class specifier, missing 7–3
  - duration 3–26
  - duration, auto 3–27
  - duration, class member 3–29
  - duration, dynamic 3–27, 5–16
  - duration, local object 3–27
  - management—see new, delete
  - of array 8–9
- `str`
  - `basic_istream` 27–59
  - `basic_ostringstream` 27–60
  - `basic_stringbuf` 27–56
  - `basic_stringstream` 27–62
  - `istream` D–10
  - `ostream` D–11
  - `sstream` D–13
  - `stringstream` D–7
- `strchr` 21–32
- stream
  - arbitrary-positional 17–1
  - repositional 17–3
- `<streambuf>` 27–22
- `streambuf` 27–3, 22
  - implementation-defined 27–1
  - `setbuf` D–10
- `streamoff` 27–6, 27–15/D–2
  - implementation-defined 27–7/D–2
- `streampos`, implementation-defined D–2
- `streamsize` 27–7
- `strftime` 22–40
- stride
  - `gslice` 26–26
  - `slice` 26–23
- `<string>` 21–5
- string
  - concatenation 2–11
  - distinct 2–11
  - literal 2–11
  - literal concatenation, undefined 2–11
  - literal, implementation-defined 2–11
  - literal, narrow 2–11
  - literal, type of 2–11
  - literal, undefined change to 2–11
  - literal, wide 2–11
  - null-terminated byte 17–7
  - null-terminated character type 17–2
  - null-terminated multibyte 17–8
  - null-terminated wide-character 17–8
  - `sizeof` 2–12
  - terminator 0 2–11
  - type of 2–11
- `stringbuf` 27–3, 54
- `<string.h>` D–1
- string-literal* 2–11
- `stringstream` 27–3
- `strlen` D–6, 11
- `strpbrk` 21–32
- `strrchr` 21–33
- `strstr` 21–33
- `~strstream`, `strstream` D–12
- `strstream` D–11
  - `~strstream` D–12
- `freeze` D–13
- `pcount` D–13
- `rdbuf` D–13
- `str` D–13
- `strstream` D–12
- `strstream` D–12
- `~strstreambuf`, `strstreambuf` D–7
- `strstreambuf` D–4
  - `~strstreambuf` D–7
- `freeze` D–7
- overflow D–7
- `pbackfail` D–7
- `pcount` D–7
- `seekoff` D–8
- `seekpos` D–9
- `setbuf` D–9
- `str` D–7
- `strstreambuf` D–5
- `strstreambuf` D–5
- underflow D–8
- struct
  - class versus 9–1
  - default member access 9–1
  - initialization 8–18
  - type specifier 9–1
- structure 9–1
  - of standard 1–4
  - tag—see class name
- sub-object 1–5
  - lattice—see DAG
- subscripting
  - example 8–8
  - explanation 8–9
  - operator 5–4, 13–21
  - operator, overloaded 13–23
- subsequence rule, overloading 13–18
- `substr`, `basic_string` 21–25
- subtraction
  - implementation defined pointer 5–23
  - operator 5–22

- suffix
  - E 2–11
  - F 2–11
  - f 2–11
  - L 2–8, 11
  - l 2–8, 11
  - U 2–8
  - u 2–8
- sum, valarray 26–19
- summary
  - compatibility with ISO C C–1
  - scope rules 3–9
  - syntax A–1
- sungetc, basic\_streambuf 27–27
- swap 25–13
  - basic\_string 21–22, 30
- swap\_ranges 25–14
- switch
  - statement 6–2/3, 6
  - statement, declaration in 6–3
- sync
  - basic\_filebuf 27–68
  - basic\_istream 27–43
  - basic\_streambuf 27–29
- sync\_with\_stdio, ios\_base 27–13
- synonym 7–15
  - type name as 7–5
- syntax
  - checking 14–26
  - class member 5–7
  - notation 1–4
  - summary A–1

## T

- table, ctype<char> 22–17
- tan 26–22, 34
  - complex 26–11
- tanh 26–22, 34
  - complex 26–11
- tellg, basic\_istream 27–43
- tellp, basic\_ostream 27–47
- template 14–1
- template 14–1
  - and < 14–5
  - and friend 14–15
  - and static member 14–13
  - argument 14–6
  - argument specification 14–48
  - class 23–48
  - definition of 14–1
  - explicit specialization 14–41
  - function 14–48
  - implicit instantiation 14–37
  - member function 14–12
  - name, linkage of 14–1
  - name lookup 14–24
  - name resolution 14–24
  - overload resolution 14–23
  - overload resolution, function 14–59
  - partial ordering, function 14–23
  - partial specializations, class 14–17
  - primary 14–17
  - specialization 14–36
  - specialization, class 14–6
  - type equivalence 14–11
- template-argument 14–5
- template-argument-list 14–5
- template-declaration 14–1
- template-id 14–5

- template-name 14–5
- template-parameter 14–2
- template-parameter-list 14–1
- temporary 12–3
  - and declarator initializer 12–4
  - constructor for 12–3
  - destruction of 12–3
  - destructor for 12–3
  - elimination of 12–3, 23
  - implementation-defined generation of 12–3
  - order of destruction of 12–4
- terminate 3–26, 15–10, 18–10, 20/21
- terminate() 15–9
- terminate\_handler 17–13, 18–21
- termination
  - and destructor, program 12–8
  - program 3–24, 26
- terminator 0, string 2–11
- terminology, pointer 3–35
- test, bitset 23–50
- this 5–2
  - pointer—see this
  - type of 9–8
- thousands\_sep, numpunct 22–33
- throw 15–1
- throw-expression 15–1
- throw-expression in conditional-expression 5–26
- throwing, exception 15–3
- tie, basic\_ios 27–18
- time\_get 22–36
  - date\_order 22–37
  - do\_date\_order 22–38
  - do\_get\_date 22–38
  - do\_get\_monthname 22–38
  - do\_get\_time 22–38
  - do\_get\_weekday 22–38
  - do\_get\_year 22–38
  - get\_date 22–37
  - get\_monthname 22–37
  - get\_time 22–37
  - get\_weekday 22–37
  - get\_year 22–38
- time\_get\_byname 22–39
- <time.h> D–1
- time\_put 22–39
  - do\_put 22–40
  - put 22–40
- time\_put\_byname 22–41
- times 20–9
- to
  - int, bool promotion 4–3
  - rvalue, lvalue conversion 4–2
- token 2–4
- token 2–4, 7
- tolower 22–10
  - ctype 22–12
  - ctype<char> 22–17
- to\_string, bitset 23–50
- to\_ulong, bitset 23–50
- toupper 22–10
  - ctype 22–12
  - ctype<char> 22–17
- traits 17–3
- transform 25–14
  - collate 22–35
- translation
  - phases 2–1
  - separate 2–1
  - unit 17–11/12
  - unit 2–1, 3–22
  - unit, name and 3–1

- trigraph 2–1, 3
- truename falsename, numpunct 22–33
- truncation 4–4
- try 15–1
- try-block* 15–1
- type 3–1
  - ambiguity, declaration 7–2
  - arithmetic 3–35
  - array 3–35, 8–10
  - bitmask 17–6/7
  - Boolean 3–34
  - char 3–34
  - character 3–34
  - character container 17–2
  - checking, argument 5–5
  - checking of default argument 8–13
  - class and 9–1
  - completely defined object 9–4
  - compound 3–35
  - const 7–6
  - conversion, explicit —see casting
  - declaration 8–4
  - declaration consistency 3–24
  - declaration, typedef as 7–5
  - definition, class name as 9–2
  - destination 8–18
  - double 3–35
  - dynamic 1–2
  - enumerated 3–35, 17–6
  - enumeration underlying 7–11
  - equivalence 7–5, 9–2
  - equivalence, template 14–11
  - example of incomplete 3–33
  - float 3–35
  - floating point 3–34
  - function 3–35, 8–9/10
  - fundamental 3–34
  - generator —see template
  - implementation-defined sizeof 3–34
  - incomplete 3–2/3, 6, 33, 4–2, 5–4/9, 14/16, 19, 22, 28, 10–1
  - int 3–34
  - integral 3–34
  - long 3–34
  - long double 3–35
  - multi-level mixed pointer and pointer to member 4–3
  - multi-level pointer to member 4–3
  - name 8–2
  - name as synonym 7–5
  - name example 8–2
  - name example, nested 9–14
  - name, nested 9–14
  - name, scope of nested 9–14
  - object 1–4
  - of bit-field 9–11
  - of character literal 2–9
  - of constructor 12–2
  - of conversion 12–6
  - of delete 12–10
  - of enum 7–10/11
  - of floating point literal 2–11
  - of integer literal 2–8
  - of integer literal, implementation-defined 2–8
  - of new 12–10
  - of ptrdiff\_t, implementation defined 5–23
  - of static member 5–14
  - of string 2–11
  - of string literal 2–11
  - of this 9–8
  - POD 3–34
  - pointer 3–35
  - polymorphic 10–6
  - pun 5–12
  - requirements, numeric 26–1
  - short 3–34
  - signed char 3–34
  - specifier, char 7–8
  - specifier, class 9–1
  - specifier, double 7–8
  - specifier, enum 7–9
  - specifier, float 7–8
  - specifier, int 7–8
  - specifier, long 7–8
  - specifier, short 7–8
  - specifier, struct 9–1
  - specifier, union 9–1
  - specifier, unsigned 7–8
  - specifier, void 7–8
  - specifier, volatile 7–8
  - static 1–2
  - unsigned 3–34
  - unsigned char 3–34
  - unsigned int 3–34
  - unsigned long 3–34
  - unsigned short 3–34
  - void 3–35
  - void\* 3–36
  - volatile 7–6
  - wchar\_t 3–34
  - wchar\_t underlying 3–34
- typedef
  - and long 7–2
  - and short 7–2
  - and signed 7–2
  - and unsigned 7–2
  - as type declaration 7–5
  - class name 7–6, 9–3
  - declaration 3–1
  - enum name 7–6
  - example 7–5
  - overloading and 13–2
  - redefinition 7–5
  - specifier 7–5
- typedef, function 8–11
- typedef-name* 7–5
- typeid 5–9
- type-id* 8–2
- type-id-list* 15–7
- <typeinfo> 18–16
- type\_info 5–9, 18–16
  - before 18–17
  - name 18–17
  - operator!= 18–17
  - operator= 18–17
  - operator== 18–16
  - type\_info 18–17
  - type\_info 18–17
- type\_info::name, implementation-defined 18–17
- typename 7–9
- type-name* 7–8
- type-parameter* 14–2
- types
  - implementation-defined 17–6
  - implementation-defined exception 17–16
- type-specifier* 7–6
- type-specifier
  - bool 7–8
  - wchart 7–8

## U

U suffix 2–8



- u suffix 2-8
  - uflow
    - basic\_filebuf 27-66
    - basic\_streambuf 27-30
  - unary
    - expression 5-14
    - minus operator 5-14/15
    - operator 5-14
    - operator, interpretation of 13-22
    - operator, overloaded 13-22
    - plus operator 5-14
  - unary-expression* 5-14
  - unary\_function 20-9
  - unary\_negate 20-11
  - unary-operator* 5-14
  - uncaught\exception 18-21
  - #undef 16-6, 17-12
  - undefined 17-3, 12/14, 18-23, 21-17, 24-24, 26-16/21, 25, 30, 27-16
    - arithmetic exception 5-1
    - behavior 1-2
    - change to const object 7-7
    - change to string literal 2-11
    - delete 5-19
    - deleted object 3-29
    - division by zero 5-1, 22
    - escape sequence 2-10
    - floating point conversion 4-4
    - function call 5-12
    - left shift 5-23
    - member function call 9-7
    - modulus zero 5-1
    - overflow 5-1
    - pointer comparison 5-23/24
    - pointer to function cast 5-12
    - pure virtual function call 10-11
    - string literal concatenation 2-11
    - unrepresentable integral value 4-4
  - underflow
    - basic\_filebuf 27-65
    - basic\_streambuf 27-29
    - basic\_stringbuf 27-56
    - strstreambuf D-8
  - underflow\_error
    - underflow\_error 19-4
    - underflow\_error 19-4
  - underlying
    - type, enumeration 7-11
    - type, wchar\_t 3-34
  - underscore
    - character 17-12
    - in identifier \_ 2-6
  - unexpected 18-20
  - unexpected() 15-10
  - unexpected\_handler 17-13, 18-20
  - unget, basic\_istream 27-42
  - uninitialized variable, indeterminate 8-16
  - uninitialized\_copy 20-19
  - uninitialized\_fill 20-19
  - uninitialized\_fill\_n 20-20
  - union 3-35, 9-10
    - access control, anonymous 9-11
    - anonymous 9-10
    - at namespace scope, anonymous 9-11
    - class versus 9-1
    - constructor 9-10
    - default member access 9-1
    - destructor 9-10
    - global anonymous 9-11
    - initialization 8-21, 9-10
    - member function 9-10
    - restriction 9-10, 12-2
    - restriction, anonymous 9-11
    - type specifier 9-1
  - unique 25-16
    - list 23-21
  - unique\_copy 25-16
  - unit
    - instantiation 2-2
    - translation 17-11/12
  - unitbuf 27-21
  - universal-character-name* 2-2
  - universal-character-name 2-2
  - unknown argument type 8-10
  - unnamed
    - bit-field 9-11
    - class 7-6
    - namespace 7-13
    - object 12-2
    - parameter example 8-15
  - unqualified name 3-9
  - unqualified-id* 5-2
  - unrepresentable integral value, undefined 4-4
  - unsetf, ios\_base 27-12
  - unshift, codecvt 22-20
  - unsigned
    - arithmetic 3-34
    - char type 3-34
    - int type 3-34
    - integer conversion, signed 4-4
    - literal 2-8
    - long type 3-34
    - short type 3-34
    - type 3-34
    - type specifier 7-8
    - typedef and 7-2
  - unsigned-suffix* 2-8
  - unspecified 18-12/14, 16, 21-13, 25-20, 26-19, 27-56/D-8
    - address of member function 17-15
    - allocation 9-5, 11-3
    - argument to constructor 5-19
    - behavior 1-3
    - constructor and new 5-19
    - order of argument evaluation 5-6
    - order of evaluation 3-25, 5-1
    - order of evaluation new 5-19
    - order of function call evaluation 5-6
    - pointer comparison 5-24
  - unwinding, stack 15-5
  - upper\_bound 25-21
  - uppercase 27-21
  - uppercase 17-7, 12
  - usefacet, locale 22-9
  - user-defined
    - conversion 12-4/6
    - conversion and name hiding 12-5
    - conversion, implicit 12-5
    - conversion, inheritance of 12-7
    - conversion, virtual 12-7
  - using-declaration 7-16
  - using-directive 7-21
  - usual arithmetic conversions 5-2
  - <utility> 20-5
- ## V
- va\_end 17-12
  - <valarray> 26-11
  - ~valarray, valarray 26-16
  - valarray 26-14, 26
  - ~valarray 26-16

- apply 26-19
- cshift 26-19
- length 26-18
- max 26-19
- min 26-19
- operator! 26-17
- operator!= 26-21
- operator% 26-20
- operator%= 26-18
- operator& 26-20
- operator&& 26-20/21
- operator&= 26-18
- operator\* 26-20
- operator\*= 26-18
- operator+ 26-17, 20
- operator+= 26-18
- operator- 26-17, 20
- operator-= 26-18
- operator/ 26-20
- operator/= 26-18
- operator< 26-21
- operator<< 26-20
- operator<= 26-18
- operator<= 26-21
- operator= 26-16
- operator== 26-21
- operator> 26-21
- operator>= 26-21
- operator>> 26-20
- operator>= 26-18
- operator[] 26-17
- operator^ 26-20
- operator^= 26-18
- operator| 26-20
- operator|= 26-18
- operator|| 26-20/21
- operator~ 26-17
- resize 26-19
- shift 26-19
- sum 26-19
- valarray 26-15
- valarray 26-15
- va\_list 17-12
- value
  - call by 5-5
  - null member pointer 4-5
  - null pointer 4-4
  - of char literal, implementation-defined 2-10
  - of enumerator 7-10
  - of multicharacter literal, implementation-defined 2-9
  - representation 3-33
  - undefined unrepresentable integral 4-4
- value-initialization 8-16
- variable
  - argument list 8-10
  - indeterminate uninitialized 8-16
  - parameter list 5-6, 8-10
  - parameter list example 8-10
- <vector> 23-12
- vector 23-26
  - assign 23-28
  - capacity 23-28
  - erase 23-29
  - insert 23-29
  - operator< 23-28
  - operator== 23-28
  - reserve 23-28
  - resize 23-29
  - vector 23-28
  - vector 23-28
- vector<bool> 23-29

- operator< 23-31
- operator== 23-31
- vertical tab 2-9
- viable function 13-5
- virtual
  - and friend 10-8
  - and multiple inheritance 10-8
  - specifier 7-5
- virtual
  - base class 10-2
  - base class DAG 10-3
  - base class dominance 10-5
  - base class initialization 12-15, 21
  - base class initialization, order of 12-14
  - destructor 12-8
  - destructor, pure 12-8
  - function 10-6
  - function access 11-10
  - function call 10-10
  - function call, constructor and 12-17
  - function call, destructor and 12-17
  - function call, undefined pure 10-11
  - function definition 10-8
  - function definition, pure 10-10
  - function example 10-8
  - function example, pure 10-10
  - function, pure 10-10/11
  - member function 17-13, 15
  - user-defined conversion 12-7
- visibility 3-9
- void
  - parameter 8-9
  - type 3-35
  - type specifier 7-8
- void& 8-6
- void\*
  - conversion, pointer to member 4-5
  - pointer comparison 5-24
  - type 3-36
- volatile 3-36
  - constructor and 9-8, 12-1
  - destructor and 9-8, 12-7
  - implementation-defined 7-8
  - member function 9-8
  - overloading and 13-2
  - type 7-6
  - type specifier 7-8

## W

- wcerr 27-5
- <wchar.h> D-1
- wchar\_t 2-9, 11, 17-8, 21-32
  - implementation-defined 3-34
  - type 3-34
  - underlying type 3-34
- wchart type-specifier 7-8
- wcin 27-5
- wclog 27-5
- wcout 27-5
- wcschr 21-33
- wcspbrk 21-33
- wcsrchr 21-33
- wcsstr 21-33
- <wctype.h> D-1
- well-formed program 1-3
- wfilebuf 27-3, 62
- wfstream 27-3
- what
  - bad\_alloc 18-15

- bad\_cast 18-17
- bad\_exception 18-20
- bad\_typeid 18-18
- exception 18-19
- ios\_base::failure 27-9
- while statement 6-3/4
- white
  - space 2-3
  - space 2-4
- wide string literal 2-11
- wide-character 2-9
  - string, null-terminated 17-8
- widen
  - basic\_ios 27-19
  - ctype 22-12
  - ctype<char> 22-17
- wide-oriented istream classes 17-3
- width, ios\_base 22-10, 27-12
- wifstream 27-3, 62
- wios 27-6
- wistream 27-3, 32
- wistringstream 27-3, 54
- wmemchr 21-33
- wofstream 27-3, 62
- wostream 27-3, 32
- wostringstream 27-3, 54
- write, basic\_ostream 27-51
- ws 27-37, 43
- wstreambuf 27-3, 22
- wstringbuf 27-3, 54
- wstringstream 27-3

## X

- xalloc, ios\_base 27-13
- xsgetn, basic\_streambuf 27-29
- xspn, basic\_streambuf 27-31
- X(X&) —see copy constructor

## Z

- zero
  - pointer 4-4
  - undefined division by 5-1, 22
  - undefined modulus 5-1
  - width of bit-field 9-11
- zero-initialization 8-16