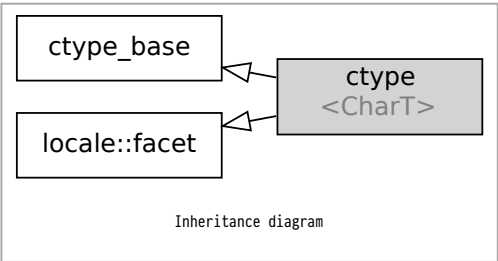


std::ctype

Defined in header <locale>

```
template< class CharT >
class ctype;
```

Class ctype encapsulates character classification features. All stream input operations performed through `std::basic_istream<charT>` use the `std::ctype<charT>` of the locale imbued in the stream to identify whitespace characters for input tokenization. Stream output operations apply `std::ctype<charT>::widen()` to narrow-character arguments prior to output.



Two standalone (locale-independent) specializations are provided by the standard library:

Defined in header <locale>

<code>std::ctype<char></code>	provides narrow character equivalents of the minimal "C" locale classification. This specialization uses table lookup for character classification
<code>std::ctype<wchar_t></code>	provides wide character classification appropriate to the native character set

In addition, every locale object constructed in a C++ program implements its own (locale-specific) versions of these specializations.

Member types

Member type	Definition
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<code>char_type</code>	<code>CharT</code>
------------------------	--------------------

Member functions

(constructor)	constructs a new ctype facet (public member function)
(destructor)	destructs a ctype facet (protected member function)
is	invokes <code>do_is</code> (public member function)
scan_is	invokes <code>do_scan_is</code> (public member function)
scan_not	invokes <code>do_scan_not</code> (public member function)
toupper	invokes <code>do_toupper</code> (public member function)
tolower	invokes <code>do_tolower</code> (public member function)
widen	invokes <code>do_widen</code> (public member function)
narrow	invokes <code>do_narrow</code> (public member function)

Member objects

<code>static std::locale::id</code>	id <i>id</i> of the locale (public member object)
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Protected member functions

do_is [virtual]	classifies a character or a character sequence (virtual protected member function)
------------------------	---

do_scan_is [virtual]	locates the first character in a sequence that conforms to given classification (virtual protected member function)
do_scan_not [virtual]	locates the first character in a sequence that fails given classification (virtual protected member function)
do_toupper [virtual]	converts a character or characters to uppercase (virtual protected member function)
do_tolower [virtual]	converts a character or characters to lowercase (virtual protected member function)
do_widen [virtual]	converts a character or characters from char to charT (virtual protected member function)
do_narrow [virtual]	converts a character or characters from charT to char (virtual protected member function)

Inherited from std::ctype_base

Member types

Type Definition

mask unspecified bitmask type (enumeration, integer type, or bitset)

Member constants

space [static]	the value of mask identifying whitespace character classification (public static member constant)
print [static]	the value of mask identifying printable character classification (public static member constant)
cntrl [static]	the value of mask identifying control character classification (public static member constant)
upper [static]	the value of mask identifying uppercase character classification (public static member constant)
lower [static]	the value of mask identifying lowercase character classification (public static member constant)
alpha [static]	the value of mask identifying alphabetic character classification (public static member constant)
digit [static]	the value of mask identifying digit character classification (public static member constant)
punct [static]	the value of mask identifying punctuation character classification (public static member constant)
xdigit [static]	the value of mask identifying hexadecimal digit character classification (public static member constant)
blank [static](C++11)	the value of mask identifying blank character classification (public static member constant)
alnum [static]	<code>alpha digit</code> (public static member constant)
graph [static]	<code>alnum punct</code> (public static member constant)

Example

The following example demonstrates modification of a ctype other than ctype<char> to tokenize a CSV file

Run this code

```
#include <iostream>
#include <locale>
#include <sstream>

struct csv_whitespace : std::ctype<wchar_t>
{
    bool do_is(mask m, char_type c) const
    {
        if ((m & space) && c == L' ') {
            return false; // space will NOT be classified as whitespace
        }
        if ((m & space) && c == L',') {
            return true; // comma will be classified as whitespace
        }
    }
}
```

```

        return ctype::do_is(m, c); // leave the rest to the parent class
    }
};

int main()
{
    std::wstring in = L"Column 1,Column 2,Column 3\n123,456,789";
    std::wstring token;

    std::wcout << "default locale:\n";
    std::wstringstream s1(in);
    while (s1 >> token) {
        std::wcout << " " << token << '\n';
    }

    std::wcout << "locale with modified ctype:\n";
    std::wstringstream s2(in);
    csv_whitespace* my_ws = new csv_whitespace;
    s2.imbue(std::locale(s2.getloc(), my_ws));
    while (s2 >> token) {
        std::wcout << " " << token << '\n';
    }
}

```

Output:

```

default locale:
Column
1,Column
2,Column
3
123,456,789
locale with modified ctype:
Column 1
Column 2
Column 3
123
456
789

```

See also

ctype<char>	specialization of std::ctype for type <code>char</code> (class template specialization)
ctype_base	defines character classification categories (class template)
ctype_byname	creates a ctype facet for the named locale (class template)

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