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<ios>
types: basic_ios fpos ios ios_base io_errc streamoff streampos streamsize wios wstreampos manipulators: boolalpha dec defaultfloat fixed hex hexfloat internal left noboolalpha noshowbase noshowpoint noshowpos noskipws nounitbuf nouppercase oct right scientific showbase showpoint showpos skipws unitbuf uppercase other functions: iostream_category

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function

std::scientific

<ios> <iostream>

ios_base& scientific (ios_base& str);

Use scientific floating-point notation

Sets the floatfield format flag for the *str* stream to *scientific*.

When floatfield is set to *scientific*, floating-point values are written using scientific notation: the value is represented always with only one digit before the decimal point, followed by the decimal point and as many decimal digits as the *precision field* (*precision*). Finally, this notation always includes an exponential part consisting on the letter *e* followed by an optional sign and three exponential digits.

C++98 C++11

The floatfield format flag is both a selective and a toggle flag: it can take combine one or more of the following values:

flag value	effect when set
<i>fixed</i>	write floating-point values in fixed-point notation
<i>scientific</i>	write floating-point values in scientific notation.
<i>(none)</i>	write floating-point values in default floating-point notation.

The default notation (*none*) is a different floatfield value than either *fixed* or *scientific*. The default notation can be selected by calling `str.unsetf(ios_base::floatfield)`.

For standard streams, no floatfield is set on initialization (default notation).

The *precision field* can be modified using member *precision*.

Notice that the treatment of the *precision field* differs between the default floating-point notation and the fixed and scientific notations (see *precision*). On the default floating-point notation, the *precision field* specifies the maximum number of meaningful digits to display both before and after the decimal point, while in both the fixed and scientific notations, the *precision field* specifies exactly how many digits to display *after* the decimal point, even if they are trailing decimal zeros.

Parameters

str

Stream object whose floatfield *format flag* is affected.

Because this function is a manipulator, it is designed to be used alone with no arguments in conjunction with the *insertion* (<<) and *extraction* (>>) operations on streams (see example below).

Return Value

Argument *str*.

Example

```

1 // modify floatfield
2 #include <iostream>      // std::cout, std::fixed, std::scientific
3
4 int main () {
5     double a = 3.1415926534;
6     double b = 2006.0;
7     double c = 1.0e-10;
8
9     std::cout.precision(5);
10
11     std::cout << "default:\n";
12     std::cout << a << '\n' << b << '\n' << c << '\n';
13
14     std::cout << '\n';
15
16     std::cout << "fixed:\n" << std::fixed;
17     std::cout << a << '\n' << b << '\n' << c << '\n';
18
19     std::cout << '\n';
20
21     std::cout << "scientific:\n" << std::scientific;
22     std::cout << a << '\n' << b << '\n' << c << '\n';
23     return 0;
24 }
```

Possible output:

```
default:  
3.1416  
2006  
1e-010  
  
fixed:  
3.14159  
2006.00000  
0.00000  
  
scientific:  
3.14159e+000  
2.00600e+003  
1.00000e-010
```

Data races

Modifies *str*. Concurrent access to the same stream object may cause data races.

Exception safety

Basic guarantee: if an exception is thrown, *str* is in a valid state.

See also

scientific	Use scientific floating-point notation (function)
ios_base::flags	Get/set format flags (public member function)
ios_base::setf	Set specific format flags (public member function)
ios_base::unsetf	Clear specific format flags (public member function)