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Title:- Write a program to make a use of manipulators in C++.

Objectives:

i- To understand the use of different manipulators.

Key concepts: manipulators

Theory:-

Manipulators are helping function that can modify the input/output stream. It does not mean that we change the value of a variables. It only modifies the I/O stream using insertion (<<) and extraction (>>) operators.

Types of manipulators

1 Manipulators without arguments: The most important manipulators defined by the IO stream library are provided below.

i- endl: It is defined in ostream. It is used to enter a new line and after entering a new line it flushes the output stream.

ii- ws: It is defined in istream and is used to ignore the whitespaces in the string sequence.

iii- ends: It is also defined in ostream and it inserts a null character into the output stream. It typically works with std::ostrstream, when the associated output buffer needs to be null-terminated to be processed as C string.

iv- flush: It is also defined in ostream and it flushes the output stream i.e. it forces all the output written on the screen or in the file. without flush, the output would be the same but may not appear in real-time.

2 Manipulators with Arguments: Some of the manipulators are used with the argument like setw(20), setfill('*') and many more. These all are defined in the header file. If we want to use these manipulators then we must

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include this header file in our program.
For Example, you can use following manipulators to set minimum width & fill the empty space with any character you want: std::cout<<std::setw(6)<<std::setfill('*');

Some important manipulators in <iomanip> are:

i- setw(val): It is used to sets the field width in output operations.
ii- setfill(c): It is used to fill the character 'c' on output stream.
iii- setprecision(val): It sets val as the new value for the precision of floating-point values.
iv- setbase(val): It is used to set the numeric base value for numeric values.
v- setiosflags(flag): It is used to sets the format flags specified by parameter mask.
vi- resetiosflags(m): It is used to resets the format flags specified by parameter mask.

Some important manipulators in <ios> are:

i- showpos: It forces to show a positive sign on positive numbers.
ii- noshowpos: It forces not to write a positive sign on positive numbers.
iii- showbase: It indicates numeric base of numeric values.
iv- uppercase: It forces uppercase letters for numeric values.
v- nouppercase: It forces lowercase letters for numeric values.
vi- fixed: It uses decimal notation for floating-point notation.
vii- hex: Read and write hexadecimal values for integers and its worxs same as the setbase(16).
viii- dec: Read and write decimal values for integers i.e. setbase(10)
ix- oct: Read and write octal values for integers i.e. setbase(10).
x- left: It adjust output to the left.
xi- right: It adjust output to the right.
xii- scientific: It use scientific floating-point notation.

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Demonstrate stack operations and manipulators data types

Example:

```
#include <iomanip>
#include <iostream>
using namespace std;
int main()
{
  double A = 100;
  double B = 2001.5251;
  double C = 201455.2646;
  // we can use setbase(16) here instead of hex
  // formatting
  cout << hex << left << showbase << nouppercase;
  // actual printed part
  cout << (long long) A << endl;
  // we can use dec here instead of setbase(10)
  // formatting
  cout << setbase(10) << right << setw(15)
       << setfill('_') << showpos
       << fixed << setprecision(2);
  // actual printed part
  cout << B << endl;
  // formatting
  cout << scientific << uppercase
       << noshowpos << setprecision(9);
  // actual printed part
  cout << C << endl;
}
```

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