Experiment No - 2

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

objectives: 1. to understand the use of different manipulators

key concept : manipulators

* Theory:

Manipulaters are helping functions that can modify the input/output stream. It does not mean that we change the value of a variable, 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 IOstream library are provided below.

→ 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.

→ ws : It is defined in istream and is used to ignore the whitespaces in the string sequence

→ 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 a string

→ 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 ~~title~~ file. Without flush, the output would be the same but may not appear in real time.

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

For example,

you can use following manipulators to set minimum width and fill the empty space with any character you want: std::cout<<std: set w(6) << std: setfill('*');

* Some important manipulators in <iomanip> are:

1. setw (val): It is used to sets the field width in output operations.
2. setfill (c): It is used to fill the character 'c' on output stream.
3. set precision(val): It sets val as the new value for precision of floating point values.
4. setbase (val): It is used to set the numeric base value for numeric values.
5. setiosflags (flag): It is used to set format flags specified by parameter mask.
6. resetiosflags (m): It is used to resets the format flags specified by parameter mask.

* Some important manipulators in <ios> are:

1. showpos: It forces to show a positive sign on positive numbers.
2. noshowpos: It forces not to write a positive sign on positive numbers.
3. showbase: It indicates numeric base of numeric values

4. uppercase : It forces uppercase letters for numeric values

5. nouppercase : It forces lowercase letters for numeric values

6. Fixed : It uses decimal notations for floating-point values

7. scientific : It use scientific floating point notation

8. hex : Read and write hexadecimal values for integers and it works same as the setbase(16)

9. dec : Read & Write decimal values for integers. setbase(10)

10. oct : Read & Write octal values for integers. setbase(8)

11. Left : It adjust output to the left

12. right : It adjust output to the right.

Example:

```
# include <iomainip>
# 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 << setprcision (2);
//actual printed part
  cout << B << endl;

// Formatting
cout << scientific << uppercase << noshowpos << setprecision(9);
// actual printed part
cout << c << endl;
}
```