EXPERIMENT NO-2

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

Objectives:

1. To understand the use of different IO manipulators.

Theory:

C++ provides various stream manipulators that perform formatting tasks. The stream manipulators provide capabilities such as setting field widths, setting precision, setting and unsetting format state, setting the fill character in fields, flushing streams, inserting a newline into the output stream (and flushing the stream), inserting a null character into the output stream, and skipping white space in the input stream.

Types of Manipulators

There are various 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 (i.e. it forces all the output written on the screen or in the file) 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 C 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 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 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::setw (6) << std::setfill ('*');

Some important manipulators in <iomanip> are:

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

Some important manipulators in <ios> are:

- showpos: It forces to show a positive sign on positive numbers.
- noshowpos: It forces not to write a positive sign on positive numbers.
- showbase: It indicates numeric base of numeric values.
- uppercase: It forces uppercase letters for numeric values.
- nouppercase: It forces lowercase letters for numeric values.
- fixed: It uses decimal notation for floating-point values.
- scientific: It use scientific floating-point notation.
- hex: Read and write hexadecimal values for integers and it works same as the setbase(16).
- dec: Read and write decimal values for integers i.e. setbase(10).
- oct: Read and write octal values for integers i.e. setbase(10).
- left: It adjust output to the left.
- right: It adjust output to the right.

Problem Statement:

Movie Tickets Sale and Donation to Charity

- A movie in a local theatre is in great demand. To help a local charity, the theater owner has decided to donate to the charity a portion of the gross amount generated from the movie. This example designs and implements a program that prompts the user to input the movie name, adult ticket price, child ticket price, number of adult tickets sold, number of child tickets sold, and percentage of the gross amount to be donated to the charity. The output of the program is as follows.

```
_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*_*
Movie Name: ..................... Journey to Mars
Number of Tickets Sold: ...........     2650
Gross Amount: .................... $ 9150.00
Percentage of Gross Amount Donated:    10.00%
Amount Donated: .................. $  915.00
Net Sale: ....................... $ 8235.00
```

Note that the strings, such as "Movie Name:", in the first column are left-justified, the numbers in the right column are right-justified, and the decimal numbers are output with two decimal places.

Program Analysis:

Input: The input to the program consists of the movie name, adult ticket price, child ticket price, number of adult tickets sold, number of child tickets sold, and percentage of the gross amount to be donated to the charity.

Output: The output is as shown above.

Keywords: cin, cout, io manipulators