OBJECT: Understanding Concept of Whitespace, Output Using cout, String Constants, Preprocessor Directives, Header Files, Comments, Defining Integer Variables, Declarations and Definitions, Variable Names Assignment Statements, Integer Constants, Output Variations, The endl Manipulator, Input with cin.

PROGRAM 1:

Write down the following program and compile it. You can write skip comments that are written after each line.

```
#include <iostream>    //preprocessor directive
using namespace std;

int main()         //function name main
{                  //start of function body
cout << "This is my first program in C++"; //statement
return 0;          //statement
}                  //end function body
```

THE #INCLUDE DIRECTIVE

Include the contents of another file, commonly called a header file, in your file. The header file contains the declaration of different functions and objects. We have included "iostream.h" to use "cout", "cin" and "endl" in our program.

COMMENTS

Comments are removed by the C pre-processor before the resulting program code is compiled so the C Compiler does not see them but they can be read by humans looking at the contents of your program file. Single line comments start with // and multi line comments starts with /* and end with */

THE MAIN() FUNCTION

When you run a C++ program, the first statement executed will be at the beginning of a function called main(). If there is no function called main() in your program, an error will be reported when you run the program.

OUTPUT USING COUT

The cout causes the phrase in quotation marks (called a string constant) to be displayed on the screen. The identifier cout (pronounced "C out") is actually an object. It is predefined in C++ to correspond to the standard output stream. A stream is an abstraction that refers to a flow of data. The operator << is called the insertion or put to operator. It directs the contents of the variable on its right to the object on its left.

INTEGER VARIABLES

A variable has a name and can be given a value. Variables are located in particular places in the computer's memory. When a variable is given a value, that value is actually placed in the memory space assigned to the variable. Integer variables represent integer numbers like 1, 30,000, and –27. The following statement is used to declare the integer variable:

```
int var1;
```

ASSIGNMENT STATEMENTS

The equal sign (=) causes the value on the right to be assigned to the variable on the left.

```
var1 = 10;
```

PROGRAM 2:

Write down the following program and compile it.

```
#include <iostream>    //preprocessor directive
using namespace std;

int main()
{
cout << "My Name is XYZ" <<endl;      //endl (end line)
cout << "My age is: " << 18;          //numbers without " "
cout << endl << "I am student of IICT";
cout << "18 + 18 = " << 18+18 << endl;     //Adding two numbers
cout << "C++ is fun";
return 0;
}
```

PROGRAM 3:

Write down the following program and compile it.

```
#include <iostream>    //preprocessor directive
using namespace std;

int main()
{
int a;            //Integer type variable declaration
a = 10;           //Assigning value to variable (initialization)
int b = 10;       //Declaration + initialization
int c;
c = a + b;        //Assigning sum of 2 variable into a variable
cout << "a = " << a << endl;
cout << "b = " << b << endl;
cout << "c = a + b =" << c << endl;
cout << "a + b = " << a + b << endl;
cout << "a + b + c= " << a + b + c;
return 0;
}
```

INPUT WITH CIN

The cin causes the program to wait for the user to type in a value. The value is placed in a variable. The keyword cin (pronounced "C in") is an object, predefined in C++ to correspond to the standard input stream. This stream represents data coming from the keyboard. The >> is the extraction or get from operator. It takes the value from the stream object on its left and places it in the variable on its right. For Example:

```
cin >> var1;
```

ARITHMETIC OPERATORS

The symbols +, -, *, / are the arithmetic operator used to perform addition, subtraction, multiplication and division between two numbers or variables.

PROGRAM 4:

Write down the following program and compile it. Observe if there is any problem in the output.

```
#include <iostream>    //preprocessor directive
using namespace std;

int main()  {
int a, b;          //Two Integer type variable declaration
float c;           //float type variable declaration
cout << "Enter first value";
cin>>a;
cout << "Enter second value";
cin>>b;
c = a + b;                          //addition
cout << "a + b = " << c << endl;
c = a - b;                          //subtraction
cout << "a - b = " << c << endl;
c = a * b;                          //multiplication
cout << "a * b = " << c << endl;
c = a / b;                          //devision
cout << "a / b = " << c ;
return 0;
}
```

Exercise 1:

Write down a program which takes the temperature in Kelvin from user and displays the output in Degree Fahrenheit °F

```
°F  = (K – 273.15) x 9/5 + 32
```

Exercise 2:

Write a program in C++ to calculate the volume of a Cone. Take the values of height and radius input from user and Use the formula:

$$V = \pi r^2 \frac{h}{3}$$

Your output should be:

```
Input the Radius of a Cone: 2
Input the Height of Cone: 6
The volume of a Cone is: 25.13274
```