Programming Fundamentals

Lecture # 2

Lecture Content

- Basic structure of C++ Program
- Cin statements
- Cout statements
- Errors
- Comments
- Lab Exercise

Basic structure of C++ Program

- The format of writing program in C++ is called its structure. It consists of the following parts:
  - Preprocessor directive
  - Main() function
  - Program body (C++ statements)

Preprocessor Directive

- Preprocessor directive is an instruction given to the compiler before the execution of actual program.
- The preprocessor directives are processed by a program known as preprocessor. It is part of C++ compiler.
- It modifies C++ source program before compilation.
- The preprocessor directive start with # symbol.

Include preprocessor

In C++ Include preprocessor is used to include header file in program.

- #include <iostream>
- The above statement tells the compiler to include the file iostream in source program before compiling.

Header files

- Libraries which contains different types of predefined functions.
- Many header files can be included in one program.
- The header file must be included in the program before calling any of its functions in the program.
- The extension of a header file is .h.
- These files are provided by C++ compiler system.
- The header files are normally stored in INCLUDE subdirectory. The name of header file is written in angle brackets.

main() Function

- Main function is starting point of the program.
- Also it called entry point of the program.

```
void main()
{
    Body of main function
}
```

cout and cin statements

These are predefined statements which help us to perform input output operations.

Cout statement:

- Use to display output on console
- Operator used(<<) in cout statement is called insertion operator.

Cin statement:

- Used to take input from user.
- Operator used(>>) in cin statement is called extraction operator.

- Header file for these statement is “iostream”

cout examples

1. cout << "Output sentence"; // prints Output sentence on screen
2. cout << 120; // prints number 120 on screen
3. cout << x; // prints the value of x on screen
4. cout << "Hello"; // prints Hello
5. cout << Hello; // prints the content of variable Hello

cout examples(Cont…)

6. cout << "This " << " is a " << "single C++ statement“.
7. cout << "I am " << age << " years old and my zipcode is " << zipcode;
8. cout << "First sentence.\n";
   cout << "Second sentence.\nThird sentence.";
9. cout << "First sentence." << endl;
   cout << "Second sentence." << endl;

cin examples

1. int age;
   cin >> age;
2. cin >> a
3. cin >> a; cin >> b >> a;
4. #include <iostream>
   using namespace std;
   int main ()
   { int i;
      cout << "Please enter an integer value: ";
      cin >> i;
      cout << "The value you entered is " << i;
      cout << " and its double is " << i*2 << ".\n";
      return 0;
   }

Types of error

- **Error** is a abnormal condition whenever it occurs execution of the program is stopped these are mainly classified into following types.
  - Compile time **errors**
  - Run time **errors**
  - Logical **errors**

Compile-time error causes

Those error which comes at compile time e.g.

- Syntax errors
- Type checking errors
- (Rarely) compiler crashes

Run-time error causes

Which comes during the execution of the program e.g.

- Division by zero
- Dereferencing a null pointer
- Running out of memory

Comments

- Program comments are explanatory statements that you can include in the C++ code. These comments help anyone reading the source code. All programming languages allow for some form of comments.
- C++ supports single-line and multi-line comments. All characters available inside any comment are ignored by C++ compiler.

Comments(Examples)

```
#include <iostream>
using namespace std;
Int main()
    {
        cout << "Hello World"; // prints Hello World
      return 0;
    }
```

Comments(Examples)

```
/* This is a comment */

/* C++ comments can also * span multiple
   lines */
```

Lab Exercise

1. Overview of visual studio
2. How to create C++ Project

Note: Project should be empty in start

3. How we can compile our code in visual studio.
4. How we can run/execute our code in visual studio.

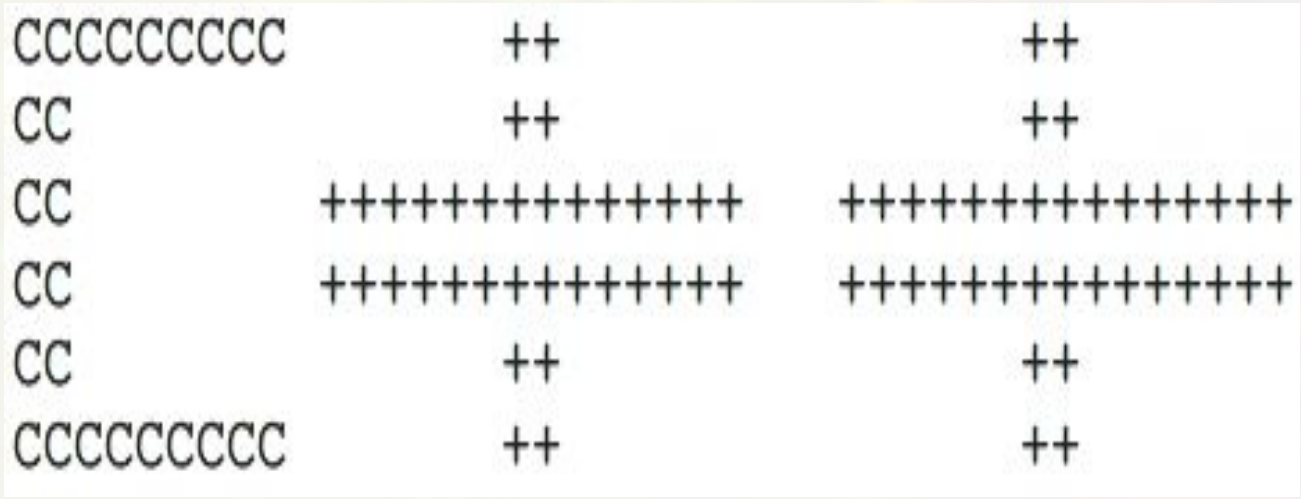
Lab Exercise(Cont…)

- Write C++ code to print your name and age on consol.
- Write and run a program to print your first name on the first line, your middle name on the second line and your last name on the third line using only cout statement.
- Write program to display following pattern(You can use only cout statement).

```
**********
          **********
          **********
          **********
```

Lab Exercise(Cont…)

- Write a program that produces the following output:



Lab Exercise(Cont…)

- Write C++ code which take your age as an input and display following statement,

  “My age is 25”.

  Note: Use proper commenting

- Write a C++ statement that stores the average of num1, num2, and num3, into average.