Introduction to Programming in C
Department of Computer Science and Engineering

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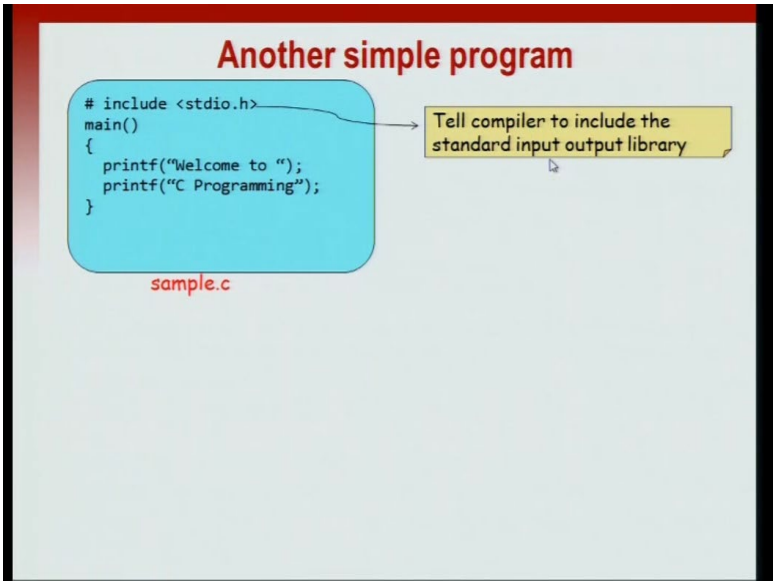

In this session let see another simple program, and try to study what is going on in there. So, here I have slightly more complicated program, then what we just saw. This has two printf statements; once is welcome to, and the second says C programming. So, it is slightly more sophisticated then the code that we have seen. So, to recap the first line # include <stdio.h>, tells the compiler to include the standard output library.

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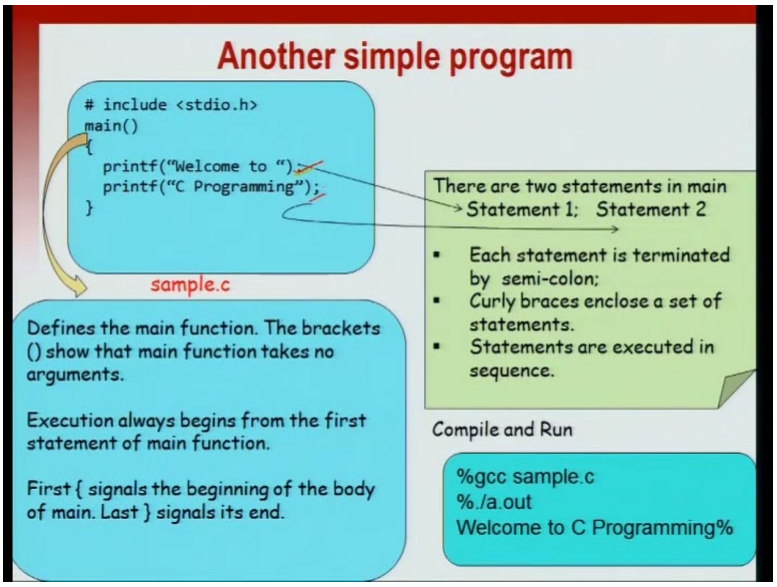

Then we have the main function; the open and close brackets immediately after name show that main is a function, execution always begins at the first line of the main statement. Then the body of the function the logic of the function is enclosed within two curly braces; the first curly brace signals - beginning of the function, and the last curly brace says that the function is over here.

This particular name function has two statements; earlier be have just one statement. The each statement as I said before is terminated with a semicolon. So, this is the first semicolon, and this is the second semicolon. The first semicolon says that the statement printf welcome to ends that point, and then followed by the second statement. And the second statement is also terminated by semicolon. Every statement in C is terminated with the semicolon. Curly braces enclose a set of statement, and each statement in a sequence is executed in the exact sequence that we wrote in the code. Now, once we edit this in an editor save the file, now compile, and run the file. So, let us call it sample.c or you may rename it any file you want. And then once the compilation is successful, you can run it using ./a.out, and then it will print welcome to C programming, which was essentially the same messages as we seen before.

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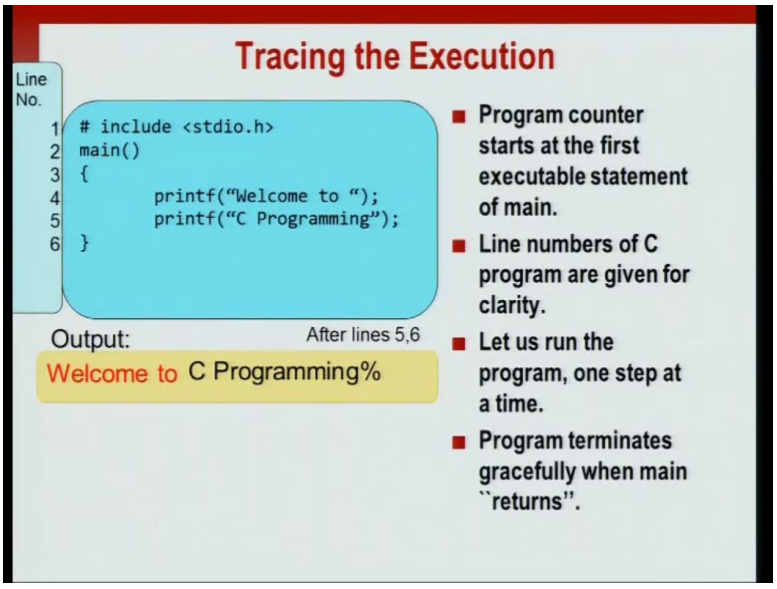

Let us try's what happens when we execute the program. By tracing we mean step by step looking at each statement, and C's see what happens when the program executes. We have what is known as a program counter, which says here is the currently executing

line of program. The program counter stars executing at the first statement of the mean, for is of reference I have given line numbers in the code. Now this is given just for clarity. Now let us just see, what happens when we run the program line by line.

So first we execute the first line of the code, after we are done executing the line 4. So, after we are done executing lines 3 and 4, the message welcome to will be printed on the terminal. This will be followed by the next line, so the next lines is C programming. So, after the next line executes, it will print C programming %. I given this in two different colors to highlight that one was printed by the first line, and otherwise printed in second line, otherwise the colors have nosing, no special meaning. The program terminates when the main finishes execution, and this is what is typically known as returning from the function, we will see this terminology later in the course.

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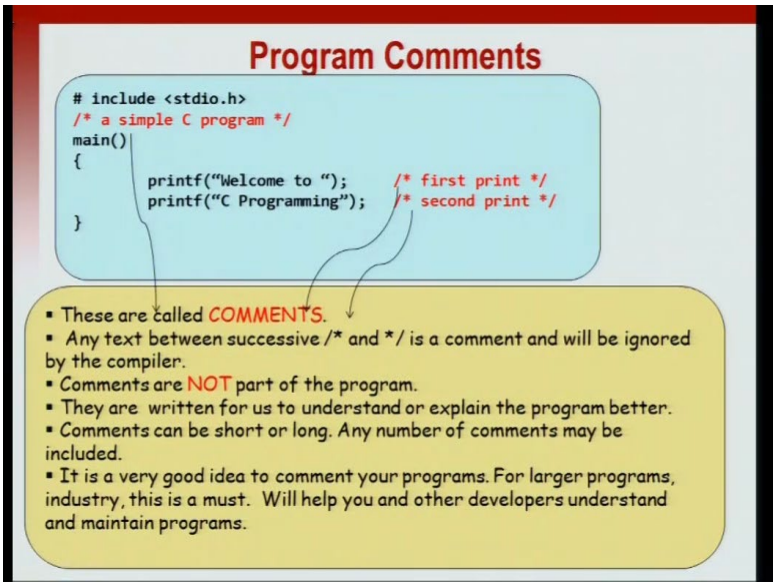

Now, when you code in addition to the statements which are actually executed, you may also give a few additional remarks; these are what are known as come program comments. For example, the lines a simple C program first print and second print; these are the comments in the code. So, whatever is highlighted in red in the code is what are known as comments. Any text between forward /*, and then later followed by a */. So, any text between successive /* and */ is a comment, and it will be ignored by the compiler. So, as far as the compiler is concerned a code with comments is the same as a code without comments. It does not effect the logic of the code. So, comments are not

part of the program; however, it is highly recommend that any program you write, you should comment the code. This is show that other people can understand your code also you yourself looking at the code 4 months later or five months later, it is it may be difficult to understand what you wrote? Much before and comments help you understand the logical of the program.

Now, it is a very good idea to comment your programs, and for lager program it is a must to comment the programs. This is standard industry practice, and even if you participating in large programming project like free software projects, comments are highly encouraged, because it will understand other developers, other programmers to understand your code. So, we will try to follow our own advice most of the programs that we will see in this code, we will comment it, so that it easy to follow the logic of the code.

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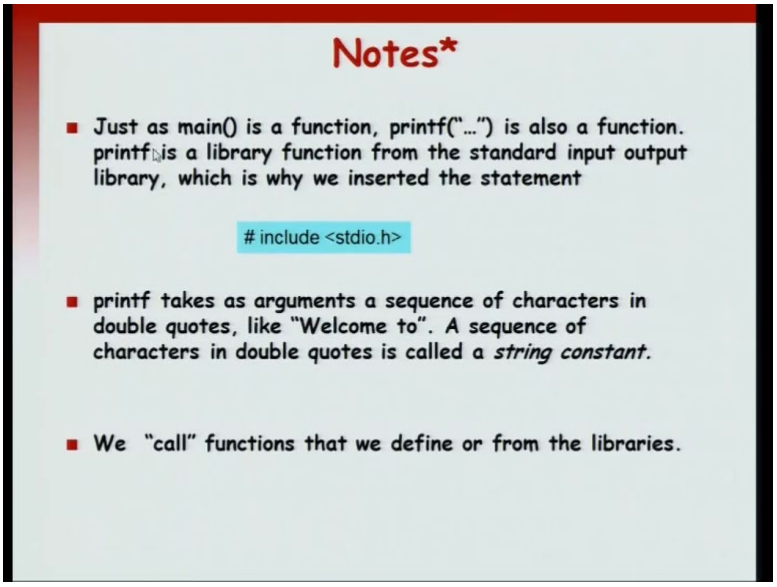

Now, a few notes just as a main is a function printf is also a function. Printf is a library function which means that it is given by the C programming language, and we wanted to tell the compiler to include this library function. The statement which set that is this # include <stdio.h>. So, # include <stdio.h> is the line telling that I want the standard input output library, because that is the library from which I will get the function printf. Now what does printf do? Printf takes two arguments, just like arguments to mathematical

function. So, it takes an input argument which in our first case was welcome to. So, this was the printf first printf statement in the program that we just soft.

Now, this was enclosed in double codes, right. So, it was enclosed in open double quote, and then ended with a close double quote. A sequence of characters in double quotes it is what is known as a string constant. Now we can call the functions that we define or we can call the functions that the library provide. This is how once you define a function, you can call a function. Now we will see an additional concept, the printf statements that we have seen so far, we will print a message and it will print there. And then the prompt the terminal prompt will come immediately after the print. Now typically what we want to do this will print a message, then say tell the prompt to appear on the next line.

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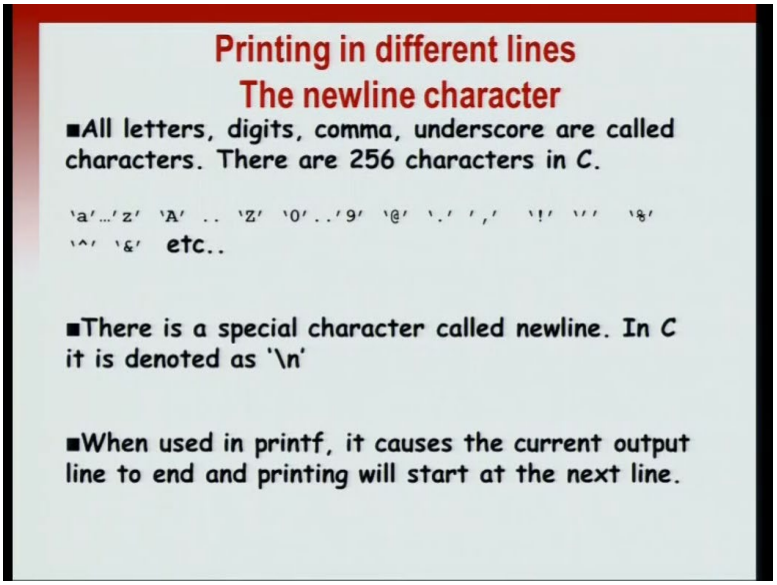

So, for this we need what is known as the new line character. All letters digits, gamma, punctuation symbol; these are called characters in the C programming language. There are the total of 256 characters in C, 256 is 2 to the 8. So, for example this small letters a to z, capital letters A to Z, 0 to 9, the at symbol, other punctuation symbols like dot, gamma, exclamation mark, and so on; are all characters in C. Now in addition to this there are certain things call special characters. So, there is a special character call new line, in the C programming language it is denoted as \n. So, there are notice that there are two kinds slashes; /, and \ on your keyboard. And the new line character is denoted as \n.

So, even though it is single character, it is denoted by two letters. When used in printf it causes the current output line to end, and then printing will start from the new line. So, it is something which says the current line has enter, now whatever you have to print, print it in the next line.

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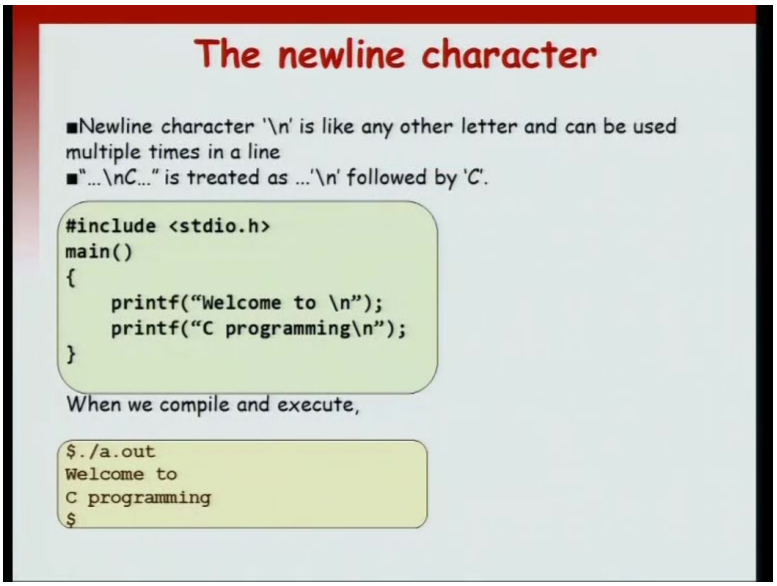

The new line character \n is like any other letter, and can be used multiple times in any particular line. For example, if you have something to printfollowed by \n, followed by C, followed by something to print. Now this will be treated as, so many characters and then a new line followed by C. So, let see a particular example, if you have the old program that we just wrote, but we end each message which a \n. So, we have printf welcome to \n, printf C programming \n. When we compile and execute, we will see something new. So, when we run this $./a.out, it will print welcome to, and then the next thing to print is is a \n which is a new line. So, printing will start from the next line, and then it will print the next message with C programming. So, it will print that followed by new line. So, the prompt will appear on the line after words. So, new line character is something that is use to make your output messages a little more ((Refer Time: 10:58)) here.

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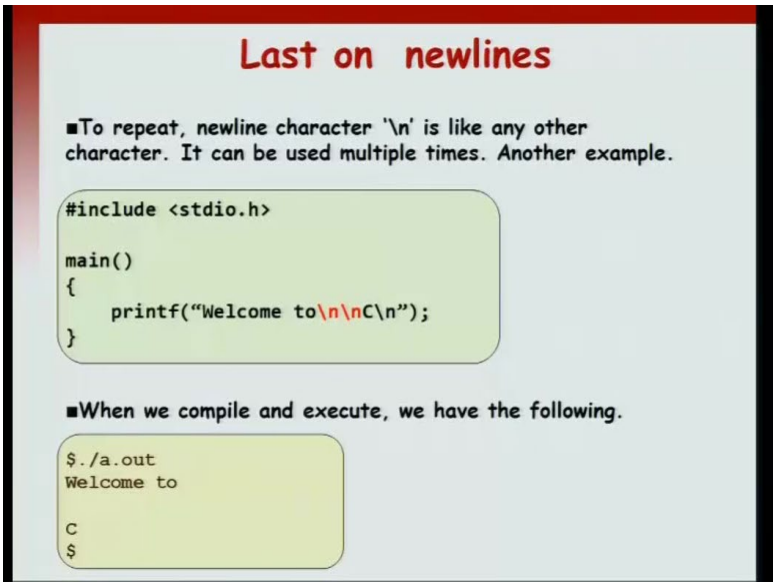

So, let us just conclude by saying one more thing about new lines, the new line character \n is like any other character, and you can use it multiple times even within single message. For example, if I do the same program, but let us say I have welcome to \n \n C \n. So, I have repeated occurrences of \n in the same message, what it will do is if will print the message welcome to, then it will print a new line, and then it will print another line, and then it will print C followed by new line. So, when you run program you will have welcome to new line, then the blank line, then C, then another line. So, new lines are just like a any other characters, the difference is that, because it is a special character, it is represented by two letter. So, it is not represented by single letter it is represented by \n. So, they are together one character in C, call the new line character.