

Numerical Aperture of Optical Fi

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- Functions are the building blocks of C and the place where all program activity occurs.

### The General Form of a Function

```
ret-type function-name(parameter list)  
{  
  body of the function  
}
```

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RITIK YADAV

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- The *ret-type* specifies the type of data that the function returns.
- A function may return any type of data except an array. The *parameter list* is a comma-separated list of variable names and their associated types. The parameters receive the values of the arguments when the function is called.
- A function can be without parameters, in which case the parameter list is empty.
- An empty parameter list can be explicitly specified as such by placing the keyword **void** inside the parentheses.

- $f(\text{type varname1}, \text{type varname2}, \dots, \text{type varnameN})$
- For example, here are a correct and an incorrect function parameter declaration:
  - `f(int i, int k, int j) /* correct */`
  - `f(int i, k, float j) /* wrong, k must have its own type specifier */`

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# Understanding the scope of a function

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The screenshot shows a Google Meet interface. At the top, there's a browser tab bar with three tabs: 'Numerical Aperture of Optical F...', 'lo-au.vlabs.ac.in/laser-optics/No...', and 'Meet - akr-kkhe-ato'. Below the browser bar, the Meet header shows 'Ritu Sibbal is presenting' on the left and 'ROHAN GOEL and 56 more' on the right. The main area is a presentation slide with a white background and black text. The text reads: '• The scope rules of a language are the rules that govern whether a piece of code knows about or has access to another piece of code or data.' On the right side of the screen, there's a vertical list of participants. From top to bottom, they are: 'You' (with a profile picture), 'Ritu Sibbal' (with a large 'R' icon), 'AMAN SONI' (with a large 'A' icon), 'RITIK YADAV' (with a profile picture), and 'ANUJ' (with a profile picture). At the bottom of the screen, there are three red circular icons: a microphone, a camera, and a hand. To the right of these icons are three buttons: 'Raise hand', 'Turn on captions', and 'Ritu Sibbal is presenting'.

boxzgsimls ^

Microphone icon, Camera icon, Hand icon

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- Now we will look closely at the specific scope: defined by a function.
- Each function is a discrete block of code. Thus, a function defines a block scope.
- A function's code is private to that function and cannot be accessed by any statement in any other function except through a call to that function.

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- The code that constitutes the body of a function is hidden from the rest of the program, and unless it uses global variables, it can neither affect nor be affected by other parts of the program.
- Stated another way, the code and data defined within one function cannot interact with the code or data defined in another function because the two functions have different scopes

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- Variables that are defined within a function are local variables. A local variable comes into existence when the function is entered and is destroyed upon exit.
- Thus, a local variable cannot hold its value between function calls.
- The only exception to this rule is when the variable is declared with the **static** storage class specifier.
- .

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- The formal parameters to a function also fall within the function's scope. This means that a parameter is known throughout the entire function.
- A parameter comes into existence when the function is called and is destroyed when the function is exited.
- We cannot define a function within a function

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Meeting interface showing a presentation slide titled "Function Arguments". The slide content is as follows:

- If a function is to accept arguments, it must declare the parameters that will receive the values of the arguments. As shown in the following function, the parameter declarations occur after the function name.
- `/* Return 1 if c is part of string s; 0 otherwise. */`
- `int is_in(char *s, char c)`
- `{`
- `while (*s)`
- `if(*s==c) return 1;`
- `else s++;`
- `return 0;`
- `}`

The interface also shows a list of participants on the right: You, Ritu Sibbal, AMAN SONI, RITIK YADAV, and ANJU. At the bottom, there are icons for "Raise hand", "Turn on captions", and "Ritu Sibbal is presenting".

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- The function `is_in()` has two parameters: `s` and `c`. This function returns 1 if the character `c` is part of the string `s`; otherwise, it returns 0.
- Even though parameters perform the special task of receiving the value of the arguments passed to the function, they behave like any other local variable.
- For example, you can make assignments to a function's formal parameters or use them in an expression.

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The screenshot shows a Google Meet interface. The main window displays a presentation slide with the title "Call by Value/Call by Reference" and two bullet points:

- In a computer language there are two ways that arguments can be passed to a subroutine. The first is *call by value*.
- This method copies the *value of* an argument into the formal parameter of the subroutine. In this case, changes made to the parameter have no effect on the argument.

The right sidebar shows a list of participants: You, Ritu Sibbal, AMAN SONI, RITIK YADAV, and ANLU. At the bottom, there are icons for microphone, video, and chat, along with a status bar indicating "Ritu Sibbal is presenting".

- In a computer language there are two ways that arguments can be passed to a subroutine. The first is *call by value*.
- This method copies the *value of* an argument into the formal parameter of the subroutine. In this case, changes made to the parameter have no effect on the argument.

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- In this example, the value of the argument to **sqr()**, 10, is copied into the parameter **x**.
- When the assignment **x = x\*x** takes place, only the local variable **x** is modified.
- The variable **t**, used to call **sqr()**, still has the value 10.
- Hence, the output is **100 10**.
- It is a copy of the value of the argument that is passed into a function. What occurs inside the function has no effect on the variable used in the call.

Participants:

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- Ritu Sibbal
- AMAN SONI
- SHYAMAL JAIN
- ANUJ

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## Creating a call by Reference

- We can create a call by reference by passing a pointer to an argument, instead of passing the argument itself.
- Since the address of the argument is passed to the function, code within the function can change the value of the argument outside the function.
- Pointers are passed to functions just like any other argument.

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```
• void swap(int *x, int *y)
• {
• int temp;
• temp = *x; /* save the value at address x */
• *x = *y; /* put y into x */
• *y = temp; /* put x into y */
```

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