

Functions in C Plus Plus

Module 1 - Introduction to Functions in C Plus Plus



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Functions in C++

A function is a set of statements that takes input, does some specific computation, and produces output. The idea is to put some commonly or repeatedly done tasks together to make a **function** so that instead of writing the same code again and again for different inputs, we can call this function. In simple terms, a function is a block of code that runs only when it is called.



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Why Do We Need Functions?

- Functions help us in **reducing code redundancy**. If functionality is performed at multiple places in software, then rather than writing the same code, again and again, we create a function and call it everywhere. This also helps in maintenance as we have to make changes in only one place if we make changes to the functionality in future.
- Functions make code **modular**. Consider a big file having many lines of code. It becomes really simple to read and use the code, if the code is divided into functions.
- Functions provide **abstraction**. For example, we can use library functions... without worrying about their internal work.



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Types of Functions in C++

1. **Built-in Functions:** Provided by libraries, like `sqrt()` from `<cmath>` or `cout` from `<iostream>`.
2. **User-defined Functions:** Created by the programmer to perform specific tasks.



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Syntax of a Function

```
return_type function_name(parameters) {  
    // Code to execute  
    return value; // Optional for void functions  
}
```



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Components of a Function

1. **Return Type:**
  - The type of value the function returns (e.g., int, float, void for no return).
2. **Function Name:**
  - Identifier for the function (e.g., add).
3. **Parameters:**
  - Inputs the function requires (e.g., int a, int b).
4. **Function Body:**



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- The block of code enclosed in { } that defines what the function does.

**5. Return Statement:**

- Ends the function and optionally returns a value.

Function Declaration

A **function declaration** (or prototype) tells the compiler about a function's name, return type, and parameters. It is usually written before the main() function to let the compiler know the function exists.

**Syntax:**

```
return_type function_name(parameter_list);
```

**Example:**

```
int add(int a, int b); // Function declaration
```

- **int:** Return type (function returns an integer).
- **add:** Function name.
- **int a, int b:** Parameters (two integers as input).

Function Definition

The **function definition** provides the actual implementation of the function. It includes the code block ({} ) that specifies what the function does.

**Syntax:**

```
return_type function_name(parameter_list) {  
    // Function body  
    return value; // Optional for void functions  
}
```

**Example:**

```
int add(int a, int b) {  
    return a + b; // Returns the sum of a and b  
}
```

Calling a Function

To execute the code inside a function, you need to **call** the function from the main() function (or another function).

**Syntax:**

```
function_name(arguments);
```

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Example:

```
int main() {  
    int x = 5, y = 10;  
    int result = add(x, y); // Function call  
    cout << "Sum: " << result << endl;  
    return 0;  
}
```

Solved Example of a Function

```
#include <iostream>  
using namespace std;  
  
// Function to add two numbers  
int add(int a, int b) {  
    return a + b;  
}  
  
int main() {  
    int x = 5, y = 10;  
    cout << "Sum: " << add(x, y) << endl;  
    return 0;  
}
```

Output:  
Sum: 15

Assignment

Ques 1: Write a function square(int num) that takes an integer as input and returns its square.

Task: Call the function from main() and display the result.

Example:

Input: 5

Output: 25

Ques 2: Write a function max(int a, int b) that returns the larger of two numbers.

Task: Take two numbers as input in main(), call the function, and print the result.

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Example:  
Input: 4, 9  
Output: 9

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Ques 3: Write a function printTable(int n) that prints the multiplication table of a number n up to 10.

Task: Call this function from main() to display the table.

Example:  
Input: 3

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Output:

$$3 \times 1 = 3$$

$$3 \times 2 = 6$$

...

$$3 \times 10 = 30$$

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