

✓ C++ Function Types (Based on Return Type)

A function in C++ can return **different types of values** or return **nothing**.

1 void Function (returns nothing)

✓ Use when:

- You just want to **perform an action**
- No value needs to be returned

Example:

```
cpp  
  
void sayHello() {  
    cout << "Hello!";  
}
```

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✓ No return statement needed

✓ Called only for its **side effects**, like printing, modifying variables, sending output

When to use void?

- Printing output
 - Updating global variables
 - Doing tasks but not giving back a result
 - Helper functions that only perform steps
-

2 int Function (returns integer)

✓ Use when:

- You need to return an **integer result**

Example:

```
cpp  
  
int add(int a, int b) {  
    return a + b; // returns an int  
}
```

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When to use int?

- Counting (e.g., count digits, count primes)
 - Returning a result that is numeric
 - Searching (returning index)
 - Simple math functions
-

3 float / double Function

✓ Use when:

- The result is a **decimal** value
- Mathematical calculations need precision

Example:

```
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double area(double r) {
    return 3.14 * r * r;
}
```

When to use?

- Geometry formulas
 - Percentage calculations
 - Averages
 - Physics/math problems
-

4 bool Function (returns true/false)

✓ Use when:

- Function needs to answer a **YES/NO** or **TRUE/FALSE** question.

Example:

```
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bool isEven(int x) {
    return x % 2 == 0;
}
```

Use cases:

- Checking conditions (prime? even? sorted?)
 - Validation (isValidPassword?)
 - Searching (found or not?)
 - Logic-based programs
-

5 string Function

✓ Use when:

- You need to return a **string**, text, or message.

Example:

```
cpp

string greet(string name) {
    return "Hello " + name;
}
```

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Use for:

- Processing text
 - Building messages
 - String manipulation problems
-

6 Returning Arrays / Vectors

Functions can return vectors or arrays wrapped inside containers.

Example:

```
cpp

vector<int> getNumbers() {
    return {1, 2, 3};
}
```

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Use when:

- You need to return multiple values
 - You want to return a dynamic list
-

7 Return Type `auto` (C++14+)

Compiler figures out return type automatically.

```
cpp
```

```
auto sum(int a, int b) {
    return a + b;
}
```

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⌚ How to Decide Which Return Type to Use?

You want to...

Use this return type

Perform an action only

`void`

Return whole numbers

`int`

Return decimal values

`double / float`

Answer yes/no question

`bool`

Return a word, message, or sentence

`string`

Return a list of values

`vector<T>`

Return different types

`auto or tuple`