

# Methods

## What is a Method in Java?

A method is a block of code that performs a specific task. It is used to execute code whenever it's called, allowing for code reusability and better organization.

### Method Structure

A method in Java typically consists of the following components:

1. Access Modifier: Defines the visibility of the method(e.g., `public`, `private`)
2. Return Type: Indicates the type of value the method will return (e.g., `int`, `void`).
3. Method Name: The name of the method (should be descriptive).
4. Parameters: Inputs to the method, defined within parentheses. They are optional.
5. Method Body: The code that defines what the method does, enclosed in braces `{}`.

### Example of a Method

Here's a simple example that includes a method to add two numbers:

```
public class Calculator {  
    // Method to add two numbers  
    public int add(int a, int b) {  
        return a + b; // Returning the sum of a and b  
    }  
  
    public static void main(String[] args) {  
        Calculator calc = new Calculator(); // Creating an instance of Calculator  
        int result = calc.add(5, 3); // Calling the add method  
        System.out.println("The sum is: " + result); // Output: The sum is: 8  
    }  
}
```

## Key Points:

Access Modifiers: `public` means the method can be accessed from anywhere; `private` restricts access to within the same class.

Return Type: If a method does not return a value, the return type is `void`.

Parameters: The `add` method takes two parameters, `a` and `b`, both of type `int`.

## Types of Methods

1. Static Methods: Belong to the class rather than instances. They can be called without creating an object of the class.

```
public static void display message() {  
    System. out.println("Hello, World!");  
}
```

2. Instance Methods: Require an object of the class to be called.

```
```java  
public void greet() {  
    System. out.println("Hello!");  
}
```

3. Overloaded Methods: Methods with the same name but different parameters (either in type or number).

```
public int add(int a, int b) {  
    return a + b;  
}  
  
public double add(double a, double b) {  
    return a + b;  
}
```

- Methods are essential for organizing and reusing code in Java. Understanding how to define and call methods is crucial for effective programming.