# TypeScript for Automation Testers – Day 9

## Topic: Functions in TypeScript (Part 1)

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### What is a Function?

Let's start simple — think of a **function** as a *small machine that performs a specific task whenever you ask it to*.

A function is a block of code designed to perform a particular operation.

You write the function once and **reuse it whenever needed**, instead of rewriting the same logic again and again.

### Why, Where, and When Do We Use Functions in TypeScript?

- **Why:** To avoid repeating the same code multiple times.
- **Where:** Wherever you need to perform a repeated logic or operation (for example, login validation, clicking elements, or performing API calls).
- **When:** Whenever you notice a repeated pattern or operation in your program, convert that logic into a reusable function.

### How Can We Reuse a Function?

We reuse a function by **calling it**.
When we call a function, the control jumps to that function's block, executes it and returns back once it's done.

### Calling a Function in Java vs TypeScript

Let's understand this with both languages because the way we **call** functions slightly differs.

| Language | How We Define | How We Call |
|---|---|---|
| **Java** | Functions are written inside a **class** and called **methods**. | You create an **object** of that class and call the method using that object. Example: `obj.login();` |
| **TypeScript** | Functions can exist **independently** (outside class) or **inside class**. | You can call them **directly by name** (if outside a class) or using an **object** (if inside a class). |

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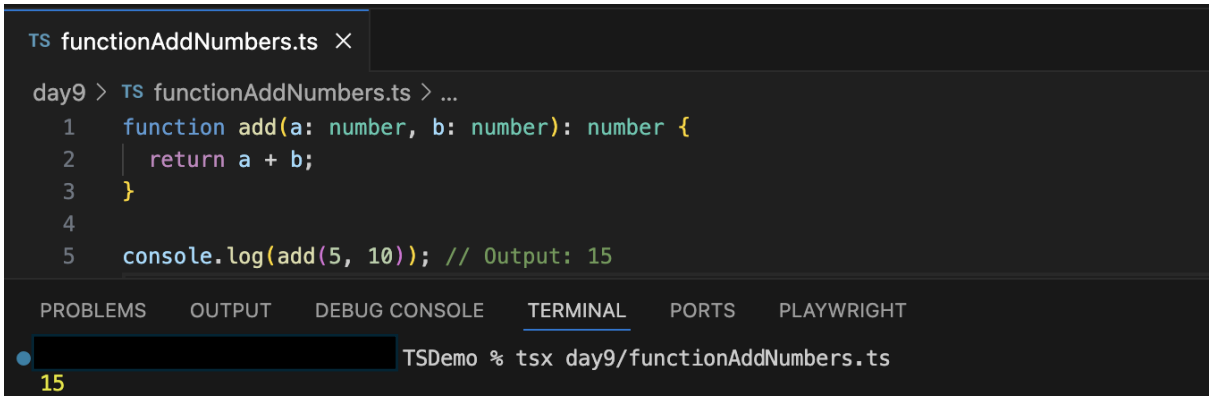
## Example – Function in TypeScript

Let's say we want to add two numbers.

```
function add(a: number, b: number): number {
  return a + b;
}

console.log(add(5, 10)); // Output: 15
```




Here,

- `function` is the keyword.
- `add` is the function name.
- `number` is a return type of the function add
- `a` and `b` are parameters.
- `return` gives back the result.
- `console.log(add(5,10))` is where we **call** the function.

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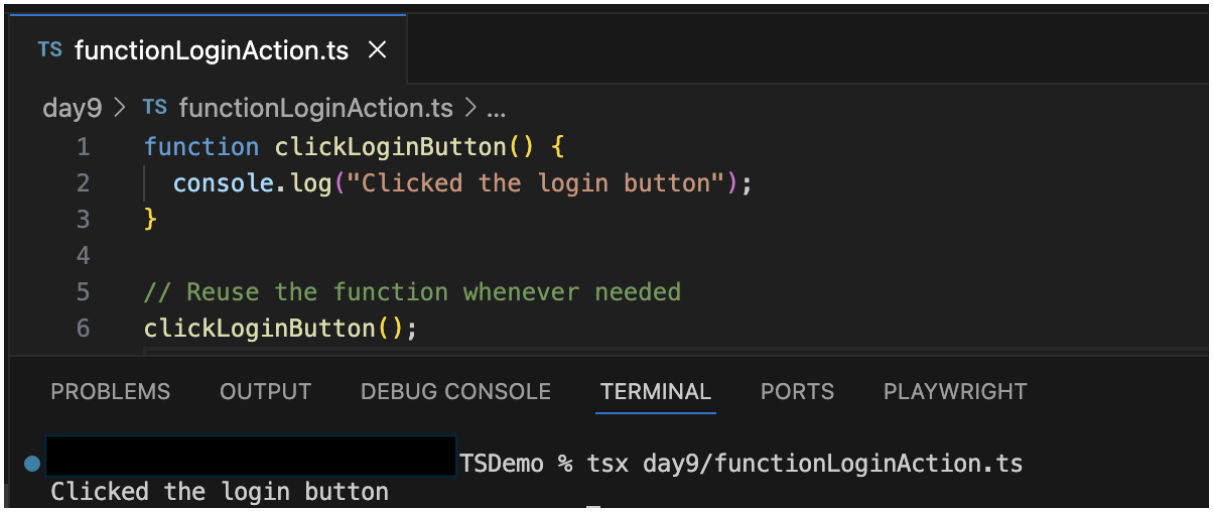
## Real-Life Example in Automation Testing

**Web Automation:**

Imagine you often click on a login button across different test cases.
Instead of repeating `driver.findElement(...).click()` every time, you can write a function like:

```
function clickLoginButton() {
  console.log("Clicked the login button");
}

// Reuse the function whenever needed
clickLoginButton();
```

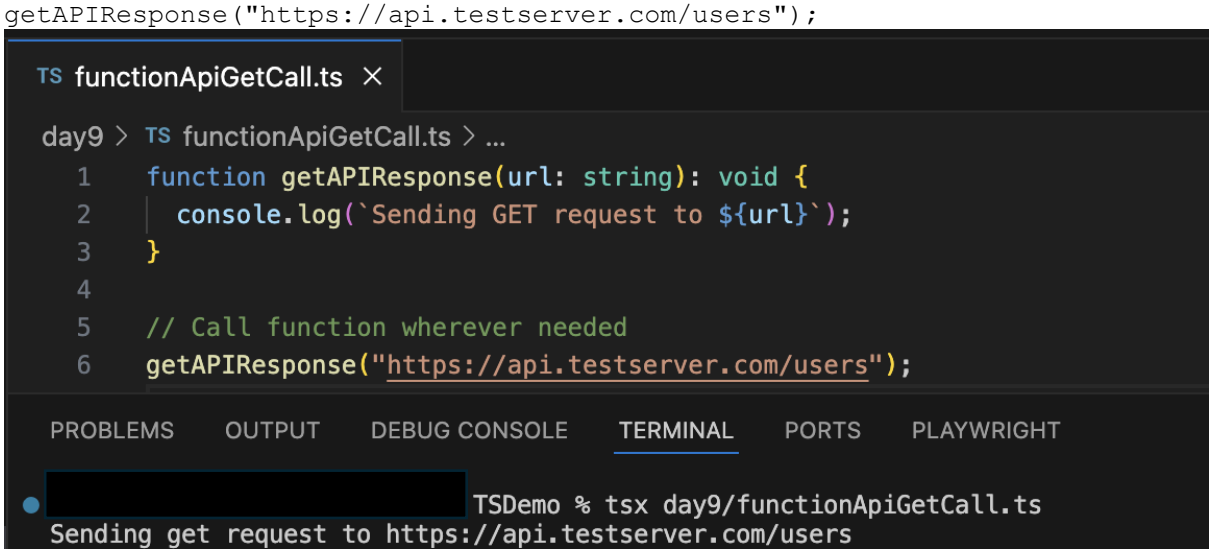



**API Automation:**

If you frequently send a GET request, you can create one function to handle it:

```
function getAPIResponse(url: string): void {
  console.log(`Sending GET request to ${url}`);
}

// Call function wherever needed
getAPIResponse("https://api.testserver.com/users");
```

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## Function vs Method — Are They the Same?

They sound similar but are not exactly the same.

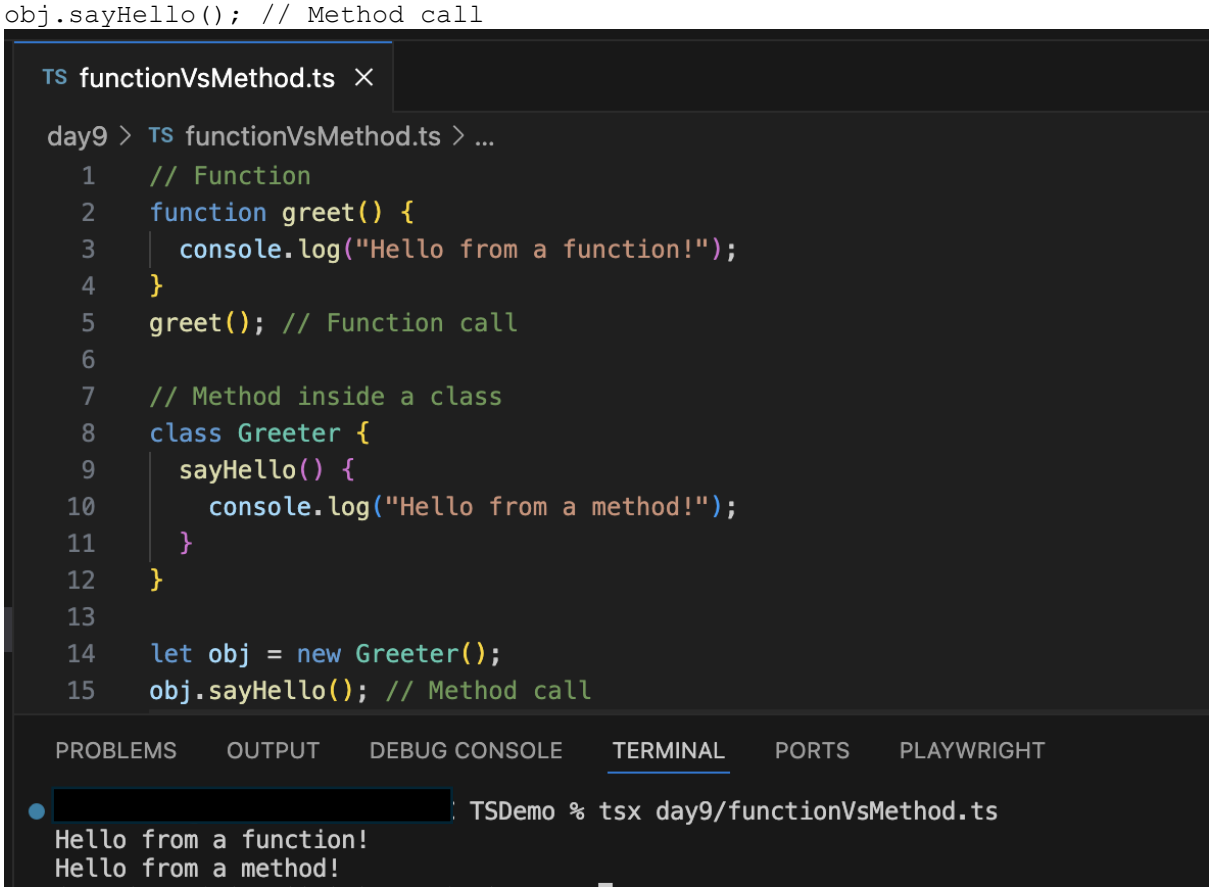
| Term | Where It Exists | How It's Used |
|---|---|---|
| **Function** | Standalone block of code (can exist outside classes). | Can be called directly using its name. |
| **Method** | A function **inside a class or object**. | Must be called using the class/object name. |

Example:

```
// Function
function greet() {
  console.log("Hello from a function!");
}
greet(); // Function call

// Method inside a class
class Greeter {
  sayHello() {
    console.log("Hello from a method!");
  }
}

let obj = new Greeter();
obj.sayHello(); // Method call
```

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## Parameters vs Arguments

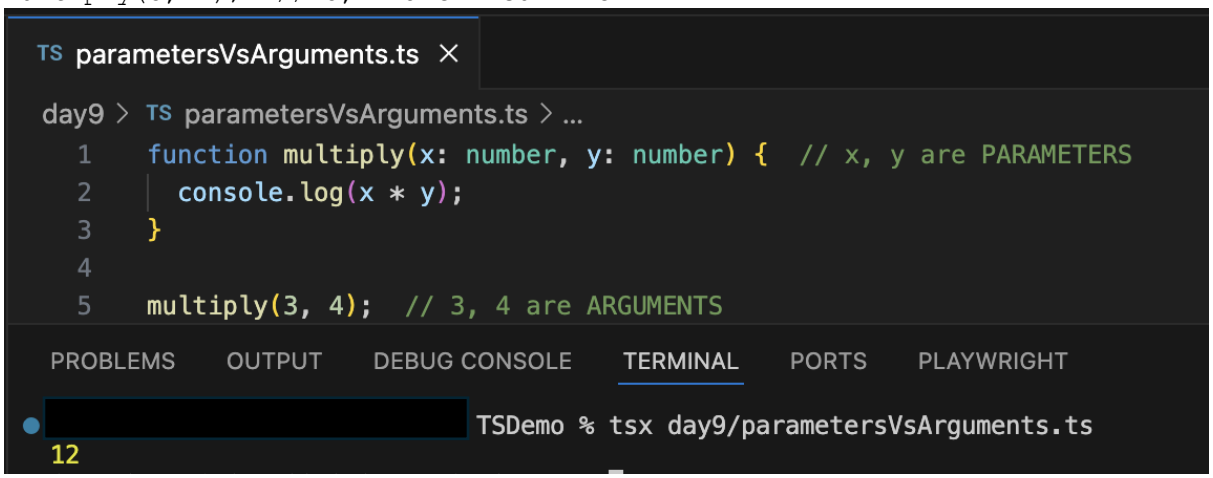
These two words are often confusing, but here's the simple difference:

- **Parameters:** The names you define in the function definition.
- **Arguments:** The actual values you pass when calling the function.

Example:

```
function multiply(x: number, y: number) {  // x, y are PARAMETERS
  console.log(x * y);
}

multiply(3, 4);  // 3, 4 are ARGUMENTS
```




## Types of Functions in TypeScript

Now that you know what a function is, let's look at the three basic types in TS.

### 1. Named Function

A function with a name that you can call directly.

```
function greetUser() {
  console.log("Welcome, Tester!");
}
greetUser();
```

### 2. Anonymous Function (Nameless Function)

A function that doesn't have a name, often stored inside a variable.

```
let greet = function() {
  console.log("Hello from an anonymous function!");
};
greet();
```

### 3. Arrow Function (Lambda Function)

A compact way to write functions, introduced in ES6.

```
let greet = () => console.log("Hello from an arrow function!");
greet();
```

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## Java vs TypeScript – Function Comparison

| Concept | Java | TypeScript |
|---|---|---|
| Function Declaration | Must be inside a class | Can be standalone or inside a class |
| Function Keyword | `void` / `public static` etc. | `function` keyword |
| Function Overloading | Supported | Supported (with signature matching) |
| Arrow Function | Not available | Available |
| Function Reuse | Through object reference | Direct or through object reference |

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## Questions

1. What is a function in TypeScript?
2. Why do we use functions in programming?
3. How is a function called in Java vs TypeScript?
4. What is the difference between a function and a method?
5. What are parameters and arguments in a function?
6. What are the three types of functions in TypeScript?
7. What is an arrow (lambda) function used for?
8. Give a real-world example of using a function in test automation.

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## Answers

1. A function is a reusable block of code that performs a specific task when called.
2. Functions reduce code duplication and improve reusability.
3. In Java, functions are called through class objects; in TypeScript, they can be called directly or through an object.
4. A function is standalone, while a method exists inside a class or object.
5. Parameters are placeholders in function definition; arguments are actual values passed during function call.
6. Named function, Anonymous function, and Arrow function.
7. Arrow functions provide a shorter syntax for defining functions and preserve `this` context.
8. Example: Creating a reusable `login()` function to automate login actions across multiple test cases.

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