TypeScript Introduction

By
Narasimha Rao T
Microsoft.Net FSD Trainer
Professional Development Trainer
tnrao.trainer@gmail.com

1. Introduction to TypeScript

What is TypeScript?

- **TypeScript** is a **superset of JavaScript** developed by Microsoft.
- It adds **static typing** and **type checking** to JavaScript.
- TypeScript code is **transpiled** (compiled) to plain JavaScript using the TypeScript compiler (`tsc`).

Why Use TypeScript?

- Detects errors at **compile time** rather than runtime.
- Provides **better IDE support** (auto-completion, navigation, refactoring).
- Enables **object-oriented programming** features like interfaces, generics, and classes.
- Makes large-scale applications **easier to maintain**.

Installing TypeScript

```
npm install -g typescript
```

Compiling TypeScript

```
tsc filename.ts
```

2. Basic Syntax

Example

```
let message: string = "Hello, TypeScript!";
console.log(message);
```

Key Points

- Every JavaScript file is **valid TypeScript**.
- You can explicitly **declare types** for variables, function parameters, and return values.

3. Type System

Basic Types

Type	Example	Description
`string`	`"Hello"`	Text values
`number`	`42`, `3.14`	Integers and floats
`boolean`	`true`, `false`	Logical values
`any`	`let x: any = 5;`	Disables type checking

4. Variables and Constants

```
let name: string = "Alice";
const age: number = 30;
```

- `let` → block-scoped variable
- `const` → read-only after initialization

5. Functions

Function Declaration

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

Optional and Default Parameters

```
function greet(name: string, greeting: string = "Hello"): void {
  console.log(`${greeting}, ${name}!`);
}
```

Arrow Functions

```
const multiply = (x: number, y: number): number => x * y;
```

6. Arrays

Arrays

```
let numbers: number[] = [1, 2, 3];
let fruits: Array<string> = ["apple", "banana"];
```

7. Objects

Object Types

```
let user: any = {
  name: "Bob",
  age: 40
};


let user: { name: string; age: number } = {
  name: "Bob",
  age: 40
};
```

8. Enums

```
enum Direction {
  Up,
  Down,
  Left,
  Right
}

let move: Direction = Direction.Up;
```

9. Union Types

Union Types

```
function printId(id: number | string) {
  console.log(`ID: ${id}`);
}
```