


# Introduction to TypeScript

*A friendly guide for JavaScript developers*

## What is TypeScript?

- A superset of JavaScript
- Adds static types 
- Developed by Microsoft
- Compiles to plain JavaScript
- Catches errors early

## Why Use TypeScript?

- **Type safety:** Find bugs before runtime
- **Better IDE support:** Autocomplete & refactoring
- **Readable & maintainable code**
- Popular in **large projects**

## Basic Types

```
let isDone: boolean = false;  
let age: number = 25;  
let name: string = "Alice";  
let numbers: number[] = [1, 2, 3];
```

- `boolean` → true/false
- `number` → integers & floats
- `string` → text
- `array` → list of values

## Functions with Types

```
function greet(name: string): string {  
    return `Hello, ${name}!`;  
}  
console.log(greet("Bob"));
```

- Parameters have **types**
- Functions can have **return types**

## Interfaces

```
interface Person {  
  name: string;  
  age: number;  
}  
  
let user: Person = { name: "Alice", age: 30 };
```

- Define **object shapes**
- Catch mistakes like missing properties

## ✨ Optional & Default Parameters

```
function greet(name: string, age?: number) {  
  console.log(`Hello, ${name}, age ${age ?? "unknown"}`);  
}
```

- `?` → optional parameter
- `=` → default value

## Type Inference

```
let message = "Hello TypeScript"; // inferred as string
```

- TypeScript can **guess types**
- Explicit typing is optional



## TypeScript vs JavaScript

Feature	JavaScript	TypeScript
Static Types	✗	✓
Compile-time checks	✗	✓
Object-oriented features	✗	✓
IDE Autocomplete	Limited	Excellent

## Getting Started

1. Install Node.js (includes npm)
2. Install TypeScript:

```
npm install -g typescript
```

3. Compile a file:

```
tsc app.ts
```


4. Run JavaScript:

```
node app.js
```

## Resources

- [TypeScript Docs](#)
- [TypeScript Handbook](#)
- [TypeScript Playground](#)

## Summary

- TypeScript = JavaScript + Types
- Catch errors early 
- Interfaces & type annotations improve readability
- Compile TypeScript → JavaScript