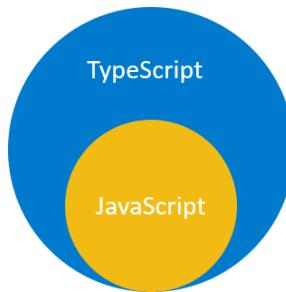


# Getting Started with TypeScript

## Introduction To TypeScript

### What is TypeScript?

- TypeScript is superset of **JavaScript**—it adds extra features to JavaScript.
- It compiles (converts) into regular JavaScript, so it runs anywhere JavaScript does.
- Files end in **.ts** (instead of .js).



### How TypeScript Works?

1. You write code in **TypeScript (.ts files)**.
2. The **TypeScript compiler** converts it into **JavaScript (.js files)**.
3. The JavaScript runs in browsers, Node.js, or any JS environment.



## TypeScript vs. JavaScript

### All JavaScript code is valid TypeScript!

- If your JavaScript code works, it will work in TypeScript too.
- TypeScript just adds **optional features** (like types) to make coding safer and easier.

## Why Use TypeScript?

- Helps catch mistakes **early** (before running the code).
  - Makes large projects **easier to manage**.
  - Works smoothly with existing JavaScript code.
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## Setting Up TypeScript

To begin with TypeScript, you'll need these tools:

- **Node.js**: This lets you run the TypeScript compiler.
- **TypeScript Compiler**: A tool that converts TypeScript code into JavaScript.
- **VS Code (Recommended)**: A free code editor that works great with TypeScript.

### Step 1: Install Node.js

1. Visit the [Node.js download page](#).
2. Download and install the correct version (18+ recommended) for your system.
3. Verify installation by opening the command line and running:

```
node -v (or) node --version
```

You should see a version number (e.g., v22.12.0).

### Step 2: Install the TypeScript Compiler

1. Open the command line.
2. Run this command:

```
npm install -g typescript
```

3. Check if TypeScript is installed:

```
tsc -v (or) tsc --version
```

You should see a version number (e.g., Version 5.8.2).

**Fix for Windows Users:** If you get a '**tsc**' is not recognized error:

1. Go to C:\Users\<your-username>\AppData\Roaming\npm
2. Copy this path and add it to your System Environment Variables.

## Step 3: Install TSX (To Run TypeScript Directly)

To execute TypeScript files without compiling them first:

```
npm install -g tsx
```

## Step 4: Install VS Code (Recommended Editor)

1. Go to the [VS Code download page](#).
2. Download the version for your OS (Windows, Mac, or Linux).
3. Run the installer and follow the steps.
4. Open VS Code—you're ready to code!

## Quick Summary

- **Node.js** → Runs TypeScript.
- **TypeScript Compiler (tsc)** → Converts .ts files to .js.
- **VS Code** → Best editor for TypeScript.
- **TSX** → Run TypeScript without compiling.

Now you're all set to start coding in TypeScript! 

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## First TypeScript Program - Simple Steps

### 1. Create a Project Folder

- Make a new folder (e.g., TSDemo).

### 2. Open the Folder in VS Code

- Open VS Code → **File > Open Folder** → Select your folder.

### 3. Create a TypeScript File

- Inside the folder, create a file named app.ts.
- Add this simple code:

```
console.log("Welcome to TypeScript!");
```

### 4. Open the Terminal in VS Code

- Press Ctrl + ~ (backtick) or go to **Terminal > New Terminal**.

## 5. Compile TypeScript to JavaScript

- Run the command:

```
tsc app.ts
```

- This generates app.js (the JavaScript version).

## 6. Run the JavaScript File

- Execute it using Node.js:

```
node app.js
```

- Output:

Welcome to TypeScript!

### Run TypeScript Without Compiling (Recommended)

If you installed **tsx**, run:

```
tsx app.ts
```

(This runs .ts files directly!)

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### Expected Error while executing tsc command:

```
PS C:\Automation\TSDemos> tsc Day1\FirstProgram.ts
tsc : File C:\Users\pavan\AppData\Roaming\npm\tsc.ps1 cannot be loaded because running scripts is disabled on this system. For more information, see
about_Execution_Policies at https://go.microsoft.com/fwlink/?LinkID=135170.
At line:1 char:1
+ tsc Day1\FirstProgram.ts
+ ~~~
+ CategoryInfo          : SecurityError: (:) [], PSSecurityException
+ FullyQualifiedErrorMessage : UnauthorizedAccess
PS C:\Automation\TSDemos> █
```

### Solution:

Run the below command in the terminal to fix Execution Policies error.

```
Set-ExecutionPolicy -Scope CurrentUser -ExecutionPolicy RemoteSigned
```