

# TypeScript

Tahaluf Training Center 2021



شركة تحالف الإمارات للحلول التقنية ذ.م.م.  
TAHALUF AL EMARAT TECHNICAL SOLUTIONS L.L.C.



# Day 01

- 1 Overview about Typescript
- 2 Why Typescript
- 3 Top frameworks and libraries that use TS
- 4 Installation and environment setup
- 5 VSCode terminal
- 6 Different between Js and Ts
- 7 Type Annotations



# Overview about Typescript

- ❖ TypeScript is an open-source which builds on JavaScript.
- ❖ Types provide a way to describe the shape of an object, providing better documentation, and allowing TypeScript to validate that your code is working correctly.



# Overview about Typescript

- ❖ Writing types can be optional in Typescript, because type inference allows you to get a lot of power without writing additional code.



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# Why Typescript

- ❖ **Types** Typescript are not fully loosely type language like what we were doing in JS or Python, in Typescript we can assign a type for each variable, parameter, or even functions. The types are the usual types in other programming languages, and we will get more deeply on them soon enough.



# Why Typescript

- ❖ **OOP support (Object Oriented Programming)** Typescript allows us to write Classes, Interfaces, Enums, Inheritances, Compositions etc.
- ❖ **Better code modularization**  
Typescript allows us to create more organized modules and use them anywhere in our code.



# Why Typescript

## ❖ **Meta programming features like decorators**

Decorators in Typescript are very much helpful, decorators mainly describe the piece of code below it and also can be used to manipulate specific data inside the code.



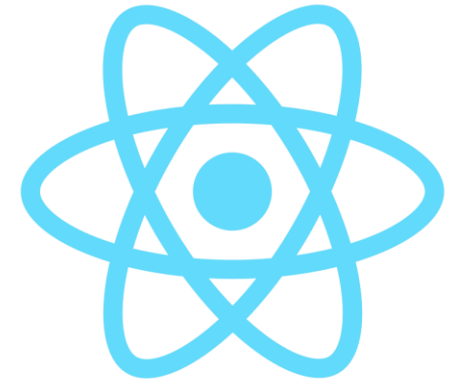
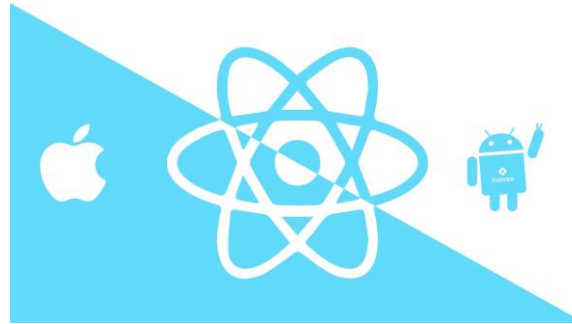


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# Top frameworks and libraries that use TS



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## Installation and environment setup

- ❖ To start working with Typescript we need to do the following steps:
  1. Install Node.js + NPM (Node Package Manager).
  2. Install Typescript .
  3. Install text-editor or IDE (integrated development environment)
  
- ❖ we will use VSCode in this course.



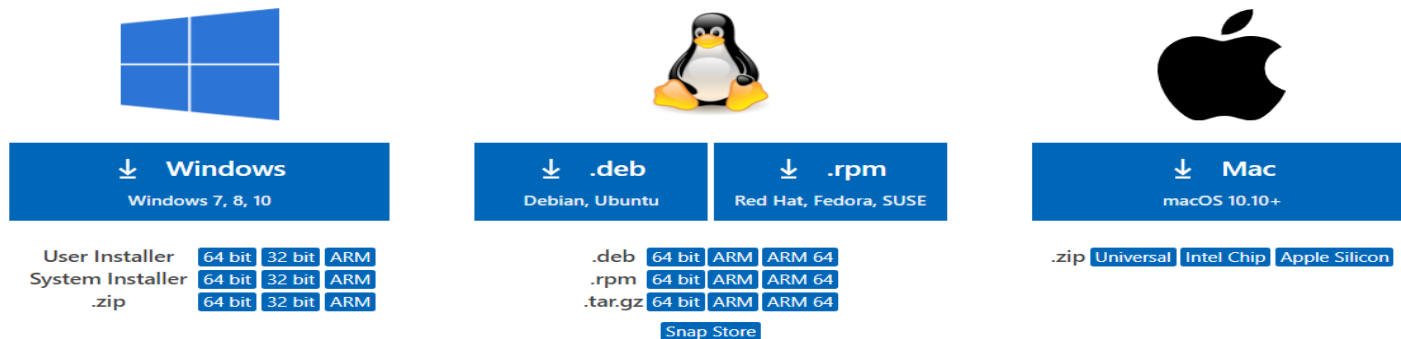
## Installation and environment setup

### ❖ First We need to Install Visual Studio Code (VSCode)

1. Go to <https://code.visualstudio.com/download> and choose the right one for your device.

## Download Visual Studio Code

Free and built on open source. Integrated Git, debugging and extensions.



The image shows the Visual Studio Code download page. It features three main sections for different operating systems: Windows, Linux (Debian/Ubuntu), and Mac. Each section has a download button and a list of available installers or packages. The Windows section includes User and System installers for 64-bit, 32-bit, and ARM. The Linux section includes .deb and .rpm packages for 64-bit and ARM, as well as a Snap Store option. The Mac section includes a .zip file for Universal, Intel Chip, and Apple Silicon.

Operating System	Download Link	Available Packages/Installers
Windows	Windows 7, 8, 10	User Installer (64 bit, 32 bit, ARM), System Installer (64 bit, 32 bit, ARM), .zip (64 bit, 32 bit, ARM)
Linux	.deb (Debian, Ubuntu), .rpm (Red Hat, Fedora, SUSE)	.deb (64 bit, ARM, ARM 64), .rpm (64 bit, ARM, ARM 64), .tar.gz (64 bit, ARM, ARM 64), Snap Store
Mac	macOS 10.10+	.zip (Universal, Intel Chip, Apple Silicon)



# Installation and environment setup

## Overview

SETUP

GET STARTED

USER GUIDE

LANGUAGES

NODEJS /  
JAVASCRIPT

TYPESCRIPT

PYTHON

JAVA

C++

CONTAINERS

DATA SCIENCE

AZURE

REMOTE

Thanks for downloading VS Code for Windows!

Download not starting? Try this [direct download link](#).  
Please take a few seconds and help us improve ... [click to take survey](#).

## Getting Started

Visual Studio Code is a lightweight but powerful source code editor which runs on your desktop and is available for Windows, macOS and Linux. It comes with built-in support for JavaScript, TypeScript and Node.js and has a rich ecosystem of extensions for other languages (such as C++, C#, Java, Python, PHP, Go) and runtimes (such as .NET and Unity). Begin your journey with VS Code with these [introductory videos](#).

## Visual Studio Code in Action

```
4 var server = express();  
5 server.use(bodyParser.json);  
6  
7 server.get  
8   .get (property) Application.get: ((name: string) ...  
9   .getMaxListeners
```

## GETTING STARTED

VS Code in

Top Extensions

First Steps


Keyboard Shortcuts

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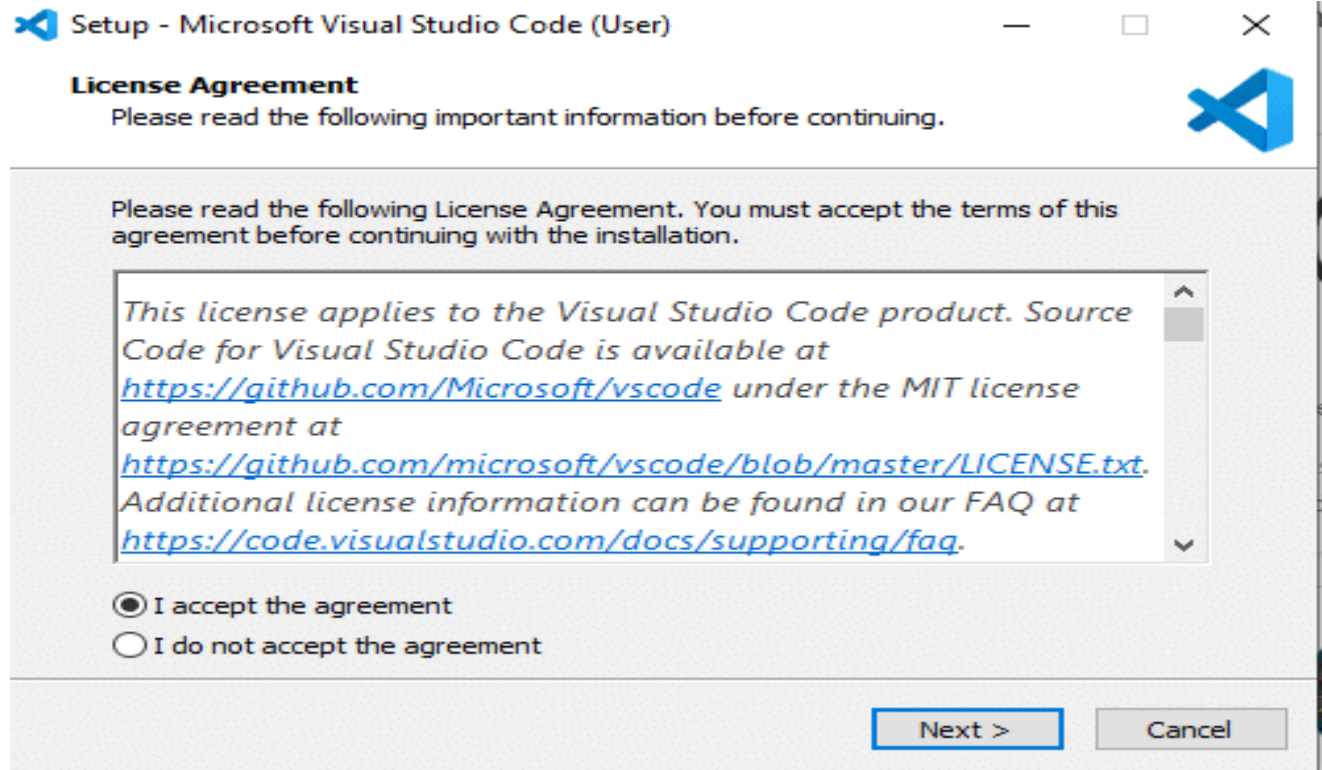
VSCodeUserSetup....exe

3.2/76.8 MB, 2 mins left



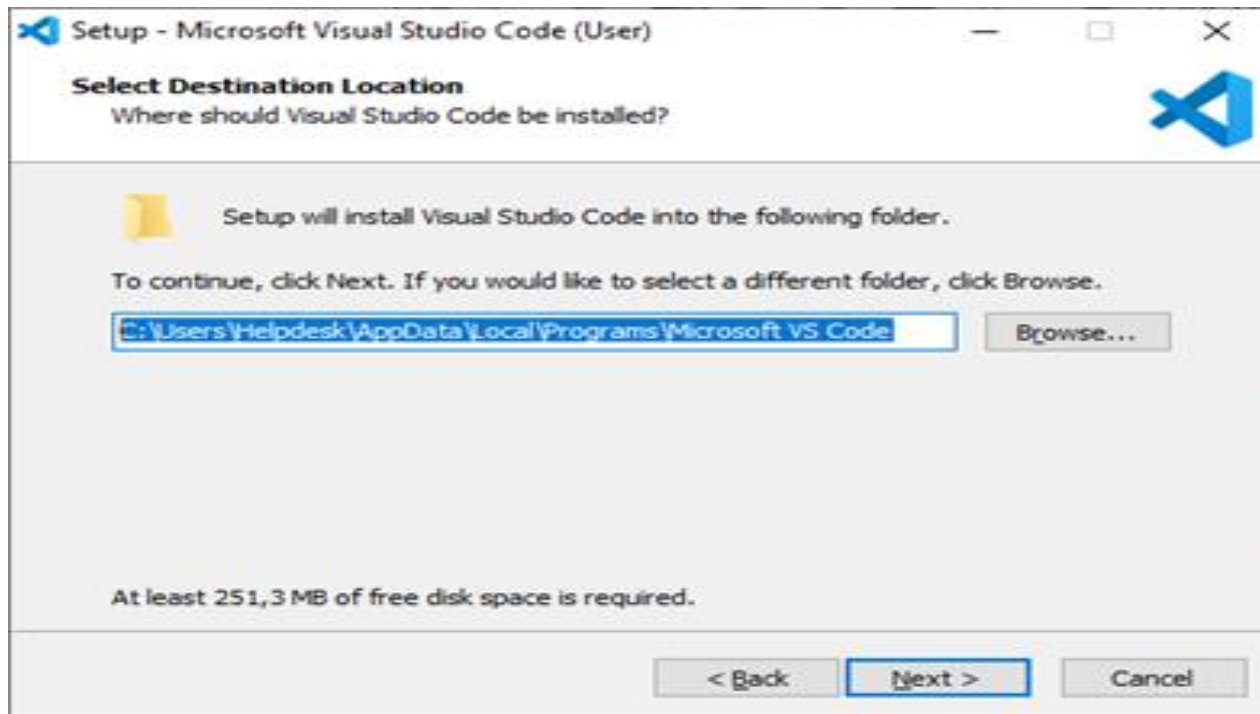
## Installation and environment setup

2. Choose I accept the agreement and then click next .



## Installation and environment setup

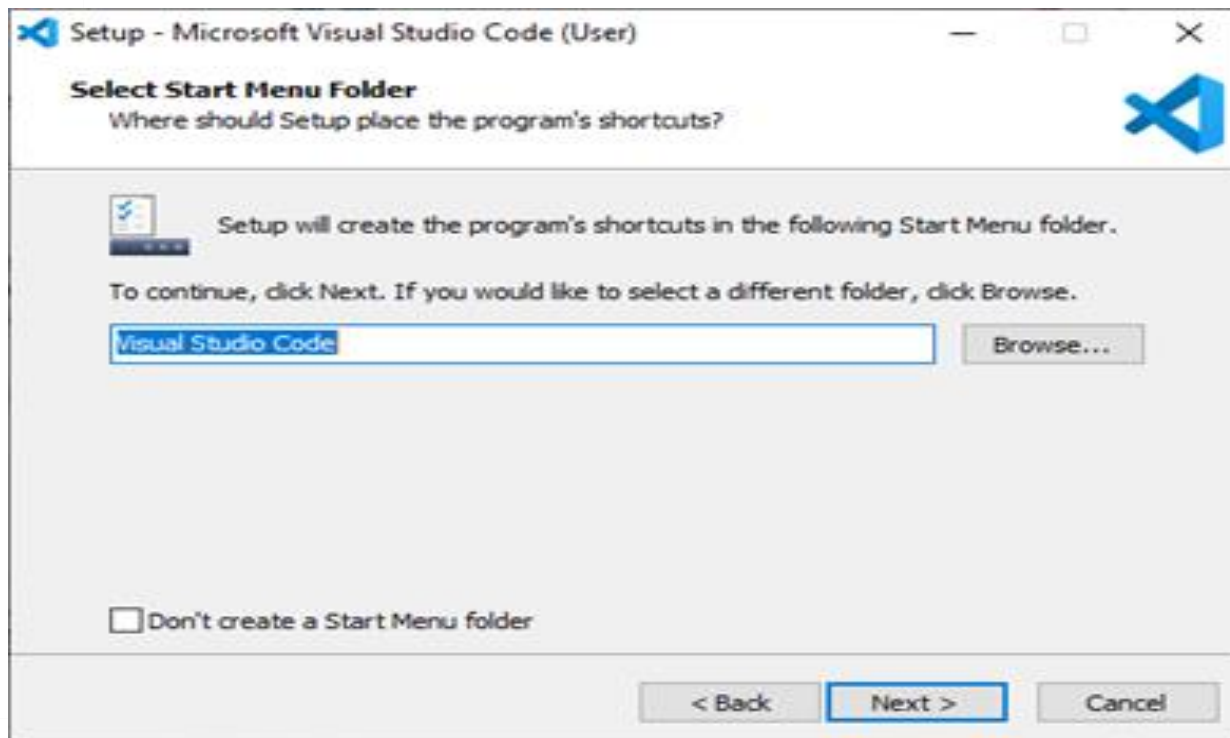
3. Choose where you want to install the software. You can change the installation folder location, or keep the default settings. Click Next to continue.





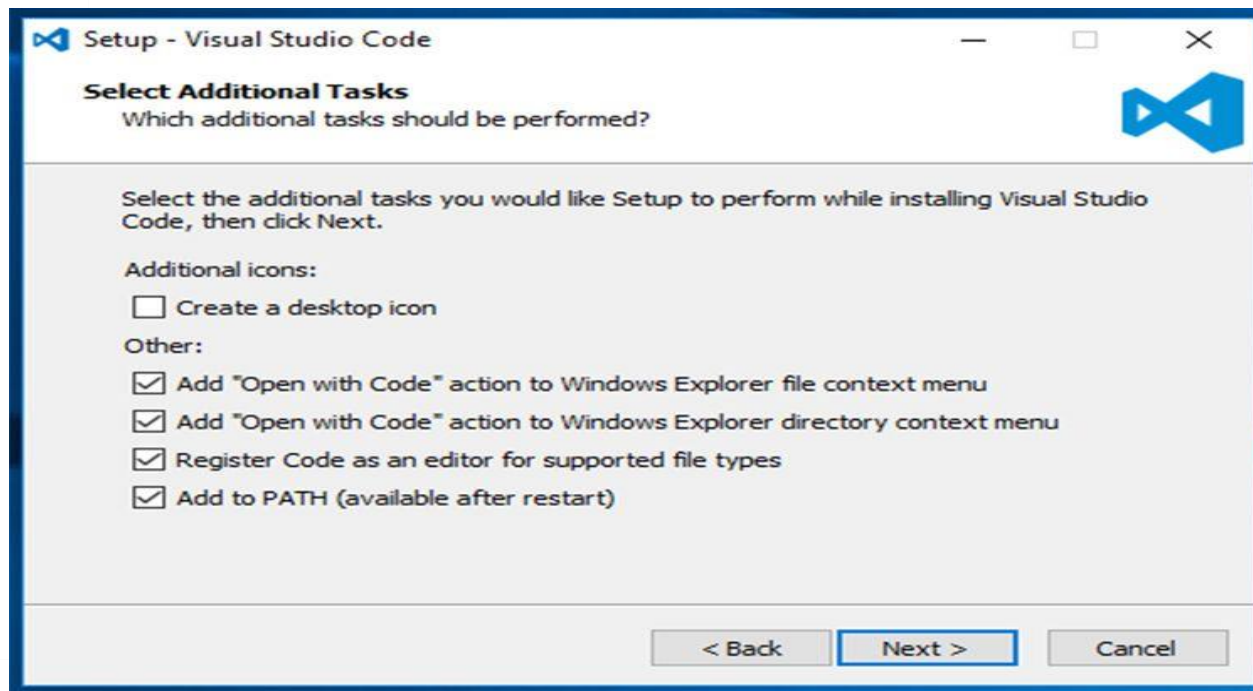
## Installation and environment setup

4. Choose if you want to change the shortcut folder name in your Start menu, or don't want to install shortcuts at all. Click Next.



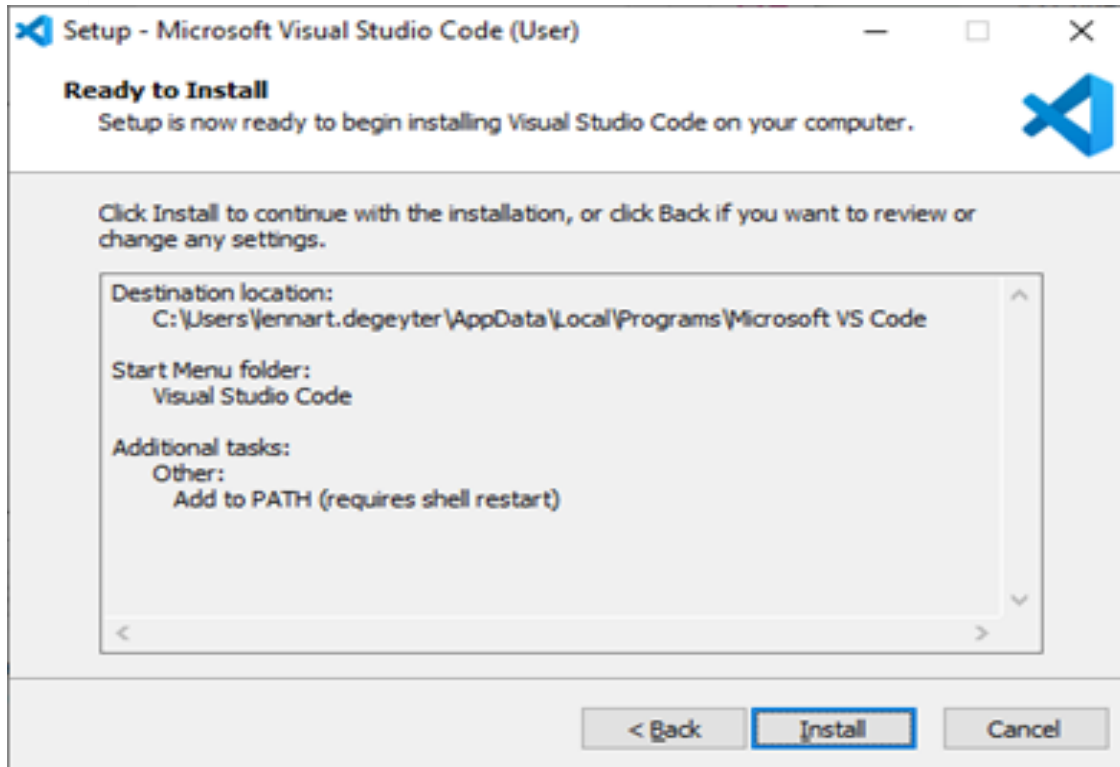
## Installation and environment setup

5. Select the additional tasks, e.g. creating a desktop icon or adding options to the Windows Explorer right-click menu. Click Next.



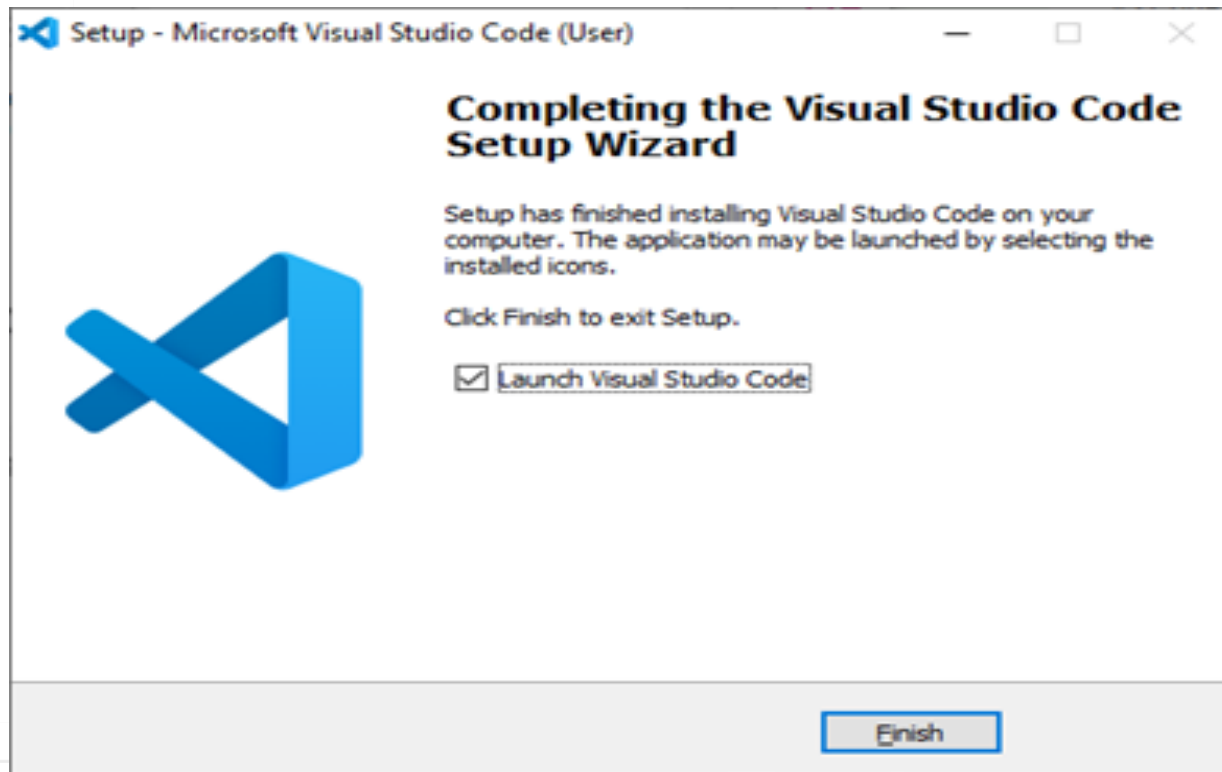
## Installation and environment setup

6. Click Install to start the software installation.



## Installation and environment setup

7. The software is installed and ready to use. Click Finish to finalize the installation and start the program



# What is NPM



# Install Typescript using NPM

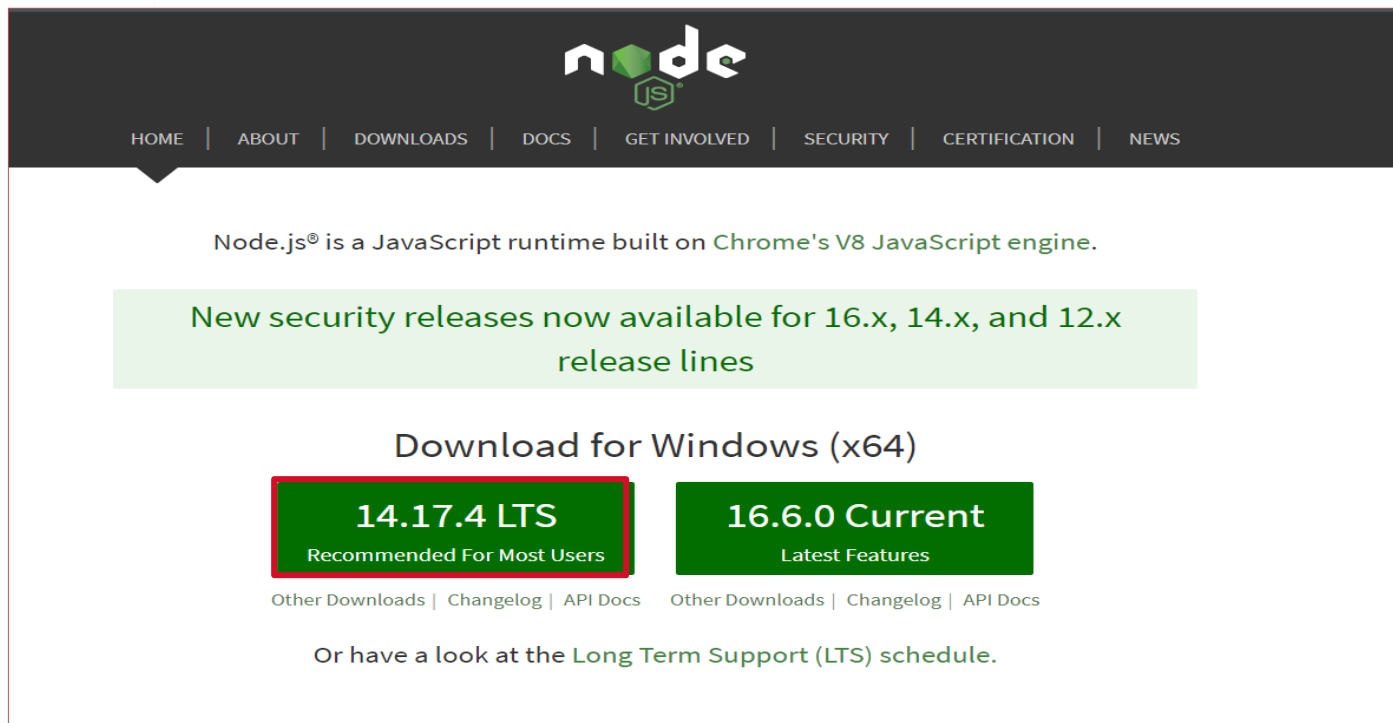
**NPM** (Node Package Manager) is used to install the typescript package on your local machine or a project. Make sure you have Node.js install on your local machine.



## Installation and environment setup

❖ Next to Install Node.js and NPM (Node Package Manager).

1. Go to <https://nodejs.org/en/>



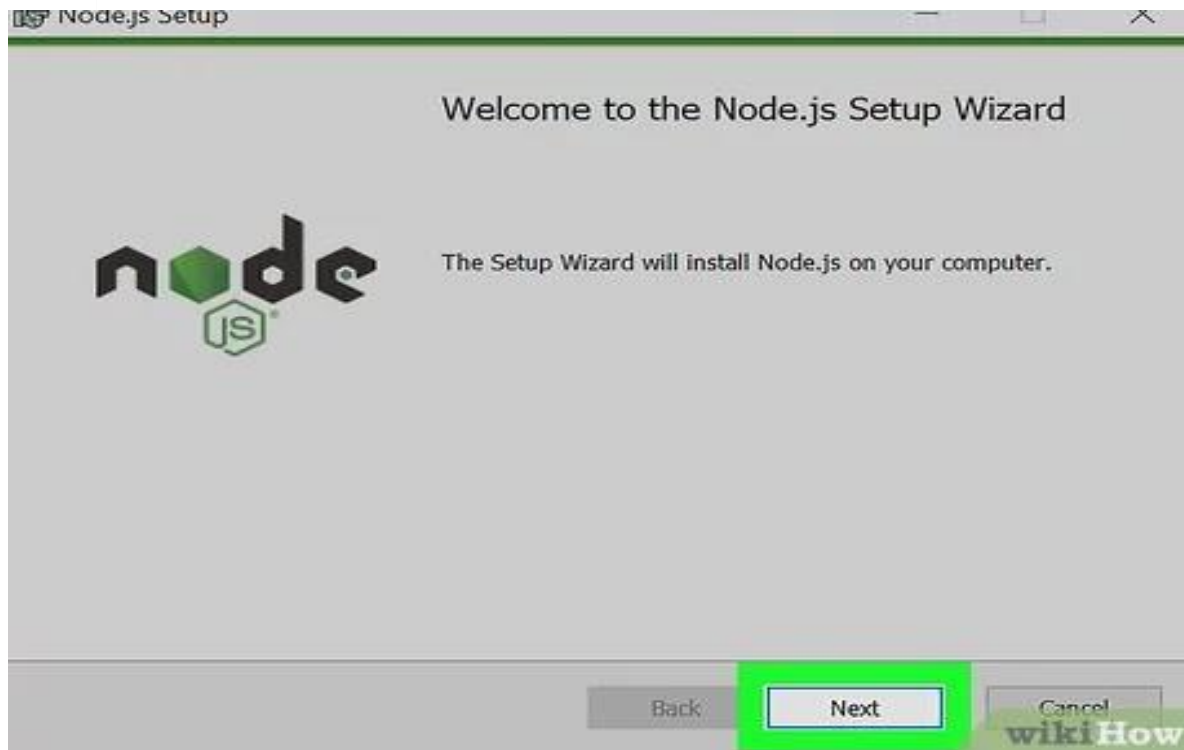
The screenshot shows the Node.js website with the following content:

- Node.js logo and navigation menu: HOME | ABOUT | DOWNLOADS | DOCS | GET INVOLVED | SECURITY | CERTIFICATION | NEWS
- Text: Node.js® is a JavaScript runtime built on Chrome's V8 JavaScript engine.
- Green banner: New security releases now available for 16.x, 14.x, and 12.x release lines
- Section: Download for Windows (x64)
- Two download options:
  - 14.17.4 LTS** (Recommended For Most Users) - This option is highlighted with a red box.
  - 16.6.0 Current** (Latest Features)
- Links: Other Downloads | Changelog | API Docs (for both versions)
- Text: Or have a look at the Long Term Support (LTS) schedule.



## Installation and environment setup

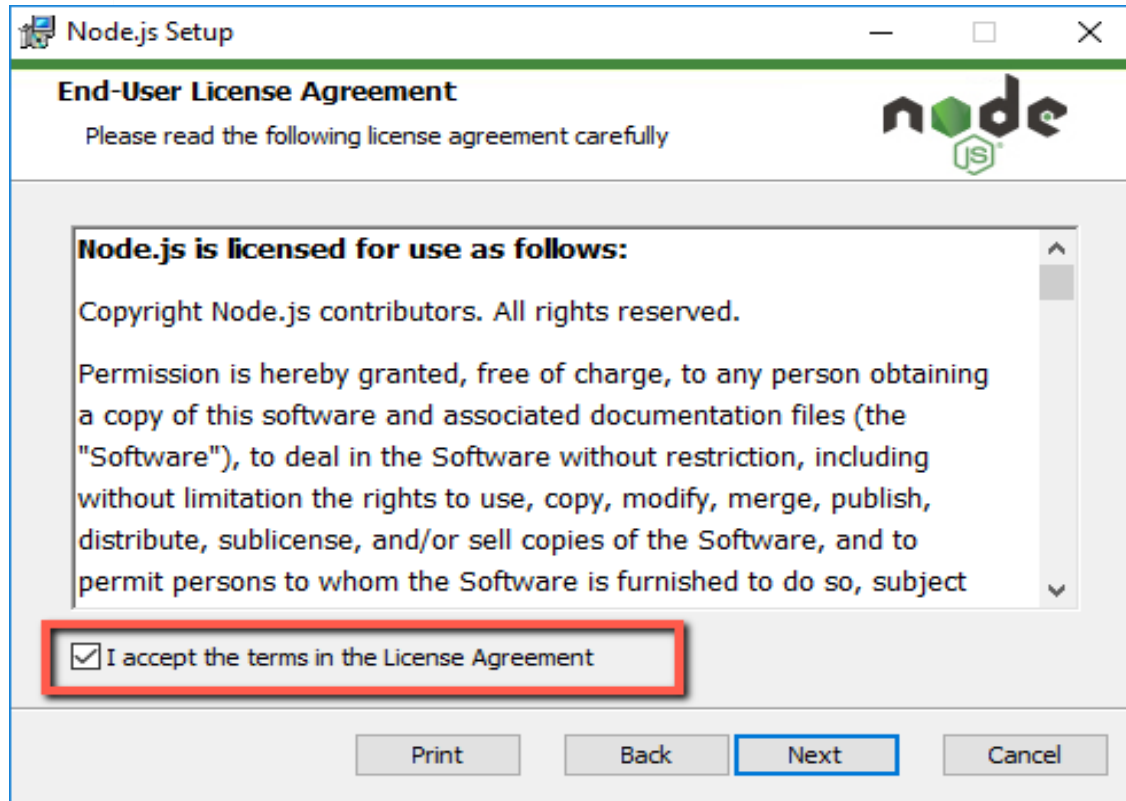
2. Click the "Next" button to continue with the installation





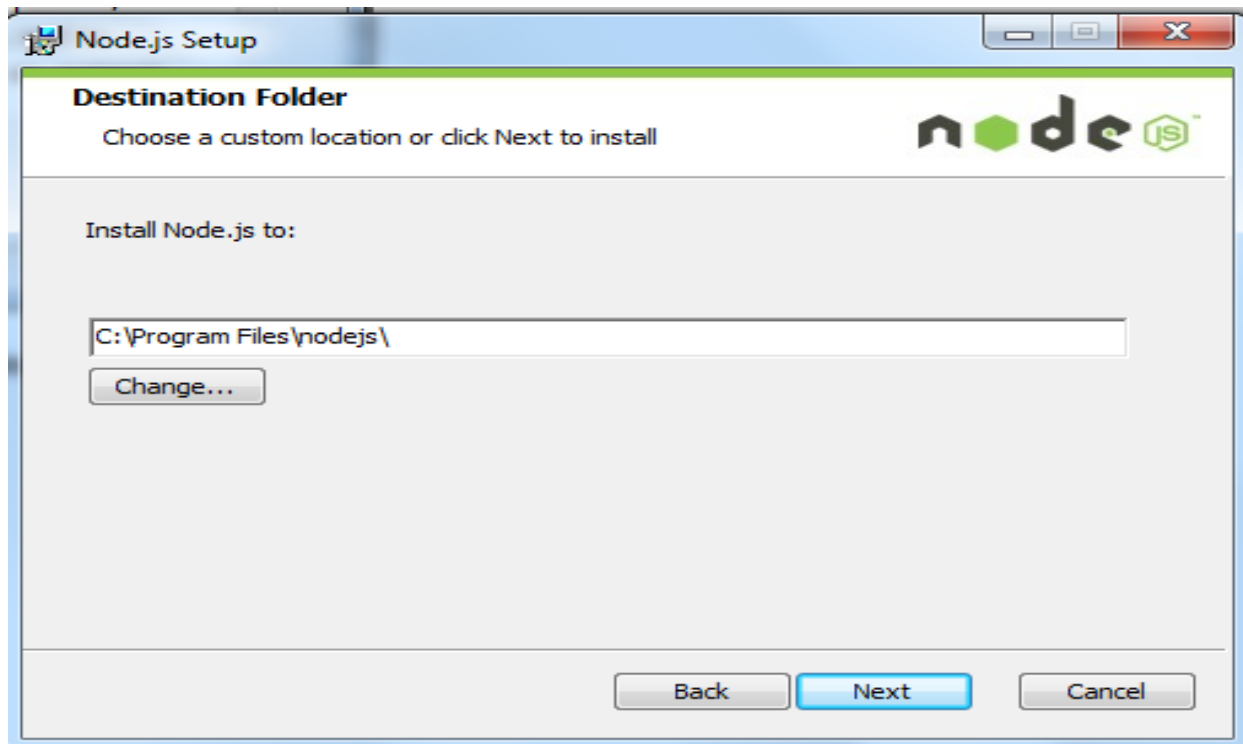
## Installation and environment setup

### 3. Accept the terms and conditions



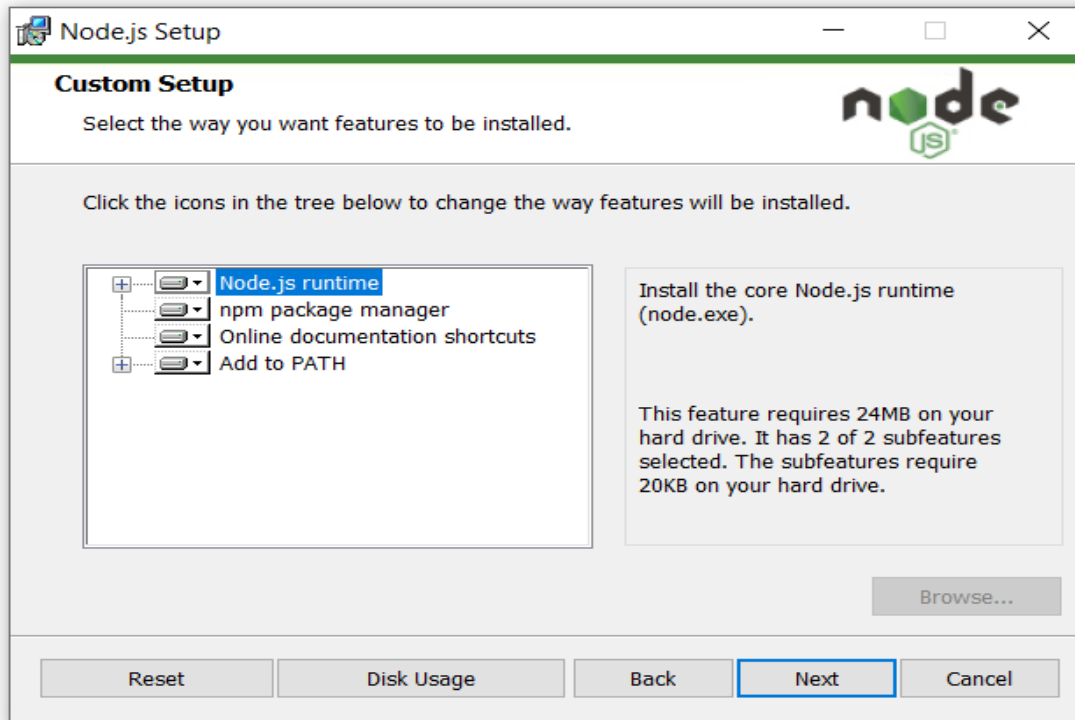
## Installation and environment setup

4. Choose the location where Node.js needs to be installed and then click on the Next button.



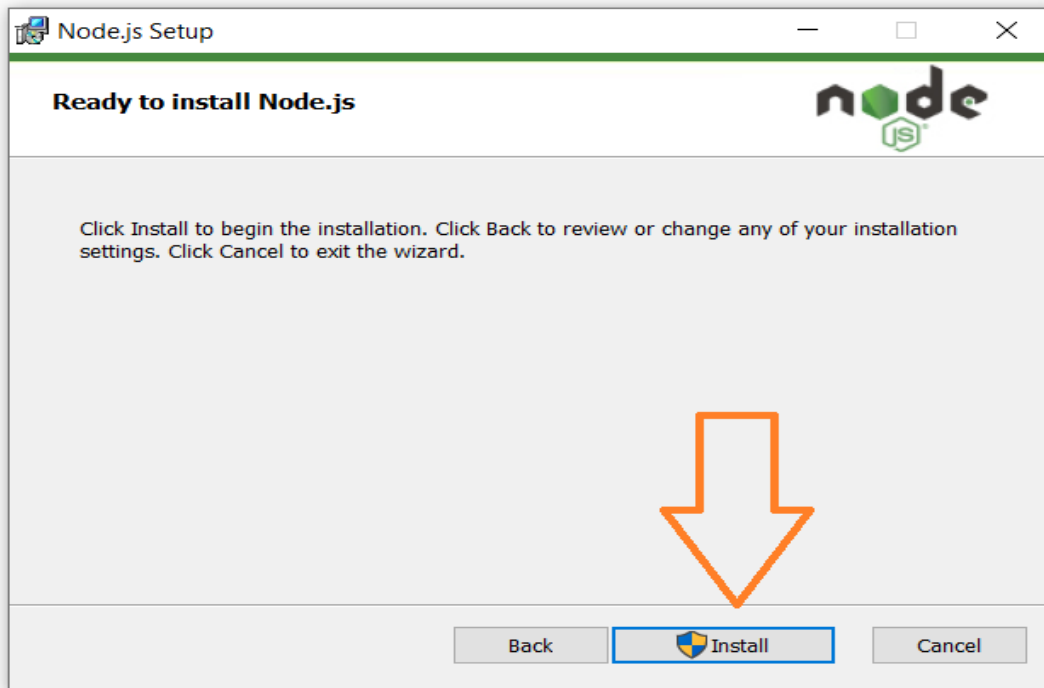
## Installation and environment setup

5. Select the default components to be installed  
Accept the default components and click on the Next button.



## Installation and environment setup

### 6. Start the installation



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## VSCode terminal

- ❖ To get the better advantages of this course we will use the **terminal** to create our files, install packages and also to run and build our code.
- ❖ To open the terminal on VSCode you can do Ctl +J on Windows or Cmd+J on OSX.



## VSCode terminal

### ❖ The main commands:

- **cd** (to navigate through files)
- **touch** <file name> (to create files) MAC and dir > for WINDOWS
- **mkdir** <folder name> (to create folders)

### ❖ Other commands will be discussed through the course.



## VSCode terminal

- ❖ We will start building our TS code to JS code then run it on the browser.
- ❖ And we will do all that using the tsc command which comes with the typescript itself,
- ❖ so basically when you install Typescript you become able to use the tsc on any ts project.





## VSCode terminal

❖ To initialize the typescript project, we will use:

- 1- npm init
- 2- tsc –init

❖ Using these commands we will have two new files the package.json file and tsconfig file, These files will help us manage our ts configurations like linting and compilation options, package.json will help us tracking and using our packages.



## VSCode terminal

❖ To Install TypeScript in your local machine :

1. Open the terminal .
2. Write this command :  
`npm install -g typescript`

❖ -g means global .



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## VSCode terminal

- ❖ Check the installed version of TypeScript using the following command:

```
PS C:\Users\User> npm version
{
  npm: '6.14.12',
  ares: '1.16.1',
  brotli: '1.0.9',
  cldr: '37.0',
  icu: '67.1',
  llhttp: '2.1.3',
  modules: '83',
  napi: '7',
  nghttp2: '1.41.0',
  node: '14.16.1',
  openssl: '1.1.1k',
  tz: '2020a',
  unicode: '13.0',
  uv: '1.40.0',
  v8: '8.4.371.19-node.18',
  zlib: '1.2.11'
}
PS C:\Users\User>
```



## VSCode terminal

- ❖ To add tsconfig.json file by using  
tsc --init command

```
PROBLEMS  OUTPUT  TERMINAL  DEBUG CONSOLE

Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\User\Desktop\Demo> tsc --init
message TS6071: Successfully created a tsconfig.json file.
PS C:\Users\User\Desktop\Demo> |
```



# Different between Js and Ts

```
Untitled-1 JS testjs.js Index.html X
Index.html > html > head > meta
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta http-equiv="X-UA-Compatible" content="IE=edge">
6   <meta name="viewport" content="width=device-width, initial-scale=1.0">
7   <title>Testing code</title>
8 </head>
9 <body>
10   <input type="number" id="num1" placeholder="number 1" >
11   <input type="number" id="num2" placeholder="number 2" >
12   <button id="button">ADD</button>
13
14 </body>
15 <script src="testjs.js"></script>
16 </html>
```



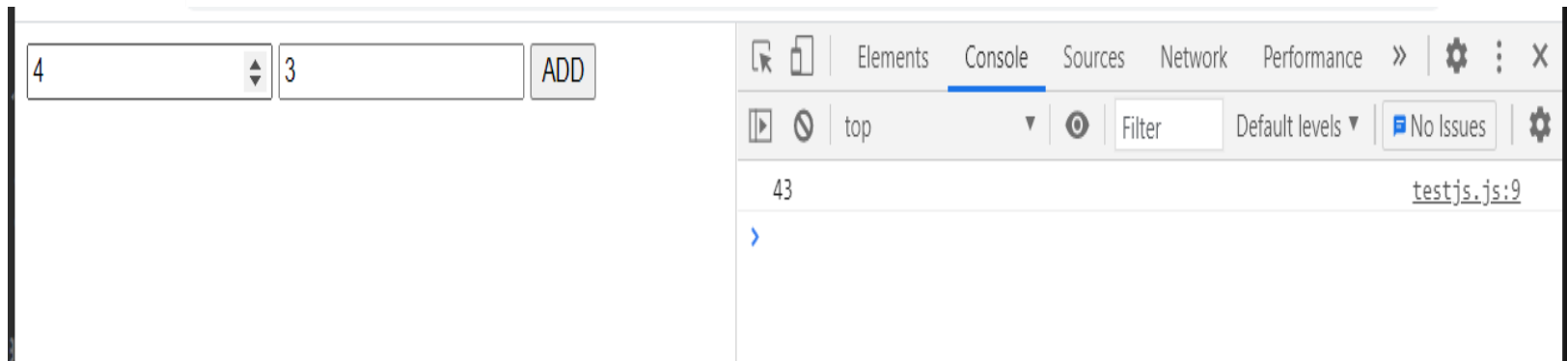
# Different between Js and Ts

```
JS testjs.js  X  <> Index.html
JS testjs.js > ...
1  const btn= document.querySelector("button");
2  const input1=document.getElementById("num1");
3  const input2=document.getElementById("num2");
4  function add(num1,num2)
5  {
6      return num1+num2;
7  }
8  btn.addEventListener("click",function(){
9      console.log(add(input1.value,input2.value));
10
11  });
12
```



## Different between Js and Ts

- ❖ This function, which was written in JavaScript he must add two numbers, but the result is concatenate them.





## Different between Js and Ts

This is the same code as the previous one, but it was written in a TypeScript method.

```
TS Test.ts > add
1  const btn= document.querySelector("button");
2  const input1=document.getElementById("num1")!as HTMLInputElement;
3  const input2=document.getElementById("num2")! as HTMLInputElement;
4  function add(num1 :number,num2:number)
5  {
6      return num1+num2;
7  }
8  btn.addEventListener("click",function(){
9      console.log(add(+input1.value,+input2.value));
10
11  });
12
```

## Different between Js and Ts

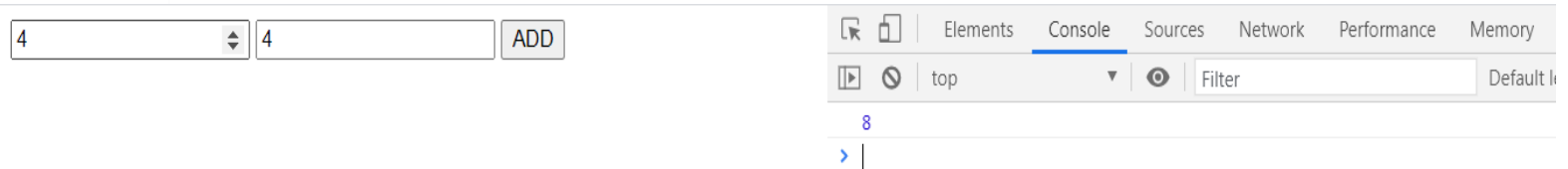
- ❖ Using this command to compile the typescript file and check if any error is occurred.

```
PROBLEMS  OUTPUT  TERMINAL  DEBUG CONSOLE  
Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.  
  
Try the new cross-platform PowerShell https://aka.ms/pscore6  
  
PS C:\Users\User\Desktop\Test> tsc .\Test.ts  
PS C:\Users\User\Desktop\Test> █
```



## Different between Js and Ts

❖ The result after this code is :



## Different between Js and Ts

- ❖ How to transform the typescript file to JavaScript file after using tsc command .

### Typescript

```
1 class Greeter {  
2   greeting: string;  
3   constructor(message: string) {  
4     this.greeting = message;  
5   }  
6   greet() {  
7     return "Hello, " + this.greeting;  
8   }  
9 }  
10  
11 var greeter = new Greeter("world");
```

### JavaScript after transformation

```
1 var Greeter = (function () {  
2   function Greeter(message) {  
3     this.greeting = message;  
4   }  
5   Greeter.prototype.greet = function () {  
6     return "Hello, " + this.greeting;  
7   };  
8   return Greeter;  
9 })();  
10 var greeter = new Greeter("world");  
11
```



# Type Annotations

❖ In typescript We can specify the type using **:Type** after the name of the variable, parameter or property. There can be a space after the colon. TypeScript includes all the primitive types of JavaScript- number, string and Boolean.



# Type Annotations

## Example :

```
var age: number = 32; // number variable  
var name: string = "Dana"; // string variable  
var isUpdated: boolean = true; // Boolean variable
```

