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.

- 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.

- **Meta programming features like decorators**
  Decorators in Typescript are very much helpful, decorators mainly describe the piece of code bellow it and also can be used to manipulate specific data inside the code.

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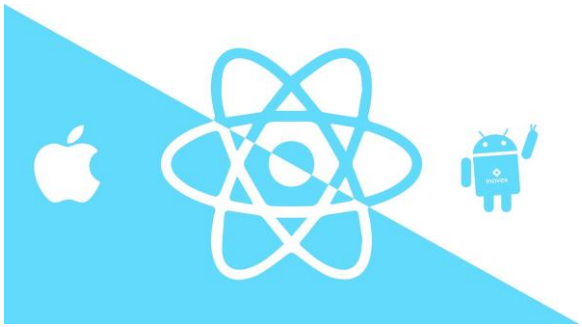
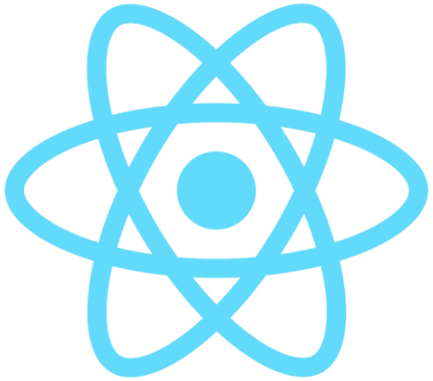
Top frameworks and libraries that use TS





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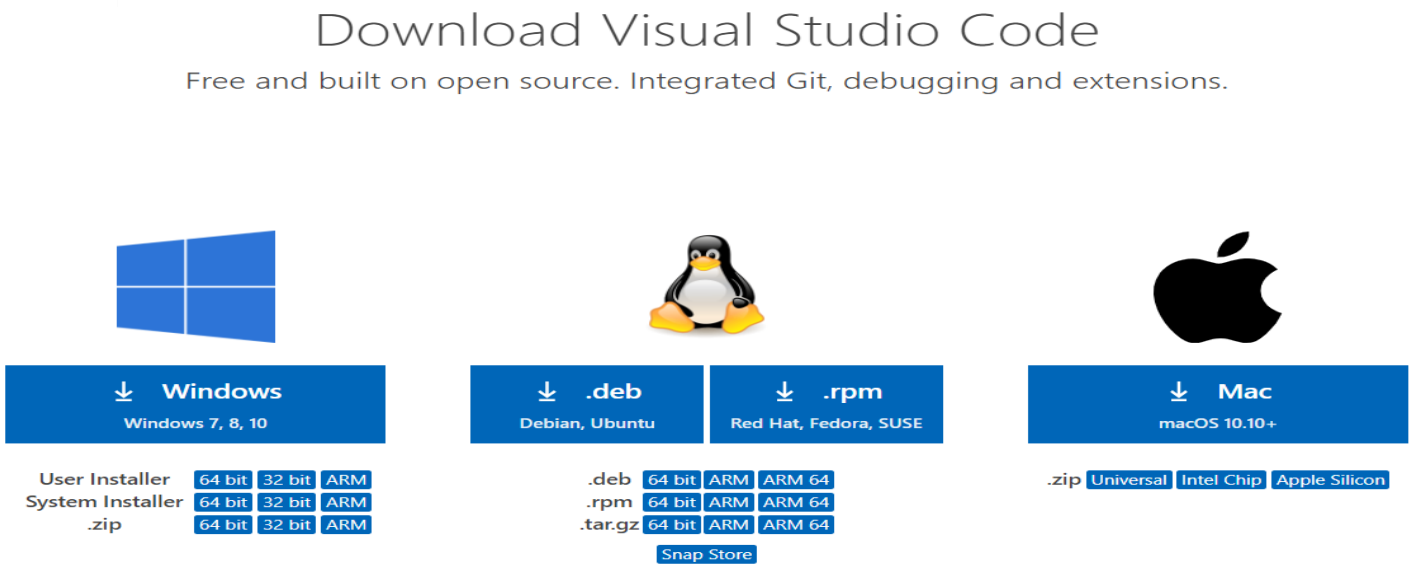
- To start working with Typescript we need to do the following steps:

  1. Install Node.js + NPM (Node Package Manager).
  2. Install Typescript .
  3. Install text-editor or IDE (integrated development environment)

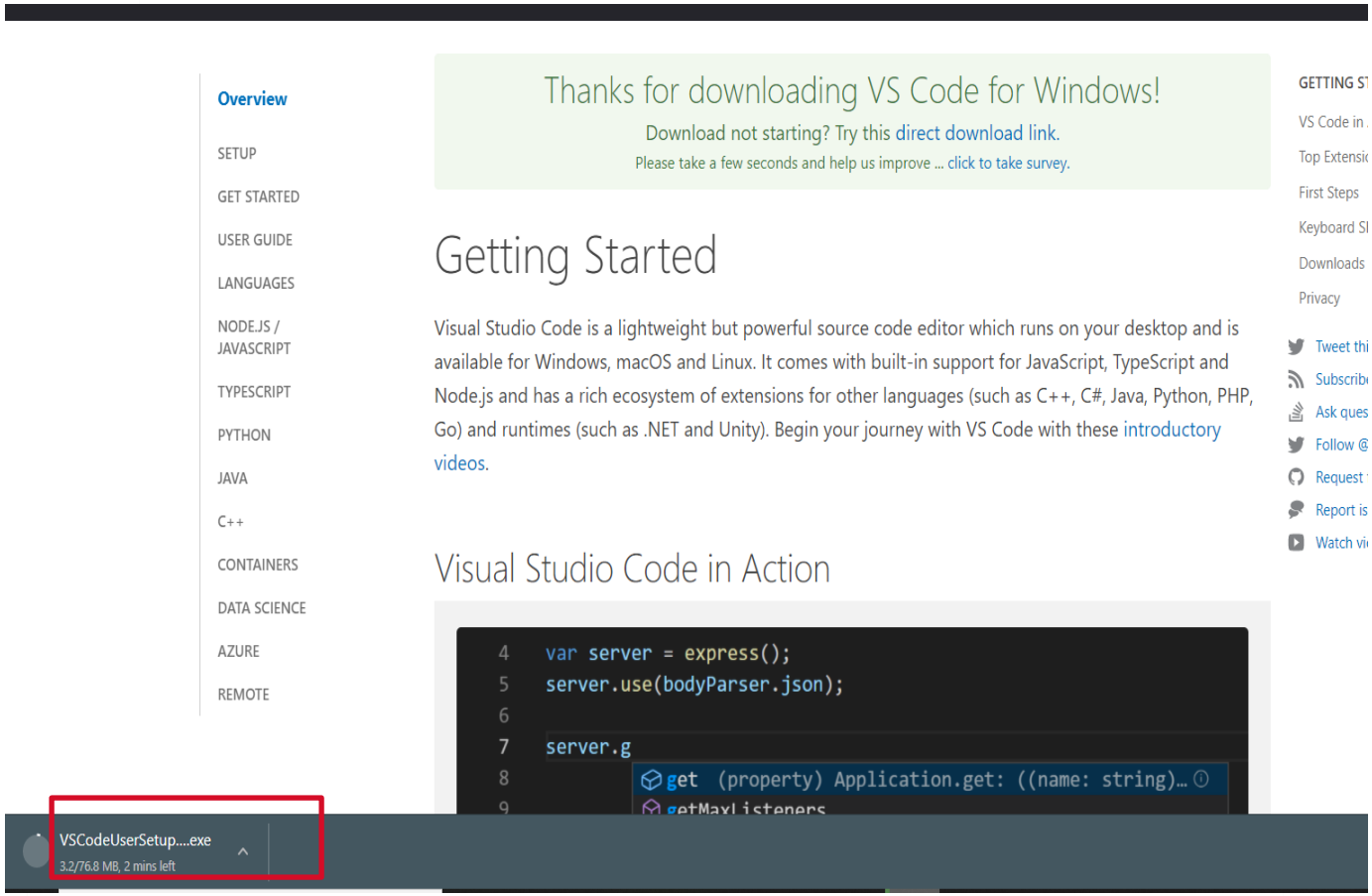
- we will use VSCode in this course.

- First We need to Install Visual Studio Code **(VSCode)**

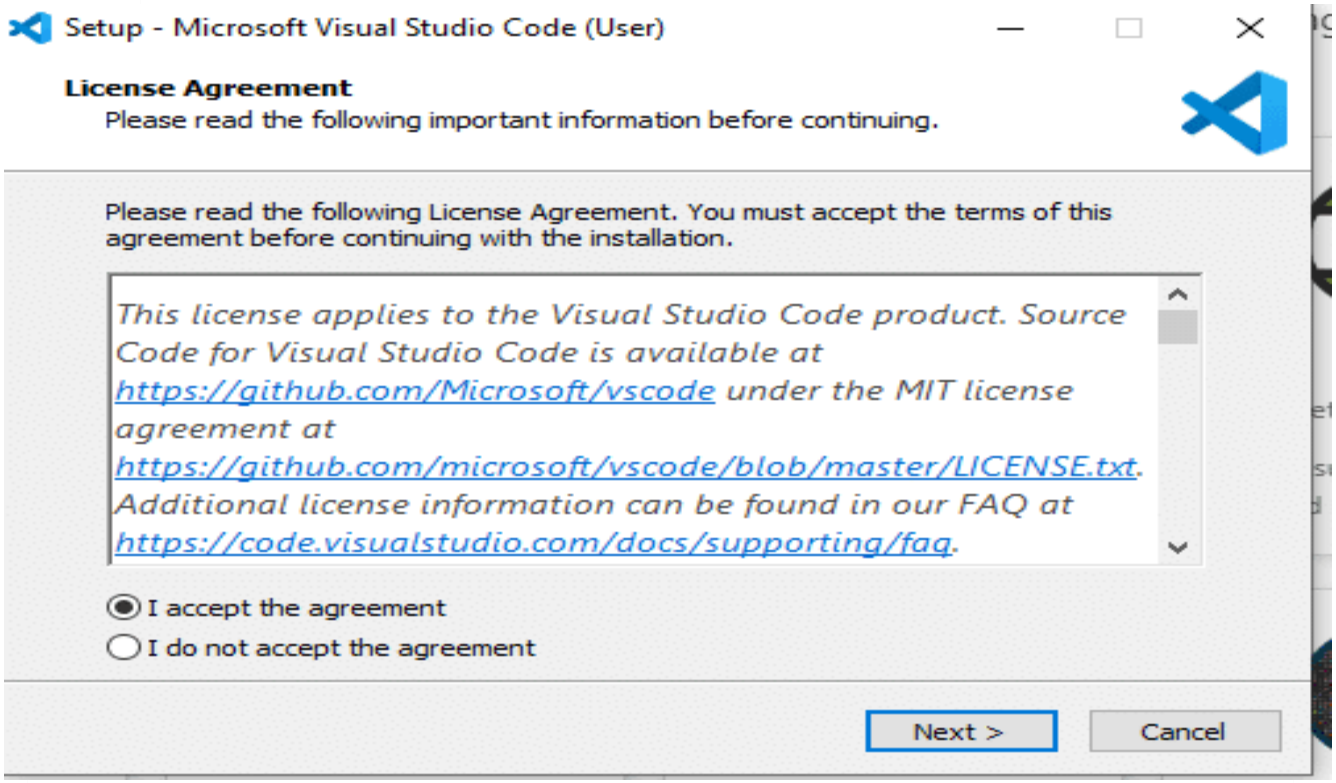
1. Go to https://code.visualstudio.com/download and choose the right one for your device.



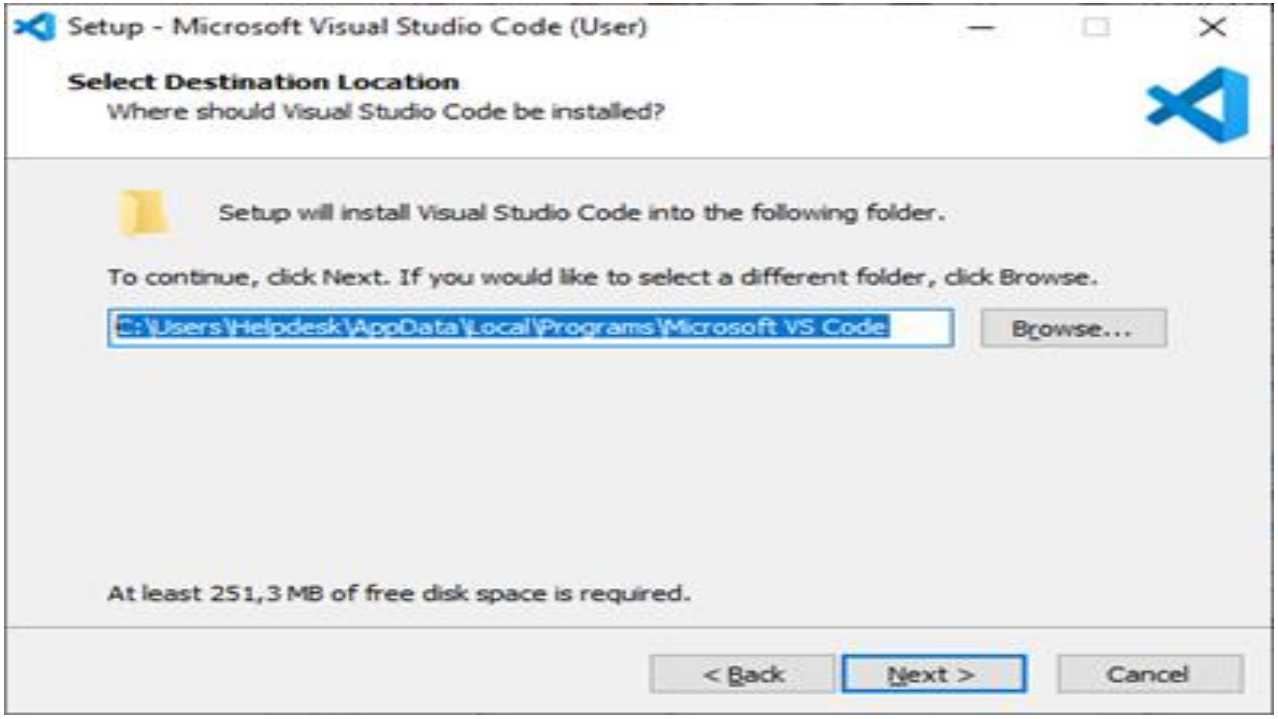
Installation and environment setup



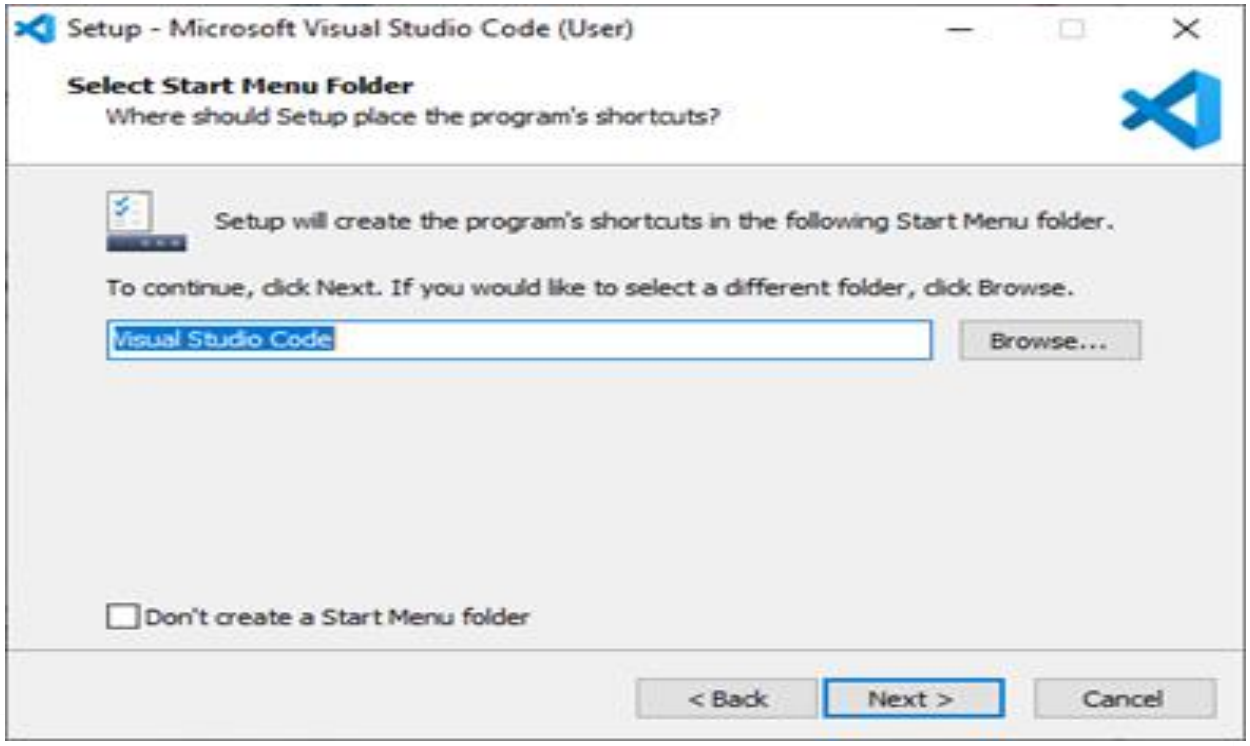
2. Choose I accept the agreement and then click next .



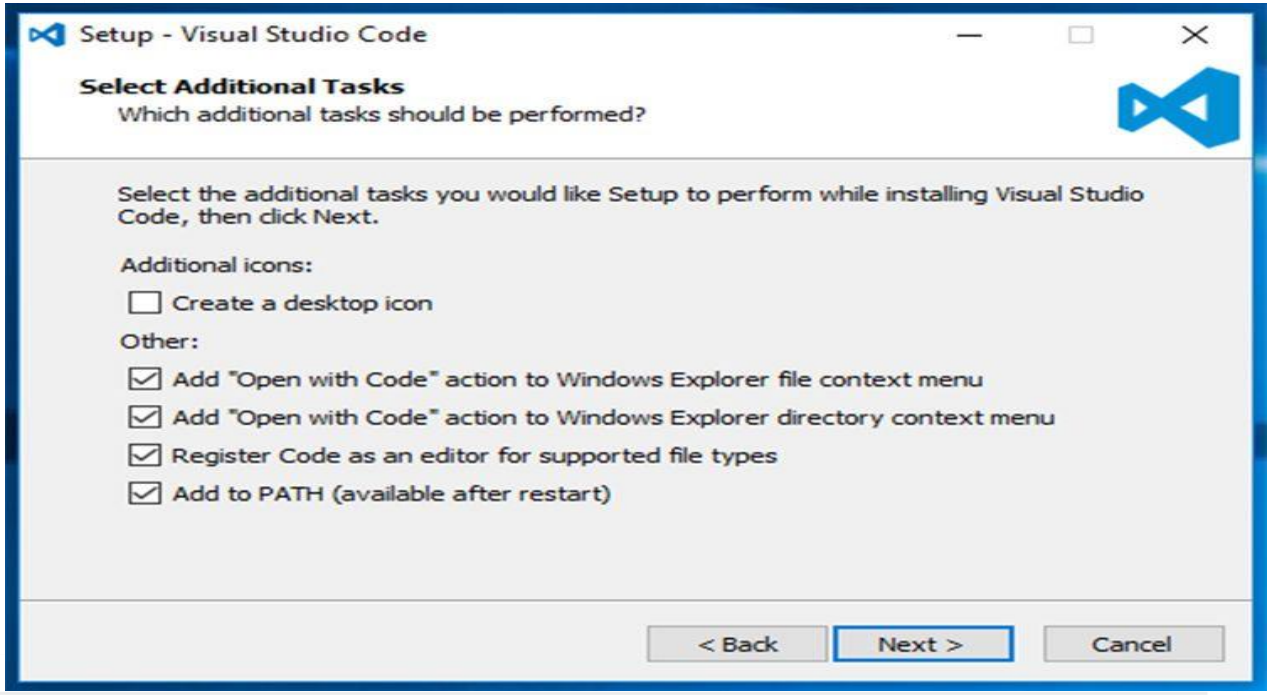
3. Choose where you want to install the software. You can change the installation folder location, or keep the default settings. Click Next to continue.



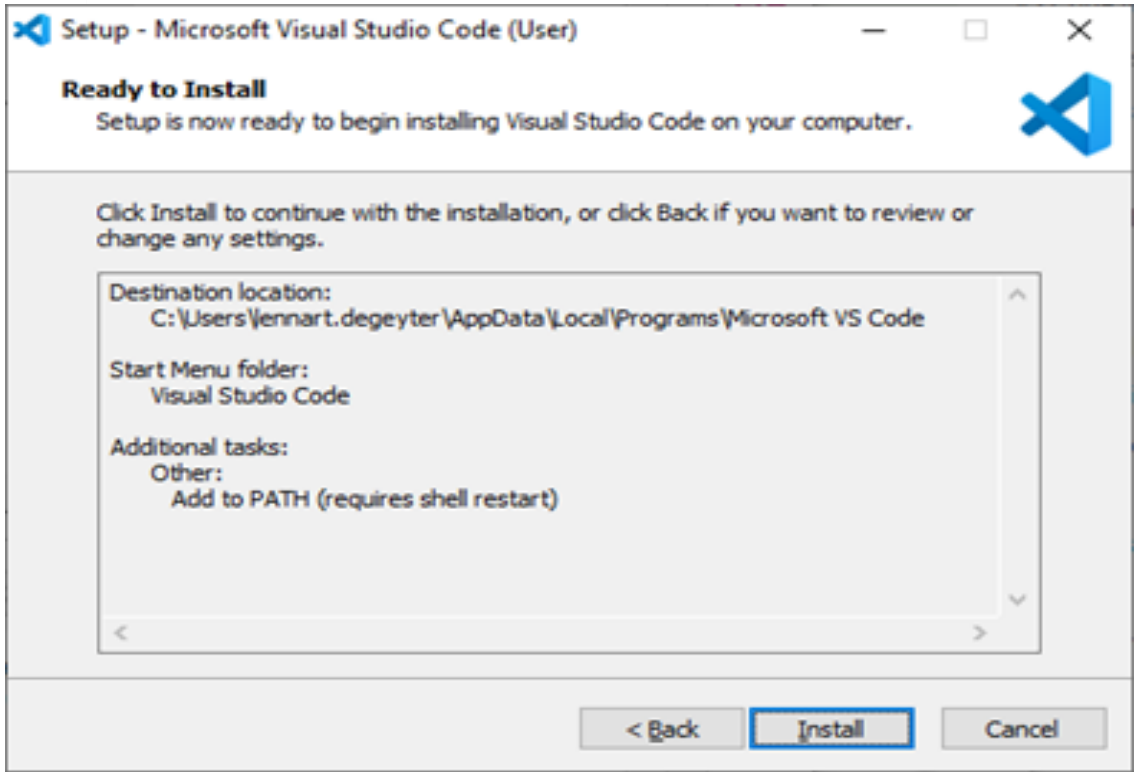
4. Choose if you want to change the shortcut folder name in your Start menu, or don't want to install shortcuts at all. Click Next.



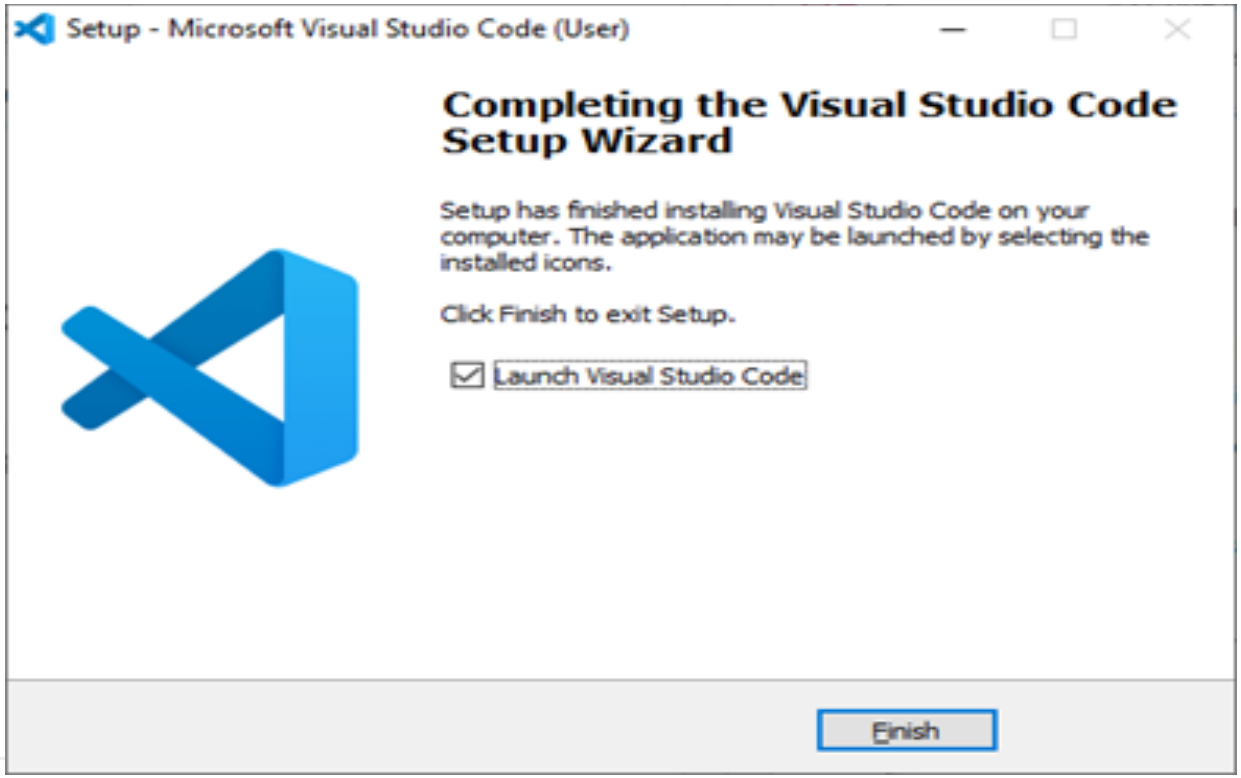
5. Select the additional tasks, e.g. creating a desktop icon or adding options to the Windows Explorer right-click menu. Click Next.



6. Click Install to start the software installation.



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



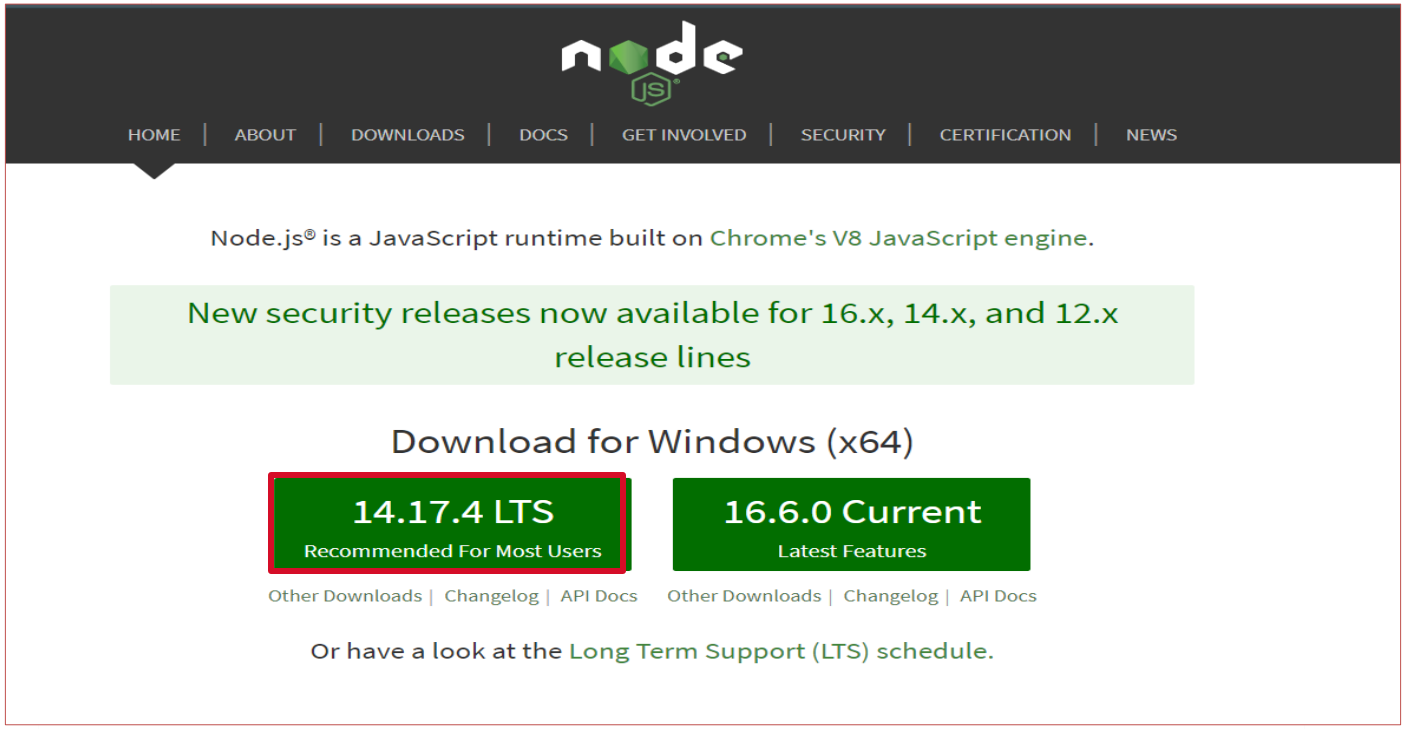
What is NPM

Install Typescript using NPM

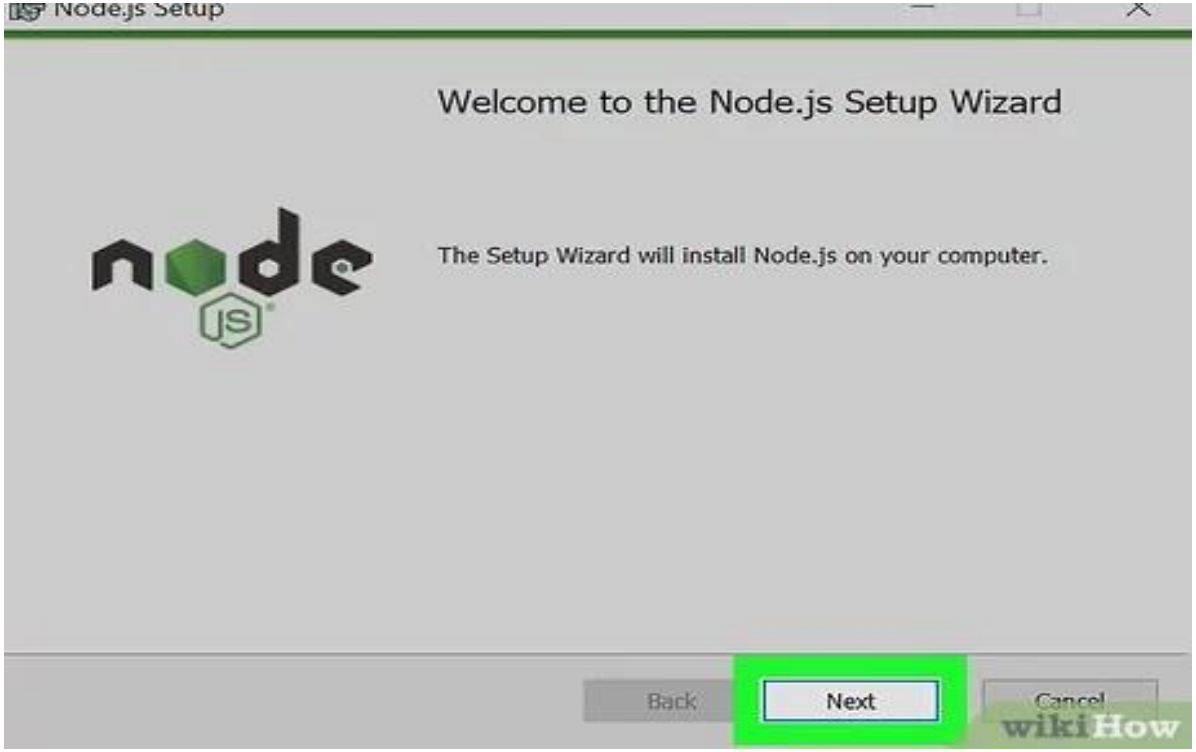
NPM (Node Package Manager) is used to install the typescript package on your local machine or a project. Make sure you have Node.js install on your local machine.

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

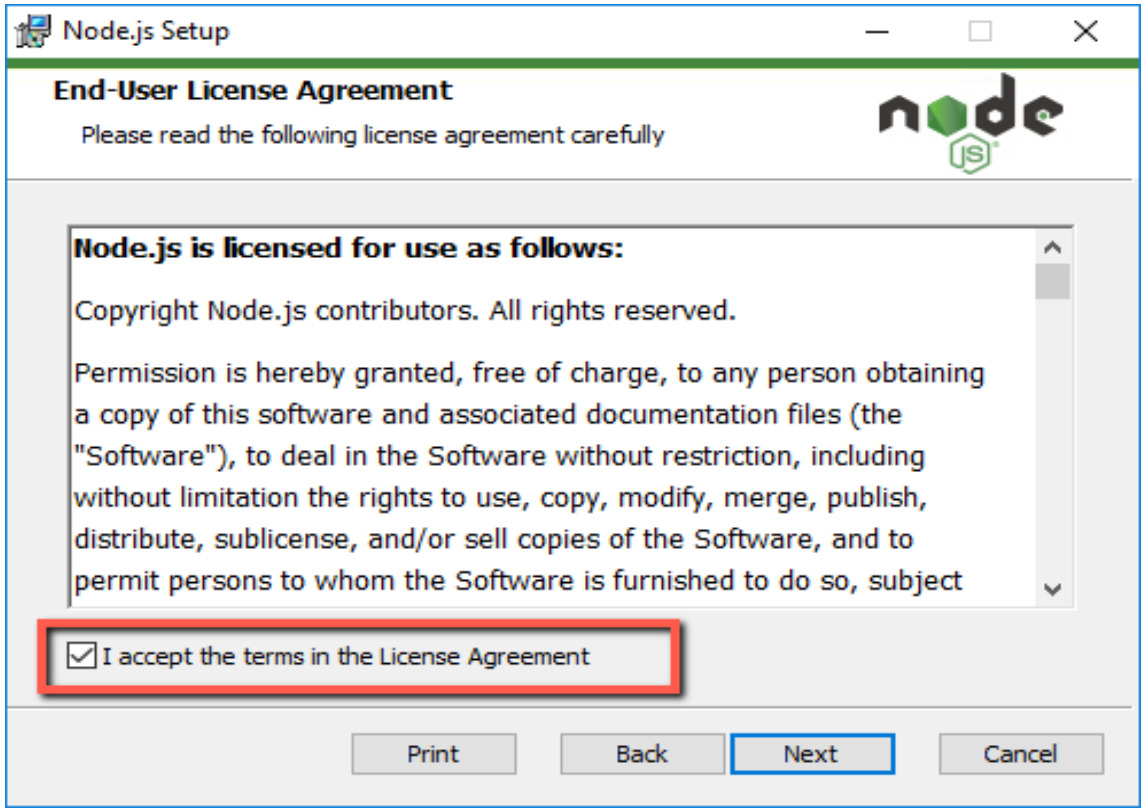
1. Go to https://nodejs.org/en/



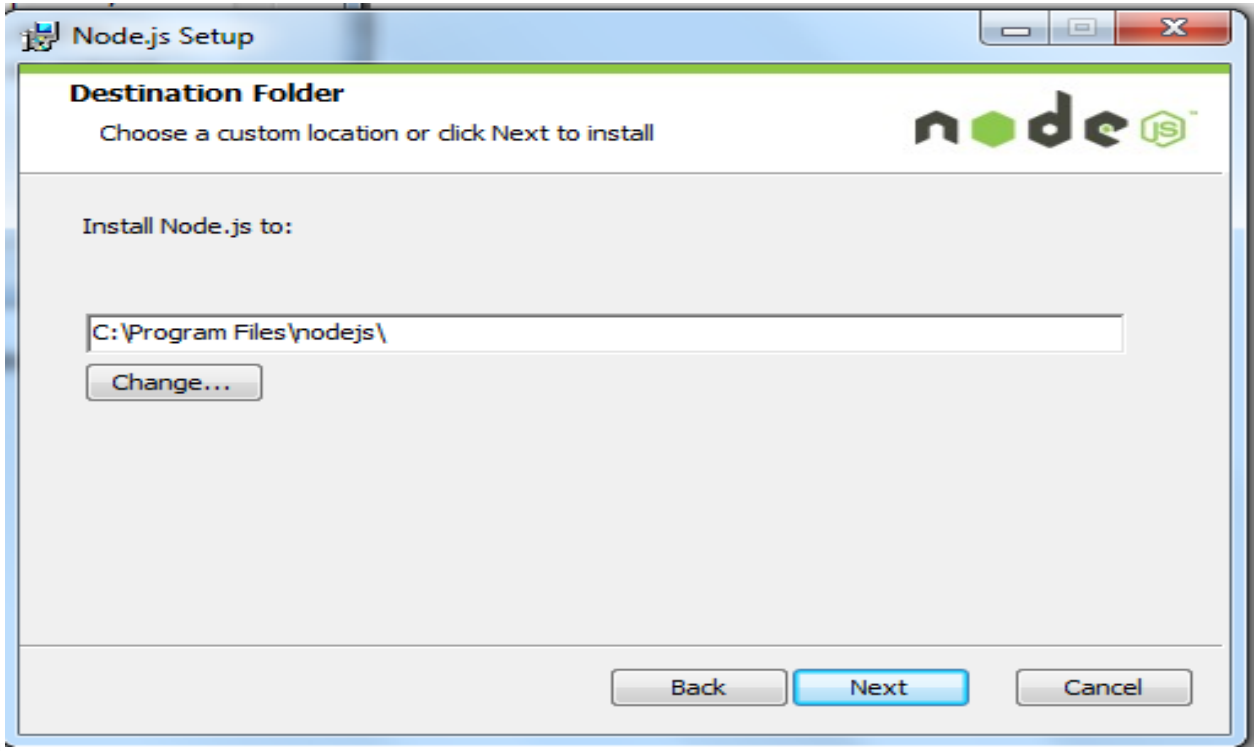
2. Click the "Next" button to continue with the installation



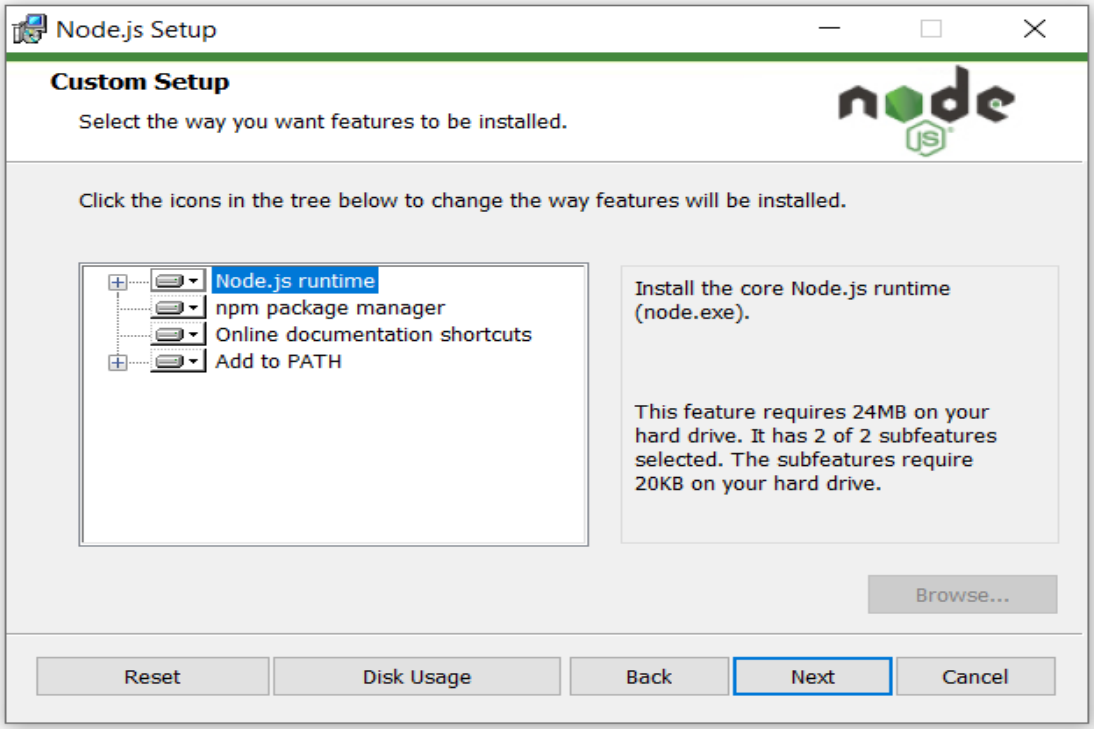
3. Accept the terms and conditions



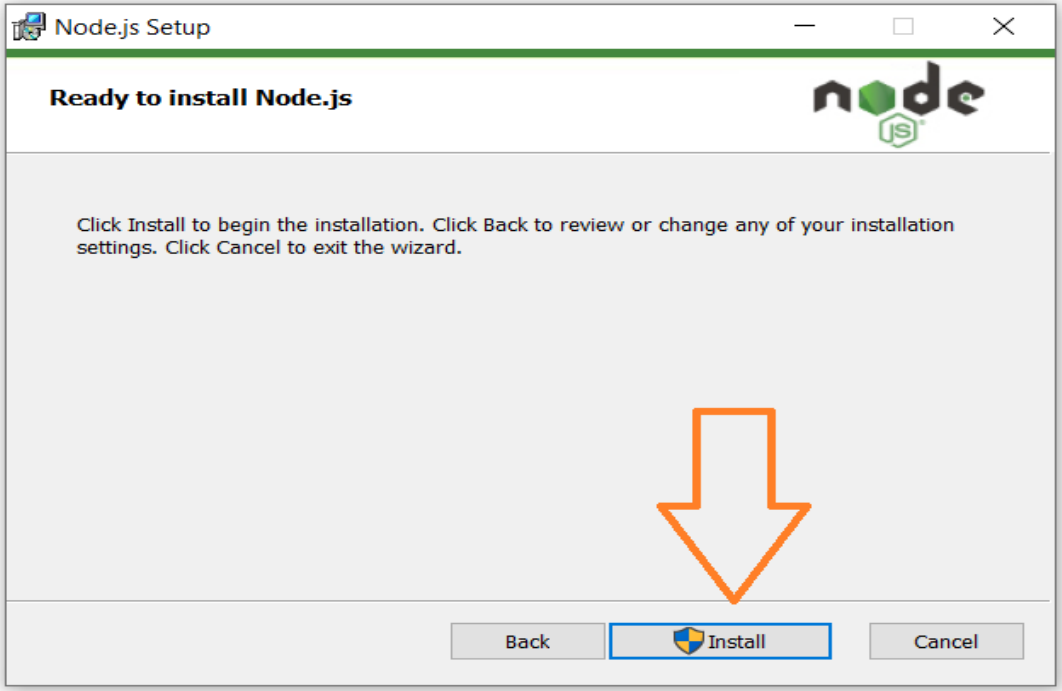
4. Choose the location where Node.js needs to be installed and then click on the Next button.



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



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.

❖ 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.

- 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.

- 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.

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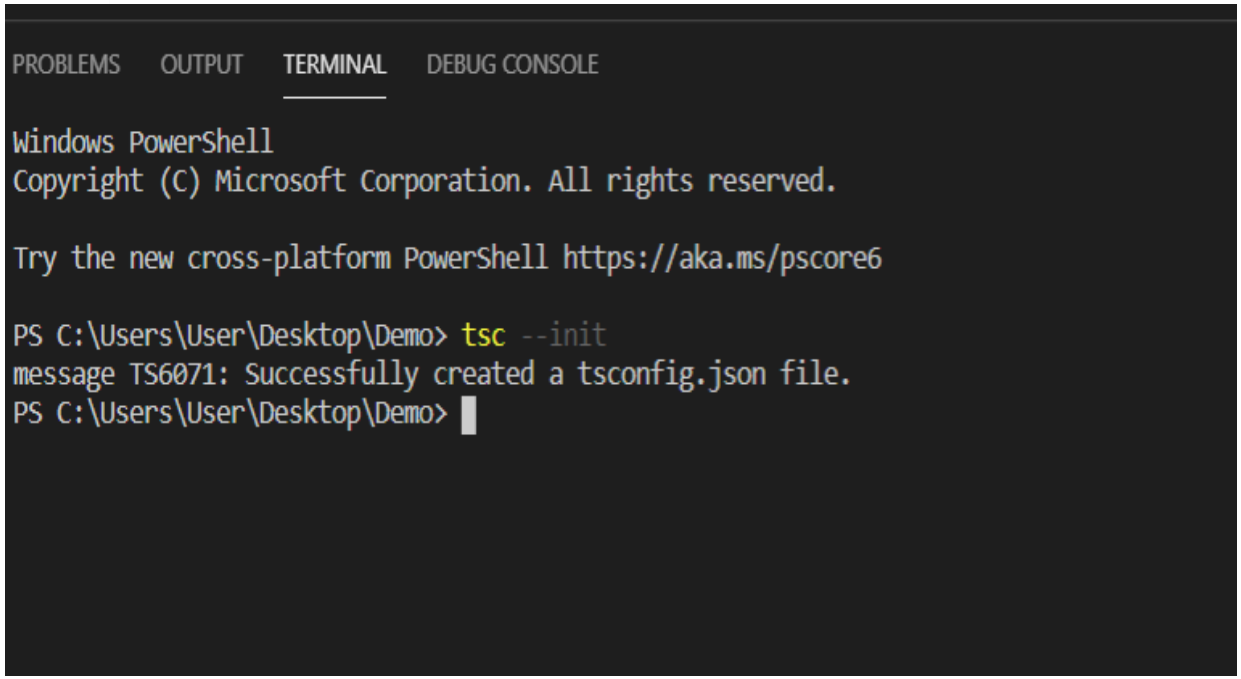
- Check the installed version of TypeScript using the following command:

```
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



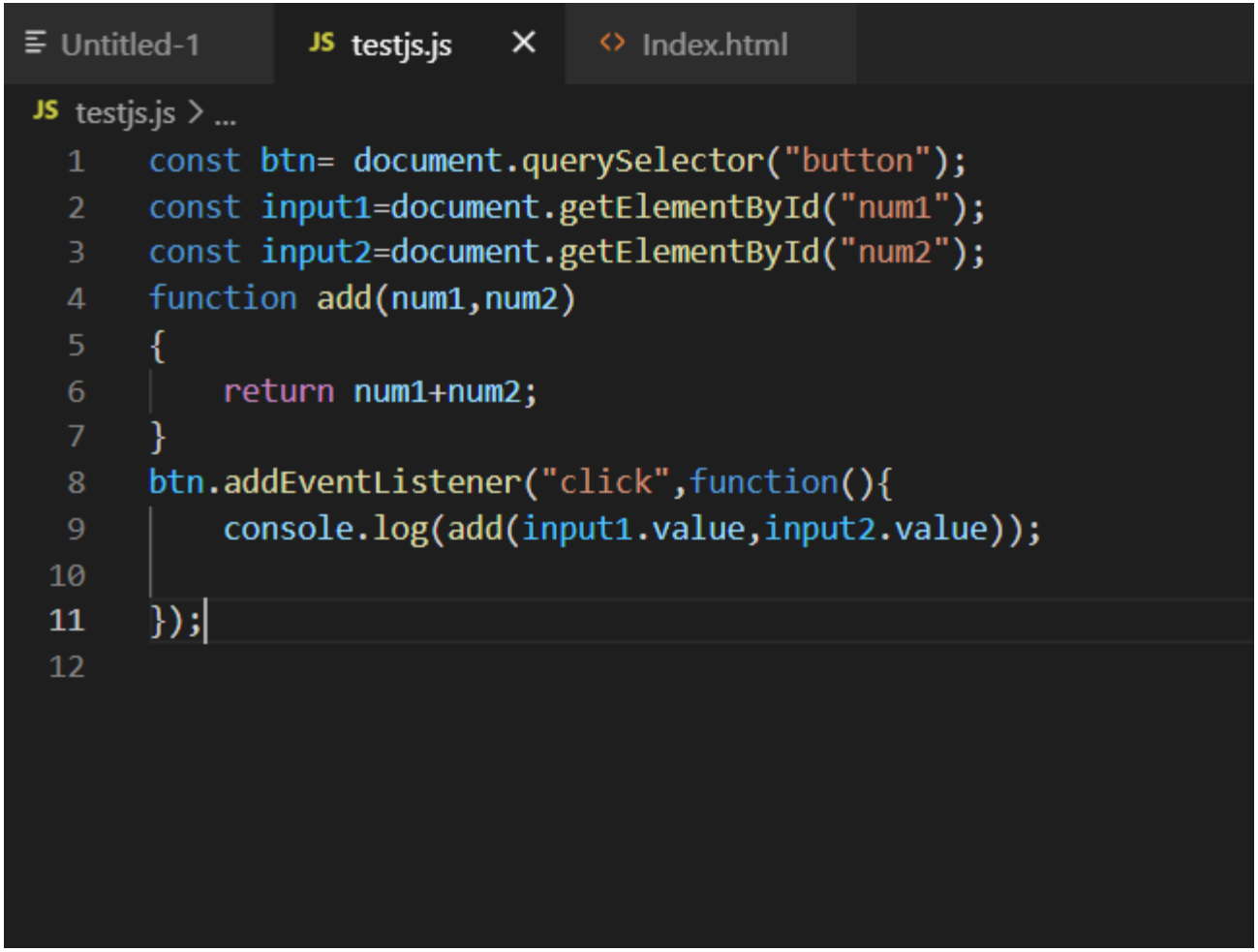
Different between Js and Ts

Untitled-1 | testjs.js | Index.html

Index.html > html > head > meta

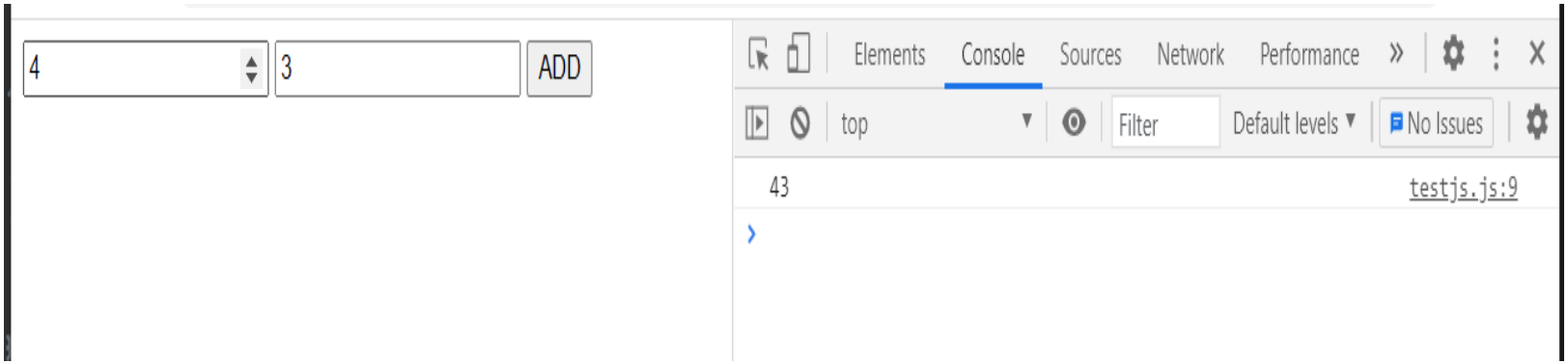
```
1   <!DOCTYPE html>
2   <html lang="en">
3   <head>
4       <meta charset="UTF-8">
5       <meta http-equiv="X-UA-Compatible" content="IE=edge">
6       <meta name="viewport" content="width=device-width, initial-scale=1.0">
7       <title>Testing code</title>
8   </head>
9   <body>
10      <input 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



Different between Js and Ts

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



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

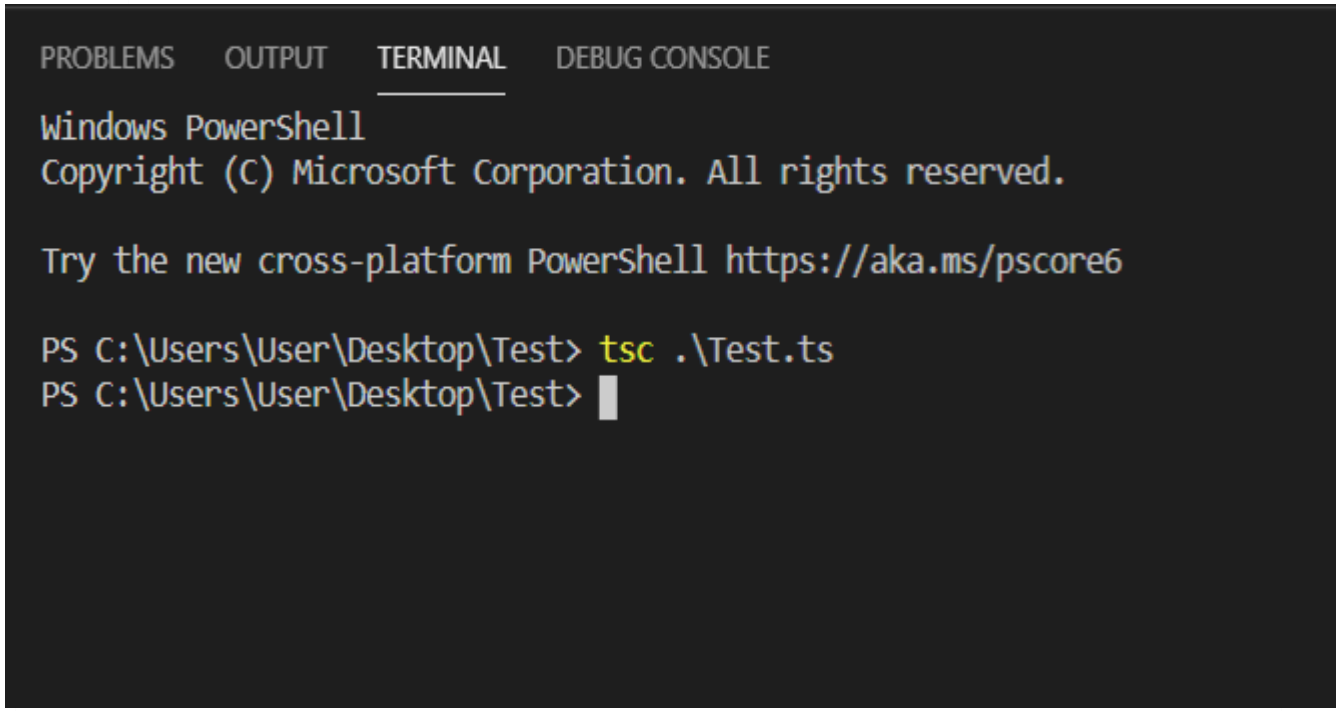
Untitled-1 | Index.html | Test.ts

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.



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

```typescript
class Greeter {
    greeting: string;
    constructor(message: string) {
        this.greeting = message;
    }
    greet() {
        return "Hello, " + this.greeting;
    }
}

var greeter = new Greeter("world");
```

JavaScript after transformation

```javascript
var Greeter = (function () {
    function Greeter(message) {
        this.greeting = message;
    }
    Greeter.prototype.greet = function () {
        return "Hello, " + this.greeting;
    };
    return Greeter;
})();
var greeter = new Greeter("world");

```

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
```