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Course : Angular
No of Days : 20 days
Daily Session : 1 hour

Pre-Requisites
HTML,CSS,JS,TypeScript

DAY-1

Agenda:

1. What is Angular?
    - SPA
    - Goals of Angular
    - Versions
    - AngularJS vs Angular
2. Angular Set Up.
    - Installation of Node.js
    - Installation of VS Code
    - Insallation of Angular

Introduction to Angular:

- ❖ Angular is a client side framework, which is used to create web applications.
- ❖ The framework provides skeleton of the project and specifies clear guidelines, where to write which type of code.
- ❖ Angular can be used in combination with any server side platform such as Java, NodeJS, Asp.Net, PHP, Python etc.
- ❖ Angular is developed using "TypeScript" language, which is a superset of JavaScript
language.

- Angular is the most-used client side framework.
- Angular was developed by Google.
- Angular is free-to-use (commercially too).
- Angular is open-source. That means the source code of angular is available online for free of cost.
- Angular is cross-platform. That means it works in all the operating systems.
- Angular is cross-browser compatible. That means it works in all the browsers, except less than IE 9 (which is completely out-dated).
- Angular is mainly used to create "data bindings". That means, we establish relation between a variable and html element; When the value of the variable is changed, the same will be automatically effected in the corresponding html element; and vice versa.
- So that the developer need not write any code for DOM manipulations (updating values of html tags, based on user requirements. for example, updating the list of categories when a new category added by the user). Thus the developer can fully concentrate on the application logic, instead of writing huge code for DOM manipulations. So we can achieve clean separation between "application logic" and "DOM manipulations".
- Angular mainly works based on "Components". The component is a class, which reprensets a specific section (part) of the web page.

Goals of Angular:

- Make a Single Page Application:
  A Single Page Application (SPA) is a web application that loads and renders all necessary content on a single web page. Instead of navigating to different pages and reloading the entire page, SPAs dynamically update the content on the page as users interact with it, providing a more seamless and responsive user experience.
  - It make Development easier.
  - SPA provides client-side navigation system; but can communicate with server only through AJAX; the web page never gets refreshed fully.
  - **Ex:** Gmail, PayPal, Pinterest, Gmail, Facebook
- Seperation HTML logic from Application Logic.
- Performing Unit Testing

Versions:

Angular Version	Release Date	Features
AngularJS 1.x	Oct 2010	Initial release of AngularJS, a JavaScript-based framework for building dynamic web applications.
Angular 2	Sep 2016	Complete rewrite of AngularJS. Introduced a component-based architecture, improved performance, and better tooling support.
Angular 4	Mar 2017	Improved performance, smaller bundle sizes, and added new features such as the introduction of the 'else' clause in Angular templates.
Angular 5	Nov 2017	Improved build optimizer, support for progressive web apps (PWA), and introduction of Angular Universal Transfer API.
Angular 6	May 2018	Introduced Angular Elements for building reusable components, Angular Material starter components, and improved Angular CLI commands.
Angular 7	Oct 2018	Improved performance and introduced features

		like Angular CLI prompts, drag-and-drop capabilities, and Virtual Scroll.
Angular 8	May 2019	Introduced Ivy Renderer as an opt-in preview, differential loading for smaller bundles, and improved Angular CLI commands.
Angular 9	Feb 2020	Introduced the Ivy Renderer as the default rendering engine, improved performance, and updated dependencies to their latest versions.
Angular 10	June 2020	Improved performance and introduced stricter type checking with the 'strict' mode enabled by default.
Angular 11	Nov 2020	Improved performance, support for webpack 5, and updated dependencies.
Angular 12	May 2021	Introduced stricter type checking for templates, improved build and testing processes, and updated dependencies.
Angular 13	Nov 2021	Improved performance, enhanced developer experience, and updated dependencies.

Difference between AngularJS and Angular

AngularJS	**Angular**
AngularJS is a **JavaScript-based** framework.	Angular is a complete rewrite of AngularJS and is built with **TypeScript**.
It follows the MVC archteicture	It follows the components and directives.
It uses ng-bind in order to bind data from view to model and vice versa.	It uses () and [] to bind the data between view and model.
It uses $routeprovider.when() for routing configuration	It uses @Route Config{(..)} for routing configuration.
It does’nt use the CLI tool	It uses the CLI tool

Browser Compatability of Angular

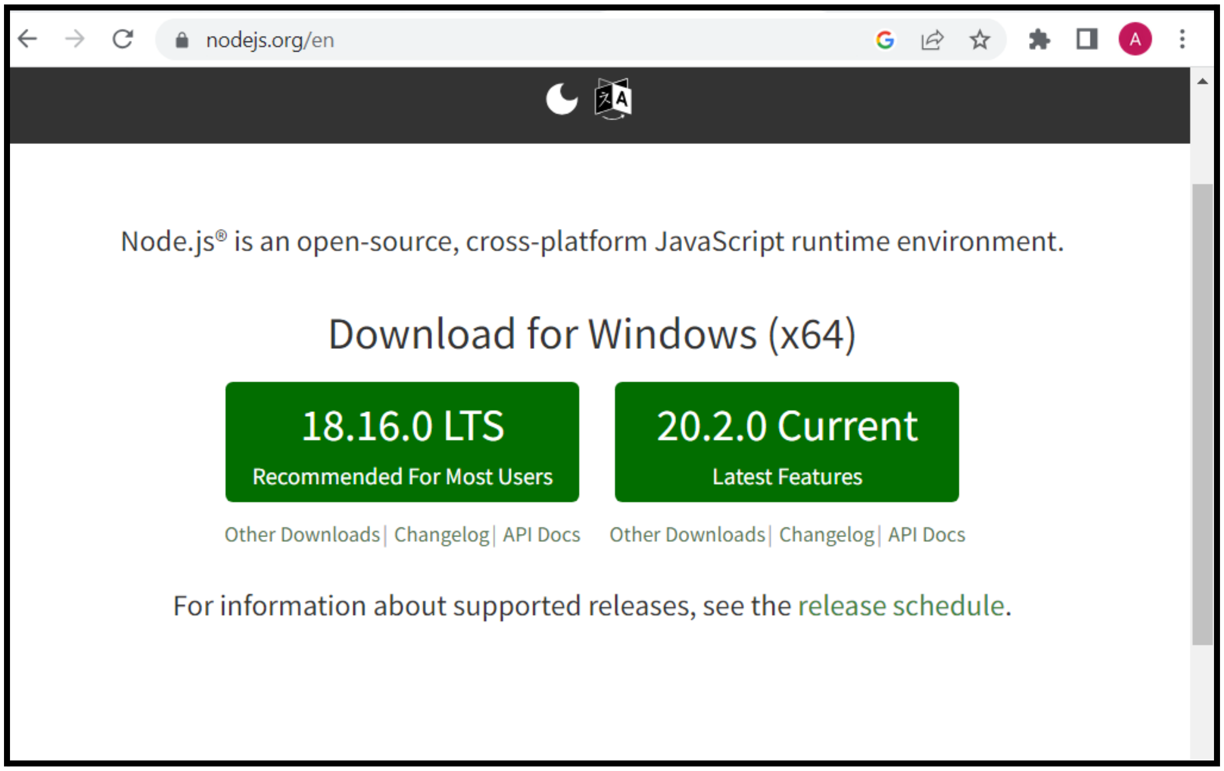
S.NO	**Browser**	**Support Version**
1.	Google Chrome	Any version
2.	Mozilla Firfox	Any version
3.	MS Internet Explorer	9+

DAY-2

2. Angular Set Up.
Angular
=========

The following are the steps involved to install Angular in the window operating system.

Step1: Install NodeJS in the windows. In order to download we use the following url:
https://nodejs.org/en



nodejs.org/en

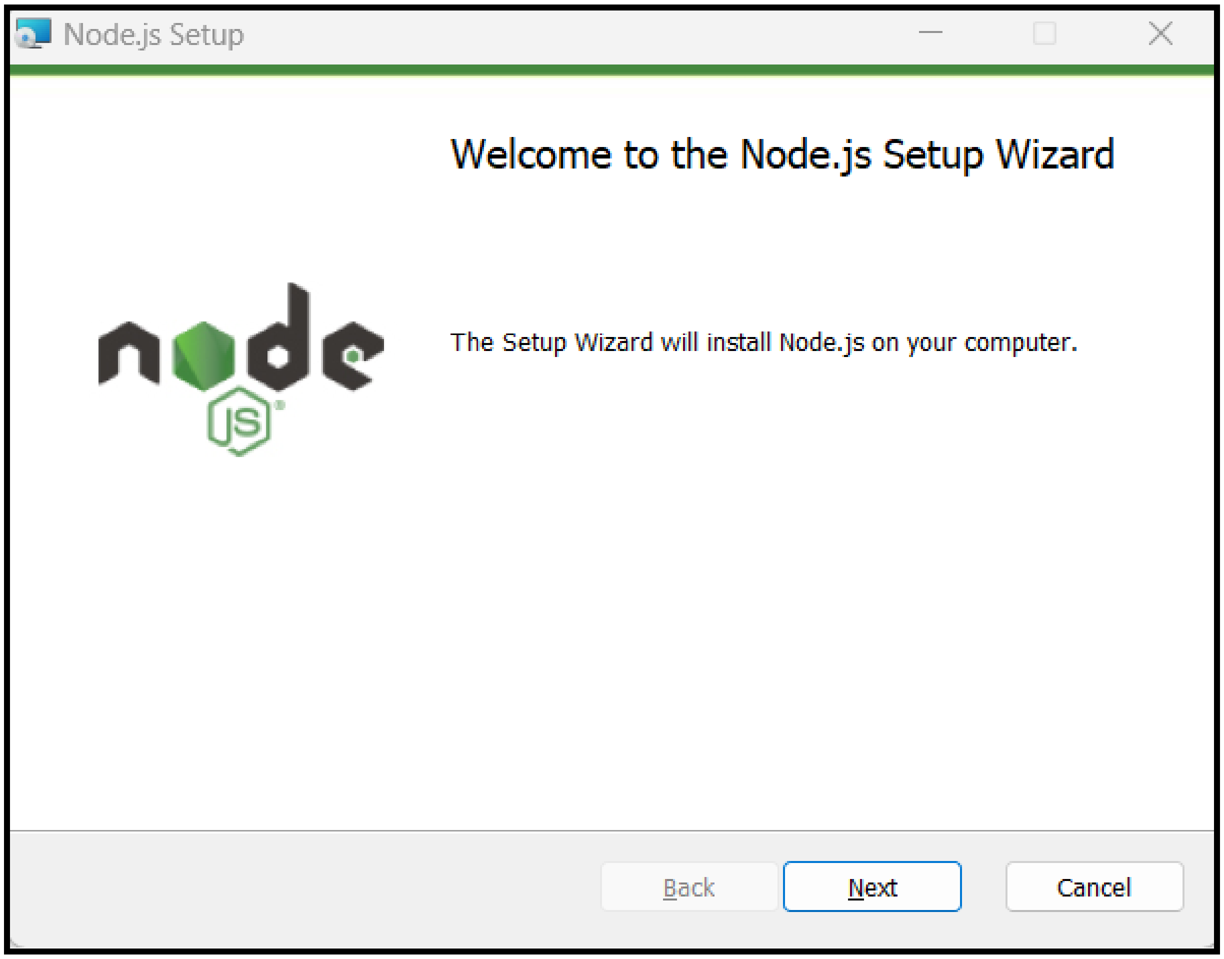
Node.js® is an open-source, cross-platform JavaScript runtime environment.

Download for Windows (x64)

18.16.0 LTS
Recommended For Most Users
20.2.0 Current
Latest Features
Other Downloads | Changelog | API Docs
Other Downloads | Changelog | API Docs

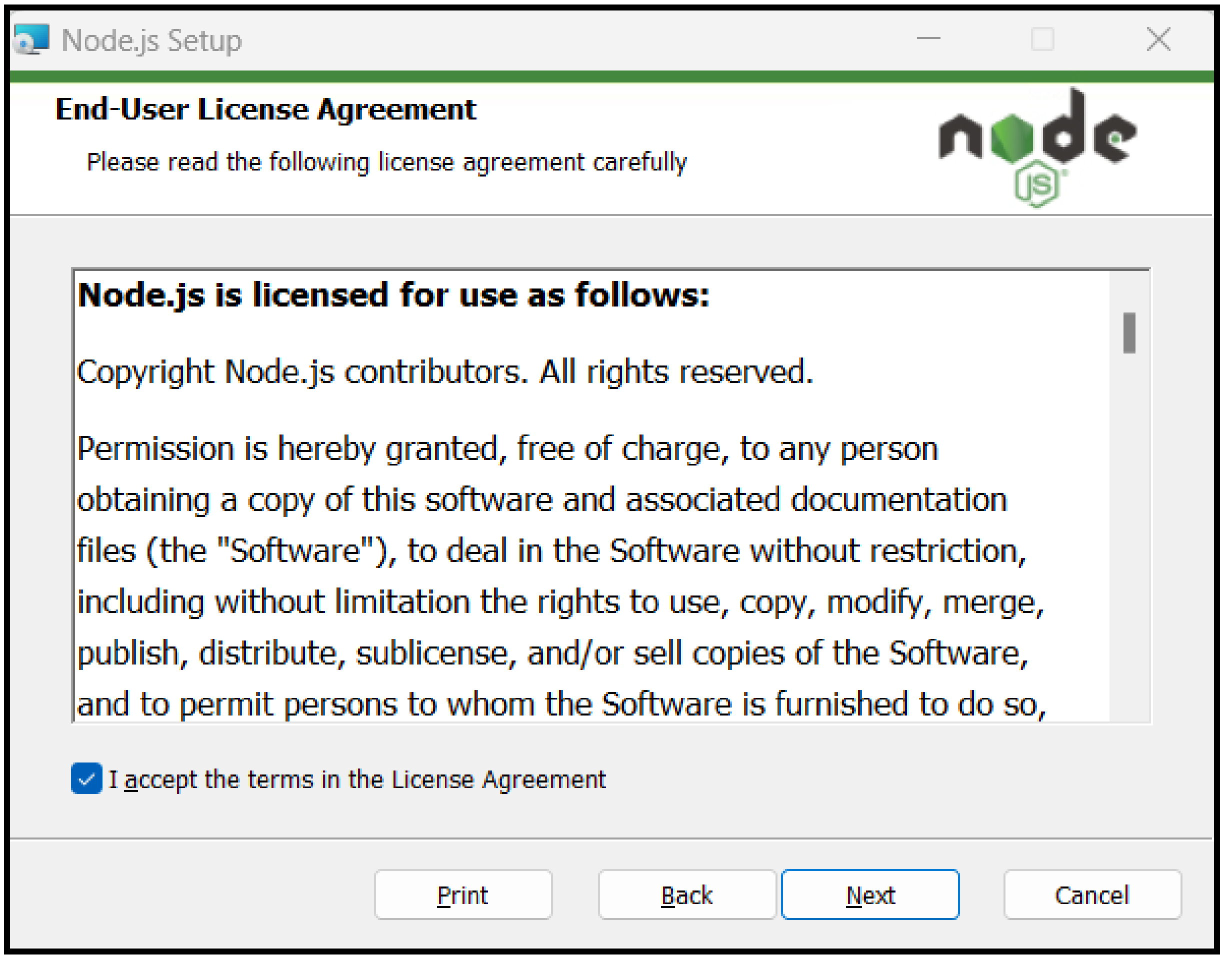
For information about supported releases, see the release schedule.

After download the nodejs the following is the way of installation of nodejs:


Node.js Setup

Welcome to the Node.js Setup Wizard

The Setup Wizard will install Node.js on your computer.



Node.js Setup

End-User License Agreement

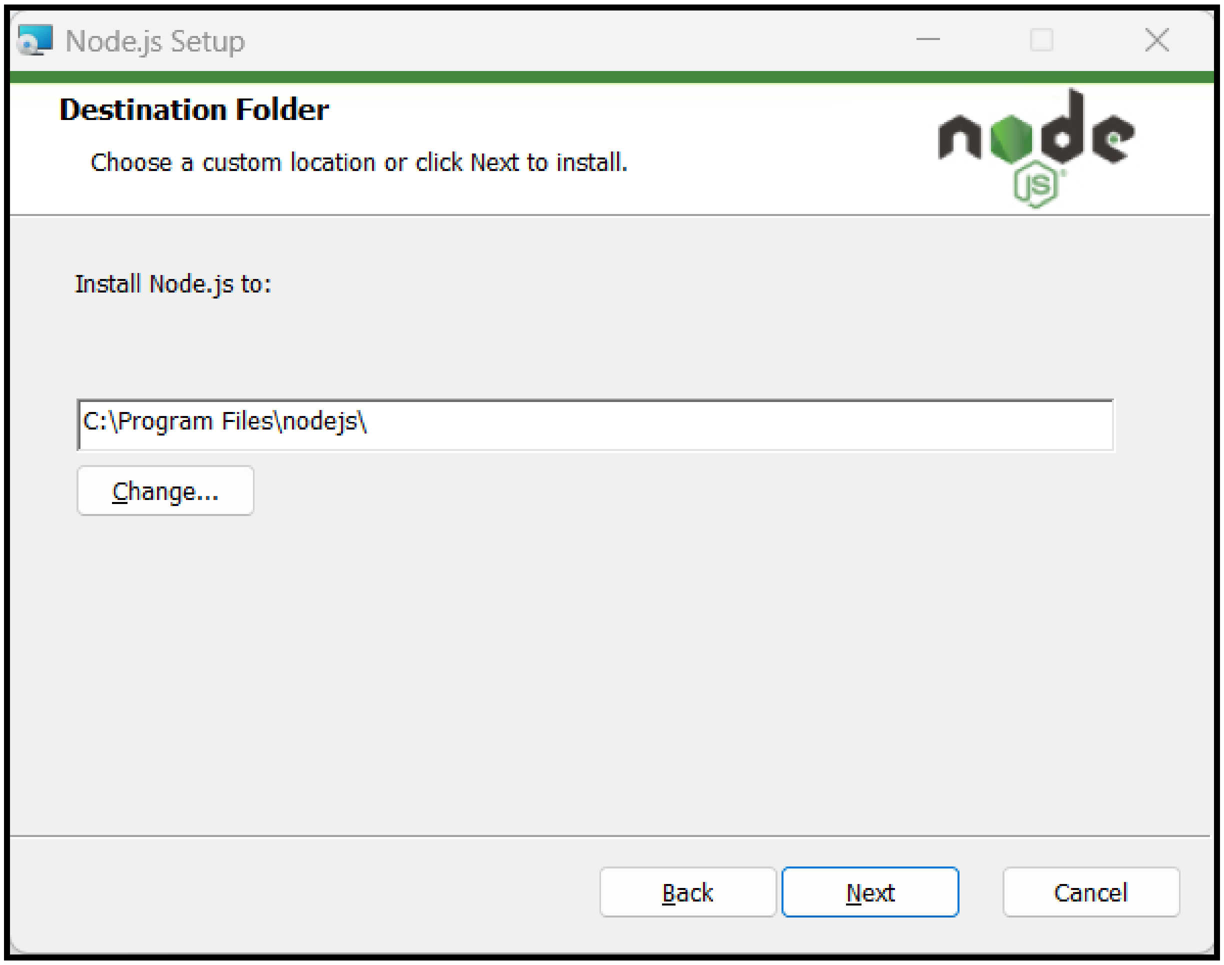
Please read the following license agreement carefully

Node.js is licensed for use as follows:

Copyright Node.js contributors. All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so,

[✓] I accept the terms in the License Agreement

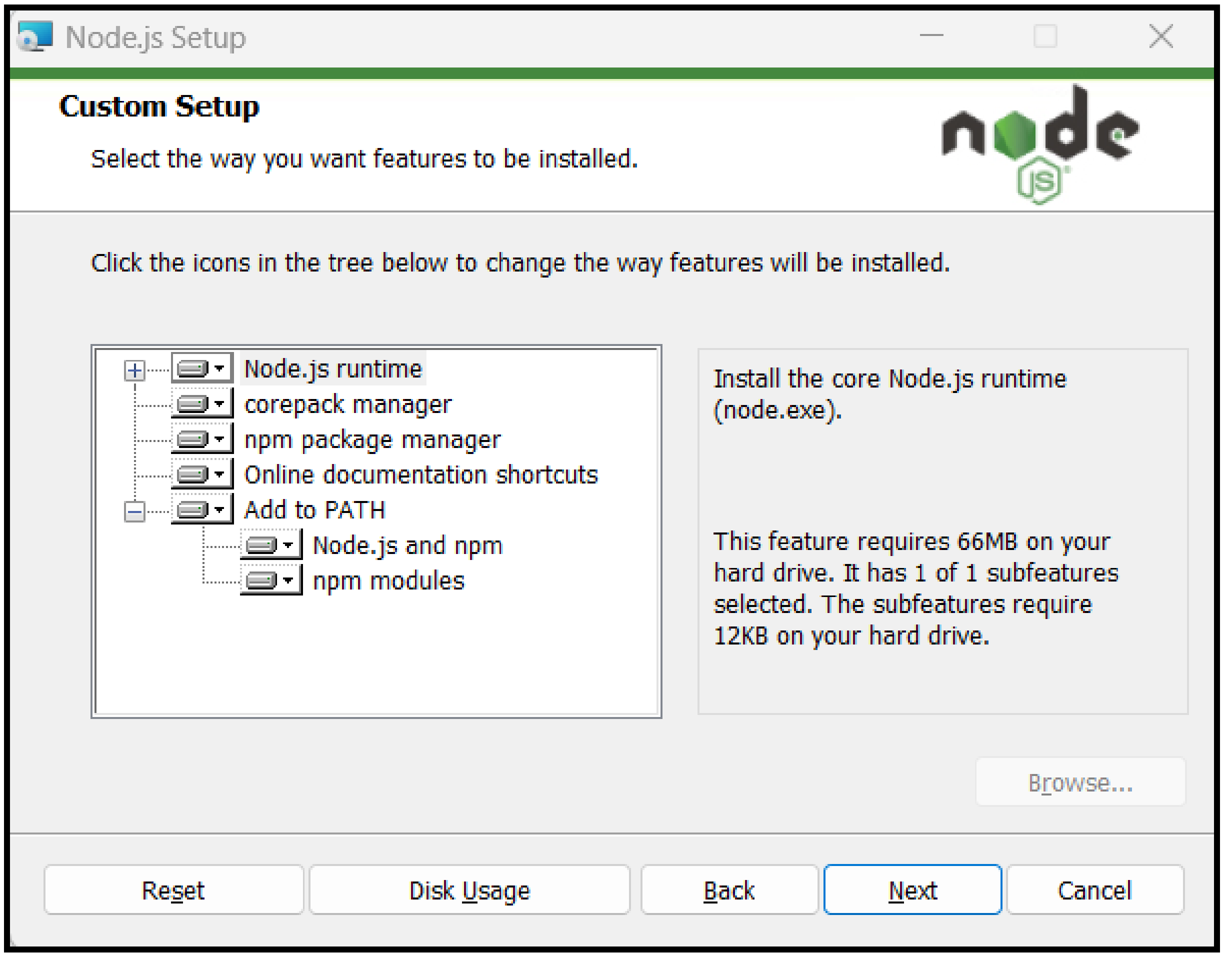

Node.js Setup

Destination Folder

Choose a custom location or click Next to install.

Install Node.js to:

C:\Program Files\nodejs\



Custom Setup

Select the way you want features to be installed.

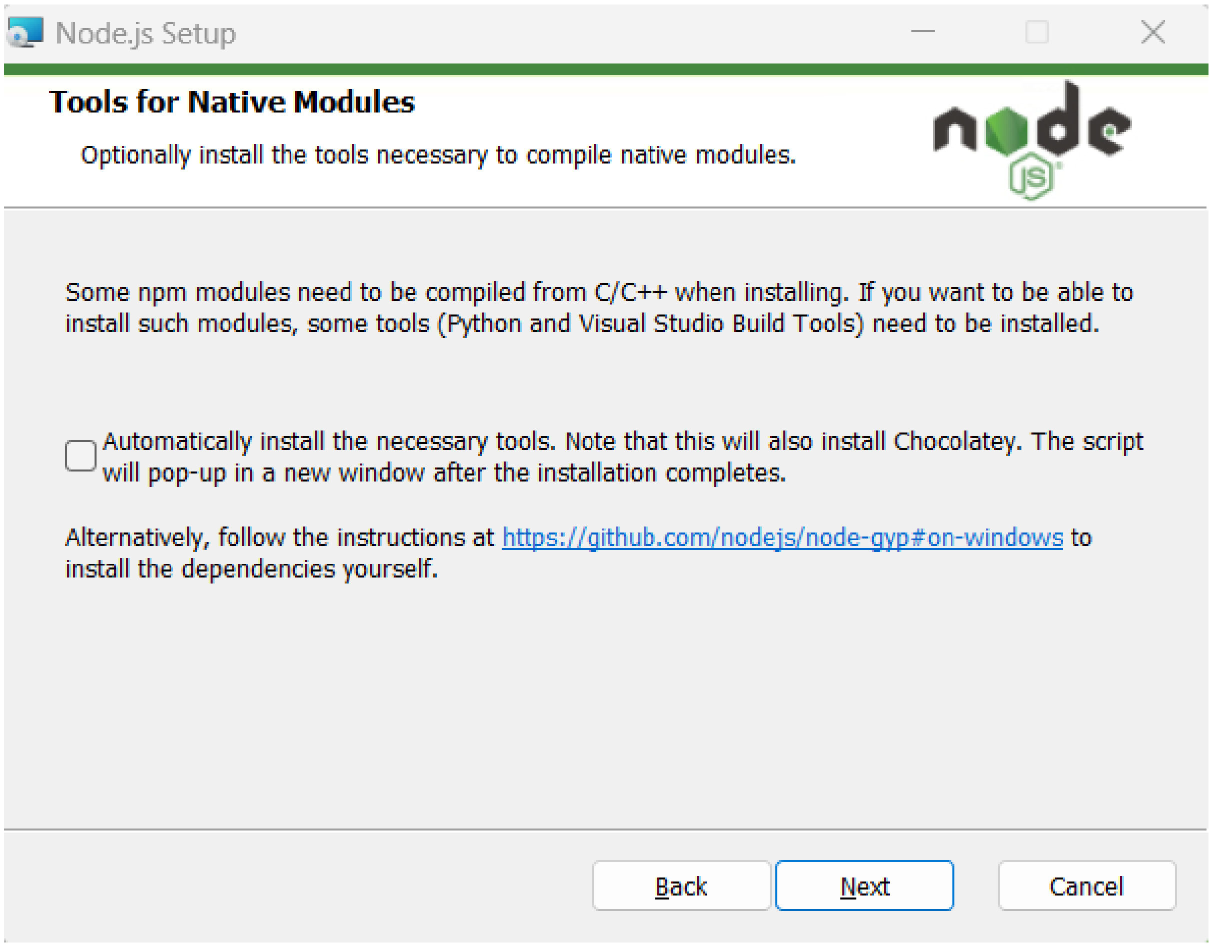
Click the icons in the tree below to change the way features will be installed.

- Node.js runtime
- corepack manager
- npm package manager
- Online documentation shortcuts
- Add to PATH
  - Node.js and npm
  - npm modules

Install the core Node.js runtime (node.exe).

This feature requires 66MB on your hard drive. It has 1 of 1 subfeatures selected. The subfeatures require 12KB on your hard drive.

Click on Next button



Tools for Native Modules

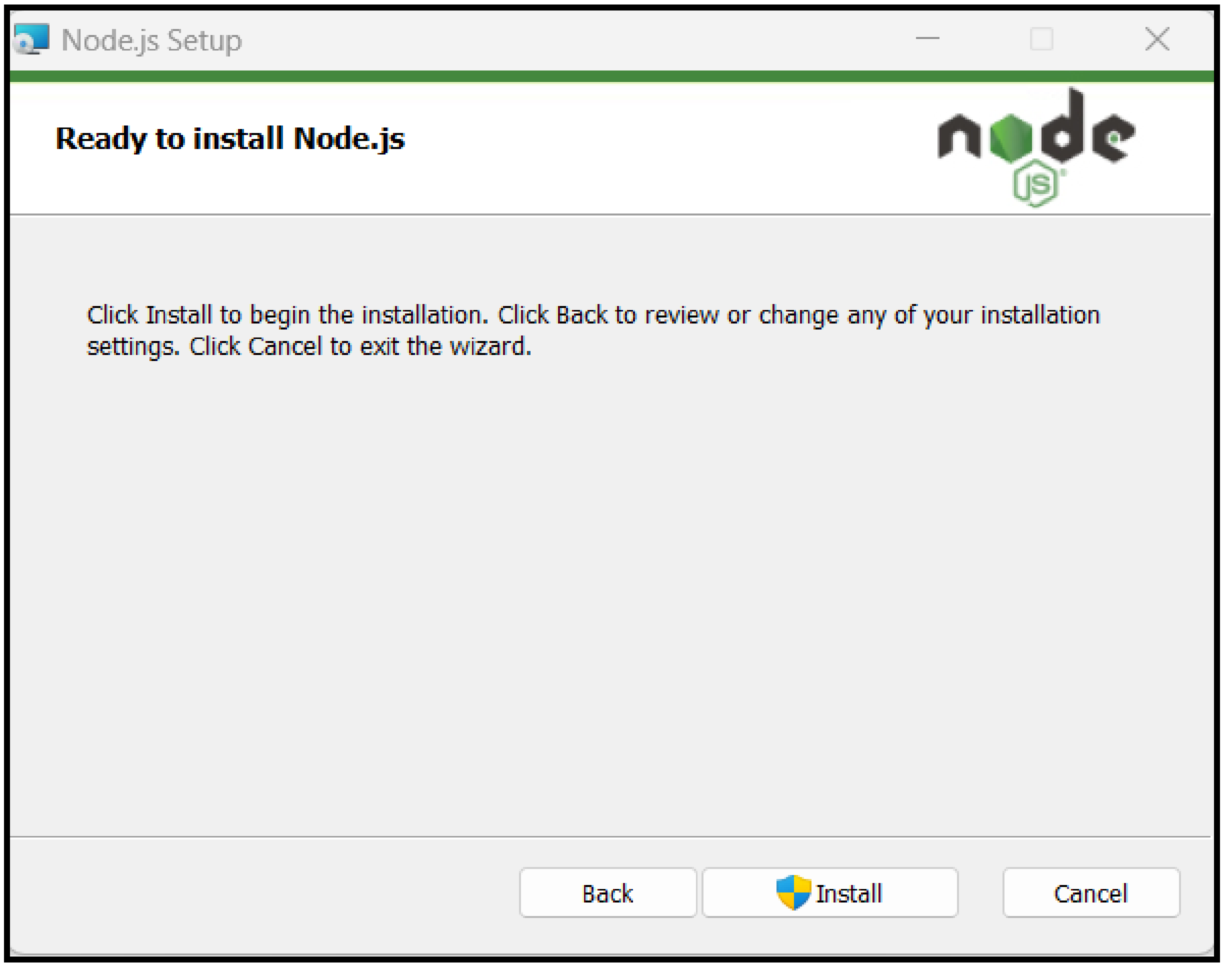
Optionally install the tools necessary to compile native modules.

Some npm modules need to be compiled from C/C++ when installing. If you want to be able to install such modules, some tools (Python and Visual Studio Build Tools) need to be installed.

[ ] Automatically install the necessary tools. Note that this will also install Chocolatey. The script will pop-up in a new window after the installation completes.

Alternatively, follow the instructions at https://github.com/nodejs/node-gyp#on-windows to install the dependencies yourself.

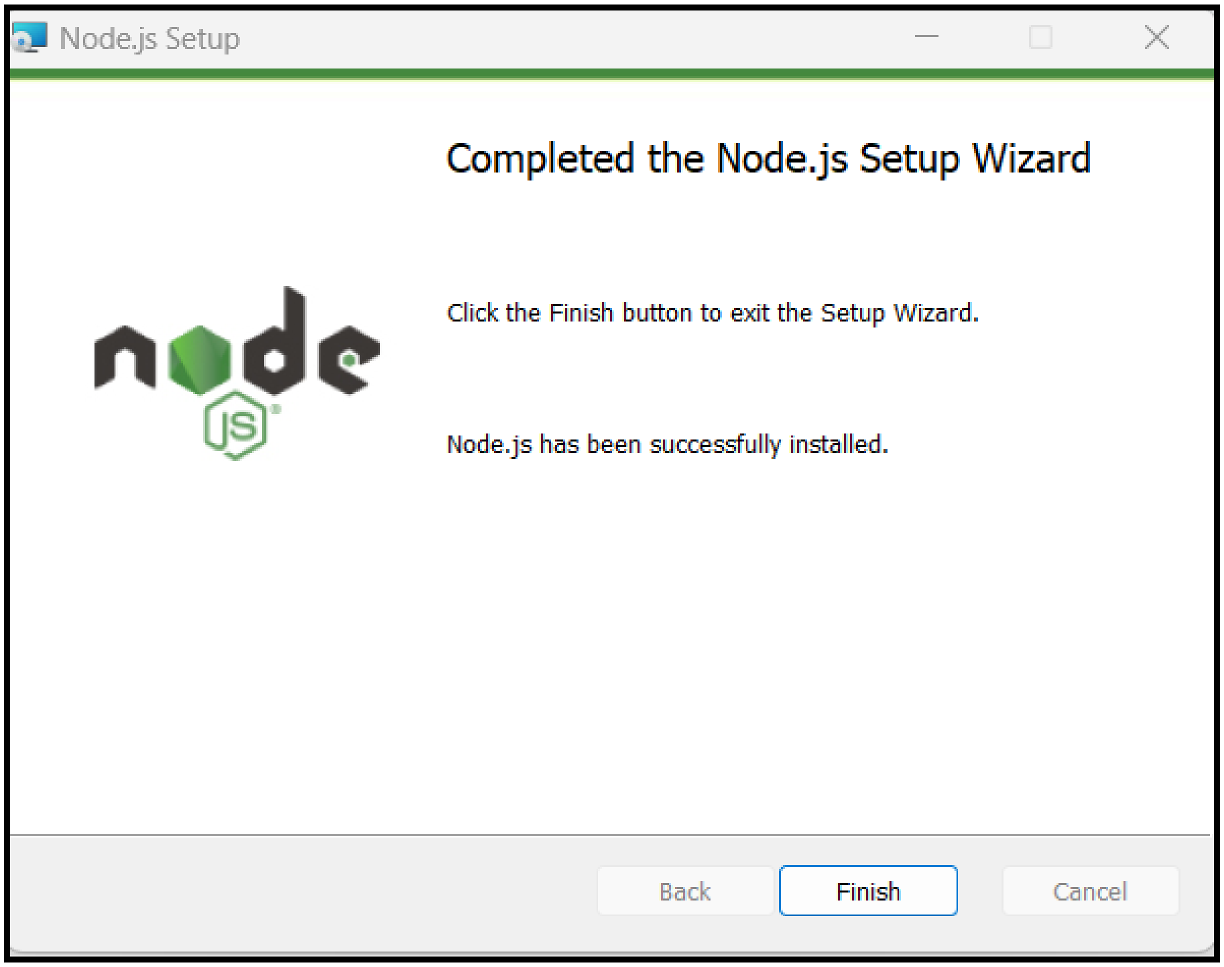
Click On Next Button



Ready to install Node.js

Click Install to begin the installation. Click Back to review or change any of your installation settings. Click Cancel to exit the wizard.

Now Click on Install button



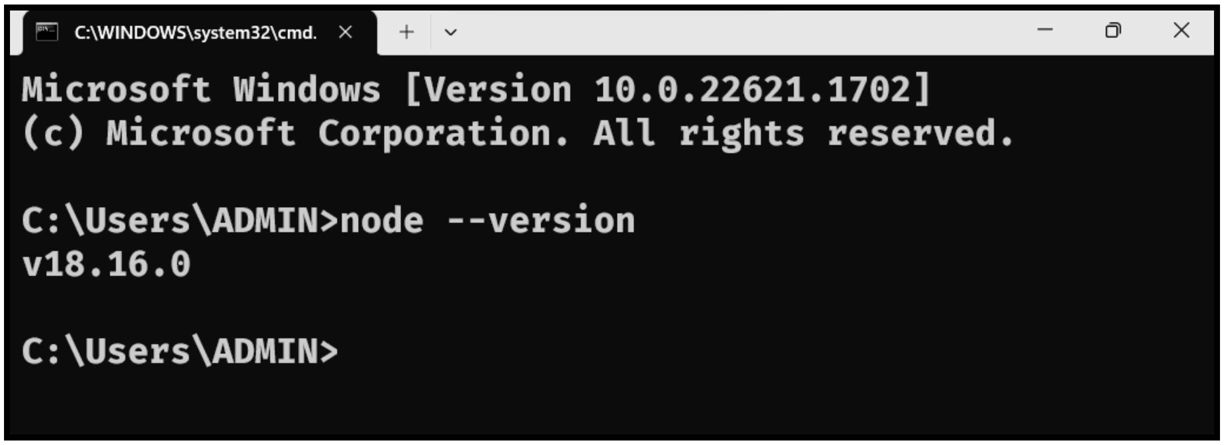
Completed the Node.js Setup Wizard

Click the Finish button to exit the Setup Wizard.

Node.js has been successfully installed.

Click on Finish Button

Once we install the nodejs we can cross check the node js by opening the command prompt.



```
Microsoft Windows [Version 10.0.22621.1702]
(c) Microsoft Corporation. All rights reserved.

C:\Users\ADMIN>node --version
v18.16.0

C:\Users\ADMIN>
```

Let’s learn about the npm which is by default installed while we install a node js.

What is NPM?

- NPM – or "Node Package Manager" – is the default package manager for JavaScript's runtime Node.js.

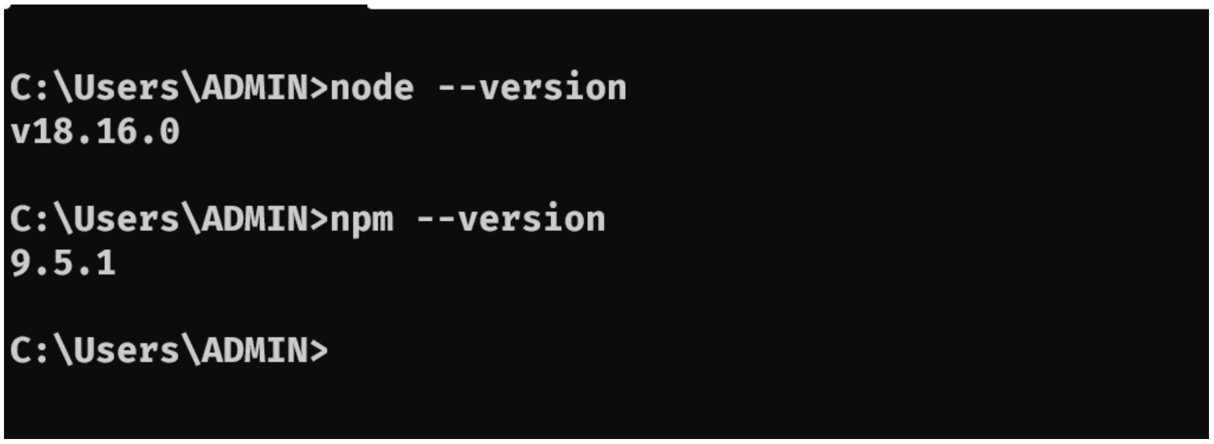
- It's also known as "Ninja Pumpkin Mutants", "Nonprofit Pizza Makers", and a host of other random names that you can explore and probably contribute to over at npm-expansions.

- **NPM consists of two main parts:**

    - a CLI (command-line interface) tool for publishing and downloading packages.
    - an online repository that hosts JavaScript packages.
      https://www.npmjs.com/

Let’s learn how to install angular in the window operating system.
The following are the below steps to install the angular:

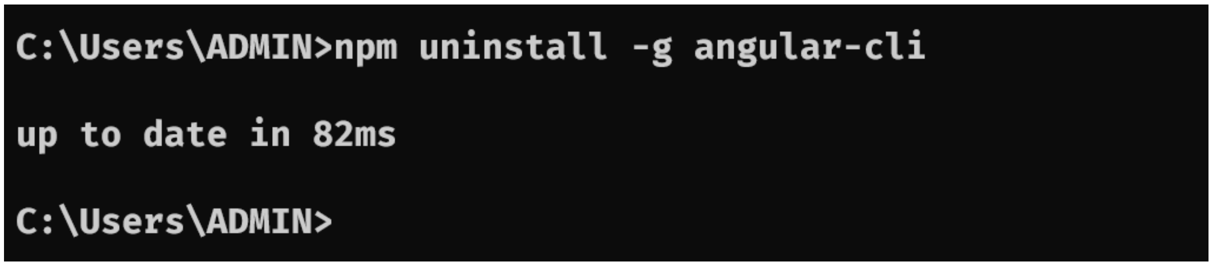
Step1 : Check the version of nodejs, npm as below command:



```
C:\Users\ADMIN>node --version
v18.16.0

C:\Users\ADMIN>npm --version
9.5.1

C:\Users\ADMIN>
```

Step2: Now install the angular by visiting the official website of angular
https://angular.io/docs
Step3: Open the command prompt and install the angular 10

Note : If angular is already there in your system you can uninstall by using following command:

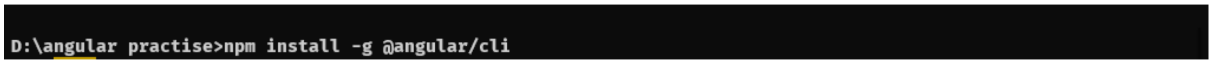


```
C:\Users\ADMIN>npm uninstall -g angular-cli

up to date in 82ms

C:\Users\ADMIN>
```

1. npm cache clean --force
2. npm cache verify

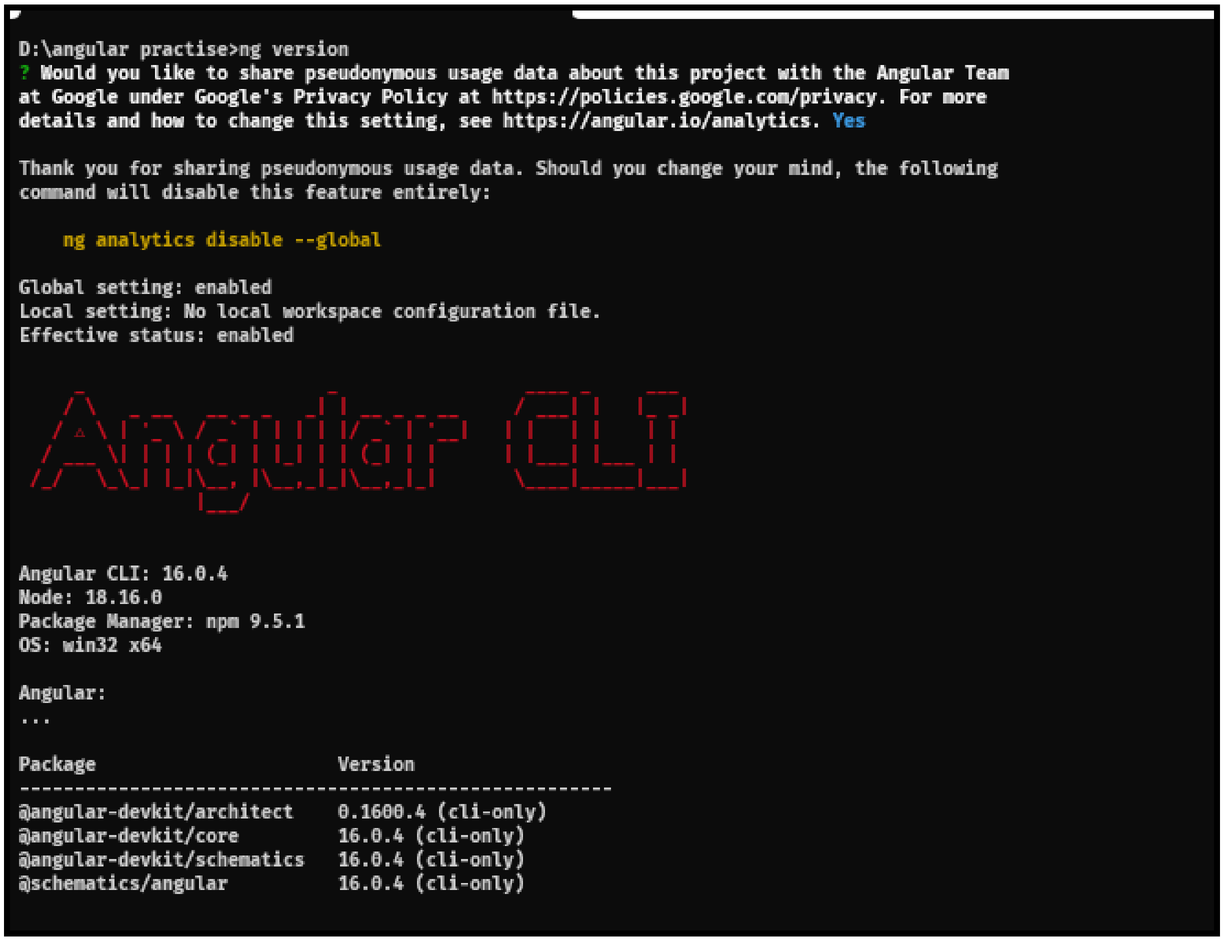
As of now we have not installed angular any version.

Let’s Learn how to install



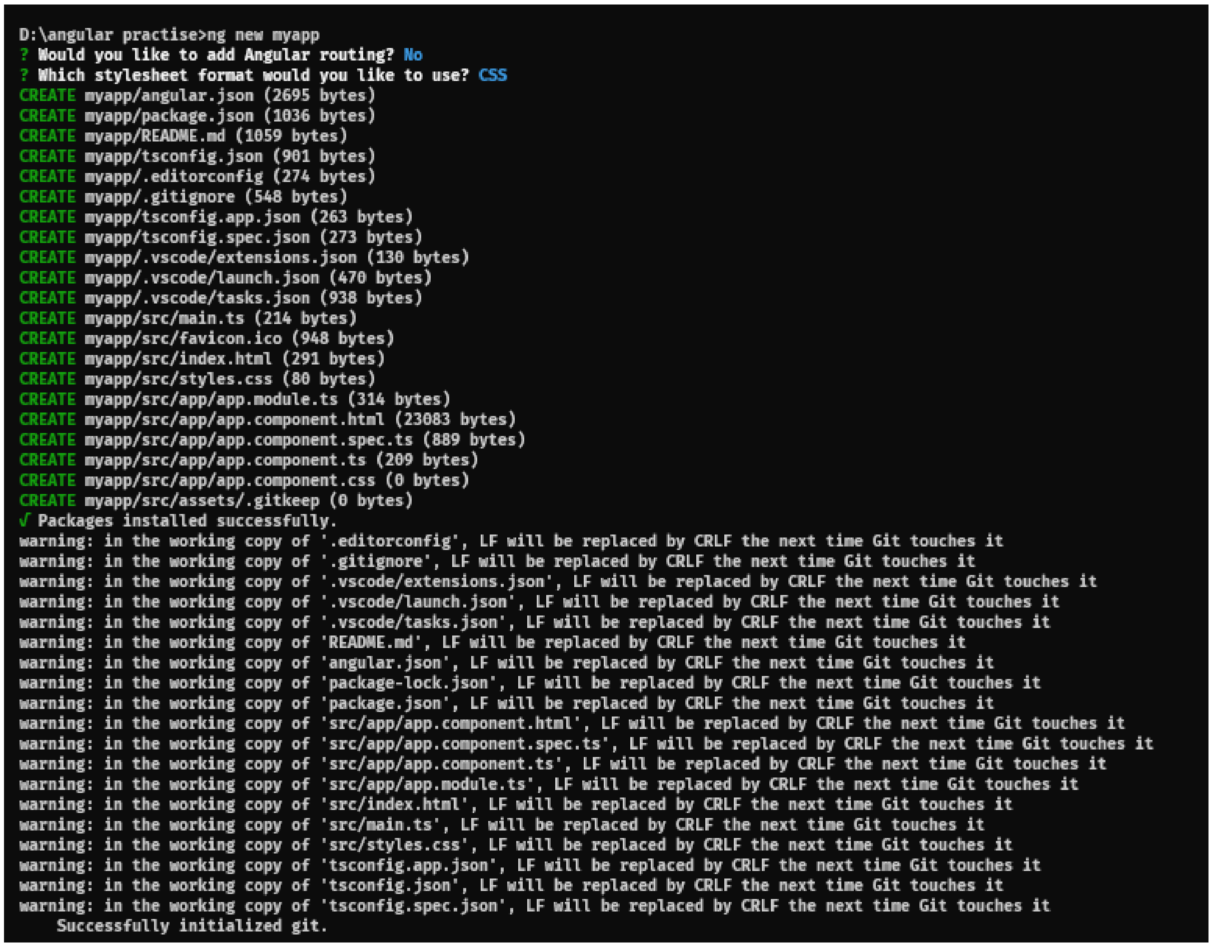
```
D:\angular practise>npm install -g @angular/cli
```

Now check the version of angular by using following command:



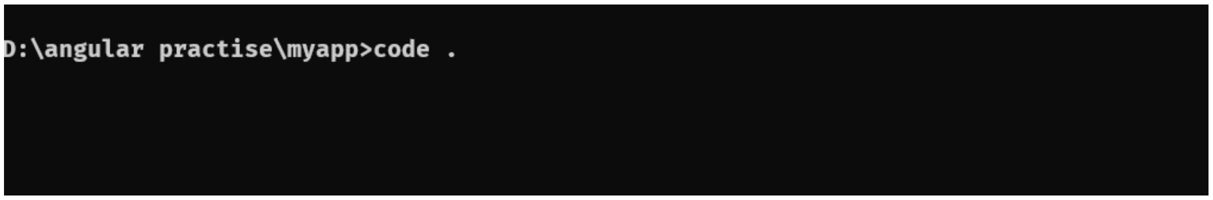
```
D:\angular practise>ng version
? Would you like to share pseudonymous usage data about this project with the Angular Team
at Google under Google's Privacy Policy at https://policies.google.com/privacy. For more
details and how to change this setting, see https://angular.io/analytics. Yes

Thank you for sharing pseudonymous usage data. Should you change your mind, the following
command will disable this feature entirely:

    ng analytics disable --global

Global setting: enabled
Local setting: No local workspace configuration file.
Effective status: enabled

Angular CLI: 16.0.4
Node: 18.16.0
Package Manager: npm 9.5.1
OS: win32 x64

Angular:
...

Package                         Version
------------------------------------------------------
@angular-devkit/architect       0.1600.4 (cli-only)
@angular-devkit/core            16.0.4 (cli-only)
@angular-devkit/schematics      16.0.4 (cli-only)
@schematics/angular             16.0.4 (cli-only)
```

Step4: Create the new angular project i.e. myapp by using below command:

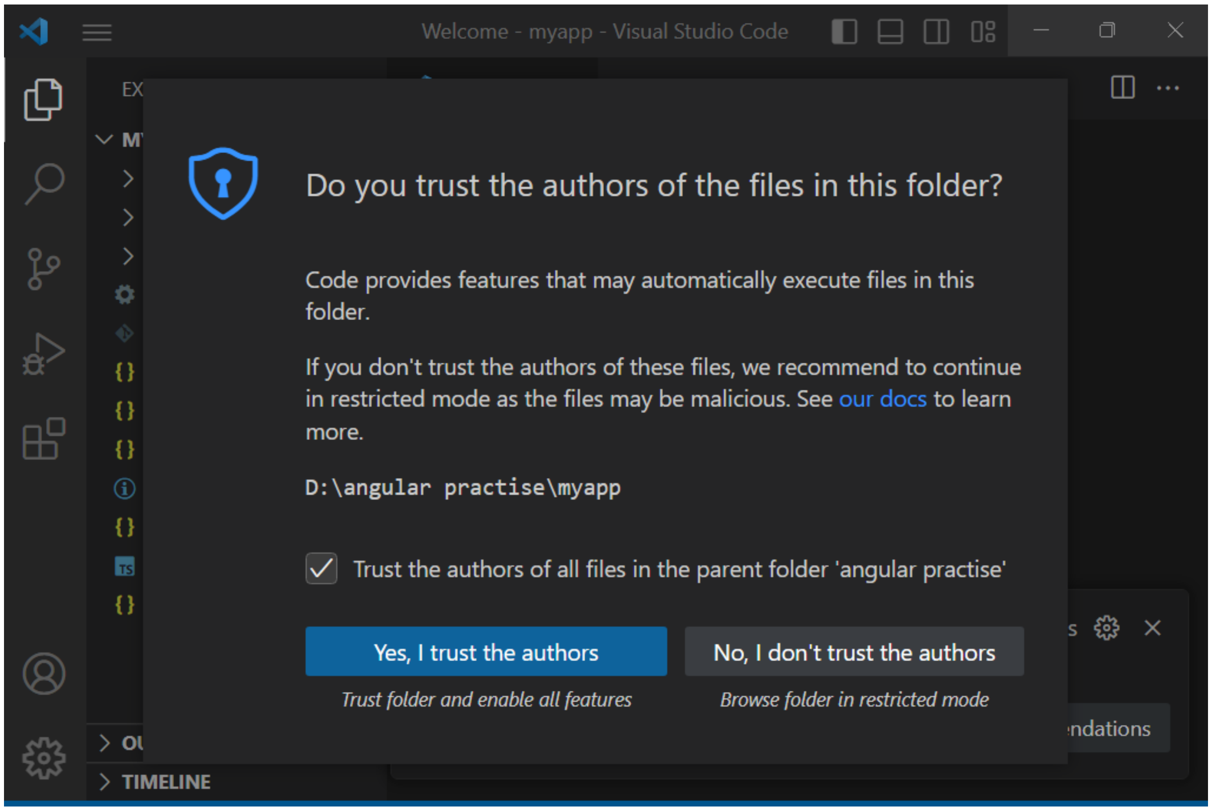


```
D:\angular practise>ng new myapp
? Would you like to add Angular routing? No
? Which stylesheet format would you like to use? CSS
CREATE myapp/angular.json (2695 bytes)
CREATE myapp/package.json (1036 bytes)
CREATE myapp/README.md (1059 bytes)
CREATE myapp/tsconfig.json (901 bytes)
CREATE myapp/.editorconfig (274 bytes)
CREATE myapp/.gitignore (548 bytes)
CREATE myapp/tsconfig.app.json (263 bytes)
CREATE myapp/tsconfig.spec.json (273 bytes)
CREATE myapp/.vscode/extensions.json (130 bytes)
CREATE myapp/.vscode/launch.json (470 bytes)
CREATE myapp/.vscode/tasks.json (938 bytes)
CREATE myapp/src/main.ts (214 bytes)
CREATE myapp/src/favicon.ico (948 bytes)
CREATE myapp/src/index.html (291 bytes)
CREATE myapp/src/styles.css (80 bytes)
CREATE myapp/src/app/app.module.ts (314 bytes)
CREATE myapp/src/app/app.component.html (23083 bytes)
CREATE myapp/src/app/app.component.spec.ts (889 bytes)
CREATE myapp/src/app/app.component.ts (209 bytes)
CREATE myapp/src/app/app.component.css (0 bytes)
CREATE myapp/src/assets/.gitkeep (0 bytes)
√ Packages installed successfully.
warning: in the working copy of '.editorconfig', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of '.gitignore', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of '.vscode/extensions.json', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of '.vscode/launch.json', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of '.vscode/tasks.json', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'README.md', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'angular.json', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'package-lock.json', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'package.json', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'src/app/app.component.html', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'src/app/app.component.spec.ts', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'src/app/app.component.ts', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'src/app/app.module.ts', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'src/index.html', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'src/main.ts', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'src/styles.css', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'tsconfig.app.json', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'tsconfig.json', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'tsconfig.spec.json', LF will be replaced by CRLF the next time Git touches it
    Successfully initialized git.
```

Step5: Now move to the myapp directory and open the project into the visual studio.



```
D:\angular practise\myapp>code .
```



Welcome - myapp - Visual Studio Code

Do you trust the authors of the files in this folder?

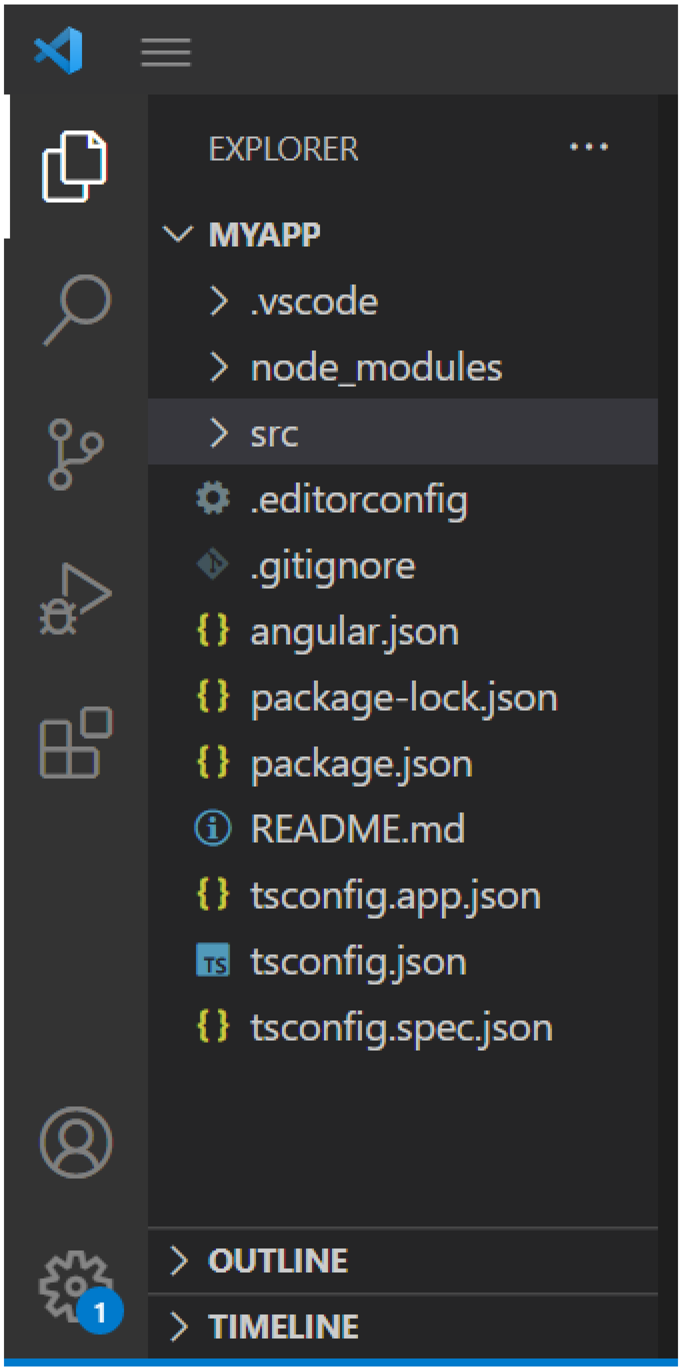
Code provides features that may automatically execute files in this folder.

If you don't trust the authors of these files, we recommend to continue in restricted mode as the files may be malicious. See our docs to learn more.

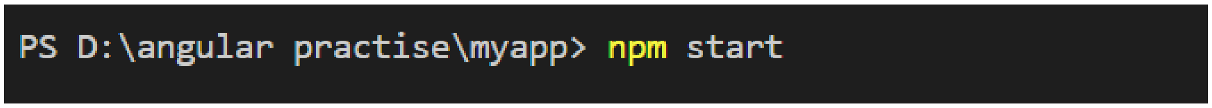
```
D:\angular practise\myapp
```

✓ Trust the authors of all files in the parent folder 'angular practise'

Yes, I trust the authors
Trust folder and enable all features
No, I don't trust the authors
Browse folder in restricted mode
TIMELINE

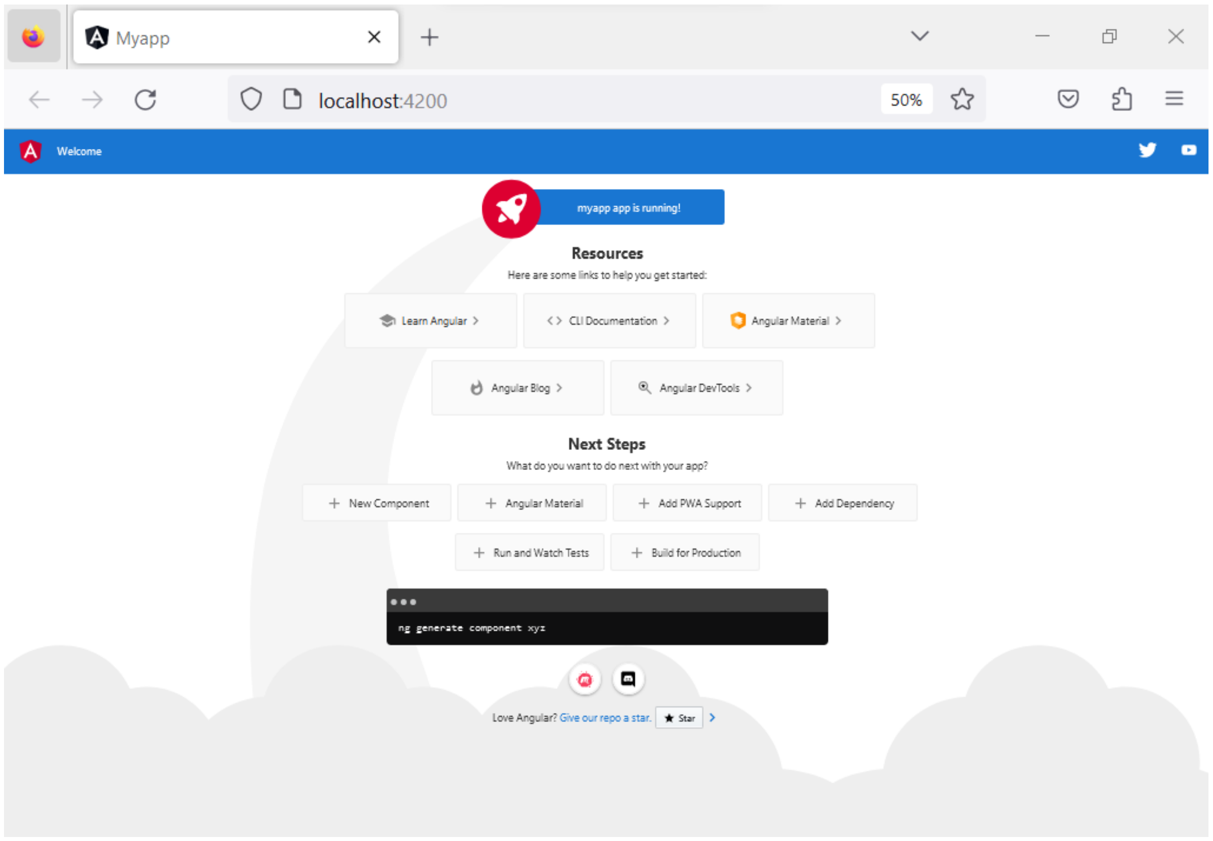


Step6: Open the terminal and start the angular application



```
PS D:\angular practise\myapp> npm start
```

Step7: Open into the browser and test it



```
ng generate component xyz
```

DAY-3

Agenda:

- **TypeScript**
  - What is TypeScript?
  - Difference between TypeScript and JavaScript
  - Features of TypeScript
  - Version of TypeScript
  - Steps to Prepare First Example in TypeScript

TypeScript:

- It is programming language, which is developed based on JS.
- It is superset of JS, which adds data types, classes, interfaces and other features.
- It is developed by Microsoft Corporation in 2012.

Difference between TypeScript and JavaScript

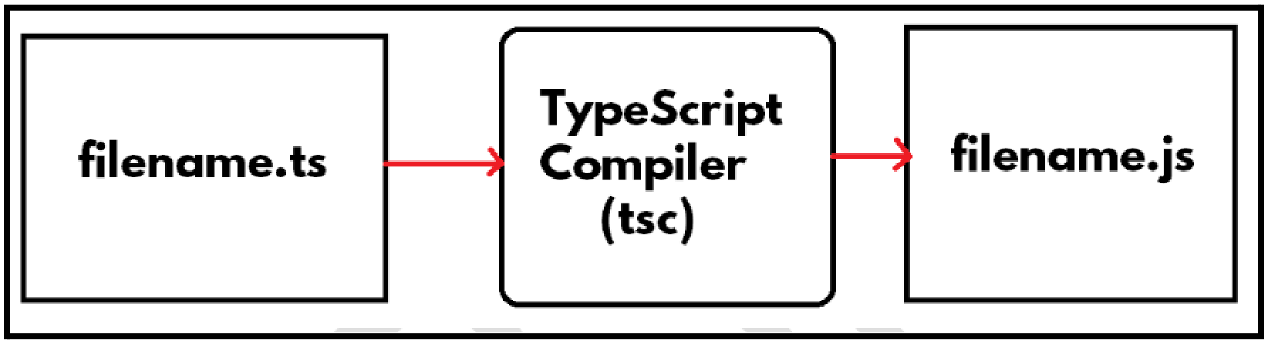
S.NO	TypeScript	JavaScript
1.	Supports static typing and allows declaring types for variables, function parameters, and return values.	Dynamically typed language where types are determined at runtime.
2.	Requires a compilation step to convert TypeScript code into JavaScript code.	No compilation step required, as JavaScript code runs directly in the browser or on a server.
3.	In Case TS we have features like interfaces, classes, modules, and generics.	It does'nt have build-in support for interfaces, classes, modules.
4.	The extension is .ts	The extension is .js
5.	It supports object-oriented programming concepts like classes, interfaces, inheritance, generics etc..	It just a scripting language.

Features of TypeScript

- **Static Typing :**
    - TypeScript allows you to explicitly declare the types of variables, function parameters, and return values. It helps catch errors during development by ensuring that values are used correctly and consistently.
- **Modules** :
    - TypeScript provides a module system that helps organize code into reusable and independent units. Modules allow you to encapsulate related functionality and control the visibility of variables and functions, making it easier to manage large codebases.
- **Interfaces** :
    - TypeScript introduces interfaces, which define the structure and shape of objects. They enable you to specify the expected properties and methods that an object should have, promoting code clarity and maintainability.
- **Classes**:
    - TypeScript supports object-oriented programming concepts like classes, inheritance, and access modifiers (e.g., public, private, protected). Classes allow you to define blueprints for creating objects with shared properties and behaviors.
- **Generics** :
    - TypeScript supports generics, allowing you to create reusable components that can work with different types. Generics provide a way to write flexible and type-safe code by abstracting over specific data types.
- **Tooling and IDE support :**

- TypeScript offers excellent tooling and support in popular IDEs like Visual Studio Code. This includes features like autocompletion, type checking, and refactoring tools, which enhance developer productivity and help identify errors early.

- **Browser Compatability :**
    - TypeScript code can be transpiled into JavaScript that is compatible with older browsers. You can write modern JavaScript syntax and features and then convert it into a version that works in a wide range of environments.



Version History

Version	Year
0.8	2012 (first version)
0.9	2013
1.0	2014
2.0	2016
2.6	2017
2.8	2018
…	..
5.0	2023
https://en.wikipedia.org/wiki/TypeScript	

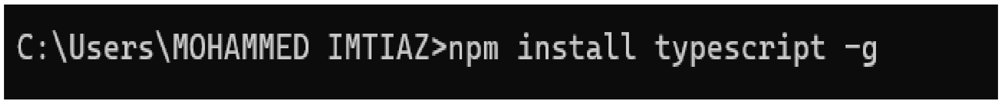
Steps to Prepare First Example in TypeScript

Step1: Install the Node.JS
- https://nodejs.org/en

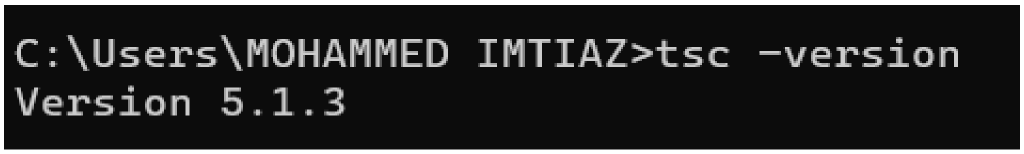
Step2: Install the TypeScript
- https://www.typescriptlang.org/download

Step3: Install VS Code
Step4 : Create a folder structure
Step5 : Create the TypeScript file and write the code
Step6 : Compile the TypeScript Program
Step7: Execute the TypeScript Program

- In order to install the typescript via npm we can use the below command:
    - npm install typescript -g



```
C:\Users\MOHAMMED IMTIAZ>npm install typescript -g
```



```
C:\Users\MOHAMMED IMTIAZ>tsc -version
Version 5.1.3
```

DAY-4

Agenda

- TypeSrcript Basics
    - Variables
    - DataTypes
- TypeScript OOPS
    - Class
    - Object
    - Constructor
    - Inheritance
    - Access Modifiers
    - Interface
    - Enumeratation
    - Moudles

TypeScript Basics

Variables

- Variable is a named memory location in RAM, to store a value at run time.
    - **Syntax**: var variable : datatype = value;
    - **Example:** var a : number = 100;
- TypeScript supports "optional static typing". That means it is optional to specify datatype
- for the variable in TypeScript.
    - **Static Typing:**
        - If you specify the data type for the variable, it is not possible assign other data type of value into the variable; if you do so, "tsc" compiler will generate coding-time and compile-time errors; but the code will be compiled and executed also, even though it is having errors.

    - **Dynamic Typing:** If you don’t specify the data type for the variable, we can assign any type of value into the variable.
- In TypeScript, we have “optional static typing”. That means it is optional to specify datatype for the variable in TypeScript

Data Types

- **The following are the list of DataTypes in TypeScript:**
    - number : All types of numbers(integer, floating)
    - string : Collection of characters in double quotes or single quotes
    - boolean : true or false
    - any : Any type of value

Object

- Object is the primary concept in OOP (Object Oriented Programming).
- “Object” represents a physical item, that represents a person or a thing.
- Object is a collection of properties (details) and methods (manipulations).
- For example, a student is an "object".
- We can create any no. of objects inside the program.

Property

- Properties are the deails about the object.
- Properties are used to store a value.
- For example, **studentname="Scott"** is a property in the "student object".
- Properties are stored inside the object.
- The value of property can be changed any no. of times

Method

- Methods are the operations / tasks of the object, which manipulates / calculates the data and do some process.
- Method is a function in the object.
- Methods are stored inside the object.

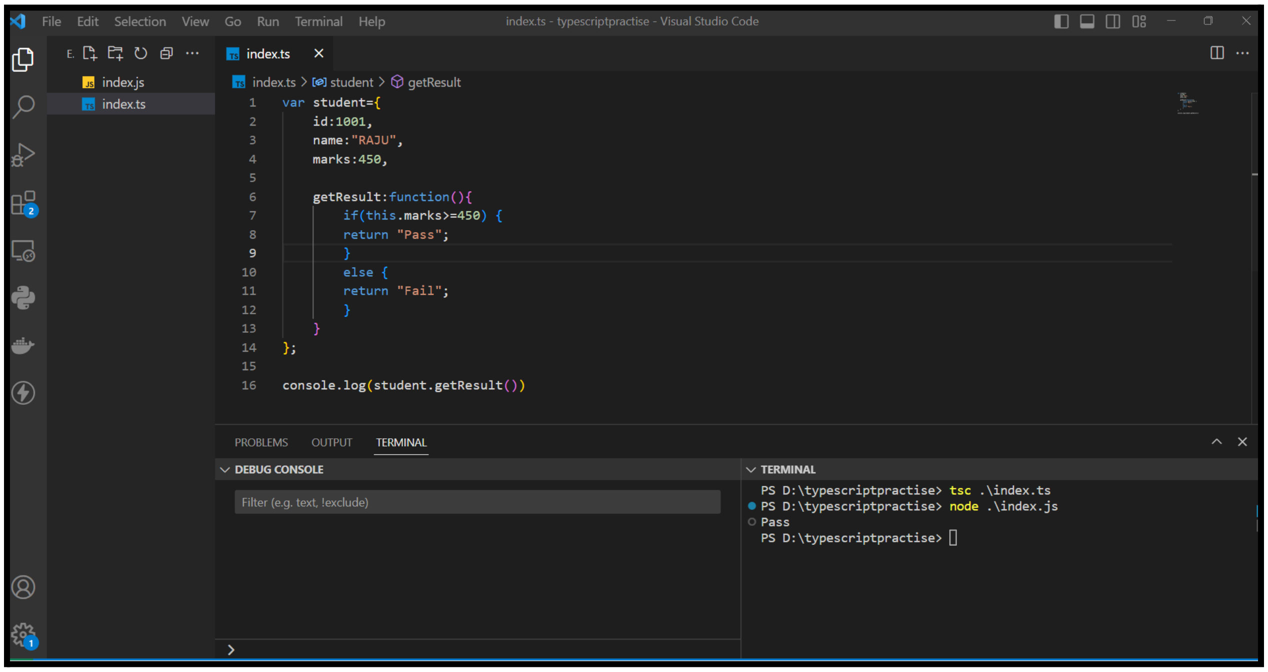
Creating Object in TypeScript

- Object can be created by using "Object Literal Pattern" in TypeScript.
- Object literal" is a collection of properties and methods, that are enclosed within curly braces { }.
- **Syntax** to create Object: { property: value, …, method: function( ) { code here } }

Reference Variable

- The "reference variable" is a variable, that can store the reference of an object.
- We can access all the properties and methods of the object, by using the "reference
- variable".
- Syntax to create Object and store its reference in the "reference variable":
- var referenceVariable = { property: value, …, method: function() { code here } };

Example :



```
var student={
    id:1001,
    name:"RAJU",
    marks:450,

    getResult:function(){
        if(this.marks>=450) {
        return "Pass";
        }
        else {
        return "Fail";
        }
    }
};

console.log(student.getResult())
```

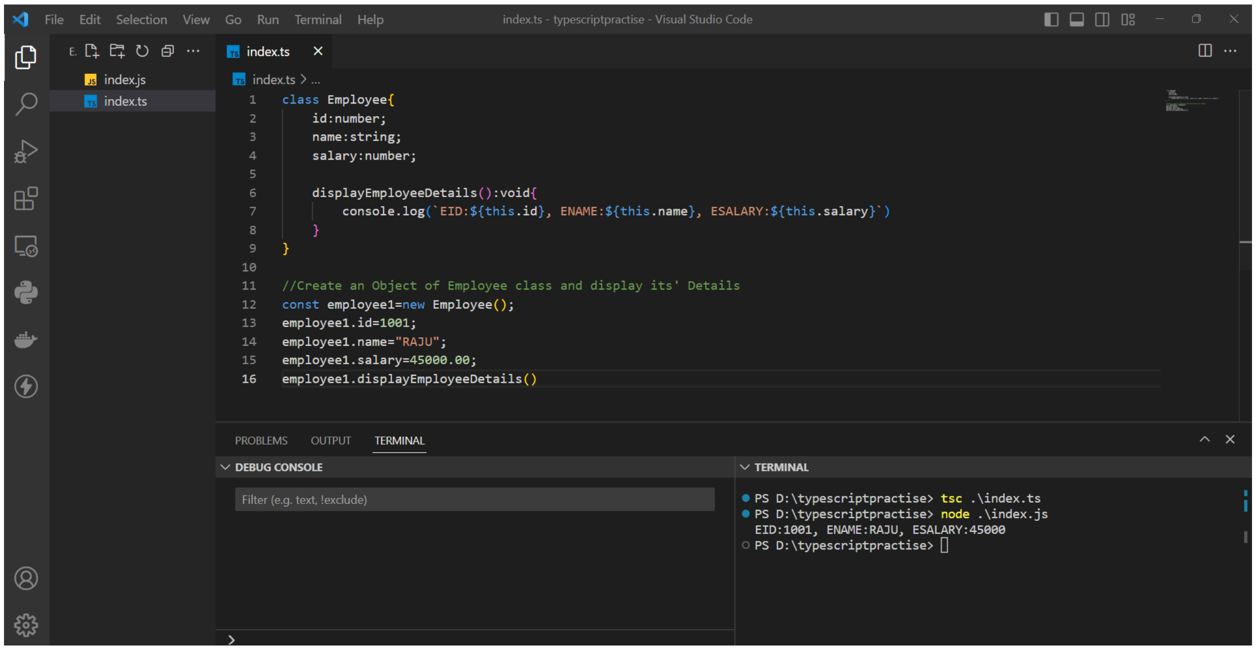
```
PS D:\typescriptpractise> tsc .\index.ts
PS D:\typescriptpractise> node .\index.js
Pass
PS D:\typescriptpractise>
```

Class

- It is represent a model of the object, which defines list of properties and method of the object.
- Example : " Employee " class represents structures(list of properties and methods) of every Employee object.
- We can create any no of objects based on a class by using a "new" keyword.
- All the objects of a class, shares same set of properties and method of the class.
- We can store the reference of the object in "reference variable"; using which you can access the object.
- Syntax:

```
class className{
   //properties
   //methods
}
```

Example:



```
class Employee{
    id:number;
    name:string;
    salary:number;

    displayEmployeeDetails():void{
        console.log(`EID:${this.id}, ENAME:${this.name}, ESALARY:${this.salary}`)
    }
}

//Create an Object of Employee class and display its' Details
const employee1=new Employee();
employee1.id=1001;
employee1.name="RAJU";
employee1.salary=45000.00;
employee1.displayEmployeeDetails()
```

```
PS D:\typescriptpractise> tsc .\index.ts
PS D:\typescriptpractise> node .\index.js
EID:1001, ENAME:RAJU, ESALARY:45000
PS D:\typescriptpractise>
```

===

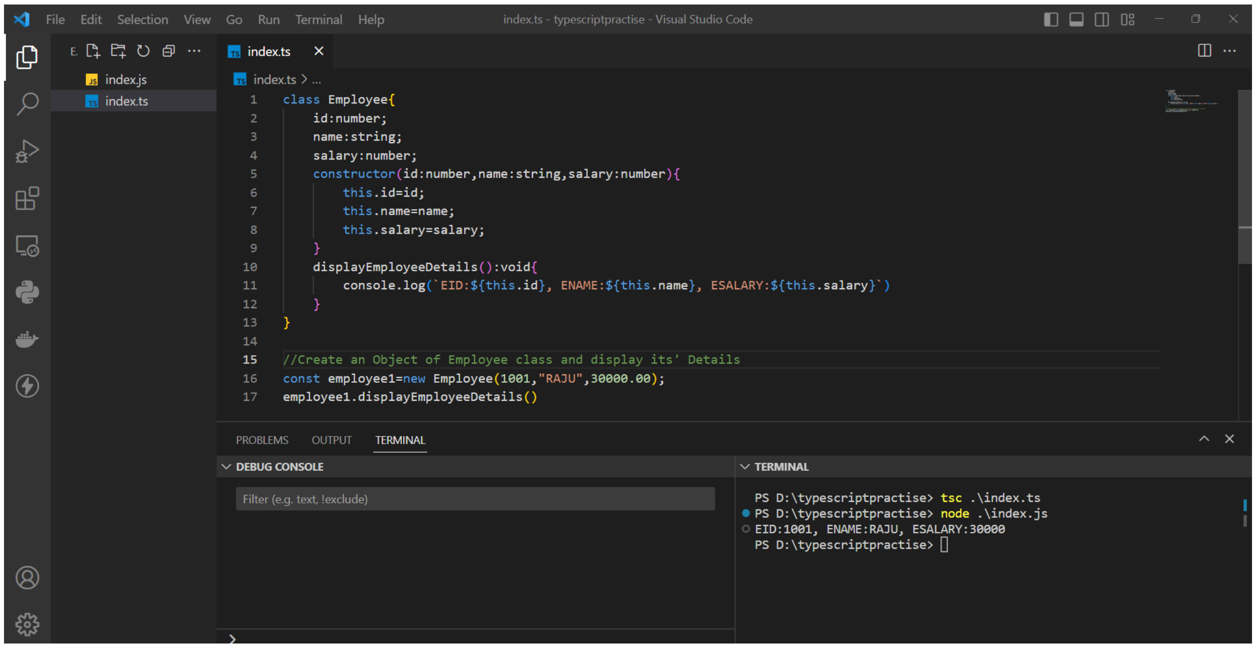
Constructor

- It is a special function which is a part of the class.
- It will invoked automatically when we create an instace of the class.
    - Note : When we create the multiple instance of the particular class every time it will invoke the constructor.
- It is basically used to initialize the properties of the class.
- We use the name as “constructor”.
- Constructor can take any no of arguments but not the return type.
  Note : We can’t define multiple constructor in TypeScript.

Syntax:

```
constructor(arg1:dataType,arg2:dataType,arg3:dataTyp,..){

}
```

Example:



```
class Employee{
    id:number;
    name:string;
    salary:number;
    constructor(id:number,name:string,salary:number){
        this.id=id;
        this.name=name;
        this.salary=salary;
    }
    displayEmployeeDetails():void{
        console.log(`EID:${this.id}, ENAME:${this.name}, ESALARY:${this.salary}`)
    }
}

//Create an Object of Employee class and display its' Details
const employee1=new Employee(1001,"RAJU",30000.00);
employee1.displayEmployeeDetails()
```

```
PS D:\typescriptpractise> tsc .\index.ts
PS D:\typescriptpractise> node .\index.js
EID:1001, ENAME:RAJU, ESALARY:30000
PS D:\typescriptpractise>
```

Inheritance

- Acquiring the properties from parent class to child class is called as Inheritance.
- The main advantage of inheritance is code reusability.

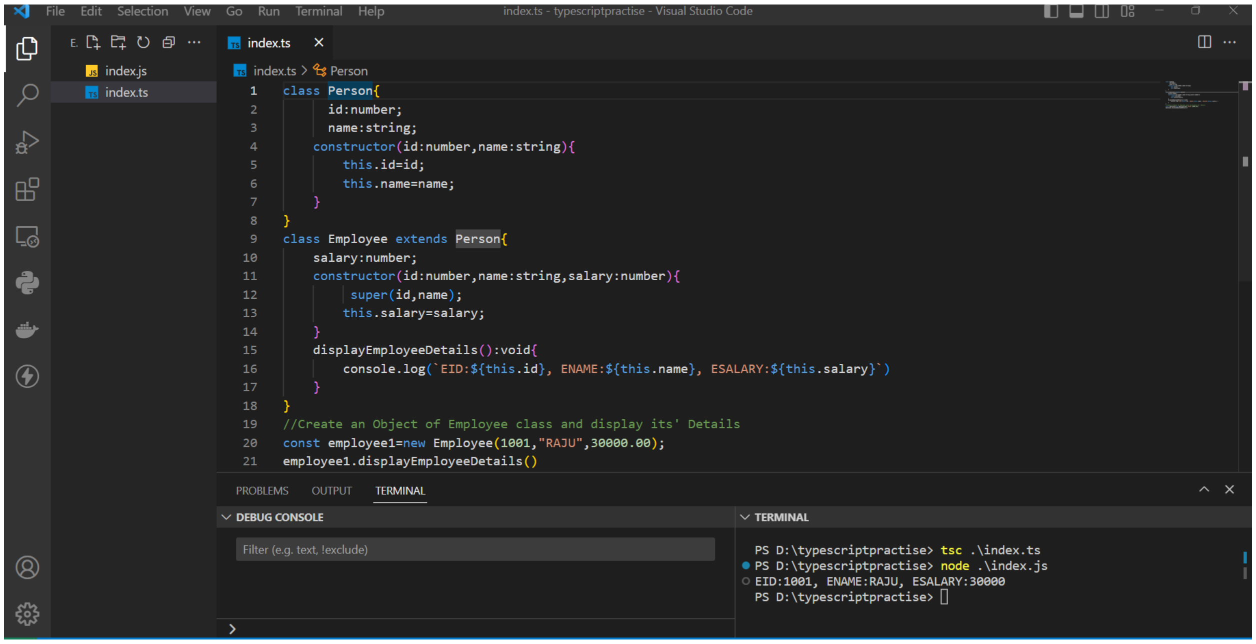
Key Points:

- ☐ The 'extends' keyword is used to create inheritance.
- ☐ The 'super' keyword is basically used to access the members of parent class from child class.
- ☐ When Parent class has a constructor, then child class has to invoke explicitly by using super(..)

- Example : Employee extends Persone , Batsmen extends Player, ICICIBank extends Bank etc…
- Syntax :
  - class parentClass{
      //parent class members
    }

    class childClass extends parentClass{
      // child class members
    }

Example:



```
class Person{
        id:number;
        name:string;
    constructor(id:number,name:string){
        this.id=id;
        this.name=name;
    }
}
class Employee extends Person{
    salary:number;
    constructor(id:number,name:string,salary:number){
         super(id,name);
        this.salary=salary;
    }
    displayEmployeeDetails():void{
        console.log(`EID:${this.id}, ENAME:${this.name}, ESALARY:${this.salary}`)
    }
}
//Create an Object of Employee class and display its' Details
const employee1=new Employee(1001,"RAJU",30000.00);
employee1.displayEmployeeDetails()
```

```
PS D:\typescriptpractise> tsc .\index.ts
PS D:\typescriptpractise> node .\index.js
EID:1001, ENAME:RAJU, ESALARY:30000
PS D:\typescriptpractise>
```

Access Modifiers

- It is used to specify where the member of a class can be accessible. That means it specifies whether the member of a class is accessible outside the class or not.
- Access Modifiers are used to implement "security" in OOP.
- Each member (property / method), we can specify the access modifier separately.
- TypeScript compiler and Visual Studio Code Edtitor shows errors, if a developer try to access the member, which is not accessible.
- "public" is the access modifier for all the members (property / method) in TypeScript class.

  TypeScript supports three access modifiers:

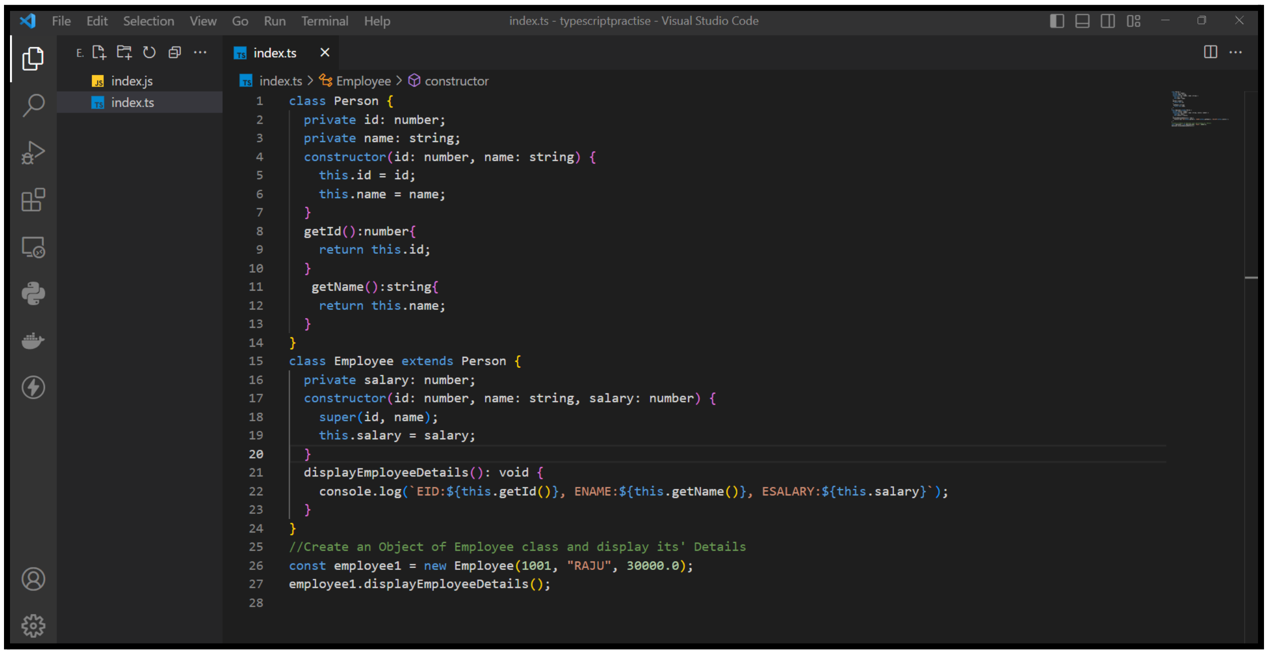
  1. public (default)
  2. private
  3. protected

1. **public**: Public members can be accessed from anywhere, both within the class and outside the class.
2. **private**: Private members can only be accessed within the class in which they are defined. They are not accessible from outside the class or from derived classes.
3. **protected**: Protected members can be accessed within the class and in derived classes. They are not accessible from outside the class.

Syntax:

```
class className{
     accessModifier property:dataType;

     accessModifier methodName(lis_of_args):returnType{

      }

}
```

Example: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index.ts - typescriptpractise - Visual Studio Code
index.js
index.ts
index.ts > Employee > constructor

```typescript
class Person {
  private id: number;
  private name: string;
  constructor(id: number, name: string) {
    this.id = id;
    this.name = name;
  }
  getId():number{
    return this.id;
  }
   getName():string{
    return this.name;
  }
}
class Employee extends Person {
  private salary: number;
  constructor(id: number, name: string, salary: number) {
    super(id, name);
    this.salary = salary;
  }
  displayEmployeeDetails(): void {
    console.log(`EID:${this.getId()}, ENAME:${this.getName()}, ESALARY:${this.salary}`);
  }
}
//Create an Object of Employee class and display its' Details
const employee1 = new Employee(1001, "RAJU", 30000.0);
employee1.displayEmployeeDetails();
```

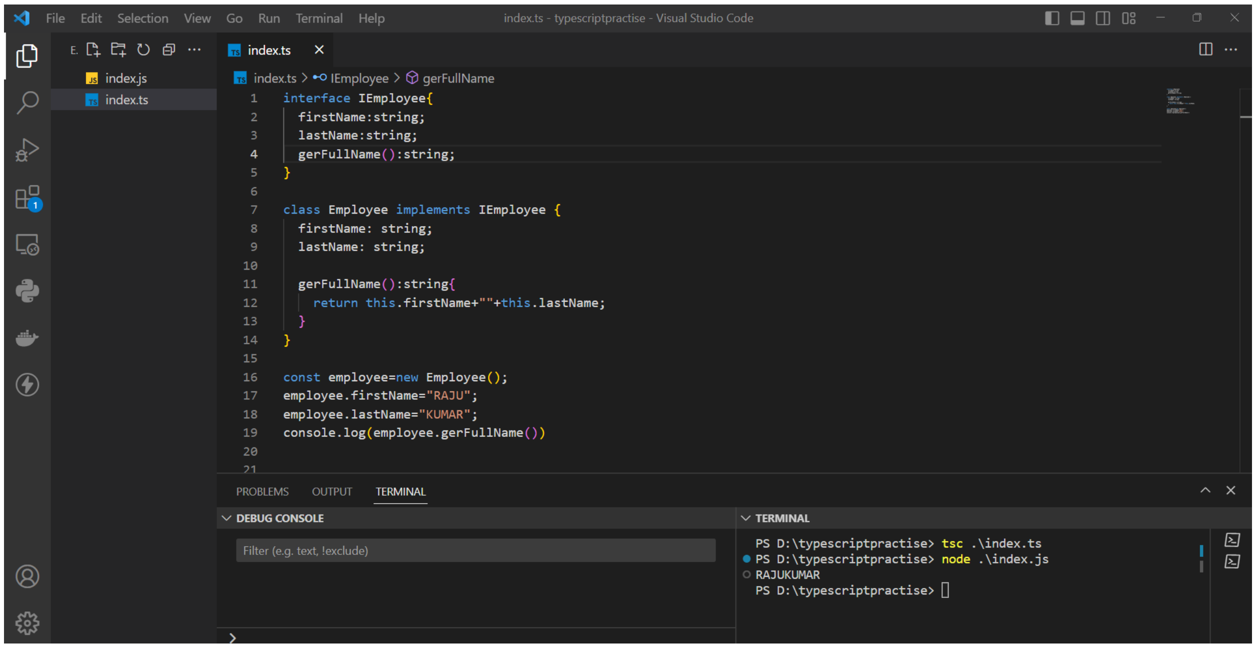
Interfaces

- Interface is the model of a class, which describes the list of properties and methods of a class.
- Interfaces doesn't contain actual code; contains only list of properties and methods.
- Interfaces doesn't contain method implementation (method definition); it contains method declaration only, which defines method access modifier, method name, method arguments and method return type.
- The child class that implements the interface must implement all the methods of the
- interface; if not, compile-time error will be shown at child class. The method name,
- parameters, return type and access modifier must be same in between "interface method (method at the interface)" and "class method (method at the class)".
- Interfaces act as a mediator between two or more developers; one developer implements the interface, other developer creates reference variable for the interface and invokes methods; so interface is common among them.
- The child class can implement the interface with "implements" keyword.
- All the methods of interface is by default, "public".
- One interface can be implemented by multiple classes; One class can implement multiple interfaces.
- We can develop "multiple inheritance" by implementing multiple interfaces at-a-time in the same class.

Syntax:

```
interface interfaceName{
	property:dataType;
	method(list_of_arg):returnType;
}
```

Example :



```
interface IEmployee{
  firstName:string;
  lastName:string;
  gerFullName():string;
}

class Employee implements IEmployee {
  firstName: string;
  lastName: string;

  gerFullName():string{
    return this.firstName+""+this.lastName;
  }
}

const employee=new Employee();
employee.firstName="RAJU";
employee.lastName="KUMAR";
console.log(employee.gerFullName())
```

```
PS D:\typescriptpractise> tsc .\index.ts
PS D:\typescriptpractise> node .\index.js
RAJUKUMAR
PS D:\typescriptpractise>
```

Enumerations:

- Enumeration is a collection of constants.
- Enumeration acts as a data type.
- We can use "enumeration" as a data type for the "enumeration variable" or "enumeration
- property".
- The enumeration variable or enumeration property can store any one of the constants of
- the same enumeration.
- Every constant of enumeration is represented with a number (starts from 0)

#Steps for creating enumeration

Step1: create the enumeration

```
enum enumeartionName{
  constant1,constant2,....;
}
```

Step2: Creating the property of enumeration type

```
class className{
 property:enumerationName;
}
```

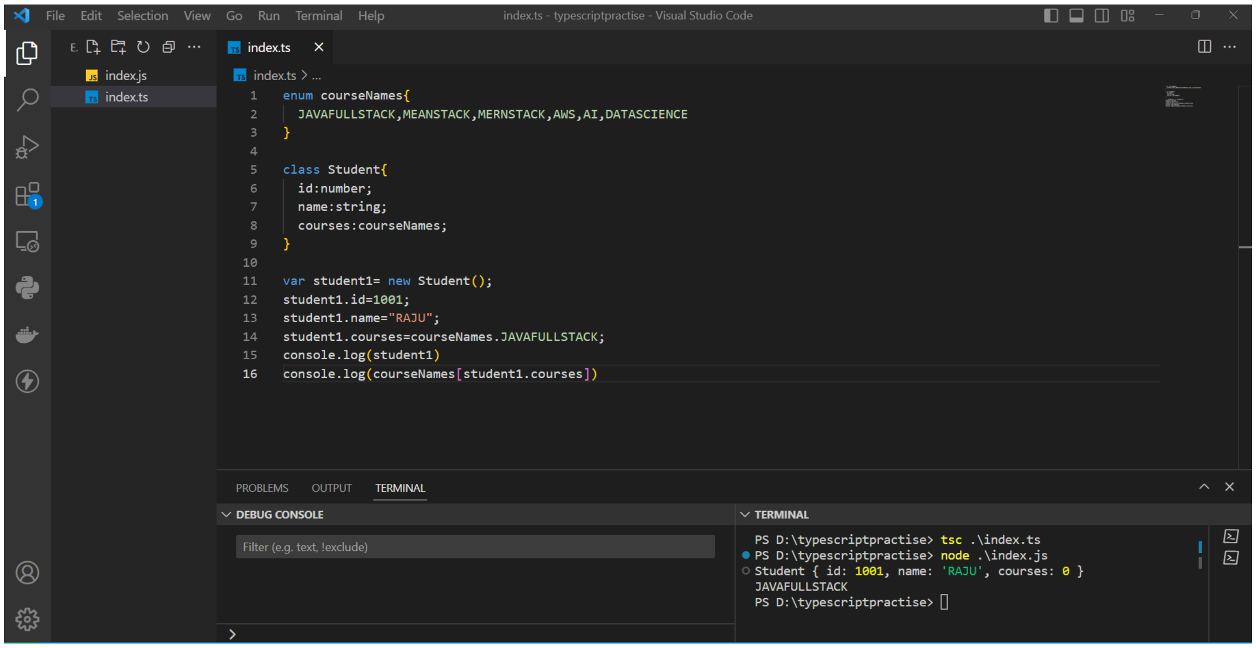
Step3: Create a variable of enumeration type

```
 variableName : enumerationName;
```

Step4: Assign the value into enumeration variable or enumeration property

```
enumerationVariable = enumerationName.constant;
this.enumerationProperty=enuermationName.constant;
```

Example:



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index.ts - typescriptpractise - Visual Studio Code
index.js
index.ts
PROBLEMS OUTPUT TERMINAL
DEBUG CONSOLE
Filter (e.g. text, !exclude)
TERMINAL

```
enum courseNames{
  JAVAFULLSTACK,MEANSTACK,MERNSTACK,AWS,AI,DATASCIENCE
}

class Student{
  id:number;
  name:string;
  courses:courseNames;
}

var student1= new Student();
student1.id=1001;
student1.name="RAJU";
student1.courses=courseNames.JAVAFULLSTACK;
console.log(student1)
console.log(courseNames[student1.courses])
```

```
PS D:\typescriptpractise> tsc .\index.ts
PS D:\typescriptpractise> node .\index.js
Student { id: 1001, name: 'RAJU', courses: 0 }
JAVAFULLSTACK
PS D:\typescriptpractise>
```

Modules:

- In large scale applications, it is recommended to write each class in a separate file.
- To access the class of one file in other file, we need the concept of "Modules".
- Module is a file (typescript file), which can export one or more classes (or interfaces,
- enumerations etc.) to other files; The other files can import classes (or interfaces,
- enumerations etc.), that are exported by the specific file. We can't import the classes (or
- others) that are not exported.
- We can export the class (or others), by using "export" keyword in the source file.
- We can import the class (or others), by using "import" keyword in the destination file.
- To represent:
  - current folder, we use "./".
  - sub folder in current folder, we use "./subfolder".
  - parent folder, we use "../".

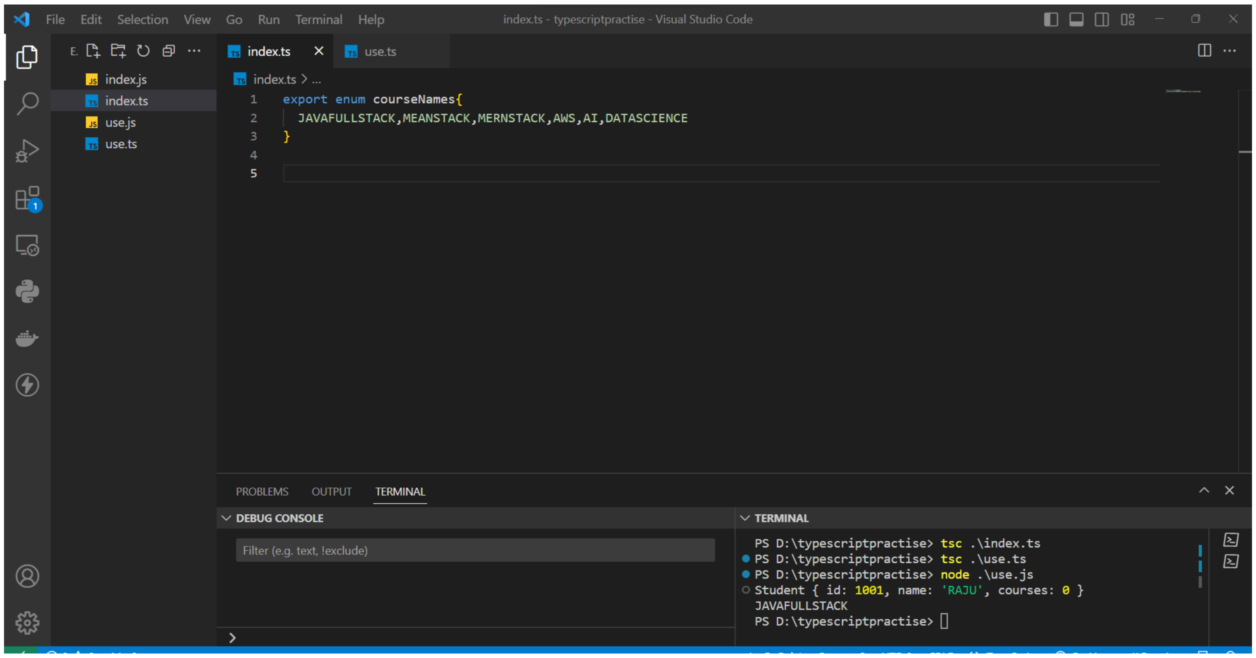
Steps for development of modules

Step1: export a class file1.ts

```
 export class className{
…
}
 import {className} from './file1.ts';
class className{
…
}
```

Example

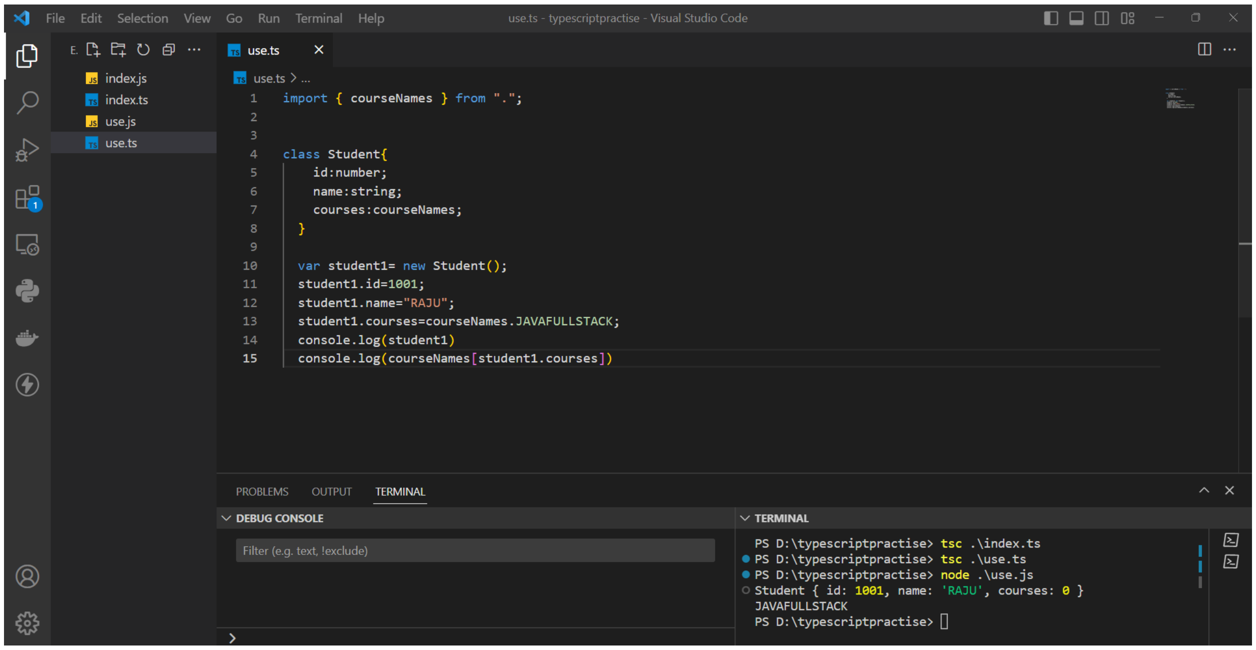
Step1 : index.ts



```
export enum courseNames{
  JAVAFULLSTACK,MEANSTACK,MERNSTACK,AWS,AI,DATASCIENCE
}
```

```
PS D:\typescriptpractise> tsc .\index.ts
PS D:\typescriptpractise> tsc .\use.ts
PS D:\typescriptpractise> node .\use.js
Student { id: 1001, name: 'RAJU', courses: 0 }
JAVAFULLSTACK
PS D:\typescriptpractise>
```

Step2: use.ts



```
import { courseNames } from ".";


class Student{
    id:number;
    name:string;
    courses:courseNames;
  }

  var student1= new Student();
  student1.id=1001;
  student1.name="RAJU";
  student1.courses=courseNames.JAVAFULLSTACK;
  console.log(student1)
  console.log(courseNames[student1.courses])
```

```
PS D:\typescriptpractise> tsc .\index.ts
PS D:\typescriptpractise> tsc .\use.ts
PS D:\typescriptpractise> node .\use.js
Student { id: 1001, name: 'RAJU', courses: 0 }
JAVAFULLSTACK
PS D:\typescriptpractise>
```