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CS325(JOEL02)::R-20::FULL STACK DEVELOPMENT

Lab1:

Create a Node.JS environment with node and npm utilities commands and to check and test the node environment with Node.js Console module.

- **Step1:installation of Node.js environment Node**

1) Download Node.js:

- 1) Visit the official Node.js website using your web browser.
- 2) On the homepage, you'll typically find download links for the latest version of Node.js. If you need a specific version, you might need to visit the "Previous releases" section.
- 3) Choose the appropriate installer for your operating system. Node.js provides installers for various platforms including Windows, macOS, and Linux.

2) Install Node.js:

- 1) Once the installer is downloaded, locate the downloaded file (usually in your "Downloads" folder).

Follow the installation instructions specific to your operating system:

Windows:

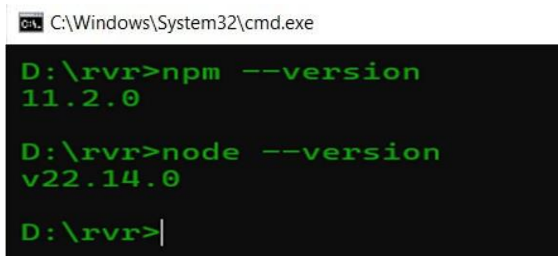
Double-click the downloaded installer file.

Follow the setup wizard instructions. You can generally accept the default settings, but ensure that the "npm package manager" option is selected during installation.

3) Verify Installation:

After installation, open a terminal or command prompt.

Type the following command to verify that Node.js and npm are installed correctly:



```
C:\Windows\System32\cmd.exe
D:\rvr>npm --version
11.2.0
D:\rvr>node --version
v22.14.0
D:\rvr>|
```

These commands will display the versions of Node.js and npm installed on your system. If you see version numbers for both, the installation was successful.

- **Step2:Test through the node REPL shell commands**
 - **Open Terminal/Command Prompt:** Open your terminal or command prompt.
 - **Check Node.js Installation:** Type `node -v` and press Enter to check if Node.js is installed correctly. It should display the version number.
 - **Open Node.js REPL:** Type `node` and press Enter to open the Node.js REPL (Read-Eval-Print Loop).
 - **Test Node.js Commands:** You can now test JavaScript commands directly in the REPL.



```
D:\rvr>node
Welcome to Node.js v22.14.0.
Type ".help" for more information.
> console.log('Hello, Welcome to FSD')
Hello, Welcome to FSD
```

- **Step-3: install prompt-sync module using npm utility.**
 - Install prompt-sync: In your terminal or command prompt,type:

```
D:\rvr>npm install prompt-sync
up to date, audited 4 packages in 11s
found 0 vulnerabilities
```

- **Step-4:Test and check the prompt-sync with console Module Application**

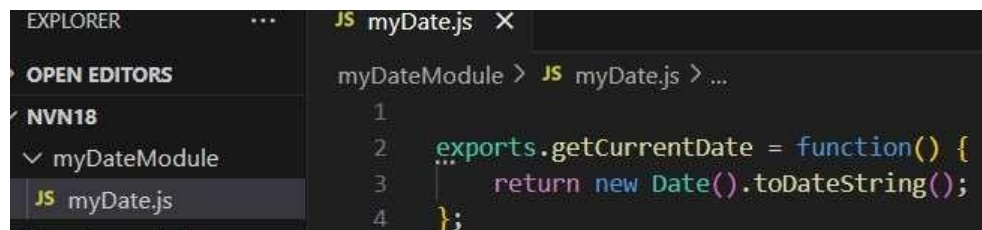
```
JS example_1.js X
JS example_1.js > ...
1  const prompt = require('prompt-sync')();|
2  const name = prompt('Enter the name:');
3  console.log(`Welcome,${name}`);
```

```
D:\rvr>node example_1.js
Enter the name:Ram
Welcome,Ram
```

Lab2:

Create a custom Date module using exports keyword Node module by using npm commands and to determine and display current Node.JS Web server time and date.

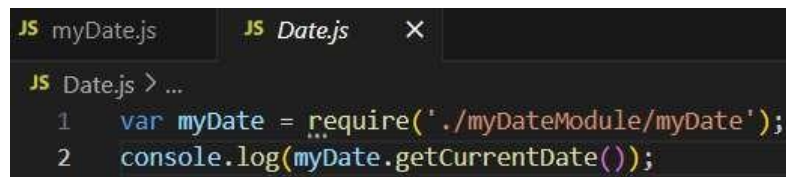
- **Step 1: Create Node Package Module myDate() using node utilities without package.json file**
 - 1) **Create a Directory:** Create a directory where you want to store your custom Node module. You can name it something like myDate Module.
 - 2) **Create myDate.js File:** Inside the directory, create a JavaScript file named myDate.js.
 - 3) **Define the Module:** In my Date.js, define your custom Date module.
 - 4) **Export the Module:** Use the exports keyword to make the get Current Date function accessible outside the module.



```
EXPLORER  ...  JS myDate.js X
OPEN EDITORS
NVN18
  myDateModule
    JS myDate.js
JS myDate.js X
myDateModule > JS myDate.js > ...
1
2   exports.getCurrentDate = function() {
3     ...   return new Date().toLocaleDateString();
4   };
```

```
D:\rvr>cd myDateModule
D:\rvr\myDateModule>node myDate.js
```

- 5) **Using the Module:** Now, you can use this module in other Node.js files by requiring it:



```
JS myDate.js  JS Date.js X
JS Date.js > ...
1   var myDate = require('./myDateModule/myDate');
2   console.log(myDate.getCurrentDate());
```

```
D:\rvr>node Date.js
Sun Mar 23 2025
```

- **Step -2 : Create the Node Package Module myDate()using with package.json file directives like version, name,bin,etc.,**

- Initialize a new npm project with npm init This will create a package.json file.
- In the package.json file,you can specify directives like version,name,bin,etc

```
{
  "name": "mydatemodule",
  "version": "1.0.0",
  "description": "",
  "main": "myDate.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC"
}
```

- **Step-3:Also install created packaged module using npm utility**

1) To install the module locally, you can use npm install <folder>. For example, if your module is in a folder named mydate, you would use npm install ./myDateModule.

```
D:\rvr>npm install ./myDateModule
npm WARN EBADENGINE Unsupported engine {
npm WARN EBADENGINE   package: 'super@0.1.0',
npm WARN EBADENGINE   required: { node: '>= 0.6.0 < 0.7.0' },
npm WARN EBADENGINE   current: { node: 'v20.11.0', npm: '10.2.4' }
npm WARN EBADENGINE }

added 1 package, and audited 8 packages in 2s

found 0 vulnerabilities
```

2) To use the module in your code, you can now use require('myDate Module').

```
JS Date.js X
JS Date.js > ...
1  var myDate = require('myDateModule');
2  console.log(myDate.getCurrentDate());
```

```
D:\rvr>node Date.js
Sun Mar 23 2025
```

Lab3:

Create Node JS Application with Folder structure using npm utilities and develop one application to display “welcome Node JS APP” Greet message

- Step-1:WithVisualStudioCodeAPPFramework(Any other)

- 1) Create a Folder named Welcome and Create the another Folder inside the Welcome named Modules , inside the Modules create the file named Dates.js in Vs Code.



```

OPEN EDITORS
NVN18 [🔍] [🔍] [🔄] [🗑️]
> myDateModule
> node_modules
> programs
▼ Welcome\modules
  JS Dates.js
  {} package-lock.json
  {} package.json

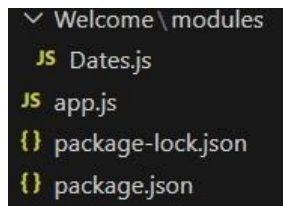
Welcome > modules > JS Dates.js > ...
1  const moment = require('moment');
2  function greet() {
3      return "Hello!NVN";
4  }
5  function getCurrentDate() {
6      return moment().format('MMMM Do YYYY, h:mm:ss a');
7  }
8  module.exports = {
9      greet,
10     getCurrentDate
11 };
  
```

```

D:\rvr\Welcome\modules>node Dates.js

D:\rvr\Welcome\modules>
  
```

- 2) Create the app.js file at Outside the Welcome Folder and run the program using the node .



```

▼ Welcome\modules
  JS Dates.js
  JS app.js
  {} package-lock.json
  {} package.json
  
```



```

JS app.js
JS app.js > ...
1  const moment = require('moment');
2  const myDate = require('./Welcome/modules/Dates');
3
4  console.log("Welcome to Node.js APP");
5  console.log("Greet Message:", myDate.greet());
6  console.log("Current Date:", myDate.getCurrentDate());
7
  
```

```

D:\rvr\Welcome\modules>cd ..

D:\rvr\Welcome>cd ..

D:\rvr>node app.js
Welcome to Node.js APP
Greet Message: Hello!NVN
Current Date: April 11th 2024, 9:09:07 pm
  
```

- **Step-2: Without Visual Studio Code APP Framework**

1) Create a Directory named Welcome and Create the another Directory inside the Welcome named Modules , inside the Modules create the file named Dates.js without Vs Code.

```
D:\rvr>mkdir Welcome
D:\rvr>cd Welcome
D:\rvr\Welcome>mkdir modules
D:\rvr\Welcome>cd modules
D:\rvr\Welcome\modules>
```

```
const moment = require('moment');
function greet() {
    return "Hello!NVN, Let's Code";
}
function getCurrentDate() {
    return moment().format('MMMM Do YYYY, h:mm:ss a');
}
module.exports = {
    greet,
    getCurrentDate
};
```

```
D:\rvr\Welcome\modules>node Dates.js
D:\rvr\Welcome\modules>
```

2) Outside the Welcome Directory Create the app.js File to run the main program:

```
JS app.js
JS app.js > ...
1  const moment = require('moment');
2  const myDate = require('./Welcome/modules/Dates');
3
4  console.log("Welcome to Node.js APP");
5  console.log("Greet Message:", myDate.greet());
6  console.log("Current Date:", myDate.getCurrentDate());
7
```

C:\Windows\System32\cmd.exe

```
D:\rvr\Welcome\modules>cd ..
D:\rvr\Welcome>cd ..
D:\rvr>node app.js
Welcome to Node.js APP
Greet Message: Hello!NVN, Let's Code
Current Date: April 11th 2024, 9:35:07 pm
```

- **Step-3: Also Access the Custom myDate Module.**

- 1) Create a file named myDates.js , where this code exports a function myDates.js that returns current date and time.

```
JS myDates.js X JS apps.js
JS myDates.js > myDates > myDates
1  exports.myDates = function()
2  {
3      return Date();
4  }
```

```
D:\rvr>node myDates.js
```

```
D:\rvr>|
```

- 2) Import the myDates.js using the require in the apps.js file:

```
JS apps.js > ...
1  var dt = require('./myDates.js');
2
3  console.log('welcome to NODEJS');
4  console.log('Current time and Date is:'+dt.myDates());|
```

```
D:\rvr>node apps.js
welcome to NODEJS
Current time and Date is:Thu Apr 11 2024 21:55:11 GMT+0530 (India Standard Time)
```


Lab4:

Create Angular CLI Applications with different component configuration steps using different @Angular ng module utilities at CLI environment.

- Step-1:ClasscomponentAngularapp

- 1) First install the angularjs using the command prompt as show in the below:

```
C:\WINDOWS\system32\cmd.exe  
D:\rvr>npm install -g @angular/cli  
added 273 packages in 2m  
52 packages are looking for funding  
run 'npm fund' for details
```

- 2) Create a new Angular Application named myApp with the following syntax:



```
D:\rvr> ng new myApp
```

- 3) Create a new Component with name of the myComponent:

```
D:\rvr> cd myApp  
D:\rvr\myApp>ng generate component myComponent
```

- Step – 2: Define Inline selector component in Angular HelloWorldapp with root element

- 1) Open my-component.component.ts in your Angular application and by default the selector value will be 'app-component' but change the selector property to 'app-root'. Your my-component.component.ts file should look like this:

```
App > src > app > my-component >  my-component.component.ts >  MyComponent  
1  import { Component } from '@angular/core';  
2  
3  @component({  
4    selector: 'app-root',  
5    standalone: true,  
6    imports: [],  
7    templateUrl: './my-component.component.html',  
8    styleUrls: ['./my-component.component.css']  
9  })  
10 export class MyComponentComponent {  
11  
12 }  
13
```

- **Step – 3: Define Inline template component in Angular HelloWorldapp with HTML elements**

- 1) In my-component.component.ts, change the templateUrl property to template and define your HTML elements inline. Your my-component.component.ts file should look like this:

```
myApp > src > app > my-component > TS my-component.component.ts > MyComponentComponent
1  import { Component } from '@angular/core';
2
3  @Component({
4    selector: 'app-root',
5    standalone: true,
6    imports: [],
7    template: `
8      <h1>HelloWorld! Welcome to Angular</h1>
9      <p>This is an inline template.</p>
10   `,
11    styleUrls: ['./my-component.component.css']
12  })
13  export class MyComponentComponent {}
14
15
```

- **Step – 4: Define Inline Style component in Angular HelloWorldapp to style the color of the message.**

- 1) In my-component.component.ts, change the StyleUrl property to styles and define your CSS elements inline. Your my-component.component.ts file should look like this :

```
myApp > src > app > my-component > TS my-component.component.ts > M
1  import { Component } from '@angular/core';
2
3  @Component({
4    selector: 'app-root',
5    standalone: true,
6    imports: [],
7    template: `
8      <h1>HelloWorld! Welcome to Angular</h1>
9      <p>This is an inline template.</p>
10     <p class="message">This is an inline template.</p>
11   `,
12     styles: [
13       `
14       .message {
15         color: red;
16       }
17     `
18   ],
19   export class MyComponentComponent {
20   }
21
```

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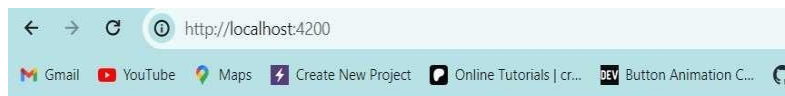
RollNo: Y22CS139

2) Run the application using the following command:

```
D:\rvr\myApp>ng serve
Initial chunk files | Names          | Raw size
polyfills.js       | polyfills      | 83.60 kB |
main.js            | main           | 1.81 kB  |
styles.css         | styles         | 95 bytes |
                   | Initial total  | 85.50 kB

Application bundle generation complete. [8.864 seconds]

Watch mode enabled. Watching for file changes...
  Local:  http://localhost:4200/
  press h + enter to show help
```



HelloWorld! Welcome to Angular

HTML TEMPLATE - This is an inline template.

STYLE TEMPLATE - This is an inline template.

Lab5:

Create Angular CLI Applications using Angular Class component constructors and objects and different variable initialization.

- **Step-1: Create Date Class Constructor with current Date in Class Component**

1) **Create a new Angular project:** you can create a new Angular project by running:

```
D:\rvr>ng new Lab --no-standalone
? Which stylesheet format would you like to use? CSS
? Do you want to enable Server-Side Rendering (SSR) and Static
```

2) **Create a new component:** Navigate into your new project directory and generate a new component. For example, if we want to create a component named date, we would run:

```
D:\rvr>cd Lab

D:\rvr\Lab>ng g c date
CREATE src/app/date/date.component.html (20 bytes)
CREATE src/app/date/date.component.spec.ts (610 bytes)
CREATE src/app/date/date.component.ts (201 bytes)
CREATE src/app/date/date.component.css (0 bytes)
UPDATE src/app/app.module.ts (543 bytes)
```

3) **Update the Component Class:** Open the date.component.ts file and update it as follows:

```
Lab > src > app > date > TS date.component.ts > ...
1  import { Component, OnInit } from '@angular/core';
2
3  @Component({
4    selector: 'app-date',
5    templateUrl: './date.component.html',
6    styleUrls: ['./date.component.css']
7  })
8  export class DateComponent implements OnInit {
9    currentDate: Date;
10
11    constructor() {
12      this.currentDate = new Date();
13    }
14
15    ngOnInit(): void {
16    }
17  }
```

After the updation of this file, print the Current Date in the date.component.html file as follows:

```

Go to component
1 <h1>Mr.NVN, The date works!</h1>
2 <h2>the current Date is {{currentDate}}</h2>

```

At this point, the newly generated component date is completed , to run this application , add the <app-date> selector in the app.component.html

```

TS app.module.ts  app.component.html X
Lab > src > app > app.component.html > ...
Go to component
1 
2 <app-date></app-date>

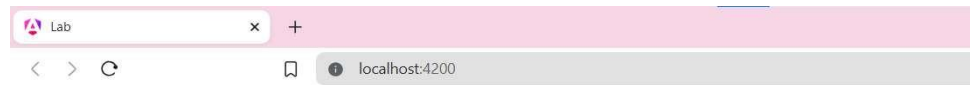
```

4) **Run the Application:** To run the application, use the following command:

```

D:\rvr\Lab>ng serve
Browser bundles
Initial chunk files | Names | Raw size
polyfills.js | polyfills | 83.60 kB |
main.js | main | 3.62 kB |
styles.css | styles | 95 bytes |
| Initial total | 87.31 kB

```



Mr. RAM , The date works!

the current Date is Sun Mar 23 2025 13:51:13 GMT+0530 (India Standard Time)

- **Step – 2: By using Selector ,templateURL and styleURL External component configurations demonstrate the constructor with different objects**

1) **Create a new component:** Navigate into your new project directory and generate a new component. Here we created the userDetails component:

```

D:\rvr\Lab>ng g c users
CREATE src/app/users/users.component.html (21 bytes)
CREATE src/app/users/users.component.spec.ts (617 bytes)
CREATE src/app/users/users.component.ts (205 bytes)
CREATE src/app/users/users.component.css (0 bytes)
UPDATE src/app/app.module.ts (626 bytes)

```

2) Update the component class: update the users.component.ts file, like this:

```
ab > src > app > users > TS users.component.ts > UsersComponent > cons
1  import { Component,OnInit } from '@angular/core';
2
3  @Component({
4    selector: 'app-users',
5    templateUrl: './users.component.html',
6    styleUrls: ['./users.component.css']
7  })
8  export class UsersComponent implements OnInit {
9    user: {name: string, age: number,class: string};
10
11    constructor() {
12      this.user = {
13        name: 'NVN',
14        age: 18,
15        class: 'CSE-C'
16      };
17    }
18
19    ngOnInit(): void {
20    }
21  }
```

3) Create the html file: update the users.component.html file in the users folder.

```
ab > src > app > users > users.component.html > html > body > p
Go to component
1  <!DOCTYPE html>
2  <html lang="en">
3  <head>
4    <meta charset="UTF-8">
5    <meta name="viewport" content="width=device-width, initial-scale=1.0">
6    <title>Document</title>
7  </head>
8  <body>
9    <h1>Users Details</h1>
10   <p>UserName:{{user.name}}</p>
11   <p>Age:{{user.age}}</p>
12   <p>Class:{{user.class}}</p>
13 </body>
14 </html>
15
```

4) Run the Application: Now, To Run the Application , use the following command:



Lab6:

Create Angular CLI Applications using Angular Expressions and Filters to demonstrate the one App.

- Create different AngularExpressions in Class Component
 - Also Specify with Different Angular pipes or filters to demonstrate each filter with Angular expression
- 1) Create the angular application with name of Expr_Filter , with the following command :

```
D:\rvr>ng new Expr_Filter --no-standalone
? Which stylesheet format would you like to use? CSS
? Do you want to enable Server-Side Rendering (SSR) and
```

- 2) Create the new component for the Expr_Filter Application with name of Expression , with the following command :

```
D:\rvr>cd Expr_Filter

D:\rvr\Expr_Filter>ng generate component Expression
CREATE src/app/expression/expression.component.html (26 bytes)
CREATE src/app/expression/expression.component.spec.ts (652 bytes)
CREATE src/app/expression/expression.component.ts (225 bytes)
CREATE src/app/expression/expression.component.css (0 bytes)
UPDATE src/app/app.module.ts (567 bytes)
```

- 3) Write the expression and filters code in the expression.component.ts and bind those values in the express.component.html files , the code follows as:

```
xpr_Filter > src > app > expression > TS expression.component.ts > ExpressionComponent
1  import { Component ,OnInit} from '@angular/core';
2
3  @Component({
4    selector: 'app-expression',
5    templateUrl: './expression.component.html',
6    styleUrls: ['./expression.component.css']
7  })
8  export class ExpressionComponent implements OnInit {
9    user: {name: string, age: number,class: string};
10    title:string;
11    currency:number;
12    date:Date;
13    constructor() {
14      this.user = {
15        name: 'NVN',
16        age: 18,
17        class: 'CSE-C'
18      };
19      this.title='Expression and Filters';
20      this.currency = 106106;
21      this.date = new Date();
22    }
23    ngOnInit(): void {
24      throw new Error('Method not implemented.');
```

3) To execute the pipes , write the following code in the expression.component.html in the following way:

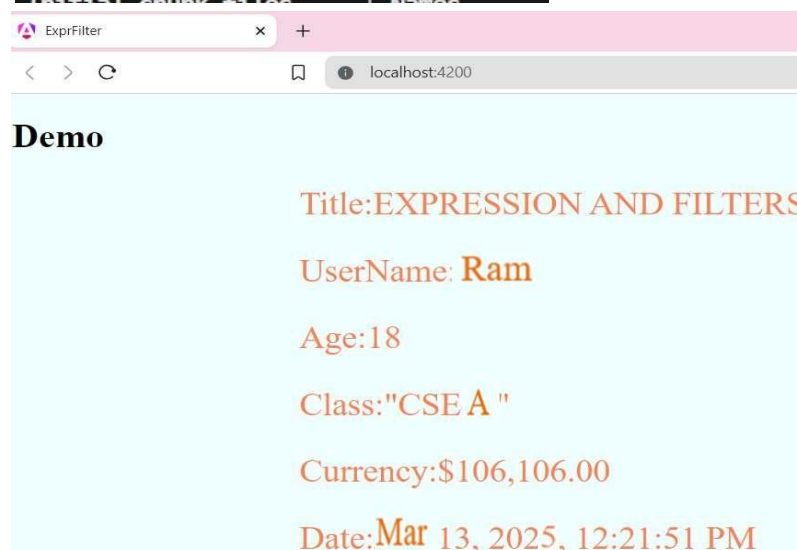
```
Go to component
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Document</title>
</head>
<body>
  <p>Title:{{title|uppercase}}</p>
  <p>UserName:{{user.name | lowercase}}</p>
  <p>Age:{{user.age | number}}</p>
  <p>Class:{{user.class | json}}</p>
  <p>Currency:{{currency|currency}}</p>
  <p>Date:{{date|date:"medium"}}</p>
</body>
</html>
```

4) Before that link the expression.component.html file to app.component.html main file , in the following way:

```
<> app.component.html • TS expression.compone
Expr_Filter > src > app > <> app.component.html > ...
Go to component
1 |
2 | <app-expression></app-expression>
```

5) Execute the angular application, with the following command:

```
D:\rvr>cd Expr_Filter
D:\rvr\Expr_Filter>ng serve
Browser bundles
Initial chunk files
```



Lab7:

Create Angular CLI Applications using Data Binding demonstrate each binding type with form elements.

- Interpolation Binding.
- Style Binding
- Class Binding.
- Two-way binding.

1) Create the angular application with name binding,in the following way:

```
D:\rvr>ng new binding --no-standalone
? Which stylesheet format would you like to use? CSS
? Do you want to enable Server-Side Rendering (SSR) and Stat
```

2) In the app.component.ts file make the following changes to do the binding process:

```
import { Component } from '@angular/core';

@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})
export class AppComponent {
  title = 'Interpolation||
  Style Binding||
  Class Binding||
  Two-Way Binding';
  color='blue';
  isSpecial: boolean = true;
  inputValue='';
}
```

3) All the binding modules will work, except the Two-Way binding , so make the changes in the app.module.ts file.

In the app.module.ts file , import the Forms Module in that file , in the following way:

```
import { NgModule } from '@angular/core';
import { BrowserModule, provideClientHydration } from '@angular/platform-browser';
import { FormsModule } from '@angular/forms';

import { AppRoutingModule } from './app-routing.module';
import { AppComponent } from './app.component';

@NgModule({
  declarations: [
    AppComponent
  ],
  imports: [
    BrowserModule,
    AppRoutingModule,
    FormsModule
  ],
  providers: [
    provideClientHydration()
  ],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

- 4) In the app.component.html , write the following code to binding the elements into webpage:

```
app.component.html X # app.component.css TS app.component.ts TS app.module.ts
inding > src > app > <> app.component.html > html > body
Go to component
1 <!DOCTYPE html>
2 <html lang="en">
3 <head>
4   <meta charset="UTF-8">
5   <meta name="viewport" content="width=device-width, initial-scale=1.0">
6   <title>Document</title>
7 </head>
8 <body>
9   <div id="interpolation">
10    <!--Interpolation Binding-->
11    <h2>This is the Interpolation</h2>
12    <h1>{{title}}</h1>
13  </div>
14
15  <div id="style">
16    <!--Style Binding-->
17    <h3>This is the Style Binding</h3>
18    <p [style.color]="color">This the style binding</p>
19  </div>
20
21  <div id="class">
22    <!--Class Binding-->
23    <h3>This is the Class Binding</h3>
24    <p [class.special]="isSpecial">This is a paragraph with the Class Binding</p>
25  </div>
26  <div id="two-way">
27    <!--Two-Way Binding-->
28    <h3>This is the Two-Way Binding</h3>
29    <input [(ngModel)]="inputValue" placeholder="Enter text">
30    <p>Your input: {{ inputValue }}</p>
31  </div>
32 </body>
33 </html>
```

- 5) To Run the Application do the following:

```
D:\rvr>cd binding
D:\rvr\binding>ng serve
Browser bundles
Initial chunk files | Names
polyfills.js       | polyfills
main.js            | main
```

Binding

✕

+

<

>

↻

🔖

localhost:4200

This is the Interpolation

Interpolation|| Style Binding|| Class Binding|| Two-Way Binding

This is the Style Binding

This the style binding

This is the Class Binding

This is a paragraph with the Class Binding

This is the Two-Way Binding

Your input: NVN

Lab8:

Create Node.js Application using URL module to decompose URL Components with

urlStr =

'http://user:pass@host.com:80/resource/path?query=string#ha'

- Resolving the URL Components with url.parse() and url.format() methods
- Also to Resolving the URL using url.resolve();

- 1) **Create a New Node.js Project:** Open your terminal and create a new directory for your project. Then navigate into that directory and initialize a new Node.js project by running:

```
D:\>cd nv18
D:\rvr>mkdir URL
D:\rvr>cd URL
D:\rvr\URL>npm init -y
```

- 2) **Install Required Dependencies:** Since we'll be using built-in Node.js modules, there are no external dependencies to install.

```
D:\rvr\URL>npm install url
added 17 packages, and audited 18 packages in 4s
11 packages are looking for funding
  run `npm fund` for details
found 0 vulnerabilities
```

- 3) **Create the Node.js Script:** Create a new JavaScript file, named **url.js** such as app.js, in your project directory. This file will contain the code to decompose and resolve URLs.

Write the code in the following ways:

```
const url = require('url');
const urlStr = 'http://user:pass@host.com:80/resource/path?query=string#ha';
const parsedUrl = url.parse(urlStr);

console.log('Decomposed URL Components:');
console.log('Protocol:', parsedUrl.protocol);
console.log('Username:', parsedUrl.auth.split(':')[0]);
console.log('Password:', parsedUrl.auth.split(':')[1]);
console.log('Host:', parsedUrl.host);
console.log('Port:', parsedUrl.port);
console.log('Path:', parsedUrl.pathname);
console.log('Query:', parsedUrl.query);
console.log('Hash:', parsedUrl.hash);
console.log('-----');
const resolvedUrl = url.format(parsedUrl);
console.log('Resolved URL:');
console.log(resolvedUrl);
console.log('-----');
const resolvedPath = url.resolve('http://example.com/', '/resource');
console.log('Resolved Path:');
console.log(resolvedPath);
```

4) **Run the Application:** Run the url.js application, in the following way:

```
D:\rvr\URL>node url.js
Decomposed URL Components:
Protocol: http:
Username: user
Password: pass
Host: host.com:80
Port: 80
Path: /resource/path
Query: query=string
Hash: #ha
-----
Resolved URL:
http://user:pass@host.com:80/resource/path?query=string#ha
-----
Resolved Path:
http://example.com/resource
```

Lab9:

Implementing Http Server and Http Client using http node.js module and demonstrate the Http Client/server Application.

- Create HttpStaticserver files data using static files.
- Define HttpRequest/HttpResponse objects.
 - 1) **Create the necessary files:** Create a new directory for your project and create the http_server.js and http_client.js files. Also, create a public directory and place server.html file in it. You can put some basic HTML content in server.html.

```
D:\rvr>mkdir HTTP
```

```
D:\rvr>cd HTTP
```

```
D:\rvr\HTTP>mkdir public
```

```
D:\rvr\HTTP>cd public
```

```
D:\rvr\HTTP\public>cd ..
```

- 2) Create the http_server.js files and http_client.js files and write the following code Mentioned below and at the same time create the server.html
- 3) **Run the server:** Open a terminal, navigate to your project directory, and run node http_server.js. You should see the message 'Server is listening on port 3000'.
- 4) **Test the server:** Open a web browser and go to http://localhost:3000. You should see the content of your index.html file.
- 5) **Run the client:** In a new terminal window (ortab), navigate to your project directory and run node http_client.js. You should see the content of your server.html file printed in the terminal. This is the response from the server.

http_server.js:

```
JS url.js JS http_client.js JS http_server.js • server.html
HTTP > JS http_server.js > ...
1  const http = require('http');
2  const fs = require('fs');
3  const path = require('path');
4
5  const server = http.createServer((req, res) => {
6    // Serve static files
7    const filePath = path.join(__dirname, 'public', req.url === '/' ? 'server.html' : req.url);
8    const contentType = getContentType(filePath);
9    // Check if file exists
10   fs.readFile(filePath, (err, content) => {
11     if (err) {
12       if (err.code === 'ENOENT') {
13         res.writeHead(404, { 'Content-Type': 'text/html' });
14         res.end('<h1>404 Not Found</h1>');
15       } else {
16         res.writeHead(500); (parameter) err: NodeJS.ErrnoException
17         res.end('Server Error: ${err.code}');
18       }
19     } else {
20       res.writeHead(200, { 'Content-Type': contentType });
21       res.end(content, 'utf8');
22     }
23   });
24 });
25 const PORT = process.env.PORT || 3000;
26
27 server.listen(PORT, () => console.log(`Server running on port ${PORT}`));
28 // Function to determine content type based on file extension
29 function getContentType(filePath) {
30   let extname = path.extname(filePath);
31   switch (extname) {
32     case '.html':
33       return 'text/html';
34     case '.js':
35       return 'text/javascript';
36     case '.css':
37       return 'text/css';
38     case '.json':
39       return 'application/json';
40     case '.png':
41       return 'image/png';
42     case '.jpg':
43       return 'image/jpg';
44     default:
45       return 'text/plain';
46   }
47 }
```

http_client.js:

```
url.js JS http_client.js X JS http_server.js <> s
HTTP > JS http_client.js > ...
1  const http = require('http');
2  const options = {
3    hostname: 'localhost',
4    port: 3000,
5    path: '/',
6    method: 'GET'
7  };
8  const req = http.request(options, (res) => {
9    let data = '';
10   res.on('data', (chunk) => {
11     data += chunk;
12   });
13   res.on('end', () => {
14     console.log('Response:', data);
15   });
16 });
17 req.on('error', (error) => {
18   console.error('Error:', error);
19 });
20 req.end();
```

Server.html:

```
HTTP > public > <> server.html > html
1  <!DOCTYPE html>
2  <html lang="en">
3  <head>
4    <meta charset="UTF-8">
5    <meta name="viewport" content="width=device-width, initial-scale=1.0">
6    <title>Document</title>
7  </head>
8  <body>
9    <p>This is the port running</p>
10 </body>
11 </html>
```


NAME: ORUGANTI MONIK PAPARAO

RollNo: Y22CS139

C:\WINDOWS\system32\cmd.exe - node http_server.js

```
D:\rvr\HTTP>node http_server.js
Server running on port 3000
```



THis is the port running

Select C:\WINDOWS\system32\cmd.exe

```
D:\rvr\HTTP>node http_client.js
Response: <!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Document</title>
</head>
<body>
  <p>THis is the port running</p>
</body>
</html>
```

Lab10.

Create Simple Arithmetic Operations Form with different form input elements N1 and N2 text components and ADD button component.

- Provide Express Server with listen port:3000
- Use Express. use route and URL Pattern '/add'
- Provide different routing configurations either POST or GET

- 1) Create the directory ADD and inside the directory create the node application with name of add.js .

```
D:\rvr>mkdir ADD
```

```
D:\rvr>cd ADD
```

```
D:\rvr>npm install express
```

```
added 64 packages, and audited 67 packages in 5s
```

```
12 packages are looking for funding  
run `npm fund` for details
```

```
found 0 vulnerabilities
```

- 2) We import Express and the body-parser middleware for parsing form data.
- 3) We create an instance of the Express application.
- 4) We set the port to 3000.
- 5) We use body Parser. urlencoded() middleware to parse URL-encoded form data.
- 6) We define a route for serving the HTML form(/), which contains two input fields for numbers (N1 and N2) and a submit button (ADD).
- 7) We define a route for handling POST requests to /add. When the form is submitted, this route extracts the numbers from the form data, adds them together, and sends the result as a response.
- 8) We optionally define a route for handling GET requests to /add. This route is similar to the POST route but expects the numbers to be passed as query parameters instead of form data.
- 9) We start the server and listen on port 3000.
- 10) The code will be followed as:

```
ADD > JS add.js > ...
1  const express = require('express');
2  const bodyParser = require('body-parser');
3  const app = express();
4  const PORT = 3200;
5  app.use(bodyParser.urlencoded({ extended: true }));
6  app.get('/', (req, res) => {
7    res.send(`
8      <form action="/add" method="POST">
9        <label for="n1">Enter number 1:</label>
10       <input type="text" id="n1" name="n1"><br>
11       <label for="n2">Enter number 2:</label>
12       <input type="text" id="n2" name="n2"><br>
13       <button type="submit">ADD</button>
14     </form>
15   `);
16 });
17 app.post('/add', (req, res) => {
18   const n1 = parseFloat(req.body.n1);
19   const n2 = parseFloat(req.body.n2);
20   const result = n1 + n2;
21   res.send(`The result of adding ${n1} and ${n2} is ${result}`);
22 });
23 app.listen(PORT, () => {
24   console.log(`Server is running on http://localhost:${PORT}`);
25 });
```

```
D:\rvr\ADD>node add.js
Server is running on http://localhost:3200
```

The image shows two screenshots of a web browser. The top screenshot shows the initial form at localhost:3200. It has two text input fields labeled 'Enter number 1:' and 'Enter number 2:'. The first field contains the number '20' and the second field contains '30'. Below these fields is a button labeled 'ADD'. The bottom screenshot shows the result page at localhost:3200/add. It displays the text 'The result of adding 20 and 30 is 50'.

The result of adding 20 and 30 is 50

Lab11:

Create Simple Login form Page Application using Express JSModule:

- Provide ExpressServer with listen port:4000 with URLPattern '/login'
- Display the login form with username, password, and submit button on the screen.
- Users can input the values on the form.
- Validate the username and password entered by the user.
- Display InvalidLogin Credentials message when the login fails.
- Show a success message when login is successful.

- 1) Create the directory named LOGIN and inside the directory create the file named login.js

```
D:\rvr>mkdir LOGIN
```

```
D:\rvr>cd LOGIN
```

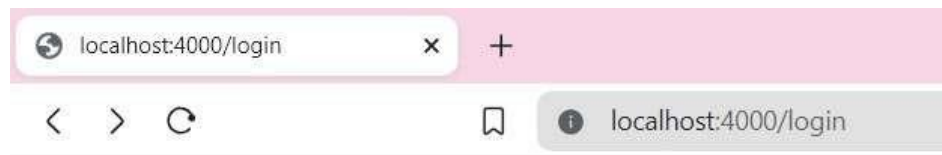
```
D:\rvr>npm install express
added 64 packages, and audited 67 packages in 5s
12 packages are looking for funding
  run `npm fund` for details
found 0 vulnerabilities
```

- 2) We import Express and the body-parser middleware for parsing form data.
- 3) We create an instance of the Express application.
- 4) We set the port to 4000.
- 5) We use bodyParser.urlencoded() middleware to parse URL-encoded form data.
- 6) We define a route for serving the login form(/login). This route displays a form with input fields for username and password, along with a submit button.
- 7) We define a route for handling POST requests to /login. This route receives the submitted form data, validates the username and password, and sends an appropriate response:
- 8) If both username and password are provided and match the expected values (in this case, 'admin' and 'password'), it sends a success message.
- 9) If either username or password is missing, it sends a message prompting the user to enter both.
- 10) If the provided username or password is incorrect, it sends an error message indicating invalid credentials.
- 11) We start the server and listen on port 4000.
- 12) The code follows as:

Login.js:

```
LOGIN > JS login.js > ...
1  const express = require('express');
2  const bodyParser = require('body-parser');
3  const app = express();
4  const PORT = 4000;
5  app.use(bodyParser.urlencoded({ extended: true }));
6  app.get('/login', (req, res) => {
7      res.send(`
8          <h1>Login</h1>
9          <form action="/login" method="POST">
10             <label for="username">Username:</label>
11             <input type="text" id="username" name="username"><br>
12             <label for="password">Password:</label>
13             <input type="password" id="password" name="password"><br>
14             <button type="submit">Login</button>
15         </form>
16     `);
17 });
18 app.post('/login', (req, res) => {
19     const { username, password } = req.body;
20     if (username && password) {
21         if (username === 'nvn' && password === 'emma') {
22             res.send('<h1>Login Successful!</h1>');
23         } else {
24             res.send('<h1>Invalid Login Credentials</h1>');
25         }
26     } else {
27         res.send('<h1>Please enter both username and password</h1>');
28     }
29 });
30 app.listen(PORT, () => {
31     console.log(`Server is running on http://localhost:${PORT}`);
32 });
```

```
D:\rvr\LOGIN>node login.js
Server is running on http://localhost:4000
```



Login

Username:

Password:



Login Successful!

Lab12:

Create Simple MongoDB Server with mongod configuration data and also manage Mongoshell using mongosh :

- Create simple student document Database
- Insert one student record in mongosh
- Update and delete one document in mongosh
- Also to perform connection from MongoDB to node.js driver connection string

Step 1: Install MongoDB First, you need to install MongoDB on your machine. You can download it from the official MongoDB website. After downloading, follow the instructions to install it.

Step 2: Start MongoDB Server You can start the MongoDB server by running the mongod command in your terminal. This will start the MongoDB server on the default port 27017.

```
C:\Users\DELL>mongod
{"t":{"$date":"2024-04-16T19:06:30.084+05:30"},"s":"I",
  "d wire specification","attr":{"spec":{"incomingExternalCl
lClient":{"minWireVersion":0,"maxWireVersion":21},"outgoi
:true}}}
```

Step-3: Connect to MongoDB Server using Mongoshell Open a new terminal window and connect to the MongoDB server using the mongo command. This will start the MongoDB shell (mongosh).

```
C:\Users\DELL>mongosh
Current Mongosh Log ID: 661e7f4e6dcde486d7117b7a
Connecting to:      mongodb://127.0.0.1:27017/?directConnectio
.2.4
Using MongoDB:      7.0.8
Using Mongosh:      2.2.4

For mongosh info see: https://docs.mongodb.com/mongoshell/

-----
  The server generated these startup warnings when booting
  2024-04-16T18:47:26.981+05:30: Access control is not enabled fo
figuration is unrestricted
-----
test>
```

Step – 4: Create the DataBase named the Student in the mongosh shell using the following command. Before creating the database first establish the connection with the MongoDB shell and place the localhost address in the mongoshell .

```
Please enter a MongoDB connection string (Default: mongodb://localhost/): mongodb://localhost:27017
mongodb://localhost:27017
Current Mongosh Log ID: 661e7bd148573ec585117b7a
Connecting to:      mongodb://localhost:27017/?directConnection=true&serverSelectionTimeoutMS=2000&
2.2.4
Using MongoDB:      7.0.8
Using Mongosh:      2.2.4

For mongosh info see: https://docs.mongodb.com/mongosh-shell/

-----
The server generated these startup warnings when booting
2024-04-16T18:47:26.981+05:30: Access control is not enabled for the database. Read and write access
figuration is unrestricted
-----
```

```
neeraj> use Student
switched to db Student
Student>
```

Step-5: Insert the values into the documents under the database named Student:

```
Student> db.details.insertOne({name:"neeraj",age:"18"})
{
  acknowledged: true,
  insertedId: ObjectId('661e838748573ec585117b7c')
}
```

```
Student> db.details.insertMany([
... {
...   name:"Tayyab",
...   age:19
... },
... {
...   name:"Roshan",
...   age:19
... },
... {
...   name:"Sathish",
...   age:19
... }
... ]);
{
  acknowledged: true,
  insertedIds: {
    '0': ObjectId('661e850048573ec585117b80'),
    '1': ObjectId('661e850048573ec585117b81'),
    '2': ObjectId('661e850048573ec585117b82')
  }
}
```


Step-6 : Update the values in the documents named details under the database Student.

```
Student> db.details.updateOne({name:"neeraj"},{$set:{age:20}})
{
  acknowledged: true,
  insertedId: null,
  matchedCount: 1,
  modifiedCount: 1,
  upsertedCount: 0
}
```

Step-7:Delete the any values in the details in the Database named Student:

```
Student> db.details.deleteOne({name:"neeraj"})
{ acknowledged: true, deletedCount: 1 }
Student> _
```

Step – 8: Connect the MongoDB server to Nodejs Application, first you need to install the mongodb in the nodejs using the npm

```
D:\nvn18>npm install mongodb
added 12 packages, and audited 82 packages in 13s

12 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
```

```
D:\nvn18>npm install mongoose
added 8 packages, and audited 90 packages in 6s

13 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
```

You can use the MongoClient object to connect to your MongoDB server:

- 1) Create the mongoo.js application and write the following code
- 2) Make sure that the mongoserver is running and make the connections
- 3) Print all the values in the database.

```
const { MongoClient } = require("mongodb");
const url = "mongodb://localhost:27017";
const client = new MongoClient(url);
async function main() {
  try {
    await client.connect();
    console.log("Connected");
  } catch (err) {
    console.log(err);
  } finally {
    await client.close();
  }
}
main();
```

OUTPUT:

C:\Users\rvr>node app.js
Connected

Insert the data using MongoClient object:

```
const { MongoClient } = require("mongodb");
async function main() {
  const url = 'mongodb://localhost:27017';
  const client = new MongoClient(url);
  try {
    await client.connect();
    console.log("Connected to MongoDB");
    const database = client.db("RVRDB");
    const collection = database.collection("Student");
    const document = [
      { name: "John Doe", age: 22, Ename: "ENG2021001" },
      { name: "Alice Smith", age: 21, Ename: "ENG2021002" },
      { name: "Michael Brown", age: 23, Ename: "ENG2021003" }
    ];
    const result = await collection.insertMany(document);
    console.log("Inserted documents:", result.insertedCount);
  } catch (err) {
    console.error("Error:", err);
  } finally {
    await client.close();
  }
}
```

OUTPUT:

C:\Users\rvr>node app.js
Connected to MongoDB
Inserted documents: 3