Angular-9

Syllabus:

- Components
- Services
- Directives
- Pipes
- Lifecycle hooks
- Communication between components
- Unit-test cases
- Integration
- Interceptors
- Forms
- Angular Material
- Behaviour subject
- Single Page Application
- Lazy loading
- Crud Operations
- Mini Project

Commands

- Create the angular application

  Ng s -o

- Switch to project

  Cd <project-name>

- Run the server file

  Node <server-file.js>

- Create the component

  ng g c components/childone --skipTests -is --selector=childone --flat true

- Create the service

- Create the Directory

  ng g d <directory-name> --skipTests

- Create the pipe

  ng g p <pipe-name> --skipTests

- Download the node modules

  yarn add express mssql body-parser cors jwt-simple –save

- **Download the Bootstrap**

  Yarn add bootstrap --save

I.Introduction

Environmental Setup for Angular9

1) download and install NodeJS

- To install "Angular9" we need "npm".
- "npm" stands for node packaging manager.
- "npm" is the tool present in "NodeJS".

Website : https://nodejs.org/en/download/

file : node-v12.16.1-x64.msi

2) install yarn tool

- "yarn" tool given by facebook.
- "yarn" tool used to download the libraries from GitHub.
- we will install yarn tool by using following command.

> npm install -g yarn@latest

where "-g" stands for global installation.

3) install Angular9

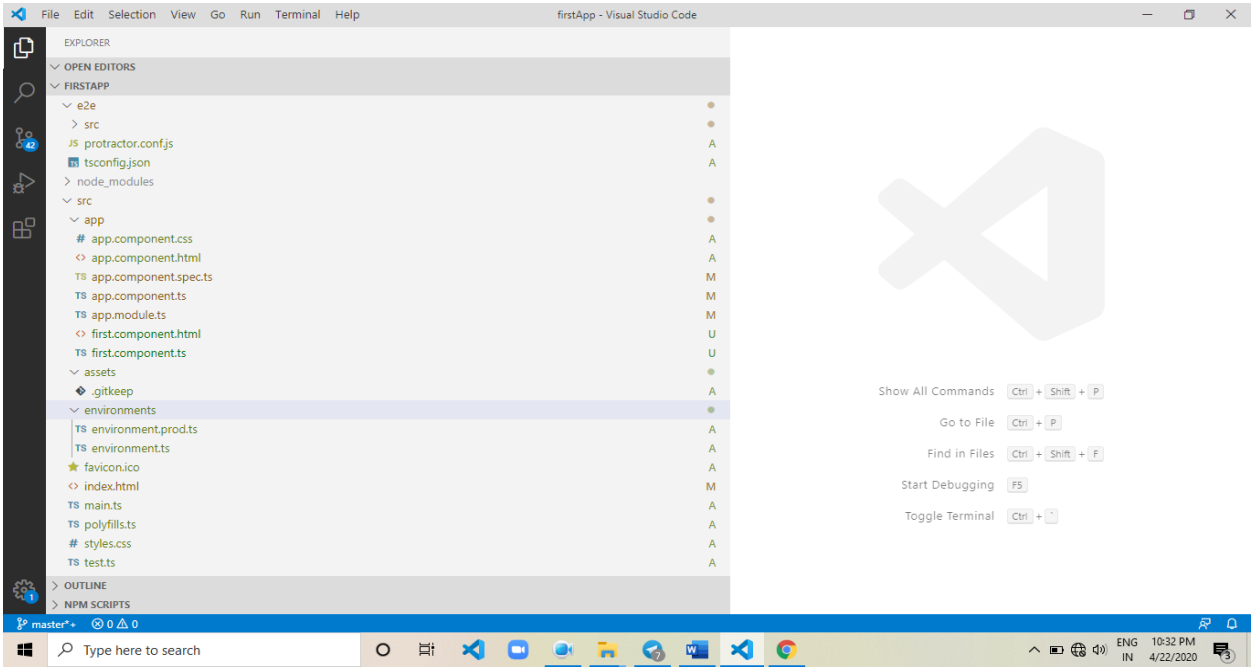
- we will install Angular9 by using following command.

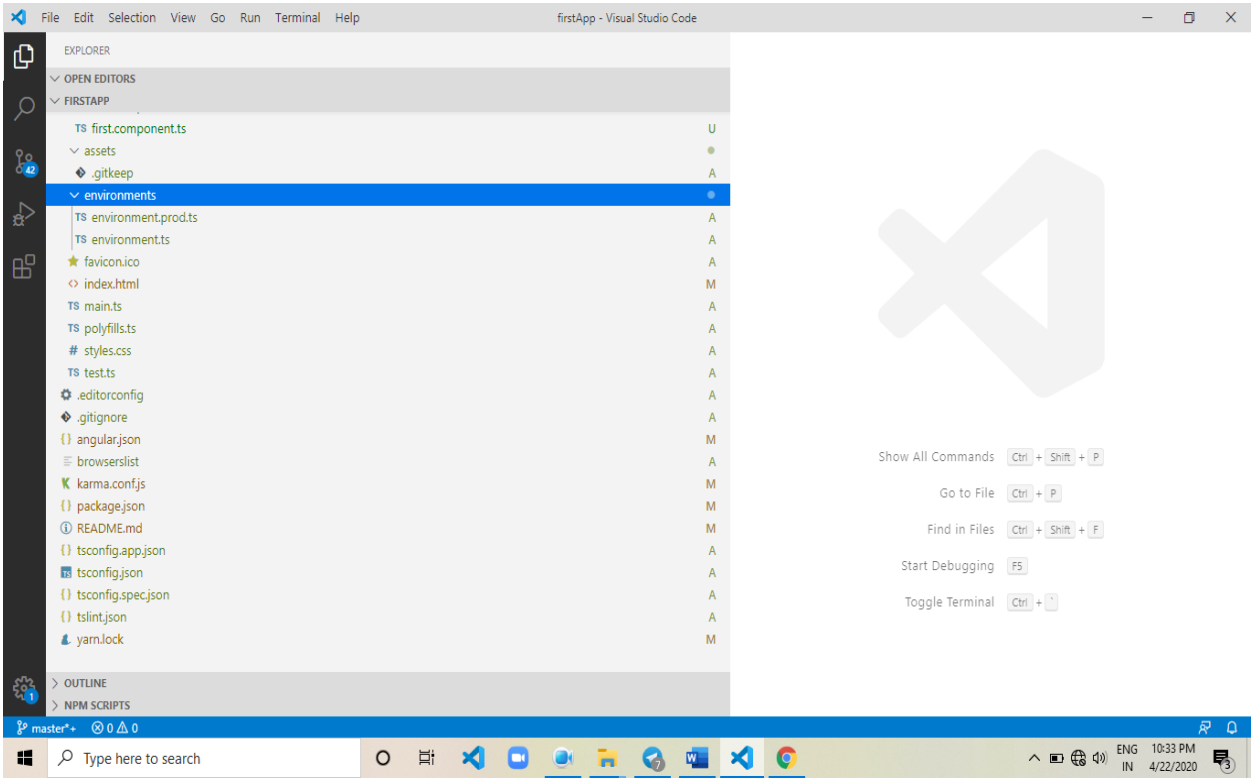
  Command: npm install -g @angular/cli@latest
- "cli" stands for command line interface
- "cli" is the tool provided by google.
- "cli" tool used to build and execute the angular applications

4) link the "yarn" tool to "cli" tool.

- we will link "yarn" tool to "cli" tool by using following command. **Command:** ng config -g cli.pacakageManager yarn
- where "M" is the capital in "pacakageManager".

Directory structure of angular application





1) e2e

- e2e stands for end to end.
- e2e directory used to write the end to end test cases to angular applications.
- in general testing divided into two types.
    - Manual Testing
    - Automation Testing
- Manual Testing is Deprecated, now a days no project using Manual Testing.
- Automation Testing divided into 3 Types.
    - Unit Testing
    - Integration Testing
    - End to End Testing
- Testing particular functionality with assumptions called as Unit Testing.
- Testing particulat functionalities with exact environment called as Integration Testing (Real Environment).
- Testing Particular functionality with "end to end scenarios (production mode)" called as end to end testing.

2) node_modules:

- "node_modules" directory containes libraries.
- those libraries helps to execute the angular application.

3) src/app:

- this directory used to deploy the angular applications.

  Ex.

  Components , Directives , Services, Pipes

4) src/app/app.module.ts

- ✓ this file we can call registration file.
- ✓ this file also called as Module file.
- ✓ this is the Default Module in Angular Application.
- ✓ this file used to register the angular applications.
- ✓ once if we register, then only angular applications will
- ✓ be executed by angular framework

5) src/assets:

- this directory used to deploy the static resources

Ex.

- o images
- o multimedia files
- o xml files
- o json files

6) environments:

- in general we have 3 types of environments
  - ➢ development environment
  - ➢ production environment
  - ➢ testing environment
- what ever the required environment, we will configure
- in environments directory.

7) src/favicon.ico:

- this is the default logo of angular.

8) src/index.html:

- angular starts the execution from "index.html" file.
- "index.html" file is the landing template.
- "index.html" file is the main template in angular application.
- main template internally invokes the "main.ts" file.
- "main.ts" file internally invokes the "app.module.ts" file.
- "app.module.ts" file containes our applications registrations.
- based on registrations our applications will be executed by angular framework.

9) src/main.ts:

- this file acting as interface between main template to registration file.

(app.module.ts <==> index.html)

10) src/polyfills.ts:

- polyfills.ts file is the library.
- this library helps to execute the projects into different browsers.

Ex.

Chrome, Mozilla…etc

11) src/styles.css:

- we will define global styles here.
- what ever the styles we define here, automatically applicable to entire angular application.

12) src/test.ts:

- this file representing sample testing file.

13) editorconfig & .gitignore:

- these two files not related to angular applications.
- first file related to "VisualStudioCode" Configurations.
- second file related "Git" configurations.

14) angular.json:

- this file representing directory structure of angular application.
- we can customize directory structure based on application requirement by using angular.json file.
- this file used to configure the 3rd party technologies

  => jQuery

  => BootStrap

  => ReactJS

15) browsers list:

- ➢ it will show supporting and non supporting browsers based on Angular9 version.

16) karma.conf.js:

- in general we will write unit test cases by using "karma with jasmine" tool.
- "karma.conf.js" file representing the configuration file of karma tool

17) package.json:

- this file used to download the 3rd party libraries.
- all these libraries downloads to "node_modules" folder.

18) tsconfig.app.json:

- this file acting as controlling file for entire angular application.
- what ever the business logic written here, automatically applicable to entire angular application.

Ex.

- removing the white spaces in entire angular applications

-overcome the data redundancy in entire angular applications.

19) tsconfig.json:

- it contain TypeScript Configurations

20) tsconfig.spec.json:

- this file is the controlling file for all unit test cases present in angular project.

21) tslint.json:

- this file acting as validator file for angular applications.

Chapter-1(Components)

Components:

- Angular is the Framework.
- Angular Framework follows the MVC Design Pattern.
    - M - Model
    - V - View
    - C - Component
- Simple TypeScript class behaves like Component.
- We Can Create more than one component in angular applications.
- Angular Applications are component based applications.
- Because of Components Code Reusability is high in Angular Compared to AngularJS.
- Component acting as Interface Between View and Service in MVC Architecture.
- we can establish the communication between server to database by using modules.
    - Ex.=> Mysql, mssql, mongodb,, firebase
- we can provide communication between service to server by using AJAX Calls (Observables).
- we can establish communication between component to service by using dependency injection.
- the communication between view to component called as two way data binding.

Example:

Directory Structure:

```
****************************************
firstApp
    src
      app
        first.component.ts
        first.component.html
        app.module.ts
      index.html
****************************************
```

- "first.component.ts" file used to create the component.
- "first.component.html" file used to display the component output.
- "first.component.html" also called as external template of component.
- in general we will register our applications (component) in app.module.ts file.
- index.html file is the main template.

First.component.ts:

- Component is predefined class available in @angular/core package
- Component class used to convert the TypeScript Standards to HTML Standards

- we will use Component class by using "@"
- Using the predefined class by using "@" symbol called as Decorator.
- Decorators are used to define th METADATA
- Data About Particular Component Called as METADATA
- Component Class constructor takes the JSON Object as Argument.
- "selector" is the json key used to define the custom HTML Element.
- we will call custom HTML Element in "index.html" file.
- "templateUrl" is the json key used to define the external template to Component.
- in general we will use external templates to display components data.
- export is the keyword in TypeScript
- export keyword used to export the components,services,directives,pipes,....
- anyone can import the exported members in angular applications

Code:

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

@Component({

    selector:"first",

    templateUrl:"./first.component.html"

})

export class firstComponent{
```

```
    private mean:string;

    private mern:string;

    private mevn:string;

    constructor(){

        this.mean = "MEAN Stack...!";

        this.mern = "MERN Stack...!";

        this.mevn = "MEVN Stack...!";

    };

    public getMeanData():string{

        return this.mean;

    };

    public getMernData():string{

        return this.mern;

    };

    public getMevnData():string{

        return this.mevn;

    };

};
```

First.component.html

- this template used to display the component result (variables & functions callings)
- {{}} used to display the data on webpage
- {{}} called as expressions / interpolation / data binding

Code:

```
<html><body>

<h1 style="color: red;">{{getMeanData()}}</h1>

<h1 style="color: green;">{{getMernData()}}</h1>

<h1 style="color: blue;">{{getMevnData()}}</h1> </body> </html>
```

App.module.ts:

- app.module.ts file acting as Registration file.
- this file used to register the Components,Services,Directives,Pipes,.....
- once if we register then only our applications will be executed
- BrowserModule used to execute the projects into Browsers
- NgModule used to create the custom modules
- collection of custom modules called as project
- AppComponent is the default component
- we have four registration arrays
  =>@declarations, @imports @providers @bootstrap
- we will register Components,Pipes and directives in "declarations" array
- we will register modules in "imports" array
- we will register services in "providers" array
- we will execute particular component by using bootstrap array.

Code:

```
import { BrowserModule } from '@angular/platform-browser';

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

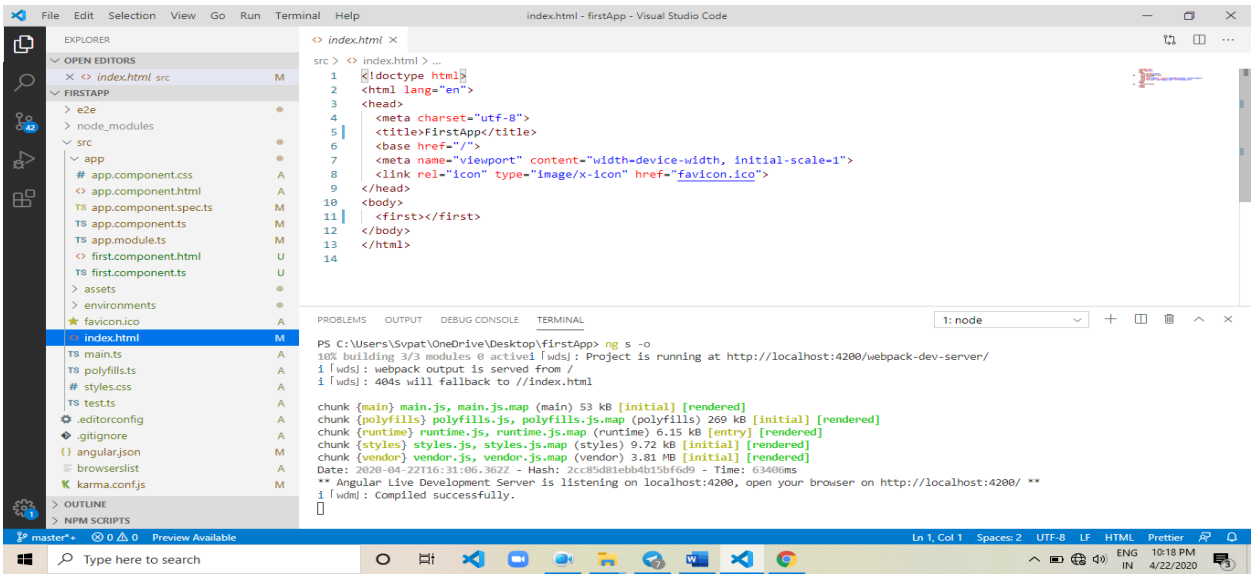
```
import { AppComponent } from './app.component';
import { firstComponent } from "./first.component";
@NgModule({
  declarations: [
    AppComponent,firstComponent
  ],
  imports: [
    BrowserModule
  ],
  providers: [],
  bootstrap: [firstComponent]
})
export class AppModule { }
```

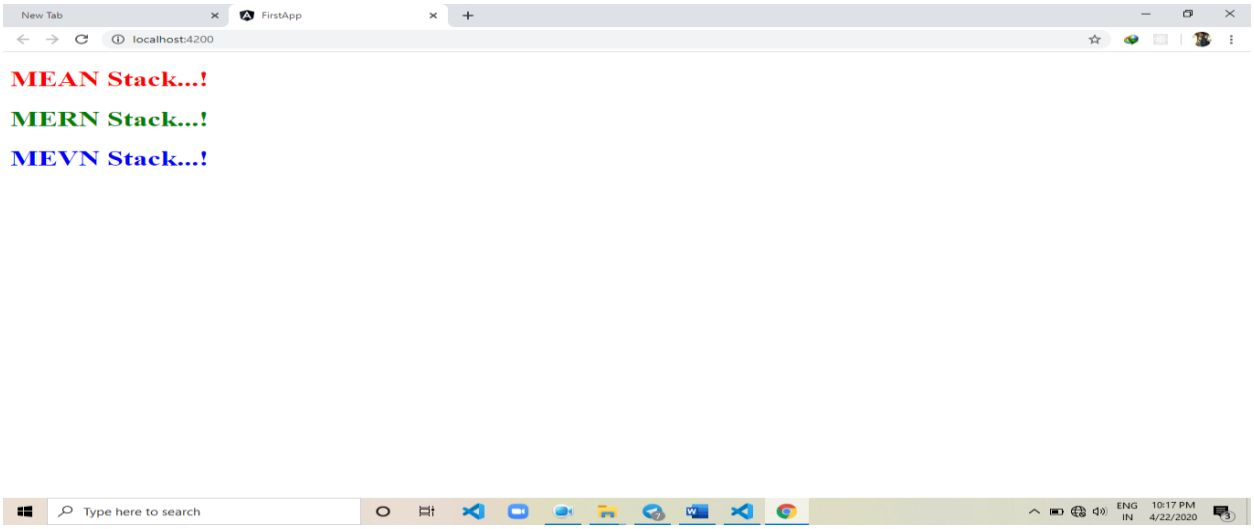
Index.html

```
<!doctype html>
<html lang="en">
<head>
  <meta charset="utf-8">  <title>FirstApp</title>
  <base href="/">
  <meta  name="viewport"  content="width=device-width,  initial-scale=1">
  <link rel="icon" type="image/x-icon" href="favicon.ico">
```

```
</head>

<body>

  <first></first>

</body>

</html>
```

Result:





Chapter-2(Services)

- Services are used to share the common business logic to multiple Components.
- we have two types of Services.
  - Predefined Services
  - Custom Services
- The Services given by angular called as Predefined Services.
- The Services Developed by us based on Application Requirement Called as Custom Services.

=>Custom Services:

- Injectable is the Predefined Class, used to create the Custom Services.
- Injectable class available in @angular/core package.

Example:

Directory Structure:

```
************************************

serEx

   src

     app

       services

         db.service.ts

       components

         mongodb.component.ts

         mongodb.component.html
```

```
        mysql.component.ts
        mysql.component.html
      app.module.ts
    index.html
```

****

Db.service.ts:

```
//import Injectable
//Injectable used to create the Custom Service
import { Injectable } from "@angular/core";
//use Injectable
//we will use predefined classes by using "@" symbol.
@Injectable({
    providedIn:"root"
})
//providedIn used to make the service as global
//providedIn facility available from Angular5 onwards
//export the class
export class dbService{
    //mysqlDB()
    public mysqlDB():string{
        return "MySQL Data Soon...!";
    };
```

```
    //mongodb()
    public mongodb():string{
        return "MongoDB Data Soon...!";
    };
};
```

Mangodb.component.ts:

```
import { Component } from "@angular/core";
//import dbService
//dbService containes mySQLDB()  mongodb()
//our component want to call mongodb()
import { dbService } from "../services/db.service";
//use Component
@Component({
    selector:"mongodb",
    templateUrl:"./mongodb.component.html"
})
//export the class
export class mongodbComponent{
    //declare the result variable
    //result variable used to hold the result coming from dbService
    private result:string;
    //create the object to the dbService
```

```
    //in general we will create objects by using constructors
    //dependency injection
    constructor(private obj:dbService){}
    //ngOnInit()
    //ngOnInit() method called as main method
    //ngOnInit() method used to write the business logic
    //ngOnInit() method called as first life cycle hook of
component
    ngOnInit(){
        this.result = this.obj.mongodb();
    }
};
```

Mangodb.component.html:

```
<html>
<body>
<h1 style="color: red;">{{result}}</h1>  </body>  </html>
```

Mysql.component.ts:

```
import { Component } from "@angular/core";
import { dbService } from "../services/db.service";
@Component({
    selector:"mysql",
    templateUrl:"./mysql.component.html"
```

```
})
export class mysqlComponent{
    private result:string;
    constructor(private obj:dbService){}
    ngOnInit(){
        this.result = this.obj.mysqlDB();
    }
};
```

Mysql.component.html:

```
<html>
<body>
<h1 style="color: rosybrown;">{{result}}</h1>
<mongodb></mongodb>
</body>
</html>
```

App.module.ts:

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { AppComponent } from './app.component';
import { mysqlComponent } from './components/mysql.component';
import { mongodbComponent } from './components/mongodb.component';
@NgModule({
```

```
  declarations: [
    AppComponent,mysqlComponent,mongodbComponent
  ],
  imports: [
    BrowserModule
  ],
  providers: [],
  bootstrap: [mysqlComponent]
})
export class AppModule { }
```

Index.html:

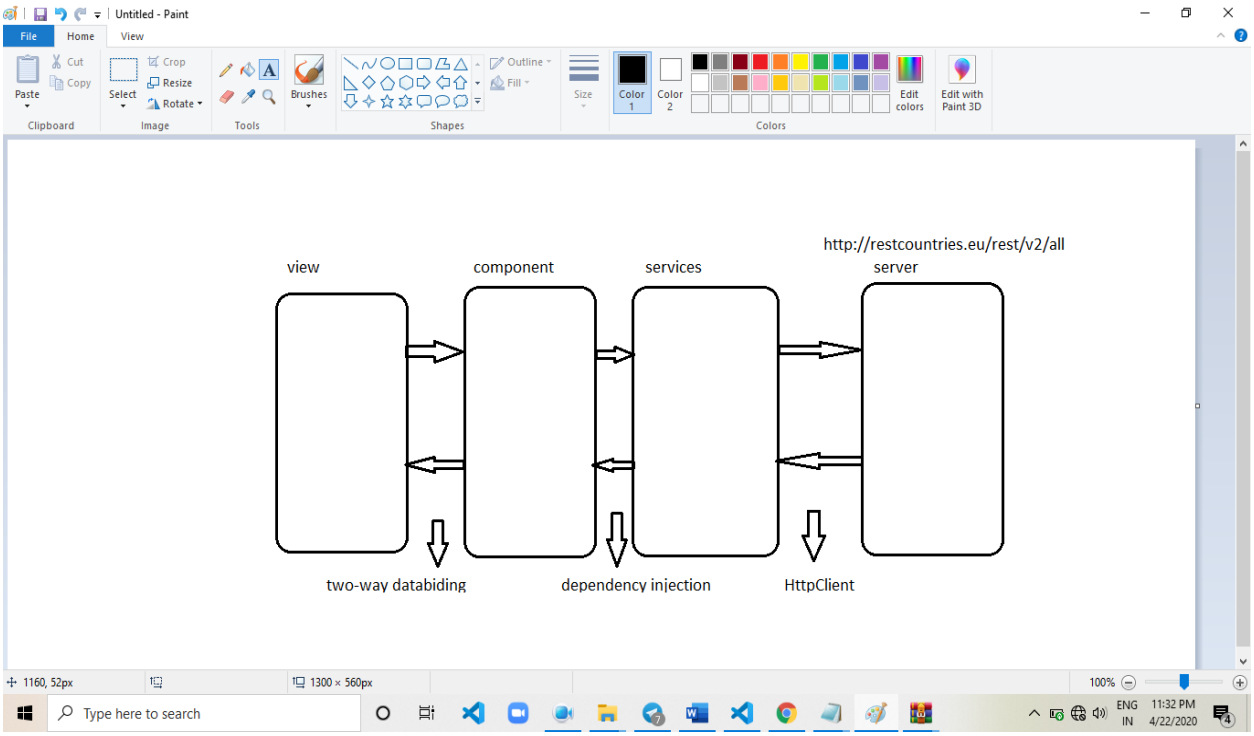
```
<html>
<body>
  <mysql></mysql>
</body>
</html>
```

=> Predefined Services:

- The Services Provided by angular framework called as Predefined Services.
- "HttpClient" is the Predefined Service.
- "HttpClient" used to make the rest api calls.
- "HttpClient" present in "HttpClientModule"

- we must register "HttpClientModule" in "imports" array (app.module.ts).
- "HttpErrorResponse" is the Predefined Service.
- "HttpErrorResponse" used to handle the "Errors" thrown by servers.
- "HttpClient","HttpClientModule", "HttpErrorResponse" present in "@angular/common/http" package.
- Observable present in rxjs package.
- "rxjs" stands for reactive extension javascript.
- Observables sends the Packets (Stream of Data) in Sequence from Server to
  Client.

Diagrame:



Example:.

Directory structure

```
****************************************
preSerEx
      src
        app
          services
              countries.service.ts
          components
              countries.component.ts
              countries.component.html
          app.module.ts
        index.html
****************************************
```

countries.service.ts:

```
//import Injectable
//Injectable used to create the Custom Service
import { Injectable } from "@angular/core";
//import HttpClient
//HttpClient used to make the rest api calls
import { HttpClient } from "@angular/common/http";
//import Observable
```

```
//HttpClient return type is Observable

//Continuous flow of data from server called as Observable.

import { Observable } from "rxjs";

//use Injectable

@Injectable({

    providedIn:"root"

})

//providedIn makes the service as global

//export the class

export class countriesService{

    //create the object to HttpClient

    //we will create objects by using constructor

    //dependency injection

    constructor(private obj:HttpClient){}

    //where obj is the HttpClient object

    //create the function

    //function should make rest api call

    public getCountries():Observable<any>{

        return
this.obj.get("https://restcountries.eu/rest/v2/all");

    };

};
```

countries.component.ts:

```
//import Component

import { Component } from "@angular/core";

//import countriesService

//countriesService containes getCountries()

//getCountries() returning Observable

//subscribe() used to read the data from Observables

import { countriesService } from "../services/countries.service";

//import HttpErrorResponse

//HttpErrorResponse used to handle the Exceptions thrown by server

import { HttpErrorResponse } from "@angular/common/http";

//use Component

@Component({

    selector:"countries",

    templateUrl:"./countries.component.html"

})

//export the class

export class countriesComponent{

    //decalre result variable

    //result variable used to hold the result coming from server

    private result:any;

    //create the object to countriesService
```

```
    //in general we will create objects by using constructor
    //dependency injection
    constructor(private obj:countriesService){}
    //where obj is the service object
    //ngOnInit() is the first life cycle hook
    //ngOnInit() used to write the business logic
    ngOnInit(){
        this.obj.getCountries().subscribe((posRes)=>{
                this.result = posRes;
        },(errRes:HttpErrorResponse)=>{
            console.log(errRes);
        });
    };  };
```

countries.component.html

```
<!--
    initially we have JSON Array
    "result" is the JSON Array
    "result" array containes 250 JSON Objects
    Each JSON Object containes following keys
            @name
            @capital
            @region
```

```
            @population
            @flag
-->
<table border="1"
       cellpadding="10px"
       cellspacing="10px"
       align="center">
       <thead style="background-color: gray;">
            <tr>
                <th>SNO</th>
                <th>Name</th>
                <th>Capital</th>
                <th>Region</th>
                <th>Population</th>
                <th>Flag</th>
            </tr>
       </thead>
<tbody>
           <tr *ngFor="let x of result;let i = index">
               <td>{{i+1}}</td>
               <td>{{x.name}}</td>
               <td>{{x.capital}}</td>
```

```
                <td>{{x.region}}</td>
                <td>{{x.population}}</td>
                <td><img width="100px" height="50px" src="{{x.flag}}"></td>
            </tr>
        </tbody>
</table>
```

App.module.ts:

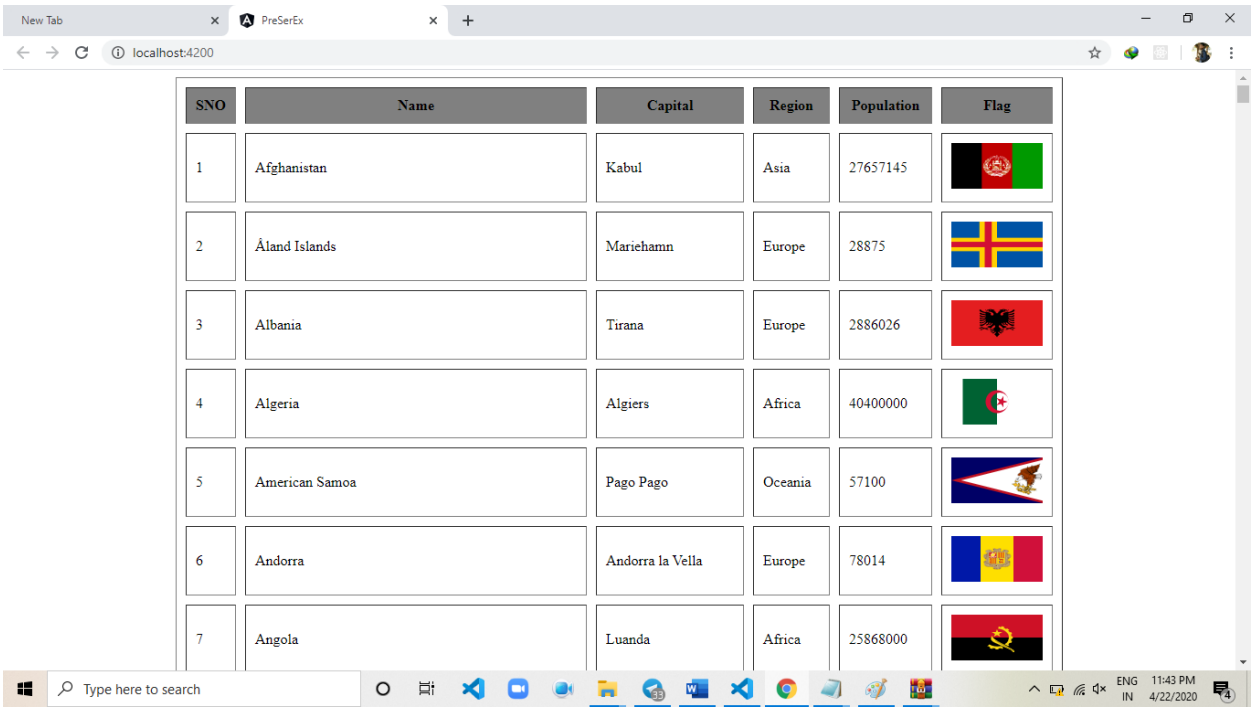
```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { AppComponent } from './app.component';
import { countriesComponent } from './components/countries.component';
import { HttpClientModule } from '@angular/common/http';
@NgModule({
  declarations: [
    AppComponent,countriesComponent
  ],
  imports: [
    BrowserModule,HttpClientModule
  ],
  providers: [],
  bootstrap: [countriesComponent]
```

```
})

export class AppModule { }
```

index.html:

```
<body>

  <countries></countries>

</body>
```

Result:



SNO	Name	Capital	Region	Population	Flag
1	Afghanistan	Kabul	Asia	27657145	
2	Åland Islands	Mariehamn	Europe	28875	
3	Albania	Tirana	Europe	2886026	
4	Algeria	Algiers	Africa	40400000	
5	American Samoa	Pago Pago	Oceania	57100	
6	Andorra	Andorra la Vella	Europe	78014	
7	Angola	Luanda	Africa	25868000	

Chapter-3(Integration)

Series & Parallel Calls

- Executing network calls "one by one" called as series calls.
- Executing network calls paralley called as Parallel Calls.
- to make parallel calls we need "Observable" class present in "rxjs-compat" package.
- we will download above library by using "yarn" tool.
  - **Command:** yarn add rxjs-compat --save

Java Integration

- "EmployeeDetailRestResource" is the java webservices project.
- "EmployeeDetailRestResource" project will be deployed into "Tomcat" Server.
- This project gives the "XML" as Response.
- below url representing rest api url of java application.

URL : http://localhost:9090/EmployeeDetailRestResource/api/empService/getAll

To execute java application we need following softwares

---

1) Tomcat

2) Ecilipse

3) jdk

4) "EmployeeDetailRestResource" project build

Dot net Integration:

- "MyFirstWebAPIService" is the dotnet web api application.
- we will deploy "MyFirstWebAPIService" application in "IIS" Server.
- below URL representing rest api url of dotnet web api application.
- URL : http://localhost:14741/api/Home
- above URL gives the xml as response.

To execute dotnet application we need following softwares

1) VisualStudio 2015

2) "MyFirstWebAPIService" Project Build

Example

Directory Structure:

```
*******************************************************

seriesAndParallelCallsEx

                        src

                          app

                            services

                              java.service.ts

                              dotnet.service.ts

                            components

                              series.component.ts

                              series.component.html
```

```
                                parallel.component.ts

                                parallel.component.html

                            app.module.ts

                        index.html
```

****

Commands:

- yarn add rxjs-compact - - save
- ng g s services/java - -skipTests
- ng g s services/dotnet - -skipTests
- ng g c component/series - -skipTests -is - -selector=series - -flat true
- ng g c component/parallel - -skipTests -is - -selector=series - -flat true

Java.service.ts:

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

import { HttpClient } from "@angular/common/http";

import { Observable } from "rxjs";

@Injectable({

  providedIn: 'root'

})

export class JavaService {

  constructor(private http:HttpClient) { }
```

```
  public getEmployees():Observable<any>{
      return
this.http.get("http://localhost:9090/EmployeeDetailRestResource/
api/empService/getAll");
  }
}
```

Dotnet.service.ts:

```
import { Injectable } from '@angular/core';
import { HttpClient } from "@angular/common/http";
import { Observable } from "rxjs";
@Injectable({
  providedIn: 'root'
})
export class DotnetService {
  constructor(private http:HttpClient) { }
  public getEmployees():Observable<any>{
    return this.http.get("http://localhost:14741/api/Home");
  };
}
```

Series.component.ts:

```
import { Component, OnInit } from '@angular/core';
import { JavaService } from "../services/java.service";
```

```
import { DotnetService } from "../services/dotnet.service";
import { HttpErrorResponse } from "@angular/common/http";
@Component({
  selector: 'series',
  templateUrl: './series.component.html',
  styles: []
})
export class SeriesComponent implements OnInit {
  public javaResult:any;
  public dotnetResult:any;
  constructor(private java:JavaService,
              private dotnet:DotnetService) { }
  public errCallBack = (err:HttpErrorResponse)=>{
    if(err.error instanceof Error){
      console.log("client side error");
    }else{
      console.log("server side error");
    }
  };
  ngOnInit() {
      this.java.getEmployees().subscribe((posRes)=>{
          this.javaResult = posRes;
```

```
     /**************************************************/
        this.dotnet.getEmployees().subscribe((posRes)=>{
                this.dotnetResult = posRes;
              },this.errCallBack);
      /**************************************************/
      },this.errCallBack);
  }; }
```

Series.component.html:

```
<h4 style="color: red;">{{javaResult | json}}</h4>
<h4 style="color: royalblue;">{{dotnetResult | json}}</h4>
```

app.module.ts:

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { AppComponent } from './app.component';
import { SeriesComponent } from './components/series.component';
import { HttpClientModule } from '@angular/common/http';
import{ParallelComponent} from './components/parallel.component';
@NgModule({
  declarations: [
    AppComponent,
    SeriesComponent,
    ParallelComponent
```

```
  ],
  imports: [
    BrowserModule,HttpClientModule
  ],
  providers: [],
  bootstrap: [SeriesComponent]
})
export class AppModule { }
```

Index.html:

```
<body>
  <series></series>
</body>
```

Parallel.component.ts:

```
import { Component, OnInit } from '@angular/core';
import { JavaService } from "../services/java.service";
import { DotnetService } from "../services/dotnet.service";
import { HttpErrorResponse } from "@angular/common/http";
import { Observable } from "rxjs-compat";
@Component({
  selector: 'parallel',
  templateUrl: './parallel.component.html',
  styles: []
```

```
})
export class ParallelComponent implements OnInit {
  public javaResult:any;
  public dotnetResult:any;
  constructor(private java:JavaService,
              private dotnet:DotnetService) { }
  public errCallBack = (err:HttpErrorResponse)=>{
      if(err.error instanceof Error){
        console.log("client side error");
      }else{
        console.log("server side error");
      }
  };
  ngOnInit() {
      Observable.forkJoin([
          this.java.getEmployees(),
          this.dotnet.getEmployees()
      ]).subscribe((posRes)=>{
          this.javaResult = posRes[0];
          this.dotnetResult = posRes[1];
      },this.errCallBack);
  }
```

```
};
```

Parallel.component.html

```
<h4>{{javaResult | json}}</h4>

<h4>{{dotnetResult | json}}</h4>
```

app.module.ts

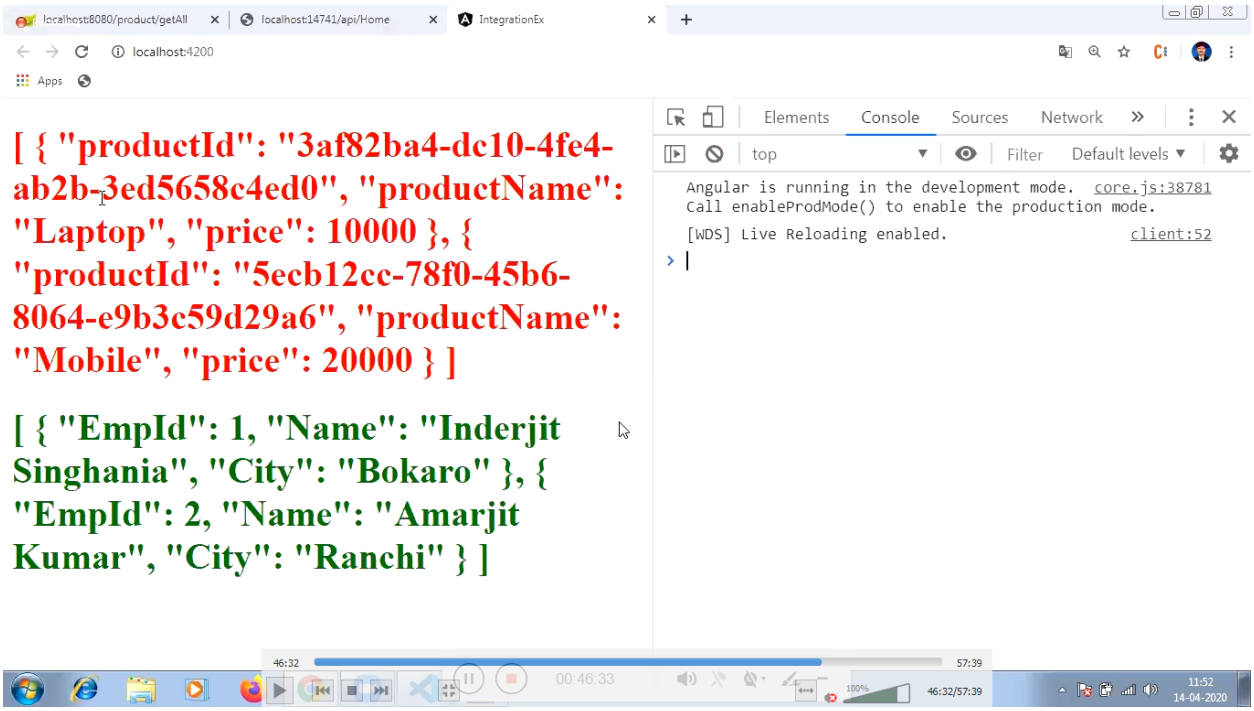
```
import { BrowserModule } from '@angular/platform-browser';

import { NgModule } from '@angular/core';

import { AppComponent } from './app.component';

import { SeriesComponent } from './components/series.component';

import { HttpClientModule } from '@angular/common/http';

import { ParallelComponent } from
'./components/parallel.component';

@NgModule({

  declarations: [

    AppComponent,

    SeriesComponent,

    ParallelComponent

  ],

  imports: [

    BrowserModule,HttpClientModule

  ],

  providers: [],
```

```
  bootstrap: [ParallelComponent]
})
export class AppModule { }
```

Index.html

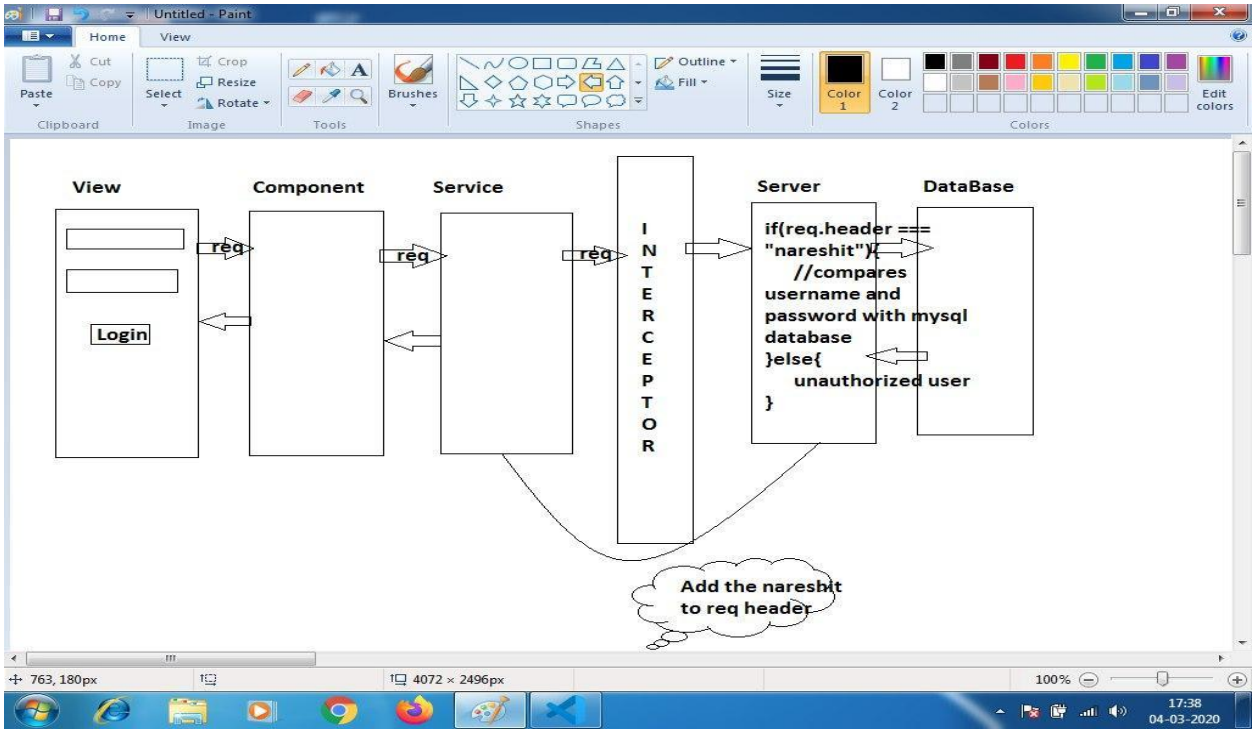
```
<body>
  <parallel></parallel>
</body>
```

Result:



Chapter-4(Interceptors)

- Interceptors Authenticate the Http Requests.
- if Http Request is Authenticated,then req will bypass to server.
- In general, we will create Interceprors by using custom services.
- In general, we will register Interceprors in providers array in module file.



steps to implement Interceptors Example

---

step 1.

install SQLServer.

=> SQL Server 2014 Management Studio

step 2.

create the table in SQLServer.

```
***************************

user     :   sa

password:   123

server   :   localhost

database:   auth

table    :   login_details

***************************
```

step 3.

create the angular application

```
> ng new InterceptorsEx
```

step 4.

switch to angular application

```
> cd InterceptorsEx
```

step 5.

download the following node modules

```
=> express

=> mssql@6.0.1

=> body-parser

=> cors
```

- "express" module used to develop the rest apis
- "mssql@6.0.1" module used to interact with the SQLServer
- "body-parser" module used to read the client data.
- "cors" module used to enable the ports communication
- we will download above modules by using yarn tool.

Command: yarn add express mssql@6.0.1 body-parser cors --save

step 6.

develop the node server

****

interceprotsEx

server

server.js

****

step 7.

start the node server

> cd server

> node server

step 8.

test the following rest api by using "Postman"

=> http://localhost:8080/login (POST)

step 9.

implement the Interceptor

****

interceptorsEx

src

app

Interceptor

token.Interceptor.ts

****

"token.Interceptor.ts" used to add the nareshit as header to req.

after adding token we will send req to server.

step 10.

create the LoginService

****

interceprorsEx

src

app

services

login.service.ts

****

> ng g s services/login --skipTests

step 11.

create the component

```
> ng g c components/login --skipTests -is --selector=login --flat true
```

step 12.

register components and interceproor in app.module.ts file

step 13.

start the servers

```
Terminal-1
----------
> cd interceprorsEx/server
> node server


Terminal-2
----------
> cd interceprorsEx
> ng s -o
```

Server.js:

```
//import the modules
//require() function used to import the modules
let express = require("express");
let mssql = require("mssql");
```

```
let bodyparser = require("body-parser");

let cors = require("cors");


//create the rest object

let app = express();

//where "app" is the rest object

//"app" object used to develop the rest apis

//set the json as MIME Type

app.use(bodyparser.json());

//read the client data

app.use(bodyparser.urlencoded({extended:false}));


//enable the cors

app.use(cors());

//create the middleware function

//this middleware function used to check the headers

let checkHeaders = (req,res,next)=>{

    let allHeaders = req.headers;

    let str = allHeaders.token;

    if(str === "nareshit"){

        next();

    }else{
```

```
        res.send({"message":"unauthorized user"});
    }
}


//create the rest api
app.post("/login",[checkHeaders],(req,res)=>{
    mssql.connect({
        user:"sa",
        password:"123",
        database:"auth",
        server:"localhost"
    },(err)=>{
        if(err) throw err;
        else{
            let queryObj = new mssql.Request();
            queryObj.query(`select  *  from  login_details  where
uname='${req.body.uname}' and upwd='${req.body.upwd}'`,
                                (err,records)=>{
                if(err) throw err;
                else{
                    if(records.recordset.length>0){
                        res.send({"login":"success"});
```

```
                    }else{
                        res.send({"login":"fail"});
                    }
                }


            })
        }
    });
});
//assign the port no
app.listen(8080);
console.log("server listening the port no.8080");
```

token.interceptor.ts:

```
import { Injectable } from "@angular/core";
import { HttpRequest,
         HttpHandler,
         HttpEvent } from "@angular/common/http";
import { Observable } from "rxjs";
@Injectable({
    providedIn:"root"
})
export class tokenInterceptor{
```

```
    intercept(req:HttpRequest<any>,
     handler:HttpHandler):Observable<HttpEvent<any>>{
        const req1 = req.clone({
            setHeaders:{
                "token":"naresh"
            }
        });
        return handler.handle(req1);
    }
};
```

Login.service.ts:

```
import { Injectable } from '@angular/core';
import { HttpClient } from "@angular/common/http";
import { Observable } from "rxjs";
@Injectable({
  providedIn: 'root'
})
export class LoginService {
  constructor(public http:HttpClient) { }
  public authenticate(data:any):Observable<any>{
      return this.http.post("http://localhost:8080/login",data);
  };
```

```
};
```

Login.component.ts:

```
import { Component, OnInit } from '@angular/core';
import {  LoginService } from "../services/login.service";
import { HttpErrorResponse } from "@angular/common/http";
@Component({
  selector: 'login',
  templateUrl: './login.component.html',
  styles: []
})
export class LoginComponent implements OnInit {
  public result:any;
  constructor(public service:LoginService) { }
  ngOnInit() {
  }
  public login(data:any):any{
    this.service.authenticate(data)
        .subscribe((posRes)=>{
          this.result = posRes;
        },(errRes:HttpErrorResponse)=>{
          if(errRes.error instanceof Error){
            console.log("client side error");
```

```
          }else{
            console.log("server side error");
          }
    });
  };
};
```

Login.component.html

```
<fieldset>
    <legend>Login</legend>
    <input type="text"
           name="uname"
           placeholder="user name"
           [(ngModel)]="uname">
    <br><br>
    <input type="password"
           name="upwd"
           placeholder="password"
           [(ngModel)]="upwd">
    <br><br>
    <button (click)="login({'uname':uname,'upwd':upwd})">
            Login
    </button>
```

```
    <h1>{{result | json}}</h1>
</fieldset>
```

app.module.ts:

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { AppComponent } from './app.component';
import { LoginComponent } from './components/login.component';
import { HttpClientModule, HTTP_INTERCEPTORS } from '@angular/common/http';
import { FormsModule } from "@angular/forms";
import { tokenInterceptor } from './interceptor/token.Interceproр';
@NgModule({
  declarations: [
    AppComponent,
    LoginComponent
  ],
  imports: [
    BrowserModule,HttpClientModule,FormsModule
  ],
  providers: [{
    provide:HTTP_INTERCEPTORS,
    useClass:tokenInterceptor,
```

```
    multi:true
  }],
  bootstrap: [LoginComponent]
})
export class AppModule { }
```

Index.html:

```
<body>
  <login></login>
</body>
```

Chapter-5(Directives)

- Directives enhances the view capabilities.
- We have two types of directives
    - Pre-defined directives
    - Custom directives
- The directives are given by angular framework is called predefined directives.
- The directives are doveloped by us based on application requirement called as custom directives

=>Pre-defined directives

1. ngFor
2. ngif
3. (click)
4. (dbclick)
5. [(ngmodel)]
6. (ngsubmit)
7. [ngclass]
8. [ngstyle]
9. [ngswitch]

- Directives are categorized into three types
    - Structural type directives
    - Event type directives
    - Attribute type directives
- Structural type directives have manipulate into dom
- Structural type directives starts with "*"
- Based on the requirement we are adding or removing dom elements from browser memory.

- In order to handle events raised by dom ,we are using event type directives.
- Event type directives are serounder with "()"
- Attribute type directives serounder with "[]"

1) *ngFor

- this directive used to iterate the Array Elements.

Syntax.

*ngFor= "let variable of array;constant1,constant2,...."

constants

----

1) index

- it is used to get the indexes for each iteration.

2**) first**

- it is used to recognise the first element in array.

3) last

- it is used to recognise the last element in array.

4) even

- it will recognise even positions in array.

5) odd

- it will recognise odd positions in array.

2) *ngIf

- this directive helps to write the conditions.

Example:

Directory Structure:

```
****************************************
firstApp
       src
      app
        first.component.ts
        first.component.html
        app.module.ts
      index.html
****************************************
```

First.component.ts:

```
import { Component } from '@angular/core';
@Component({
  selector: 'app-root',
  templateUrl: './first.component.html',
  styleUrls: ['./first.component.css']
})
export class firstComponent {
    title = 'first';
    num:number = 0;
```

```
    clickMe(arg1,arg2){
      if(arg1 === "admin" && arg2 === "admin"){
        alert("Login Success");
      }else{
        alert("Login Fail");
      }
    };
}
```

First.component.html

```
<!--
    *ngFor
    ------
      - it is used to iterate the array elements.
-->


<!--
<div *ngFor="let x of [10,20,30,40,50];
             let i = index;
             let f = first;
             let l = last;
             let e = even;
             let o = odd;">
```

```
    <span>{{x}}...{{i}}...{{f}}...{{l}}...{{e}}...{{o}}</span>
</div>
-->
<!--
  [ngStyle]
    - ngStyle directive used to apply the "CSS" to "DOM Elements".


<h1 [ngStyle]="{'color':'red'}">Hello</h1>
<h1
[ngStyle]="{'color':title===='firstApp'?'green':'red'}">Welcome</
h1>


<div *ngFor="let x of [10,20,30,40,50]">
    <div [ngSwitch]="x">
<div *ngSwitchCase="10" [ngStyle]="{'color':'red'}">{{x}}</div>
<div *ngSwitchCase="20" [ngStyle]="{'color':'green'}">{{x}}</div>
<div *ngSwitchCase="30" [ngStyle]="{'color':'blue'}">{{x}}</div>
<div *ngSwitchCase="40" [ngStyle]="{'color':'pink'}">{{x}}</div>
<div *ngSwitchDefault [ngStyle]="{'color':'yellow'}">{{x}}</div>
    </div>
</div>
-->
<!--
```

```
  [ngClass]

      - it is used to apply the bootstarp to DOM Elements

-->

<!--

<h1 [ngClass]="{'text-success':true}">Hello</h1>

<h1 [ngClass]="{'text-danger':title=='firstApp'}">Welcome</h1>

<div *ngFor="let x of [10,20,30,40,50]">

<div [ngSwitch]="x">

<div             *ngSwitchCase="10"             [ngClass]="{'text-
success':true}">{{x}}</div>

        <div         *ngSwitchCase="20"         [ngClass]="{'text-
info':true}">{{x}}</div>

        <div         *ngSwitchCase="30"         [ngClass]="{'text-
primary':true}">{{x}}</div>

        <div         *ngSwitchCase="40"         [ngClass]="{'text-
danger':true}">{{x}}</div>

        <div          *ngSwitchDefault          [ngClass]="{'text-
default':true}">{{x}}</div>

    </div>

</div>  -->

<!--

<div class="container">

    <br><br>
```

```
    <button class="glyphicon glyphicon-plus btn-success btn-sm"
            (dblclick)="num=num+1"></button>
    <button class="btn btn-primary">{{num}}</button>
    <button class="glyphicon glyphicon-minus btn-success btn-sm"
            (dblclick)="num=num-1"></button>
</div>
-->
<fieldset>
    <legend>Login</legend>
    <input type="text"
           placeholder="user name"
           #uname>
    <br><br>
    <input type="password"
           placeholder="user password"
           #upwd>


    <br><br>
    <button
(click)="clickMe(uname.value,upwd.value)">Login</button>
</fieldset>
```

App.module.ts:

```
import { BrowserModule } from '@angular/platform-browser';

import { NgModule } from '@angular/core';

import { FirstComponent } from './first.component';

@NgModule({

  declarations: [

    FirstComponent

  ],

  imports: [

    BrowserModule

  ],

  providers: [],

  bootstrap: [FirstComponent]

})

export class AppModule { }
```

Index.html:

```
<body>

<first></first>

</body>
```

=>Custom Directives:

Creating our own directives based on application requirement is called as custom directives.

We can create two types of custom directives.

- ✓ Attribute type custom directives
- ✓ Structurl type custom directives

Attribute type custom directives

Directive is the predefined class used to dovelop the custom directives

"elementref" is the predefined class used to manipulate the dom elements in custom directives

"input" is the predefined class used to apply the data to directive form component

"Hostlistener" class helps to apply the mouse events to dom elements

Command: ng g d mydir --skipTests

Example:

Directory Structure:

```
****************************************

CustDirex

    src

      app

        my.directive.ts

        app.component.ts

        app.component.html

        app.module.ts
```

```
      index.html
****************************************
```

app.component.html

```
<h1    [var_one]="color_one.value"    [var_two]="color_two.value"
myDir>hello</h1>

<br><br>

<input type="color" #color_one>

<input type="color" #color_two>
```

my.directive.ts

```
import    {    Directive,HostListener,Input,ElementRef    }    from
'@angular/core';

@Directive({

  selector: '[myDir]'

})

export class myDirective {

  @Input() var_one;

  @Input() var_two;

  constructor(public _el:ElementRef) { }

  @HostListener("mouseenter") onmouseenter(){

      this.changeColor(this.var_one);

  };

  @HostListener("mouseleave") onmouseleave(){
```

```
      this.changeColor(this.var_two);
  };
  public changeColor(arg1){
    this._el.nativeElement.style.backgroundColor=arg1;
  }
}
```

app.module.ts:

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { AppComponent } from './app.component';
import { myDirective } from './my.directive';
@NgModule({
  declarations: [
    AppComponent,
    myDirective
  ],
  imports: [
    BrowserModule
  ],
  providers: [],
  bootstrap: [AppComponent]
})
```

```
export class AppModule { }
```

Index.html:

```
<body>

<app></app>

</body>
```

Structural Type Custom Directives

- Structural Directive prefixed with "*".
- Structural Directive have the capability to "manipulate the DOM".
- Based on Requirement DOM Element "added/removed" from browser memory.
- "Directive" is the predefined class, used to create the "Custom Directive".
- "TemplateRef" is the predefined class, used to manipulate the "DOM".
- "ViewContainerRef" is the predefined class, used to "add/remove" the DOM Elements from browser memory.
- "Input" is the predefined class used to pass the data from Component to Directive.

Example:

Directory Structure:

```
****************************************
CustDirex
  src
    app
      strl.directive.ts
```

```
        app.component.ts
        app.component.html
       app.module.ts
      index.html
   ****************************************
```

app.component.html

```
<h1 *hello="false">Welcome</h1>
```

strl.directive.ts

```
import  {  Directive,TemplateRef,ViewContainerRef,Input  }  from
'@angular/core';

@Directive({

  selector: '[hello]'

})

export class StrlDirective {

  constructor(public _templateRef:TemplateRef<any>,

              public _viewContainerRef:ViewContainerRef) { }

  @Input() set hello(arg1:boolean){

      //if arg1 is "true" , add "_templateRef" to "browser memory"
with the help of "_viewContainerRef"

      if(arg1){
this._viewContainerRef.createEmbeddedView(this._templateRef)

      }else{

        this._viewContainerRef.clear();

      }; }    };
```

App.module.ts:

```
import { BrowserModule } from '@angular/platform-browser';

import { NgModule } from '@angular/core';

import { AppComponent } from './app.component';

import { StrlDirective } from './strl.directive';

@NgModule({

  declarations: [

    AppComponent,

    StrlDirective

  ],

  imports: [

    BrowserModule

  ],

  providers: [],

  bootstrap: [AppComponent]

})

export class AppModule { }
```

Index.html:

```
<body>

<app-root></app-root>

</body>
```

Chapter-6(Communication between components)

- As a angular developer we can create morethan one component
- We can provide communication between components
- In angular we can provide communication in four ways
  - @Input
  - @Output
  - @viewchild
  - @viewchildren

@Input

This directive used to store the data from parent component to child component.

@Output

This directive used to store the data from child component to parent component.

Steps to store the data from parent component to child component

---

Step-1) create the childComponent

****

child.component.ts

child.component.html

****

Step-2) create the parentComponent

****

parent.component.ts

parent.component.html

****

Step-3)map the parentcomponent data to childcomponent properties.

Step-4) bootstrap the parentComponent

Steps to store the data from parent component to child component

Step-1. Create the child component

Step-2. Fire the eventEmiter object

Step-3. Map the childcomponent data to parentcomponent

Example:

Directory Structure:

```
*****************************************
Combtcom
  src
    app
      child.component.ts
      child.component.html
      parent.component.ts
      parent.component.html

       app.module.ts

    index.html
*****************************************
```

child.component.ts

```
import { Component,Input, Output, EventEmitter } from "@angular/core";

  @Component({
      selector:"child",
      templateUrl:"./child.component.html"
  })
  export class childComponent{
      @Input() p_id;
      @Input() p_name;
      @Input() p_cost;
      @Output() send:EventEmitter<any> = new EventEmitter();
      clickMe():any{

  this.send.emit(this.p_id+"...."+this.p_name+"...."+this.p_cost
  )
      };
  };
```

child.component.html

```
<h2>Product ID:<span style="color: red;">{{p_id}}</span></h2>
<h2>Product Name:<span style="color: red;">{{p_name}}</span></h2>
<h2>Product Cost:<span style="color: red;">{{p_cost}}</span></h2>
<button (click)="clickMe()">Send</button>
<hr>
```

parent.component.ts

```
import { Component } from "@angular/core";
@Component({
```

```
    selector:"parent",
    templateUrl:"./parent.component.html"
})
export class parentComponent{
    private products:Array<any> = [
        {p_id:111,p_name:"p_one",p_cost:10000},
        {p_id:222,p_name:"p_two",p_cost:20000},
        {p_id:333,p_name:"p_three",p_cost:30000},
        {p_id:444,p_name:"p_four",p_cost:40000},
        {p_id:555,p_name:"p_five",p_cost:50000}
    ];

    public myFun(data:any){
        alert(data);
    }

};
```

parent.component.html

```
<child
 [p_id]="x.p_id"
 [p_name]="x.p_name"
 [p_cost]="x.p_cost"
 (send)="myFun($event)"
 *ngFor="let x of products"></child>
```

app.module.ts

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { AppComponent } from './app.component';
import { parentComponent } from './parent.component';
import { childComponent } from './child.component';
```

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

index.html

```
<body>
  <parent></parent>
</body>
```

@Viewchild() and @Viewchildren:

If we want to store the data between components without relationship between them parent and child then we will use @viewchild() and @viewchildren()

Steps to Implement the Application by using ViewChild and ViewChildren

---

1) create the secondComponent

****

second.component.ts

second.component.html

****

2) create the firstComponent

****

first.component.ts

first.component.html

****

3) bootstrap the firstComponent

Example:

Directory Structure:

```
*****************************************
Combtcom
  src
    app
      first.component.ts
      first.component.html
      second.component.ts
      second.component.html

      app.module.ts

    index.html
*****************************************
```

first.component.ts

```
import { Component,ViewChild, ViewChildren, QueryList } from "@angular/core";

import { secondComponent } from "./second.component";

@Component({

    selector:"first",
```

```
    templateUrl:"./first.component.html"
})
export class firstComponent{
    /*
        @ViewChild(secondComponent,{static:true})
        private second:secondComponent;
        clickMe(){
            this.second.var_one = "welcome_1";
            this.second.var_two = "welcome_2";
        };
    */
    @ViewChildren(secondComponent)
    private obj:QueryList<secondComponent> = new QueryList();
    private arr:Array<any> = [];
    ngAfterViewInit(){
        this.arr = this.obj.toArray();
    };
    clickMe(){
        this.arr.forEach((element,index)=>{
            element.var_one = "welcome_1";
            element.var_two = "welcome_2";
        });
```

```
    };
    //QueryList is the utility class helps to create the map object
based on target occurances.


    //we must convert datastructure to equalent array.


    //in order to convert "one data structure" to "another data
structure" we will use ngAfterViewInit() life cycle hook


};
```

first.component.html

```
<second></second>
<second></second>
<second></second>
<button (click)="clickMe()">Change</button>
```

second.component.ts

```
import { Component } from "@angular/core";
@Component({
    selector:"second",
    templateUrl:"./second.component.html"
})
export class secondComponent{
```

```
    public var_one:string;

    public var_two:string;

    constructor(){

        this.var_one = "hello_1";

        this.var_two = "hello_2";

    };

};
```

second.component.html

```
<h1 style="color: red;">{{var_one}}</h1>

<h1 style="color: green;"><marquee>{{var_two}}</marquee></h1>
```

app.module.ts

```
  import { BrowserModule } from '@angular/platform-browser';
  import { NgModule } from '@angular/core';
  import { AppComponent } from './app.component';
  import { firstComponent } from './first.component';
  import { secondComponent } from './second.component';
  @NgModule({
    declarations: [
      AppComponent,firstComponent,secondComponent
    ],
    imports: [
      BrowserModule
    ],
    providers: [],
    bootstrap: [firstComponent]
  })
```

```
  export class AppModule { }
```

index.html

```
<body>

  <first></first>

</body>
```

Note: Viewchild() can reflect the changes on Target component if any one existing occurs to "To overcome limitation we will use @viewchildren.

Chapter-7(Pipes)

- Pipes are used to manipulate the data based on Application Requirement.
- we have two types of pipes.
    - predefined pipes
    - custom pipes
- the pipes given by angular framework called as predefined pipes.
- the pipes developed by us based on Application Requirement called as custom Pipe.

=>predefined pipes

- uppercase
- lowercase
- titlecase
- currency
- json
- slice
- number
- percent
- async
- date

1) uppercase

- it is used to convert the lowercase characters to uppercase characters.

2) lowercase

- it is used to convert the uppercase characters to lowercase characters.

3) titlecase

- it is used to create the camelcase words.

4) currency

- it is used to append the currencies symbols to numerical values.

5) json

- it will convert "JSON Object" to "JSON String".

6) slice

- it is used to manipulate the arrays.

7) number/decimal

- it is used to manipulate the numerical values.

8) percent

- used to convert the fractions to equalent percentages.

9) async

- it is used to display the asynchronous data on webpages.

10) date

- it is used to manipulate the "date" accroding to application requirement.

Command: ng g p reverse --skipTests

ng g p message --skipTests

=>Custom Pipes

- creating our own pipes based on application requirement called as custom pipe.

Example:

Directory Structure:

```
****************************************
pipesex
  src
    app
      reverse.pipe
      message.pipe
      app.component.ts
      app.component.html
      app.module.ts
    index.html
****************************************
```

app.component.html

```
<h1>{{"hello" | reverse}}</h1>

<h1>{{"hello" | reverse}}</h1>

//where reverse,message are custom pipes
```

reverse.pipe

```
import { Pipe, PipeTransform } from '@angular/core';

@Pipe({

  name: 'reverse'

})
```

```
export class ReversePipe implements PipeTransform {
  transform(value: any, ...args: any[]): any {
      return Array.from(value).reverse().join("");
  }
}
```

message.pipe

```
import { Pipe, PipeTransform } from '@angular/core';
@Pipe({
  name: 'message'
})
export class MessagePipe implements PipeTransform {
  transform(value: any, ...args: any[]): any {
      return args[1]+" "+args[0]+" "+value;
  }
}
```

app.component.html

```
<h1 style="color: green;">
    {{"Angular9" | message:"to":"welcome"}}
</h1>
<h1 style="color: red;">{{"hello" | reverse}}</h1>
<!--
    where "reverse" is the custom pipe
```

```
-->

<h1>{{var_ten | async}}</h1>

<h1>{{var_nine | date:"fullDate"}}</h1>

<h1>{{var_nine | date:"medium"}}</h1>

<h1>{{var_nine | date:"short"}}</h1>

<h1>{{var_nine | date:"dd-MMM-yyyy"}}</h1>

<h1>{{var_nine | date:"dd-MM-yy"}}</h1>

<h1>{{var_eigth | percent}}</h1>

<h1>{{var_seven | number:"4.1-2"}}</h1>

<h1>{{var_seven | number:"3.2-3"}}</h1>

<h1>{{var_six | slice:2:-3}}</h1>

<h1>{{var_six | slice:2:-1}}</h1>

<h1>{{var_six | slice:2:5}}</h1>

<h1>{{var_six | slice:2:4}}</h1>

<h1>{{var_five | json}}</h1>

<h1>{{var_four | currency:"INR"}}</h1>

<h1>{{var_four | currency:"EUR"}}</h1>

<h1>{{var_four | currency:"GBP"}}</h1>

<h1>{{var_four | currency}}</h1>

<h1>{{var_three | titlecase}}</h1>

<h1>{{var_two | lowercase}}</h1>

<h1>{{var_one | uppercase}}</h1>
```

app.component.ts

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

@Component({

  selector: 'app-root',

  templateUrl: './app.component.html',

  styleUrls: ['./app.component.css']

})

export class AppComponent {

    private var_one:string="hello";

    private var_two:string = "HELLO";

    private var_three:string="naresh it";

    private var_four:number=100;

    private var_five:any={

        p_id:111,

        p_name:"p_one",

        p_cost:10000

    };

    private var_six:Array<number>=[

        10,20,30,40,50

    ];

    private var_seven:number=100.12345;
```

```
    private var_eigth:number = 0.9;

    private var_nine:Date = new Date();

    private var_ten:any;

    constructor(){

      this.var_ten = new Promise((resolve,reject)=>{

          setTimeout(()=>{

              resolve("Success");

          },5000);

      });

    };

}
```

app.module.ts

```
import { BrowserModule } from '@angular/platform-browser';

import { NgModule } from '@angular/core';

import { AppComponent } from './app.component';

import { ReversePipe } from './reverse.pipe';

import { MessagePipe } from './message.pipe';

@NgModule({

  declarations: [

    AppComponent,

    ReversePipe,

    MessagePipe
```

```
  ],
  imports: [
    BrowserModule
  ],
  providers: [],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

index.html

```
<body>
  <app-root></app-root>
</body>
```

Chapter-8 (Lifecycle hooks)

1) ngOnChanges()

2) ngOnInit()

3) ngDoCheck()

4) ngAfterContentInit()

5) ngAfterContentChecked()

6) ngAfterViewInit()

7) ngAfterViewChecked()

8) ngOnDestroy()

Example:

Directory Structure:

```
****************************************
lifecyclehoks
  src
    app
      app.component.ts
      app.component.html
      app.module.ts
    index.html
****************************************
```

app.component.ts

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

@Component({

  selector: 'app-root',
```

```
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})
export class AppComponent {
    constructor(){
        //constructor will execute at booting time
        //constructor used to initilize the instant members
        //mainly we are using constructor for dependency injection
purpose
        console.log("--in constructor--");
    };
    ngOnChanges(){
        //when ever change detected in "@Input" binding properties
automatically this life cycle hook will execute.
        //ngOnChanges() will execute immidiately after constructor
        console.log("--in ngOnChanges--");
    };
    ngOnInit(){
      //ngOnInit() will execute after first successful execution
of ngOnChanges()
      //ngOnInit() also called as first life cycle hook of
component.
      //ngOnInit() will execute only once.
```

```
      //ngOnInit() helps to maintain the main business logic.
      //Ex. making the service calls
      console.log("--in ngOnInit--");
    };
    public num:number = 100;
    public increment():number{
        return this.num+=100;
    };
    public decrement():number{
      return this.num-=100;
    };
    ngDoCheck(){
        //when ever change detected in Application Model(num),
automatically this life cycle hook will execute.
        console.log("--in ngDoCheck--");
    };
    ngAfterContentInit(){
        //if framework identifies the memory for component with
the help of browser engine, automatically this life cycle hook
will execute
        console.log("--in ngAfterContentInit--");
    };
    ngAfterConetentChecked(){
```

```
        //if browser engine allots the memory for component then
this life cycle hook will execute.
        console.log("--in ngAfterContentChecked--");
    };
    ngAfterViewInit(){
        //if component loaded successfully, then this life cycle
hook will execute.
        console.log("--in ngAfterViewInit--");
    };
    ngAfterViewChecked(){
      //if data populated successfully, then this life cycle hook
will execute
      console.log("--in ngAfterViewCheck--");
    };
    ngOnDestroy(){
//ngOnDestroy() will execute by framework, before kiling the
component by framework.
        //in general we will use this life cycle hook to maintain
cleanup code
        console.log("--in ngOnDestroy--");
    };
};
```

app.component.html

```
<h1>{{num}}</h1>

<button (click)="increment()">Increment</button>

<button (click)="decrement()">Decrement</button>
```

app.module.ts

```
import { BrowserModule } from '@angular/platform-browser';

import { NgModule } from '@angular/core';

import { AppComponent } from './app.component';

@NgModule({

  declarations: [

    AppComponent

  ],

  imports: [

    BrowserModule

  ],

  providers: [],

  bootstrap: [AppComponent]

})

export class AppModule { }
```

index.html

```
<body>

  <app-root></app-root> </body>
```

Chapter-9 (Forms)

- Angular supports two types of forms.

  1) Template Driven Forms (TDF)

  2) Model Driven Forms (MDF)

- "Template Driven Forms" mainly on Application Design.
- "Template Driven Forms" may not support Framework facilities.
- "Model Driven Forms" mainly on "Application Model".
- "Model Driven Forms" also called as Reactive Forms.
- "Model Driven Forms" provides the facilities upto Framework Level Forms Design.

=>Template Driven Forms

Example:

Directory Structure:

```
****************************************
tdfex
  src
    app
      components
        tdf.component.ts
        tdf.component.html
    app.module.ts
    index.html
```

tdf.component.ts

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

```
@Component({
  selector: 'tdf',
  templateUrl: './tdf.component.html',
  styleUrls: ['./tdf.component.css']
})
export class TdfComponent implements OnInit {

  constructor() { }

  ngOnInit() {
  }

  register(data:any){
    console.log(data);
  }}
```

tdf.component.html

```
<!--

      Directives in TDF

      1) ngForm
          - this directive helps assign the logical name to forms.
      2) ngModel
          - this directive behaves like one way data binding
directive.

          - this directive saves the application data (Form Field
Data).

      3) ngModelGroup
```

```
        - this directive helps to create the subgroups.

        [A group inside another group called as subgroup]

    4)  to  handle  form  submition   we  will  use  (ngSubmit)
directive.
-->



<body>
    <form #profileData="ngForm"
          (ngSubmit)="register(profileData.value)">
        <table>
            <tr>
                <td>User Name</td>
                <input type="text" name="uname" ngModel>
            </tr>

            <tr>
                <td>Password</td>
                <input type="password" name="upwd" ngModel>
            </tr>

            <tr>
                <td>Age</td>
                <input type="number" name="age" ngModel>
            </tr>

            <tr>
                <td>Gender</td>
                <td><input type="radio"
```

```
                name="gender"
                value="male"
                ngModel>Male</td>
    <td><input type="radio"
                 name="gender"
                 value="female"
                 ngModel>Female</td>
</tr>

<tr ngModelGroup="addr">
    <td>City</td>
    <td>
        <input type="text"
                name="ucity"
                ngModel>
    </td>
</tr>

<tr>
   <td>Country</td>
   <td><select name="ucountry" ngModel>
       <option value="india">India</option>
       <option value="usa">USA</option>
       <option value="canada">Canada</option>
   </select></td>
</tr>

<tr>
    <td></td>
    <td><input type="submit"></td>
</tr>
```

```
        </table>
    </form>
</body>
```

app.module.ts

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { FormsModule } from "@angular/forms";
import { AppComponent } from './app.component';
import { TdfComponent } from './components/tdf.component';

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

index.html

```
<body>
   <tdf></tdf>
</body>
```

=>Model Driven Forms

- Model Driven forms provides the more flexibility to developers to handle "validations".
- Model Driven Forms also called as "Reactive Forms".
- Reactive Forms present in "ReactiveFormsModule".
- [formGroup] is the directive used to assign the logical name to Forms.
- "formControlName" is the directive used to save the forms data(form fields data).
- "formGroupName" is the directive used to create the SubGroups.

Example:

Directory Structure:

```
****************************************
mdfex
  src
    app
        app.component.ts
        app.component.html
     app.module.ts
   index.html
****************************************
```

app.component.ts

```
import { Component } from '@angular/core';
import { FormGroup, FormControl, Validators } from "@angular/forms";
@Component({
```

```
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})
export class AppComponent {
    profileData:FormGroup;
    constructor(){
        this.profileData = new FormGroup({
            uname                    :                    new
FormControl("Naresh",[Validators.required,

Validators.minLength(3),

Validators.maxLength(6)]),
            addr  : new FormGroup({
              address : new FormControl()
            }),
            gender : new FormControl(),
            country : new FormControl()
        });
    }
    register():any{
      console.log(this.profileData.value);
    };
};
```

app.component.html

```
<div class="container mt-5">
    <form [formGroup]="profileData"
                    (ngSubmit)="register()">
        <div class="form-group">
```

```
            <label>Uname</label>
            <input type="text"
                   name="uname"
                   class="form-control"
                   formControlName="uname"
                   required>
        </div>
        <div *ngIf="profileData.controls['uname']
                    .hasError('required')"
             class="alert alert-danger">
            **** can't left blank ****
        </div>
        <div *ngIf="profileData.controls['uname']
                    .hasError('minlength')"
              class="alert alert-danger">
            **** minimum 3 characters are required ****
        </div>
        <div
*ngIf="profileData.controls['uname'].hasError('maxlength')"
              class="alert alert-danger">
            **** maximum 6 characters are allowed ****
        </div>

        <div class="form-group" formGroupName="addr">
            <div class="form-group">
              <label>Address</label>
              <textarea
                    cols="4"
                    rows="5"
                    name="address"
                    formControlName="address"
```

```
            class="form-control"></textarea>
    </div>
</div>


<div class="form-group">
  <label>Gender</label>
  <input type="radio"
         class="form-control"
         name="gender"
         value="male"
         formControlName="gender">Male
  <input type="radio"
         class="form-control"
         name="gender"
         value="female"
         formControlName="gender">Female
</div>

<div class="form-group">
    <label>Country</label>
    <select name="country"
            class="form-control"
            formControlName="country">
        <option value="india">India</option>
        <option value="usa">USA</option>
        <option value="canada">Canada</option>
        <option value="japan">Japan</option>
        <option value="china">China</option>
    </select>
</div>
```

```
            <div class="form-group" align="center">
                <input type="submit"
                       class="btn btn-success">
            </div>

        </form>
    </div>
```

app.module.ts

```
import { BrowserModule } from '@angular/platform-browser';

import { NgModule } from '@angular/core';

import { AppComponent } from './app.component';

import { ReactiveFormsModule } from '@angular/forms';

@NgModule({

  declarations: [

    AppComponent

  ],

  imports: [

    BrowserModule,ReactiveFormsModule

  ],

  providers: [],

  bootstrap: [AppComponent]

})
```

```
export class AppModule { }
```

index.html

```
<body>

  <app-root></app-root>

</body>
```

Chapter-10 (Angular Material)

- Angular Material is the library provided by google.
- Angular Material library used to develop the Rich UI.
- we will add Angular Material by using following command.

```
> ng add @angular/material
```

Example:

Directory Structure:

```
*****************************************
angmatex
  src
    app
        app.component.ts
        app.component.html
     app.module.ts
   index.html
*****************************************
```

app.component.html

```
<br><br>

<div class="mat-elevation-z8">

 <table mat-table [dataSource]="data" style="width: 100%;"
matSort>

 <ng-container matColumnDef="p_id">

  <th mat-header-cell *matHeaderCellDef mat-sort-header>p_id</th>

   <td mat-cell *matCellDef="let row">{{row.p_id}}</td>

        </ng-container>
```

```
<ng-container matColumnDef="p_name">
<th mat-header-cell *matHeaderCellDef mat-sort-header>p_name</th>
  <td mat-cell *matCellDef="let row">{{row.p_name}}</td>
        </ng-container>
 <ng-container matColumnDef="p_cost">
<th mat-header-cell *matHeaderCellDef mat-sort-header>p_cost</th>
          <td mat-cell *matCellDef="let row">{{row.p_cost}}</td>
        </ng-container>
<tr mat-header-row *matHeaderRowDef="displayedColumns"></tr>
<tr mat-row *matRowDef="let row;columns:displayedColumns"></tr>
</table>
<mat-paginator [pageSizeOptions]="[1, 2, 3, 5]"></mat-paginator>
</div>
```

app.component.ts

```
import { Component, ViewChild } from '@angular/core';
//prepare data, which is suitable to "Material Table"
import    {    MatTableDataSource,MatPaginator,MatSort    }    from
"@angular/material";
@Component({
  selector: 'app-root',
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
```

```
})
export class AppComponent {
    @ViewChild(MatPaginator,{static:true})
    public paginator:MatPaginator;
    @ViewChild(MatSort,{static:true})
    public sort:MatSort;
public displayedColumns:string[] = ["p_id","p_name","p_cost"];
    public data:MatTableDataSource<any>;
    constructor(){
        this.data = new MatTableDataSource([
              {"p_id":111,"p_name":"p_one","p_cost":10000},
              {"p_id":555,"p_name":"p_five","p_cost":50000},
              {"p_id":222,"p_name":"p_two","p_cost":20000},
              {"p_id":444,"p_name":"p_four","p_cost":40000},
              {"p_id":333,"p_name":"p_three","p_cost":30000}
        ]);  };
    ngOnInit(){
      this.data.paginator = this.paginator;
      this.data.sort = this.sort; };}
```

app.module.ts

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

```
import { AppComponent } from './app.component';

import { BrowserAnimationsModule } from '@angular/platform-browser/animations';

import { MatTableModule,MatPaginatorModule, MatSortModule } from "@angular/material";

@NgModule({

  declarations: [

    AppComponent

  ],

  imports: [

    BrowserModule,

    BrowserAnimationsModule,

    MatTableModule,

    MatPaginatorModule,

    MatSortModule

  ],

  providers: [],

  bootstrap: [AppComponent]

})

export class AppModule { }
```

index.html

```
<body>

  <app-root></app-root> </body>
```

Chapter-11(Unit-Test Cases)

- Testing particular functionality with assumptions called as Unit Testing.
- "karma" is the automation tool, helps to write the unit test cases.
- "karma" is the inbuilt tool of angular.
- unit Testing files should have the ".spec.ts" extension.
- we will execute unit test cases by using following command.

```
> ng test
```

Example:

Directory Structure:

```
*****************************************
unittestex
  src
    app
        app.component.ts
        app.component.html
        calc.spec
        calc
     app.module.ts
    index.html
*****************************************
```

app.component.ts

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

@Component({

  selector: 'app-root',
```

```
  templateUrl: './app.component.html',
  styleUrls: ['./app.component.css']
})
export class AppComponent {
  title = 'unitTestCasesEx';
}
```

calc.spec

```
import { Calculator } from "./calc";
/*
    karma with jasmine starts the execution from describe()
*/
describe("calculator testing",()=>{
    let obj:Calculator;


    /*
    //it will execute before each describe() function
    beforeEach(()=>{
        obj =  new Calculator();
    });
    */
    /*
        //it will execute only once globally
```

```
    */
    beforeAll(()=>{
        obj =  new Calculator();
    });


    /*
        these describe() functions used to write the unit test
cases to particular functions
    */
    describe("add function testing",()=>{
        /*
            it() function used to write the test suits
        */
        it("10+10 should be equal to 20",()=>{
            const result = obj.add(10,10);
            /*
                expect() function used for assertions
            */
            expect(result).toBe(20);
        });
    });
    describe("sub function testing",()=>{
```

```
        it("10-10 should be equal to 0",()=>{
            const result = obj.sub(10,10);
            expect(result).toBe(0);
        });
    });
    describe("array testing",()=>{
        it("check 30 in my_array",()=>{
            expect(obj.my_array).toContain(30);
        });
    });
});
```

Calc:

```
export class Calculator{
    public add(num1:number,
               num2:number):number{
        return num1+num2;
    };
    public sub(num1:number,
               num2:number):number{
        return num1-num2;
    };
    public my_array:Array<number> = [10,20,30,40,50]; };
```

app.module.ts

```
import { BrowserModule } from '@angular/platform-browser';

import { NgModule } from '@angular/core';

import { AppComponent } from './app.component';

import { BrowserAnimationsModule } from '@angular/platform-browser/animations';

@NgModule({

  declarations: [

    AppComponent

  ],

  imports: [

    BrowserModule,

    BrowserAnimationsModule

  ],

  providers: [],

  bootstrap: [AppComponent]

})

export class AppModule { }
```

index.html

```
<body>

  <app-root></app-root>

</body>
```

Chapter-12(BehaviorSubject)

- BehaviorSubject used to sync the data between components.
- BehaviorSubject is the predefined service available in "rxjs" package

Example:

Directory Structure:

```
*******************************************

bahaviourSubEx

            src

              app

               services

                  test.service.ts

               components

                   first.component.ts

                   first.components.html


                   second.component.ts

                   second.component.html

               app.module.ts

              index.html

*********************************************
```

test.service.ts

```
import { Injectable } from "@angular/core";

import { BehaviorSubject } from "rxjs";

@Injectable({

    providedIn:"root"

})

export class testService{

    private data = new BehaviorSubject<string>("Angular9");

    public cast = this.data.asObservable();


    public changeData(arg1:string){

        this.data.next(arg1);

    };

};
```

first.component.ts

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

import { testService } from "../services/test.service";

@Component({

    selector:"first",

    templateUrl:"./first.component.html"

})

export class firstComponent{
```

```
    private result:string;
    constructor(private service:testService){}
    ngOnInit(){
        this.service.cast.subscribe((posRes)=>{
            this.result = posRes;
        });
    };
    clickMe(arg1){
        this.service.changeData(arg1);
    };
};
```

first.components.html

```
<h1>{{result}}</h1>
<input type="text" #msg>
<button (click)="clickMe(msg.value)">Change</button>
```

second.component.ts

```
 import { Component } from "@angular/core";
import { testService } from "../services/test.service";
@Component({
    selector:"second",
    templateUrl:"./second.component.html"
})
```

```
export class secondComponent{
    private result:string;
    constructor(private service:testService){}
    ngOnInit(){
        this.service.cast.subscribe((posRes)=>{
            this.result = posRes;
        });
    };
};
```

second.component.html

```
    <h1>{{result}}</h1>
```

app.module.ts

```
   import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { AppComponent } from './app.component';
import { firstComponent } from './components/first.component';
import { secondComponent } from './components/second.component';
@NgModule({
  declarations: [
    AppComponent,firstComponent,secondComponent
  ],
  imports: [
```

```
    BrowserModule
  ],
  providers: [],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

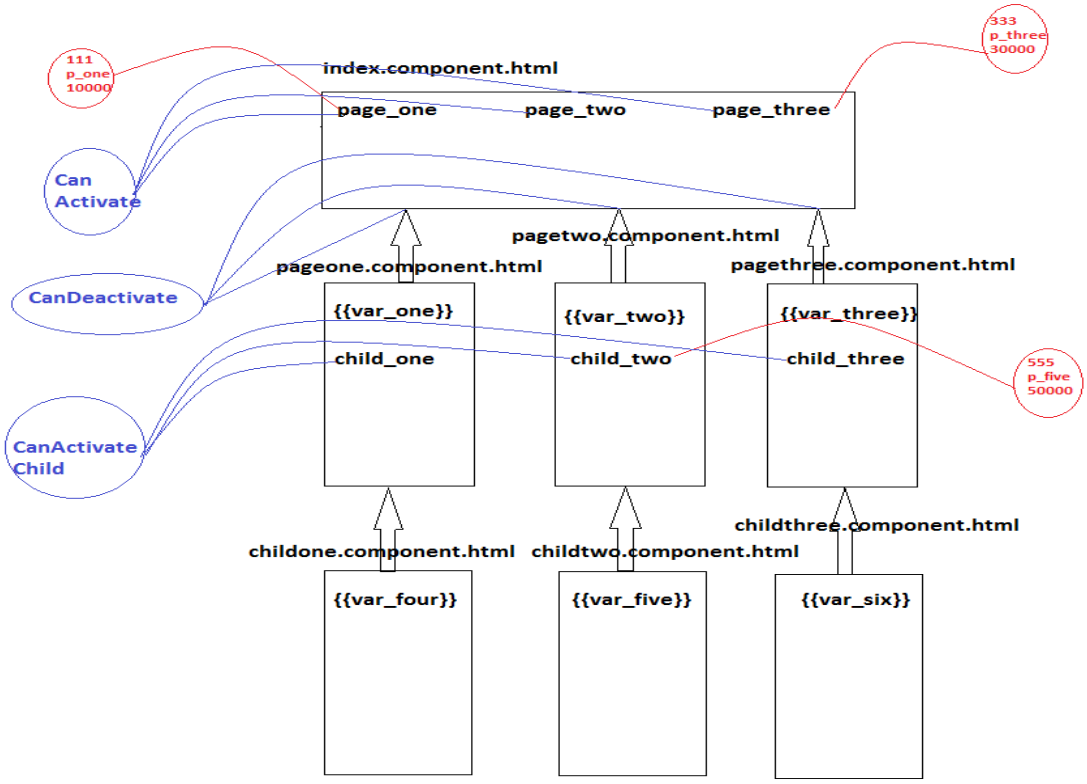
index.html

```
<body>
  <app-root></app-root>
</body>
```

Chapter-13(Single Page Applications)

- loading one template to another template without refreshing the whole webpage called as single page application.
- loading one webpage to another webpage in single page application called as routing.
- we will implement the "Routing" in single page application by using "Routes" class.
- we will load "Routes" into framwork by using "RouterModule"
- both "Routes" and "RouterModule" present in "@angular/router" package

Diagram:



step 1.

create the components

- ng g c components/index --skipTests -is --selector=index --flat true
- ng g c components/pageone --skipTests -is --selector=pageone --flat true
- ng g c components/pagetwo --skipTests -is --selector=pagetwo --flat true
- >ng g c components/pagethree --skipTests -is --selector=pagethree --flat true

- where "IndexComponent" is the main component.
- where "PageoneComponent", "PagetwoComponent" and "PagethreeComponent" are target components in single page application

step 2.

implement the business logic in target components

step 3.

create the router links

step 4.

implement the routing

src

app

routes

app.routes.ts

****

step 5.

load "appRoutes" into framwork by using "RouterModule"

implementation of child routing

---

step 6.

create the components

- ng g c components/childone --skipTests -is --selector=childone --flat true
- ng g c components/childtwo --skipTests -is --selector=childtwo --flat true
- ng g c components/childthree --skipTests -is --selector=childthree --flat true

step 7.

implement the business logic in target components

step 8.

create the hyperlinks

- we must create following hyperlinks

=> /child_one

=> /child_two

=> /child_three

step 9.

implement the child routing

step 10.

Passing Routing Parameters in Single Page Applications

"ActivatedRoute" is the predefined class in Angular, helps to read the Routing Parameters.

"snapshot" is the predefined property(utility property) helps to ActivatedRoute in order to read Routing Parameters.

step 11.

Routing Guards

- Routing Guards helps to perform the authentication in single page applications.

1) CanActivate

- authentication before entering into main routes.

2) CanDeactivate

- authentication before leaving main routes.

3) CanActivateChild

- authentication before entering into child routes.

we will implement authentication Guards by using custom services

Example:

Directory Structure:

```
****************************************
spademoex
  src
    app
      components
       page_one.component.html
       page_one.component.ts
       page_two.component.html
       page_two.component.ts
       page_three.component.html
       page_three.component.ts
       child_one.component.html
       child_one.component.ts
       child_two.component.html
       child_two.component.ts
       child_three.component.html
       child_three.component.ts
       index.component.html
       index.component.ts

      guards
       auth.guards.ts

      routings
       app.routes.ts
     app.module.ts
   index.html
****************************************
```

page_one.component.html

```
 <p>page-one works!</p>
<h1 style="color: black;margin-right:100px;">{{var_one}}</h1>
<a [routerLink]="['childone']" ><b>Child_one</b></a>
<router-outlet></router-outlet>
```

page_one.component.ts

```
    import { Component, OnInit } from '@angular/core';
import { ActivatedRoute } from '@angular/router';

@Component({
  selector: 'pageone',
  templateUrl: './page-one.component.html',
  styles: []
})
export class PageOneComponent implements OnInit {
    private var_one:any;
  constructor(public route:ActivatedRoute) {

this.var_one=this.route.snapshot.params["p_id"]+"....."+

this.route.snapshot.params["p_name"]+"...."+
                  this.route.snapshot.params["p_cost"];
  }

  ngOnInit() {
  }

}
```

page_two.component.html

```
          <p>page-two works!</p>
     <h1 style="color: blue;margin-right:100px;">{{var_two}}</h1>
     <a [routerLink]="['childtwo']" ><b>Child_two</b></a>
<router-outlet></router-outlet>
```

page_two.component.ts

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

     @Component({
       selector: 'pagetwo',
       templateUrl: './page-two.component.html',
       styles: []
     })
     export class PageTwoComponent implements OnInit {
     private var_two:any;
       constructor() {
         this.var_two="Welcome to pagetwo............!"
       }

       ngOnInit() {
       }}
```

page_three.component.html

```
          <p>page-two works!</p>
     <h1 style="color: blue;margin-right:100px;">{{var_two}}</h1>
     <a [routerLink]="['childtwo']" ><b>Child_two</b></a>
<router-outlet></router-outlet>
```

page_three.component.ts

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

@Component({
```

```
  selector: 'pagethree',
  templateUrl: './page-three.component.html',
  styles: []
})
export class PageThreeComponent implements OnInit {
private var_three:any;
  constructor() {
    this.var_three="welcome to page three.......!";
  }

  ngOnInit() {
  }}
```

Index.component.html

```
<!DOCTYPE html>
<html>
  <head>

  </head>
  <body>
    <nav  class="navbar  navbar-expand-sm  bg-light  navbar-
light">
        <ul class="navbar-nav">
          <li class="nav-item active">
<a  [routerLink]="['/pageone',111,'p_one',1000]"  style="margin-
right: 100px;">PageOne</a>
          </li>
<li class="nav-item">
```

```
<a        [routerLink]="['/pagetwo']"        style="margin-right:
100px;">Pagetwo</a>

               </li>
               <li class="nav-item">

<a       [routerLink]="['/pagethree']"       style="margin-right:
100px;">Pagethree</a>

               </li>


             </ul>
           </nav>


     <!--
     <a      [routerLink]="['/pageone']"      style="margin-right:
     100px;">PageOne</a>
     <a      [routerLink]="['/pagetwo']"      style="margin-right:
     100px;">Pagetwo</a>
     <a     [routerLink]="['/pagethree']"     style="margin-right:
     100px;">Pagethree</a>
     -->
     <router-outlet></router-outlet>


     </body>
</html>
```

child_one.component.html

```
      <h1 style="color: springgreen;">{{var_four}}</h1>
```

child_one.component.ts

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

```
@Component({
    selector:"childone",
    templateUrl:'./child-one.component.html'
})
export class childonecomponent
{
    private var_four:any;
    constructor(){
        this.var_four="Welcome to child_one component";
    }
}
```

child_two.component.html

```
      <h1 style="color: tomato;">{{var_five}}</h1>
```

child_two.component.ts

```
      import { Component } from '@angular/core';
import { ThrowStmt } from '@angular/compiler';
@Component({
    selector:"childtwo",
    templateUrl:"./child-two.component.html"
})
export class childtwocomponent
{
    private var_five:any;
    constructor(){
        this.var_five="Welcome to child_two component";
    }

}
```

child_three.component.html

```
      <h1 style="color: violet;">{{var_six}}</h1>
```

child_three.component.ts

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

@Component({

    selector:"childthree",

    templateUrl:"./child-three.component.html"

})

export class childthreecomponent

{

    private var_six:any;

    constructor(){

        this.var_six="Welcome to child_two component";

    }}
```

app.routes.ts

```
import { Routes } from "@angular/router";

import { PageOneComponent } from '../components/page-one.component';

import { PageTwoComponent } from '../components/page-two.component';

import { PageThreeComponent } from '../components/page-three.component';

import { childonecomponent } from '../components/child-one.component';
```

```
import { childtwocomponent } from '../components/child-two.component';

import { childthreecomponent } from '../components/child-three.component';

import { authGuards } from '../guards/auth.guards';

export const appRoutes:Routes = [


{path:"pageone/:p_id/:p_name/:p_cost",component:PageOneComponent,

      children:[{path:"childone",component:childonecomponent}],

    canActivate:[authGuards]},

{path:"pagetwo",component:PageTwoComponent,

      children:[{path:"childtwo",component:childtwocomponent}],

    canDeactivate:[authGuards]},

{path:"pagethree",component:PageThreeComponent,
   children:[{path:"childthree",component:childthreecomponent}],
    canActivateChild:[authGuards]}

];
```

auth.guards.ts

```
import { Injectable } from "@angular/core";

@Injectable({

    providedIn:"root"

})

export class authGuards{
```

```
canActivate():boolean{
   return confirm("do you want to enter into first page ??");
};
canDeactivate():boolean{
   return confirm("do you want to leave second page ??");
};
canActivateChild():boolean{
   return confirm("do you want to enter into 3rd child ??");
};};
```

App.module.ts

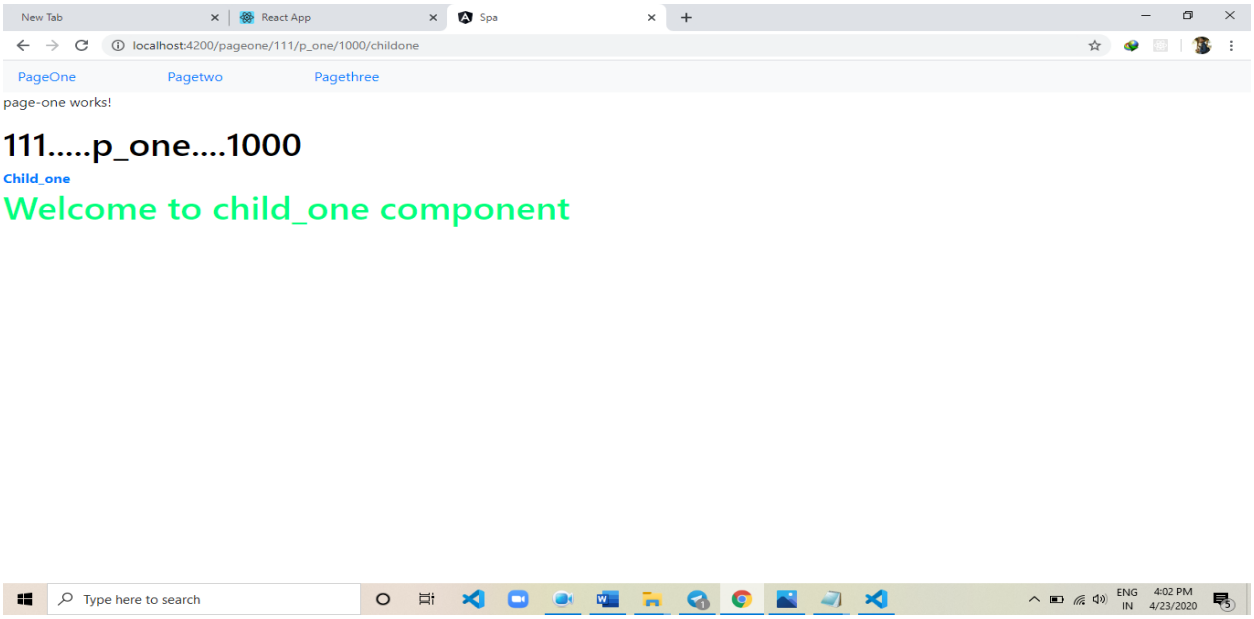
```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { AppComponent } from './app.component';
import { PageOneComponent } from './components/page-one.component';
import { IndexComponent } from './components/index.component';
import { PageTwoComponent } from './components/page-two.component';
import { PageThreeComponent } from './components/page-three.component';
import { RouterModule } from '@angular/router';
import { appRoutes } from './routes/app.routes';import { childonecomponent } from './components/child-one.component';
```

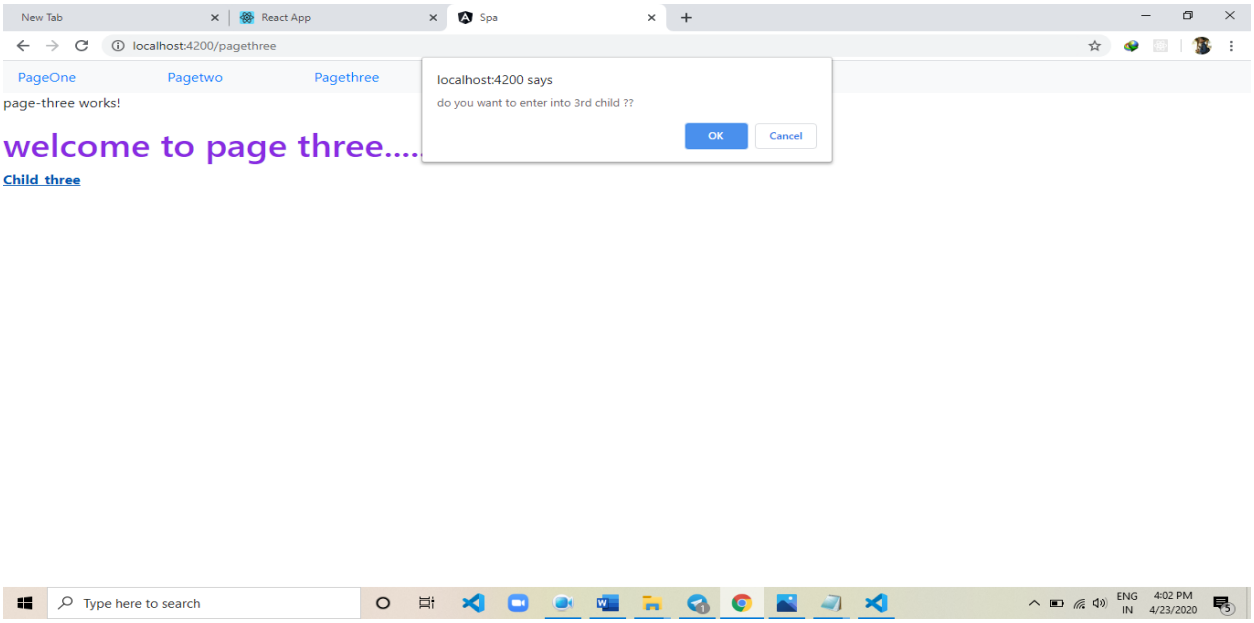
```
import { childtwocomponent } from './components/child-two.component';
import { childthreecomponent } from './components/child-three.component';
@NgModule({
  declarations: [
    AppComponent,
    PageOneComponent,
    IndexComponent,
    PageTwoComponent,
    PageThreeComponent,
    childonecomponent,
    childtwocomponent,
    childthreecomponent
  ],
  imports: [
    BrowserModule,RouterModule.forRoot(appRoutes)
  ],
  providers: [],
  bootstrap: [IndexComponent]
})
export class AppModule { }
```

index.html

```
<body> <index></index>   </body>
```

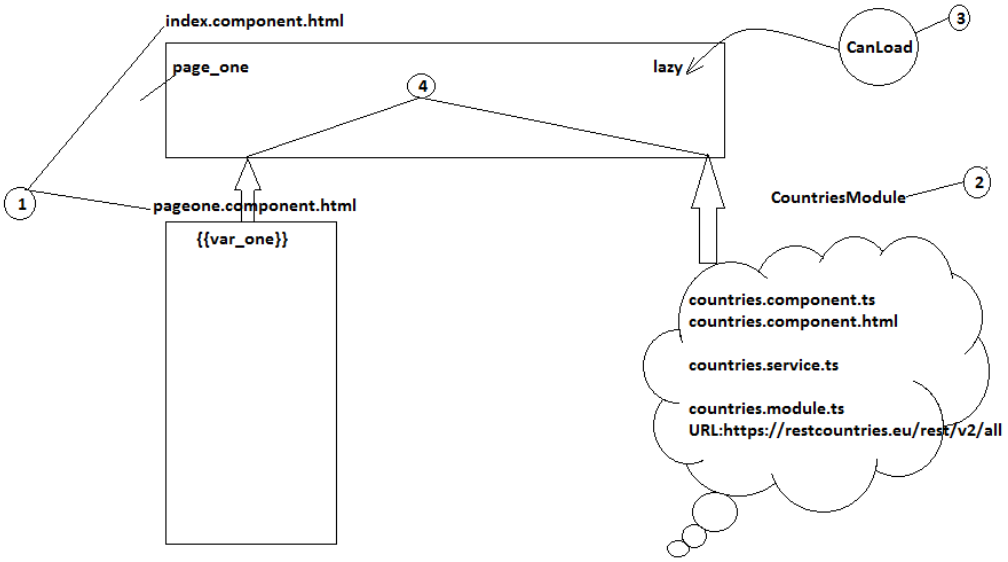
Result:





Lazy-loading

Diagram:



- if we load "bulk data of applications (images,audio and video files)" at booting time, automatically booting time will be incresed.
- so, as a developer, we must load bulk data of applications (modules) based on application requirement(customer demand).
- loading module based on customer demand called as lazy loading.

step 1.

create the components

IndexComponent

PageoneComponent

step 2.

create the CountriesModule

```
            - CountriesComponent

            - CountriesService

            - CountriesModule
```

step 3.

create the Auth Guard (CanLoad)

step 4.

implement the routing

PageoneComponent ==> IndexComponent

CountriesModule ==> IndexComponent

1) create the components

Directory structure(Main)

```
**************************************************

spaDemo2

      src

        app

          index.component.html

          index.component.ts


          pageone.component.html

          pageone.component.ts

**************************************************
```

2) create the CountriesModule

****

spaDemo2

src

app

countries.service.ts

countries.component.ts

countries.component.html

countries.module.ts

****

- Here in this context, we must develop our own registration file i.e countries.module.ts
- in this content, we must make "CountriesComponent" as "Default Component" in CountriesModule

3) implement the CanLoad Authentication Guard.

- "CanLoad" Authentication Guard, used to perform the Authentication while entering into Lazily Loaded Module

Directory structure:

****

spaDemo2

src

app

auth.guard.ts

****

4) implement the routing

PageoneComponent to IndexComponent 1

CountriesModule to IndexComponent 2

app.routes.ts

5) bootstrap the IndexComponent

index.component.html

```
<a [routerLink]="['/page_one']" style="margin-right: 100px;"><b>Page_One</b></a>

<a [routerLink]="['/lazy']"><b>Lazy</b></a>

<br><br>

<router-outlet></router-outlet>
```

index.component.ts

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

@Component({

    selector:"index",

    templateUrl:"./index.component.html"

})
```

```
export class IndexComponent{}
```

pageone.component.html

```
<h1 style="color: red;">{{var_one}}</h1>
```

pageone.component.ts

```
import { Component } from "@angular/core";
@Component({
    selector:"page_one",
    templateUrl:"./pageone.component.html"
})
export class PageoneComponent{
    public var_one:string;
    constructor(){
        this.var_one = "Page One !!!";
    };
};
```

countries.service.ts

```
import { Injectable } from "@angular/core";
import { HttpClient } from "@angular/common/http";
import { Observable } from 'rxjs';
@Injectable({
    providedIn:"root",
})
```

```
export class CountriesService{

    constructor(public http:HttpClient){}

    public getCountries():Observable<any>{

        return
this.http.get("https://restcountries.eu/rest/v2/all");

    };

};
```

countries.component.ts

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

import { CountriesService } from './countries.service';

import { HttpErrorResponse } from '@angular/common/http';

@Component({

    selector:"countries",

    templateUrl:"./countries.component.html"

})

export class CountriesComponent{

    public result:any;

    constructor(public service:CountriesService){}

    ngOnInit(){

        this.service.getCountries().subscribe((posRes)=>{

            this.result = posRes;

        },(errRes:HttpErrorResponse)=>{
```

```
            if(errRes.error instanceof Error){
                console.log("client side errors");
            }else{
                console.log("server side error");
            }
        });
    }
}
```

countries.component.html

```
<table border="1"
       cellpadding="10px"
       cellspacing="10px"
       align="center">
    <thead style="background-color: gray;">
        <tr>
            <th>SNO</th>
            <th>NAME</th>
            <th>CAPITAL</th>
            <th>POPULATION</th>
            <th>REGION</th>
            <th>NATIVENAME</th>
            <th>FLAG</th>
```

```
        </tr>
    </thead>
    <tbody>
        <tr *ngFor="let x of result;let i = index">
            <td>{{i+1}}</td>
            <td>{{x.name}}</td>
            <td>{{x.capital}}</td>
            <td>{{x.population}}</td>
            <td>{{x.region}}</td>
            <td>{{x.nativeName}}</td>
            <td><img width="100px" height="50px"
src="{{x.flag}}"></td>
        </tr>
    </tbody>
</table>
```

countries.module.ts

```
//import NgModule
//NgModule used to create the Custom Module
import { NgModule } from "@angular/core";
//import CountriesComponent
import { CountriesComponent } from "./countries.component";
//import CountriesService
```

```
import { CountriesService } from "./countries.service";

//import HttpClientModule

import { HttpClientModule } from "@angular/common/http";

//import CommonModule

import { CommonModule } from "@angular/common";

//import RouterModule

//RouterModule helps to create the "Default Component" in Module

import { RouterModule } from "@angular/router";

@NgModule({

    declarations:[CountriesComponent],

    imports:[HttpClientModule,

             CommonModule,


RouterModule.forChild([{path:"",component:CountriesComponent}])]
,

    providers:[CountriesService],

    exports:[CountriesComponent]

})

export class CountriesModule{}
```

auth.guard.ts

```
import { Injectable } from "@angular/core";

@Injectable({

    providedIn:"root"
```

```
})
export class authGuard{
    canLoad():boolean{
        return confirm("do you want to enter into lazily loaded module ??")
    }
};
```

app.module.ts

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { AppComponent } from './app.component';
import { IndexComponent } from './index.component';
import { PageoneComponent } from './pageone.component';
import { lazyRoutes } from './app.routes';
@NgModule({
  declarations: [
    AppComponent,IndexComponent,PageoneComponent
  ],
  imports: [
    BrowserModule,lazyRoutes
  ],
  providers: [],
```

```
  bootstrap: [IndexComponent]
})
export class AppModule { }
```

app.routes

```
import { Routes,RouterModule } from "@angular/router";
import { PageoneComponent } from "./pageone.component";
import { CountriesModule } from "./countries.module";
import { authGuard } from "./auth.guard";
//import ModuleWithProviders
//ModuleWithProviders helps to implement the Lazy Loading
import { ModuleWithProviders } from "@angular/core";
// export const appRoutes:Routes = [
//     {path:"page_one",component:PageoneComponent},
//
{path:"lazy",loadChildren:"./countries.module#CountriesModule",
//      canLoad:[authGuard]}
// ];


export const appRoutes:Routes = [
    {path:"page_one",component:PageoneComponent},
    {path:"lazy",
loadChildren:()=>import("./countries.module").then(m=>m.Countrie
sModule),
```

```
    canLoad:[authGuard]}
];
export const lazyRoutes:ModuleWithProviders = RouterModule.forRoot(appRoutes);
```

index.html

```
<body>
  <index></index>
</body>
```

Chapter-14(Crud Operations)

CRUD Operations:

Example:

Directory Structure:

```
*****************************************

crudApp

   server
    server.js
    src
      app
        components
          crud.component.html
          crud.component.ts

        services
          FetchService

          InsertService

          UpdateService

          DeleteService

       app.module.ts
     index.html

*****************************************
```

1) make the MySQL DataBase Ready for CRUD Operations.

```
    Default Password : root

> create schema angular7am;
```

```
    - automatically "angular7am" DataBase will create.

> use angular7am;

    - we can switch to angular7am DataBase.

> create table products(p_id integer,  p_name varchar(20),

                        p_cost integer);

    - automatically "products" table will create.

> insert into products values(111,"p_one",10000);

    - automatically record will be inserted.

> select * from products;

    - we can fetch the data from products table.
```

****

host : localhost

user : root

Password: admin

database: angular7am

table : products

****

2) create the angular project

```
    > ng new crudApp
```

3) switch to angular application

```
    > cd crudApp
```

4) download the following node modules

=> express

=> mysql

=> cors

=> body-parser

- "express" module used to develop the rest apis.
- "mysql" module used to interact with the mysql database.
- "cors" module used to enable the ports communication.
- "body-parser" module used to read the post parameters.

- we will download above modules by using "yarn" tool.

> yarn add express mysql cors body-parser --save

5) develop rest apis by using nodejs.

****

crudApp

server

server.js

****

server.js:

```
//import the modules
//require() function used to import the modules in nodejs
let express = require("express");
let mysql = require("mysql");
let cors = require("cors");
let bodyparser = require("body-parser");

//create the rest object
let app = express();
```

```
//enable the cors
app.use(cors());

//set the JSON as MIME Type
app.use(bodyparser.json());

//read the JSON
app.use(bodyparser.urlencoded({extended:false}));


//create the connection object
let connection=mysql.createConnection({
    host:"localhost",
    user:"root",
    password:"admin",
    database:"angular7am"
});

//connect to database
connection.connect();

//create the get request
app.get("/fetch",(req,res)=>{
    connection.query(`select * from products`,(err,records,fields)=>{
        if(err) throw err;
        else{
            res.send(records);
        }
    });
});


//create the post request
app.post("/insert",(req,res)=>{
    connection.query(`insert into products values(${req.body.p_id},'${req.body.p_
name}',${req.body.p_cost})`,(err,result)=>{
        if(err) throw err;
        else{
           res.send({insert:"success"});
        }
    });
});
```

```
//create the put request
app.post("/update",(req,res)=>{
    connection.query(`update products set p_name='${req.body.p_name}',p_cost=${re
q.body.p_cost} where p_id=${req.body.p_id}`,
                    (err,result)=>{
        if(err) throw err;
        else{
           res.send({update:"success"});
        }
    });
});


//delete request
app.post("/delete",(req,res)=>{
    connection.query(`delete from products where p_id=${req.body.p_id}`,(err,resu
lt)=>{
        if(err) throw err;
        else{
          res.send({delete:"success"});
        }
    });
});
//assign the port no
app.listen(8080);
console.log("server listening the port no.8080");
```

6) start the node server

```
> cd server

> node server
```

7) test the rest apis by using Postman

```
=> http://localhost:8080/fetch  (GET)

=> http://localhost:8080/insert (POST)

=> http://localhost:8080/update (PUT)

=> http://localhost:8080/delete (DELETE)
```

8) create the services

=> FetchService

=> InsertService

=> UpdateService

=> DeleteService

```
> ng g s services/fetch --skipTests

> ng g s services/insert --skipTests

> ng g s services/update --skipTests

> ng g s services/delete --skipTests
```

=> "FetchService" is ready with "getProducts()" function.

=> "InsertService" is ready with "insertRecord(data)" function.

=> "UpdateService" is ready with "updateRecord(data)" function.

=> "DeleteService" is ready with "deleteRecord(data)" function.

=> Fetch.Service.ts

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

import { HttpClient } from "@angular/common/http";
import { Observable } from "rxjs";
@Injectable({
  providedIn: 'root'
})
export class FetchService {
  constructor(private http:HttpClient) { }
  public getProducts():Observable<any>{
    return this.http.get("http://localhost:3306/fetch");
  }; };
```

=> Insert.Service.ts

```
import { Injectable } from '@angular/core';
import { HttpClient } from "@angular/common/http";
import { Observable } from "rxjs";
@Injectable({
  providedIn: 'root'
})
export class InsertService {
  constructor(private http:HttpClient) { }
  public insertRecord(data:any):Observable<any>{
    return this.http.post("http://localhost:3306/insert",data);
  };
}
```

=> Update.Service.ts

```
import { Injectable } from '@angular/core';
import { HttpClient } from "@angular/common/http";
import { Observable } from "rxjs";
@Injectable({
  providedIn: 'root'
})
export class UpdateService {
  constructor(private http:HttpClient) { }
  public updateRecord(data:any):Observable<any>{
     return this.http.post("http://localhost:3306/update",data);
  };
};
```

=> Delete.Service.ts

```
import { Injectable } from '@angular/core';
import { HttpClient } from "@angular/common/http";
import { Observable } from "rxjs";
@Injectable({
  providedIn: 'root'
})
export class DeleteService {
  constructor(private http:HttpClient) { }
  public deleteRecord(data:any):Observable<any>{
      console.log(data);
      return this.http.post("http://localhost:3306/delete",data);
  }; };
```

9) create the component.

```
> ng g c components/crud --skipTests -is --selector=crud --flat true
```

Crud.component.ts

```
import { Component, OnInit } from '@angular/core';
import { FetchService } from "../services/fetch.service";
import { InsertService } from "../services/insert.service";
import { UpdateService } from "../services/update.service";
import { DeleteService } from "../services/delete.service";
import { HttpErrorResponse } from "@angular/common/http";
import { ModalService } from "../_modal/modal.service";
@Component({
  selector: 'crud',
  templateUrl: './crud.component.html',
  styles: []
})
export class CrudComponent implements OnInit {
  private result:any;
  private update_pid:number;
  private update_pname:string;
  private update_pcost:number;
  bodyText:any;
  constructor(private fetch:FetchService,
              private insert:InsertService,
              private update:UpdateService,
              private remove:DeleteService,
              private service:ModalService) { }

  private errCallBack = (errRes:HttpErrorResponse)=>{
      if(errRes.error instanceof Error){
        console.log("client side error");
      }else{
        console.log("server side error");
      }
  };

  ngOnInit() {
    this.fetch.getProducts().subscribe((posRes)=>{
        this.result = posRes;
    },this.errCallBack);
```

```
  }

  deleteRecord(data):any{
      console.log(data);
      this.remove.deleteRecord({p_id:data})
          .subscribe((posRes)=>{
            if(posRes.delete === "success"){
              let i =
                this.result
                  .findIndex((element,index)=>{
                  return element.p_id === data;
               });
               this.result.splice(i,1);
            }else{
              alert("delete fail");
            }
      },this.errCallBack);
  }

  openUpdateModal(id: string,data:any) {
    this.bodyText = data;
    console.log(this.bodyText);
    this.update_pid=data.p_id;
    this.update_pname=data.p_name;
    this.update_pcost=data.p_cost;
    this.service.open(id);
  }

  closeUpdateModal(id: string) {
    this.update.updateRecord({"p_id":this.update_pid,"p_name":this.update_pname,"
p_cost":this.update_pcost})
              .subscribe((posRes)=>{
                if(posRes.update === "success"){
                  let i = this.result.findIndex((element,index)=>{
                      return element.p_id == this.update_pid;
                  });
                  this.result[i].p_name = this.update_pname;
                  this.result[i].p_cost = this.update_pcost;
                  this.service.close(id);
                }
              },this.errCallBack);

  }
```

```
  cancel(id:string){
    this.service.close(id);
  }


  insertRecord(){
     this.service.open("insert");
  };


  insertR(id,data:any){
     this.insert.insertRecord(data)
                .subscribe((posRes)=>{
        if(posRes.insert === "success"){
            this.result.push(data);
        }else{
            alert("Insert Fail");
        }
        this.service.close(id);
     },this.errCallBack);
  }

  removeR(id){
    this.service.close(id);
  }
```

Crud.component.html

```
<button class="glyphicon glyphicon-plus

               btn btn-success"
        (click)="insertRecord()"
        style="position: absolute;
               right: 0;
               padding: 10px;"></button>


<table border="1"
       cellpadding="30px"
       cellspacing="30px"
       align="center"
       style="font-size: 20px;
       text-align: center;">
    <thead style="background-color: gray;">
```

```
        <tr>
            <th>SNO</th>
            <th>P_ID</th>
            <th>P_NAME</th>
            <th>P_COST</th>
            <th>EDIT</th>
            <th>DELETE</th>
        </tr>
    </thead>
    <tbody>
        <tr *ngFor="let x of result;let i=index">
            <td>{{i+1}}</td>
            <td>{{x.p_id}}</td>
            <td>{{x.p_name}}</td>
            <td>{{x.p_cost}}</td>
            <td><button
                 class="glyphicon glyphicon-edit"
                 (click)="openUpdateModal('edit',x)"></button></td>
            <td><button
                class="glyphicon glyphicon-trash"
                (click)="deleteRecord(x.p_id)"></button></td>
        </tr>
    </tbody>
</table>

<jw-modal id="edit">
    <h1>Edit</h1>
    <p>P_ID: <input type="number"
                    [(ngModel)]="update_pid" /></p>
    <p>P_NAME: <input type="text"
                    [(ngModel)]="update_pname" /></p>
    <p>P_COST: <input type="number"
                    [(ngModel)]="update_pcost" /></p>

    <button (click)="closeUpdateModal('edit');">Update</button>
    <button (click)="cancel('edit');">Cancel</button>
</jw-modal>


<jw-modal id="insert">
    <h1>Insert</h1>
    <p>P_ID: <input type="number"
                    [(ngModel)]="insert_pid" /></p>
    <p>P_NAME: <input type="text"
```

```
                    [(ngModel)]="insert_pname" /></p>
    <p>P_COST: <input type="number"
                    [(ngModel)]="insert_pcost" /></p>

    <button (click)="insertR('insert',
                            {'p_id':insert_pid,
                           'p_name':insert_pname,
                           'p_cost':insert_pcost});">Insert</button>
    <button (click)="removeR('insert');">Cancel</button>
</jw-modal>
}
```

Displaying the Model Popup to Perform "Update" and "Insert" Operations

1) download 3rd party library and place in "app"

```
   Directory

  ********************

   src

     app

       _model

   ********************
```

- where "_model" is the 3rd party directory.

- This directory containes "Popup" design.

2) add the dependency with the help of "app.module.ts" file.

app.module.ts

```
import { BrowserModule } from '@angular/platform-browser';
import { NgModule } from '@angular/core';
import { AppComponent } from './app.component';
import { CrudComponent } from './components/crud.component';
import { HttpClientModule } from '@angular/common/http';
import { FormsModule } from "@angular/forms";
import { ModalModule  } from "./_modal/modal.module";
```

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

3) design the Popup by using HTML Custom Element.

4) handle the Popup Events

=> show the Popup with "Edit" icon event.

```
<button class="glyphicon glyphicon-edit"
        (click)="openUpdateModal('edit',x)"></button>

openUpdateModal(id: string,data:any) {
    this.bodyText = data;
    console.log(this.bodyText);
    this.update_pid=data.p_id;
    this.update_pname=data.p_name;
    this.update_pcost=data.p_cost;
    this.service.open(id);
}



closeUpdateModal(id: string) {
    this.update.updateRecord({"p_id":this.update_pid,
                 "p_name":this.update_pname,
                 "p_cost":this.update_pcost})
               .subscribe((posRes)=>{
                 if(posRes.update === "success"){
                   let i = this.result
                         .findIndex((element,index)=>{
                       return element.p_id ==
                                     this.update_pid;
```

```
                  });
                  this.result[i].p_name =
                                this.update_pname;
                  this.result[i].p_cost =
                                this.update_pcost;
                  this.service.close(id);
                }
              },this.errCallBack);

  }


  cancel(id:string){
    this.service.close(id);
  }
```

implementation of insert functionality

=> we have following functions

1) **insertRecord()** function used to show the popup

2) **insert(-,-)** used to insert the data into database.

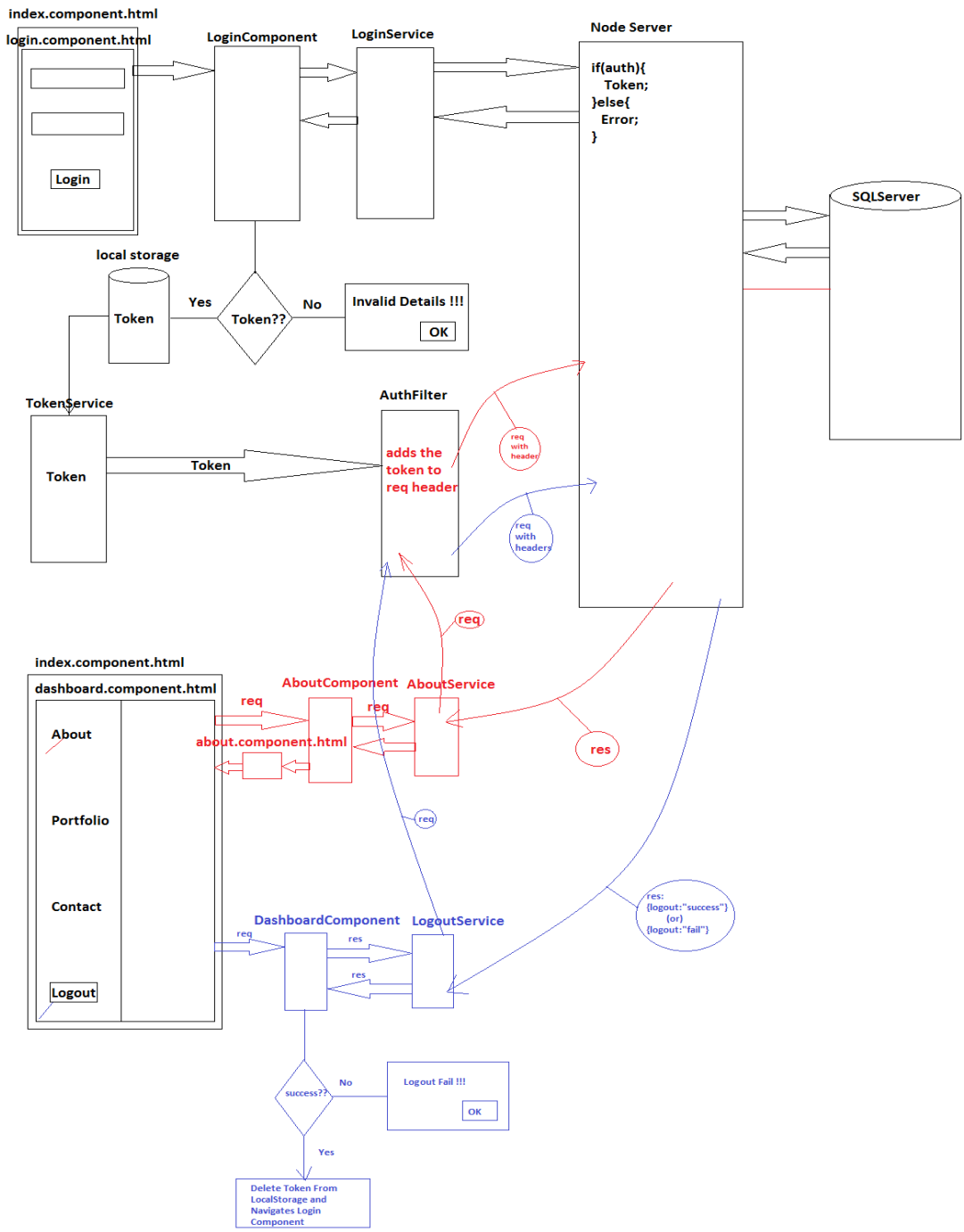
3) **remove(-)** used to remove the popup.

Index.html

```
<body>
    <crud></crud>
</body>
```

Result:

MiniProject Implementation



****

Frontend : Angular

Backend : NodeJS

Database : SQLServer

****

1) make the SQLServer Ready for MiniProject Implementation.

- we need four tables for Implementation.

=> login_details

=> about

=> portfolio

=> contact

****

server : localhost

user : sa

password : 123

database : miniproject

tables : login_details

about

portfolio

contact

****

2) create the angular application

```
> ng new miniproject
```

3) switch to miniproject

```
> cd miniproject
```

4) download following node modules

```
=> express

=> mssql

=> body-parser

=> cors

=> jwt-simple
```

- "express" module used to develop the rest apis.
- "mssql" module used to interact with the SQLServer.
- "body-parser" module used to read the post parameters.
- "cors" module used to enable the ports communication.
- "jwt-simple" module used to generate the token.

- we will download above modules by using "yarn" tool.

Command:

```
> yarn add express mssql body-parser cors jwt-simple --save
```

5) develop rest apis by using nodejs

Directory structure

```
************************************

miniproject

         server

             config

                db_properties.js

                token.js

                generateToken.js

                auth.js

             login

                login.js

             about

                about.js

             portfolio

                portfolio.js

             contact

                contact.js

             logout

                logout.js

             server.js

****************************************
```

-"db_properties.js" file used to maintain the database properties(SQLServer)

- "token.js" file used to store the server side token.

- "generateToken.js" file used to generate the tokens.

- "auth.js" file used to compare the server side tokens.

- "login.js" file used to generate the "login rest api" with module.

- "about.js","portfolio.js","contact.js" and "logout.js" files are used to develop the coresponding rest apis.

- "server.js" file is the main node server.

db_properties.js

```
const obj = {
    server : "localhost",
    user : "sa",
    password : "123",
    database : "miniproject"
};
module.exports = obj;
```

token.js

```
let obj = {
    token : ""
};
module.exports = obj;n.js
```

generateToken.js

```
//converting readable data to unreadable data with custom password called as token.

let jwt = require("jwt-simple");

let genToken = (data,password)=>{

    return jwt.encode(data,password);

};

module.exports = genToken;
```

auth.js

```
//import token.js file

//it containes server side token

let obj = require("./token");

//create the function

let auth = (req,res,next)=>{

    //read headers

    let allHeaders = req.headers;

    let c_token = allHeaders.token;

    //compare the tokens

    if(c_token === obj.token){

        next();

    }else{

        res.send({'message':'unauthorized user'});
```

```
    }
};
module.exports = auth;
```

login.js

```
//it is used to create and export the module
//import mssql module
let mssql = require("mssql");
let login = require("express").Router()
                            .post("/",(req,res)=>{
    mssql.connect(require("../config/db_properties"),(err)=>{
        if(err) throw err;
        else{
            let queryObj = new mssql.Request();
queryObj.query(`select * from login_details where
uname='${req.body.uname}' and upwd='${req.body.upwd}'`,
(err,records)=>{
                if(err) throw err;
                else{
                    if(records.recordset.length>0){
                        let token =
require("../config/generateToken")({'uname':req.body.uname,

'upwd':req.body.upwd},"hr@tcs.com");
```

```
                        require("../config/token").token = token;

res.send({'login':'success','token':token});
                    }else{
                        res.send({'login':'fail'});
                    }
                }
                mssql.close();
            });
        }
    });
});
module.exports = login;
```

about.js

```
let mssql = require("mssql");
let about = require("express").Router().get("/",
    [require("../config/auth")],(req,res)=>{

  mssql.connect(require("../config/db_properties"),
                (err)=>{
    if(err) throw err;
    else{
      let queryObj = new mssql.Request();
      queryObj.query(`select * from about`,
```

```
                    (err,records)=>{
            if(err) throw err;
            else{
                res.send(records);
            }
            mssql.close();
        });
    }
  });
});
module.exports = about;
```

portfolio.js

```
let mssql = require("mssql");
let portfolio = require("express").Router().get("/",
    [require("../config/auth")],(req,res)=>{

  mssql.connect(require("../config/db_properties"),
                    (err)=>{
    if(err) throw err;
    else{
        let queryObj = new mssql.Request();
        queryObj.query(`select * from portfolio`,
                    (err,records)=>{
            if(err) throw err;
            else{
                res.send(records);
```

```
        }
        mssql.close();
      });
    }
  });
});
module.exports = portfolio;
```

contact.js

```
let mssql = require("mssql");
let contact = require("express").Router().get("/",
        [require("../config/auth")],(req,res)=>{

    mssql.connect(require("../config/db_properties"),
                                (err)=>{
        if(err) throw err;
        else{
            let queryObj = new mssql.Request();
            queryObj.query(`select * from contact`,
                            (err,records)=>{
                if(err) throw err;
                else{
                    res.send(records);
                }
```

```
                mssql.close();
            });
        }
    });
});
module.exports = contact;
```

logout.js

```
let logout =
        require("express").Router()
        .get("/",[require("../config/auth")],(req,res)=>{
    require("../config/token").token = "";
    let obj = require("../config/token");
    if(obj.token === ""){
        res.send({logout:"success"});
    }else{
        res.send({logout:"fail"});
    } });
module.exports = logout;
```

server.js

```
let express = require("express");
let bodyparser = require("body-parser");
let cors = require("cors");
```

```
let app = express();

app.use(cors());

app.use(bodyparser.json());

app.use(bodyparser.urlencoded({extended:false}));

app.use("/login",require("./login/login"));

app.use("/about",require("./about/about"));

app.use("/portfolio",require("./portfolio/portfolio"));

app.use("/contact",require("./contact/contact"));

app.use("/logout",require("./logout/logout"));

app.listen(8080);

console.log("server listening the port no.8080");
```

6) start the node server

```
> cd miniproject

> cd server

> node server
```

7) test the rest apis by using Postman.

```
=> http://localhost:8080/login      (POST)

=> http://localhost:8080/about      (GET)

=> http://localhost:8080/portfolio  (GET)

=> http://localhost:8080/contact    (GET)

=> http://localhost:8080/logout     (GET)
```

8) divide the application into modules

```
*************************************************************

         AppModule(Main Module)(BootStrap)

        LoginModule         DashboardModule

                                    - AboutModule

                                    - PortfolioModule

                                    - ContactModule

/*************************************************************/
```

ContactModule

```
**********************************

src

  app

    contact

      services

        contact.service.ts

      components

        contact.component.ts

        contact.component.html

      module

        contact.module.ts

**********************************
```

contact.service.ts

```
import { Injectable } from "@angular/core";
import { HttpClient } from '@angular/common/http';
import { Observable } from 'rxjs';
@Injectable({
    providedIn:"root"
})
export class ContactService{
    constructor(private http:HttpClient){}
    public getData():Observable<any>{
        return this.http.get("http://localhost:8080/contact");
    };
};
```

contact.component.ts

```
import { Component } from "@angular/core";
import { ContactService } from '../services/contact.service';
import errCallBack from 'src/app/config/errCallBack';
@Component({
    selector:"contact",
    templateUrl:"./contact.component.html"
})
export class ContactComponent{
    private result:any;
    constructor(private service:ContactService){}
    ngOnInit(){
```

```
        this.service.getData().subscribe((posRes)=>{
            this.result = posRes;
        },errCallBack);
    }
};
```

contact.component.html

```
<h1>{{result | json}}</h1>
```

contact.module.ts

```
import { NgModule } from "@angular/core";
import { ContactComponent } from '../components/contact.component';
import { CommonModule } from '@angular/common';
import { HttpClientModule } from '@angular/common/http';
import { TokenModule } from 'src/app/token/token.module';
import { ContactService } from '../services/contact.service';
import { Routes,RouterModule } from "@angular/router";
export const appRoutes:Routes = [
    {path:"",component:ContactComponent}
];
@NgModule({
    declarations:[ContactComponent],
    imports:[CommonModule,
```

```
            HttpClientModule,
            TokenModule,
            RouterModule.forChild(appRoutes)],
    providers:[ContactService],
    exports:[ContactComponent]
})
export class ContactModule{}
```

TokenModule

****

```
src
  app
    token
      gettoken.service.ts
      auth.interceptor.ts
      token.module.ts
```

****

gettoken.service.ts

```
//this service used to fetch the token from local storage.
import { Injectable } from "@angular/core";
@Injectable({
    providedIn:"root"
})
```

```
export class FetchTokenService{
   public getToken():string{
       let str = window.localStorage.getItem("login_details");
       let obj = JSON.parse(str);
       return obj.token;
   };
};
```

auth.interceptor.ts

```
import { Injectable } from "@angular/core";
import { FetchTokenService } from './gettoken.service';
import { HttpRequest,HttpHandler,HttpEvent } from "@angular/common/http";
import { Observable } from "rxjs";
@Injectable({
    providedIn:"root"
})
export class authInterceptor{
    constructor(private service:FetchTokenService){}
    intercept(req:HttpRequest<any>,handler:HttpHandler)
                                :Observable<HttpEvent<any>>{
        if(req.url == "http://localhost:8080/login"){
            return handler.handle(req);
```

```
        }else{
            const req1 = req.clone({
                setHeaders:{
                    token:this.service.getToken()
                }
            });
            return handler.handle(req1);
        }
    };
};
```

token.module.ts

```
import { NgModule } from "@angular/core";
import { CommonModule } from '@angular/common';
import { FetchTokenService } from './gettoken.service';
import { HTTP_INTERCEPTORS } from '@angular/common/http';
import { authInterceptor } from './auth.interceptor';
@NgModule({
    imports:[CommonModule],
    providers:[FetchTokenService,{
        provide:HTTP_INTERCEPTORS,
        useClass:authInterceptor,
        multi:true
```

```
    }]
})
export class TokenModule{}
```

PortfolioModule

```
**********************************
src
  app
    portfolio
      services
        portfolio.service.ts
      components
        portfolio.component.ts
        portfolio.component.html
      module
        portfolio.module.ts
**********************************
```

portfolio.service.ts

```
import { Injectable } from "@angular/core";
import { HttpClient } from '@angular/common/http';
import { Observable } from 'rxjs';
@Injectable({
  providedIn:"root"
})
```

```
export class PortfolioService{
  constructor(private http:HttpClient){}
  public getData():Observable<any>{
    return this.http.get("http://localhost:8080/portfolio");
  };
};
```

portfolio.component.ts

```
import { Component } from "@angular/core";
import { PortfolioService } from '../services/portfolio.service';
import errCallBack from 'src/app/config/errCallBack';
@Component({
    selector:"portfolio",
    templateUrl:"./portfolio.component.html"
})
export class PortfolioComponent{
    private result:any;
    constructor(private service:PortfolioService){}
    ngOnInit(){
        this.service.getData().subscribe((posRes)=>{
            this.result = posRes;
        },errCallBack);
    }
};
```

portfolio.component.html

```
<h1>{{result | json}}</h1>
```

portfolio.module.ts

```
import { NgModule } from "@angular/core";
import { PortfolioComponent } from
'../components/portfolio.component';
import { CommonModule } from '@angular/common';
import { HttpClientModule } from '@angular/common/http';
import { TokenModule } from 'src/app/token/token.module';
import { PortfolioService } from
'../services/portfolio.service';
import { Routes,RouterModule } from "@angular/router";
export const appRoutes:Routes = [
    {path:"",component:PortfolioComponent}
];
@NgModule({
    declarations:[PortfolioComponent],
    imports:[CommonModule,
             HttpClientModule,
             TokenModule,
             RouterModule.forChild(appRoutes)],
    providers:[PortfolioService],
    exports:[PortfolioComponent]
})
export class PortfolioModule{}
```

AboutModule

```
**********************************

src

  app

    about

      services

        about.service.ts

      components

        about.component.ts

        about.component.html

      module

        about.module.ts

**********************************
```

about.service.ts

```
import { Injectable } from "@angular/core";
import { HttpClient } from '@angular/common/http';
import { Observable } from 'rxjs';
@Injectable({
    providedIn:"root"
})
export class AboutService{
    constructor(private http:HttpClient){}
    public getData():Observable<any>{
        return this.http.get("http://localhost:8080/about");
```

```
    };
};
```

about.component.ts

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

import { AboutService } from '../services/about.service';

import errCallBack from 'src/app/config/errCallBack';

@Component({

    selector:"about",

    templateUrl:"./about.component.html"

})

export class AboutComponent{

    private result:any;

    constructor(private service:AboutService){}

    ngOnInit(){

        this.service.getData().subscribe((posRes)=>{

            this.result = posRes;

        },errCallBack);

    }

};
```

about.component.html

```
<h1>{{result | json}}</h1>
```

about.module.ts

```
import { NgModule } from "@angular/core";

import { AboutComponent } from '../components/about.component';

import { CommonModule } from '@angular/common';

import { HttpClientModule } from '@angular/common/http';

import { TokenModule } from 'src/app/token/token.module';

import { AboutService } from '../services/about.service';

import { Routes,RouterModule } from "@angular/router";

export const appRoutes:Routes = [

    {path:"",component:AboutComponent}

];

@NgModule({

    declarations:[AboutComponent],

    imports:[CommonModule,

             HttpClientModule,

             TokenModule,

             RouterModule.forChild(appRoutes)],

    providers:[AboutService],

    exports:[AboutComponent]

})

export class AboutModule{}
```

DashboardModule

```
**********************************

dashboard

       services

          logout.service.ts

       components

          dashboard.component.ts

          dashboard.component.html

       module

          dashboard.module.ts

************************************
```

logout.service.ts

```
import { Injectable } from "@angular/core";

import { HttpClient } from '@angular/common/http';

import { Observable } from 'rxjs';

@Injectable({

    providedIn:"root"

})

export class logoutService{

    constructor(private http:HttpClient){}

    public logout():Observable<any>{

        return this.http.get("http://localhost:8080/logout")
```

```
    };
};
```

dashboard.component.ts

```
import { Component } from "@angular/core";
import { logoutService } from "../services/logout.service";
import { Router } from "@angular/router";
import errCallBack from "../../config/errCallBack";
@Component({
    selector:"dashboard",
    templateUrl:"./dashboard.component.html"
})
export class dashboardComponent{
    constructor(private router:Router,
                private service:logoutService){}
    logout():any{
        this.service.logout().subscribe((posRes)=>{
            if(posRes.logout == "success"){
                window.localStorage.removeItem("login_details");
                this.router.navigate(["/"]);
            }
        },errCallBack);
    };};
```

dashboard.component.html

```
<a [routerLink]="['about']" style="margin-right: 100px;">
    <b>About</b>
</a>
<a [routerLink]="['portfolio']" style="margin-right: 100px;">
    <b>Portfolio</b>
</a>
<a [routerLink]="['contact']" style="margin-right: 100px;">
    <b>Contact</b>
</a>
<button (click)="logout()">Logout</button>
<br><br>
<router-outlet></router-outlet>
```

dashboard.module.ts

```
import { NgModule } from "@angular/core";
import { dashboardComponent } from '../components/dashboard.component';
import { CommonModule } from '@angular/common';
import { HttpClientModule } from '@angular/common/http';
import { TokenModule } from 'src/app/token/token.module';
import { logoutService } from '../services/logout.service';
import { Routes,RouterModule } from "@angular/router";
```

```
export const appRoutes:Routes = [
    {path:"",component:dashboardComponent,

children:[{path:"about",loadChildren:"src/app/about/module/about
.module#AboutModule"},

{path:"portfolio",loadChildren:"src/app/portfolio/module/portfol
io.module#PortfolioModule"},

{path:"contact",loadChildren:"src/app/contact/module/contact.mod
ule#ContactModule"}]}
];


@NgModule({
    declarations:[dashboardComponent],
    imports:[CommonModule,
             HttpClientModule,
             TokenModule,
             RouterModule.forChild(appRoutes)],
    providers:[logoutService],
    exports:[dashboardComponent]
})
export class DashboardModule{}
```

LoginModule

```
****************************************
login
    services
        login.service.ts
    components
        login.component.ts
        login.component.html
    module
        login.module.ts
****************************************
```

login.service.ts

```
import { Injectable } from "@angular/core";
import { HttpClient } from '@angular/common/http';
import { Observable } from 'rxjs';
@Injectable({
    providedIn:"root"
})
export class loginService{
    constructor(private http:HttpClient){}
    public login(data:any):Observable<any>{
```

```
        return
this.http.post("http://localhost:8080/login",data);
    };
};
```

login.component.ts

```
import { Component } from "@angular/core";
import { loginService } from "../services/login.service";
import errCallBack from "../../config/errCallBack";
import { Router } from "@angular/router";
@Component({
    selector:"login",
    templateUrl:"./login.component.html"
})
export class loginComponent{
    constructor(private service:loginService,
                private router:Router){}
    public login(data:any){
        this.service.login(data).subscribe((posRes)=>{
            if(posRes.login == "success"){
                let str = JSON.stringify(posRes);

window.localStorage.setItem("login_details",str);
                this.router.navigate(["/dashboard"]);
```

```
            }else{
                alert("Login Fail");
            }
        },errCallBack);
    };  };
```

login.component.html

```
<fieldset>
    <legend>Login</legend>
    <input  type="text"  [(ngModel)]="uname"  placeholder="User Name">
    <br><br>
    <input  type="password"  [(ngModel)]="upwd"  placeholder="User Password">
    <br><br>
    <button (click)="login({'uname':uname,
                            'upwd':upwd})">Login</button>
</fieldset>
```

login.module.ts

```
import { NgModule } from "@angular/core";
import { loginComponent } from '../components/login.component';
import { CommonModule } from '@angular/common';
import { HttpClientModule } from '@angular/common/http';
```

```
import {  FormsModule } from "@angular/forms";

import { loginService } from '../services/login.service';

import { Routes,RouterModule } from "@angular/router";

export const appRoutes:Routes = [

    {path:"",component:loginComponent}

];

@NgModule({

    declarations:[loginComponent],

    imports:[CommonModule,

             HttpClientModule,

             FormsModule,

             RouterModule.forChild(appRoutes)],

    providers:[loginService],

    exports:[loginComponent]

})

export class LoginModule{}
```

AppModule

****

app.component.ts

app.component.html

app.module.ts

****

app.component.ts

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

@Component({

  selector: 'app-root',

  templateUrl: './app.component.html',

  styleUrls: ['./app.component.css']

})

export class AppComponent {

  title = 'miniproject';

}
```

app.component.html

```
<router-outlet></router-outlet>
```

app.module.ts

```
import { BrowserModule } from '@angular/platform-browser';

import { NgModule } from '@angular/core';

import { AppComponent } from './app.component';

import { LoginModule } from './login/module/login.module';

import { DashboardModule } from
'./dashboard/module/dashboard.module';

import { Routes,RouterModule } from "@angular/router";

export const appRoutes:Routes = [
```

```
{path:"",loadChildren:"./login/module/login.module#LoginModule"}
, {path:"dashboard",
loadChildren:"./dashboard/module/dashboard.module#DashboardModul
e"}
];
@NgModule({
  declarations: [
    AppComponent
  ],
Imports:[     BrowserModule,
              LoginModule,
              DashboardModule,
              RouterModule.forRoot(appRoutes)
  ],
  providers: [],
  bootstrap: [AppComponent]
})
export class AppModule { }
```

9) execute the miniproject

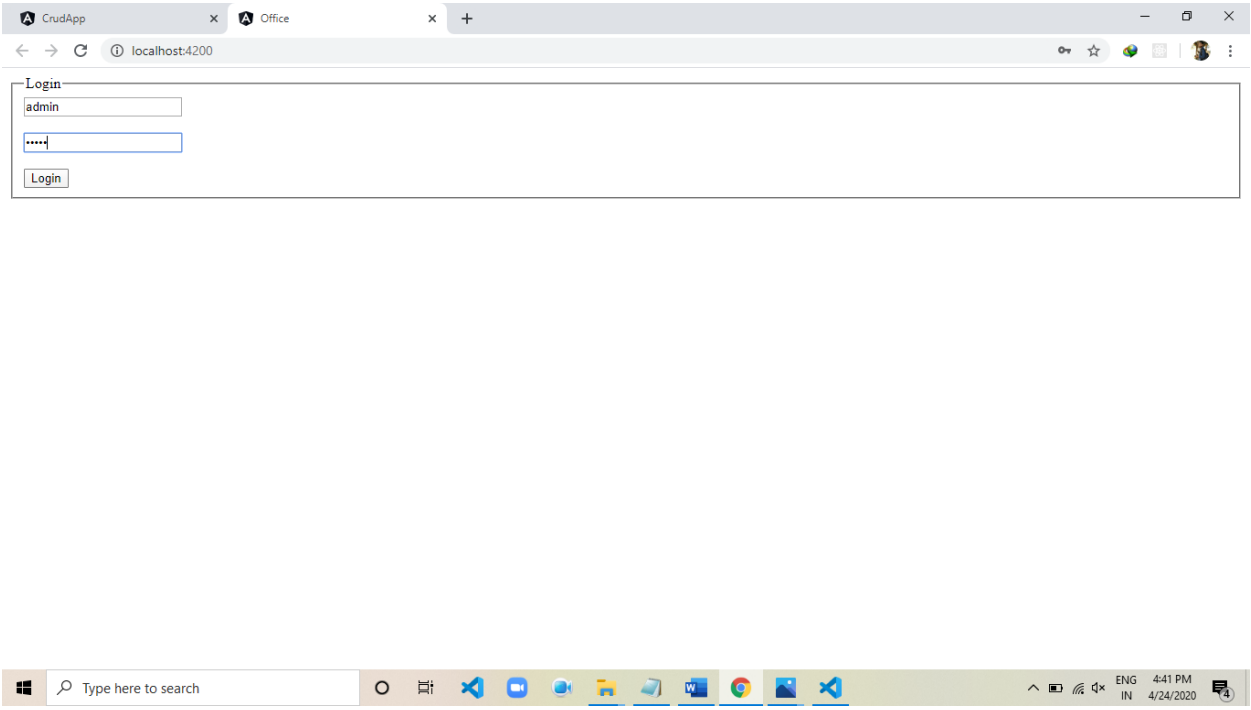
Terminal-1

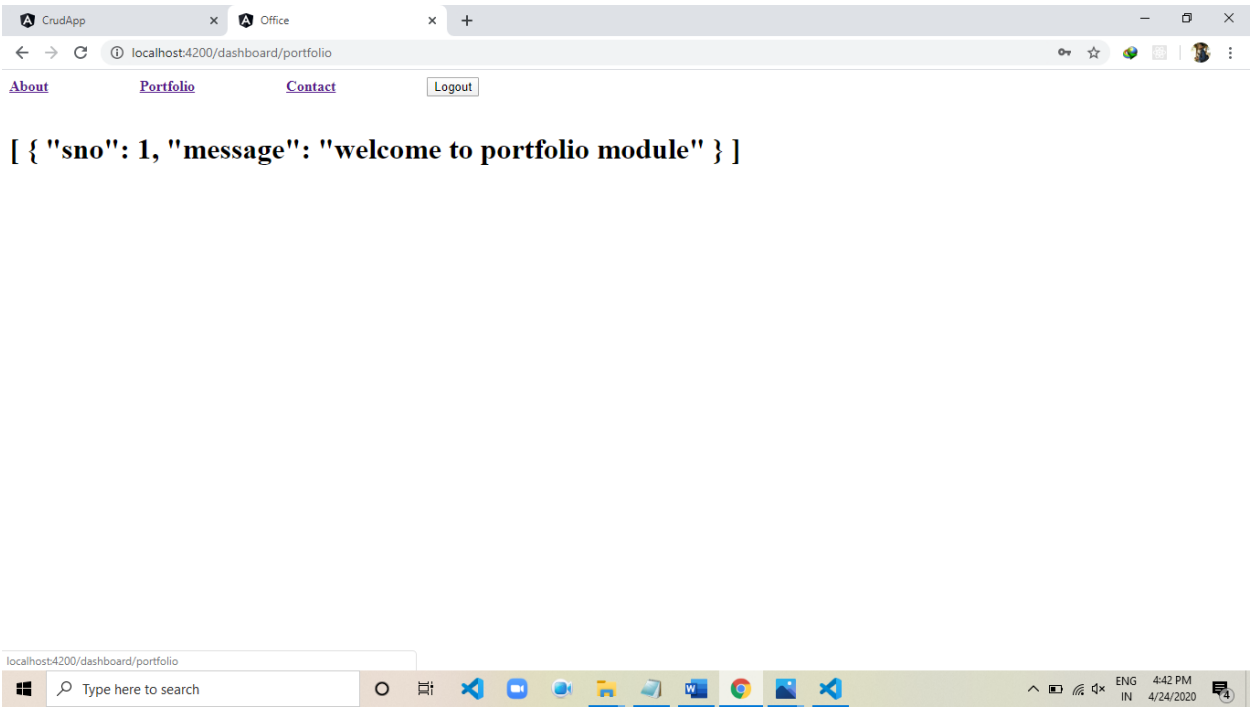
```
> cd miniproject

> cd server

> node server
```

Terminal-2

```
> cd miniproject

> ng s -o
```

Result:





Server.js(mysql Database)-Node js Code:

```
let generateToken =

require("./config/generate.Token");

let obj = require("./config/token");

let auth = require("./config/Auth");

let express = require("express");

let mysql = require("mysql");

let cors = require("cors");

let bodyparser = require("body-parser");

let app = express();

app.use(cors());
```

```
app.use(bodyparser.json());

app.use(bodyparser.urlencoded({ extended: false }));


let connection = mysql.createConnection({

host: "localhost",

user: "root",

password: "admin",

database: "miniproject",

port: 3306

});

connection.connect();


//Login request

app.post("/login", (req, res) => {

connection.query(

    `select * from login_details where uname='${req.body.uname}'
and upwd='${req.body.upwd}'`,

    (err, records, feilds) => {

        if (records.length > 0) {

            let newToken = generateToken(

                {

                    uname: req.body.uname,
```

```
                    upwd: req.body.upwd
                },
                "Raju"
            );
            obj.token = newToken;
            res.send({ login: "success", token: newToken });
        } else {
            res.send({ login: "fail" });
        }
    }
);
});

//create the get request
app.get("/about",[auth],(req,res)=>{
 connection.query(`select * from about`,(err,records,fields)=>{
        if(err) throw err;
        else{
            res.send(records);
        }
    }); });
//create the get request
```

```
app.get("/contact",[auth],(req,res)=>{

connection.query(`select * from contact`,(err,records,fields)=>{

        if(err) throw err;

        else{

            res.send(records);

        }

    });

});


//create the get request

app.get("/portfolio",[auth],(req,res)=>{connection.query(`select
* from portfolio`,(err,records,fields)=>{

        if(err) throw err;

        else{

            res.send(records);

        }

    });

});





//Login code
```

```
app.get("/",[require("../config/auth")],(req,res)=>{

    require("../config/token").token = "";

    let obj = require("../config/token");

    if(obj.token === ""){

        res.send({logout:"success"});

    }else{

        res.send({logout:"fail"});

    }

});


//assign the port no

app.listen(8080);

console.log("server listening the port no.8080");
```

***** Steps to implement the MiniProject *****

- in our miniproject we will use following databases.

1) mysql

2) mongodb

3) sql server

- we will use mysql database for both authentication and about module in miniproject.

Queries

Default Password : root

```
> create schema miniproject;

> use miniproject;

> create table login_details(uname varchar(20),upwd varchar(20));

> insert into login_details values("admin","admin");

> create table about(sno integer,about varchar(50));

> insert into about values(1,"MEAN Stack...!");

> insert into about values(2,"MERN Stack...!");

> select * from login_details;

> select * from about;
```

****

host : localhost

user : root

password: root

database: miniproject

tables : login_details

about

****

- we will use mongodb database for portfolio module in miniproject.

Queries

```
> mongod

> mongo

> use miniproject;

> db.createCollection("portfolio");

> db.portfolio.insert({"sno":1,

                "sub":"JavaScript",

                "demand":"High"});

> db.portfolio.find();
```

****

protocol : mongodb

port : 27017

database : miniproject

collection : portfolio

****

- we will use SQL Server DataBase for contact module.

****

server : localhost

user : sa

password: 123

database: miniproject

table : contact

****

Step 2.

create the server directory.

Ex.

server

Step 3.

download the following node modules.

> yarn add express

mysql

mongodb@2.2.32

mssql

body-parser

cors

jwt-simple --save

Step 4.(Develop the rest apis by using NodeJS)

```
server
      common
        imports.js
        mysql_properties.js
        mssql_properties.js
        mysql_connection.js
        generateToken.js
        token.js
        auth.js
      login
        login.js
      about
        about.js
      portfolio
        portfolio.js
      contact
        contact.js
      logout
        logout.js
      server.js
```

****

- "imports.js" file used to maintain all the imports.
- "mysql_properties.js" file used to maintain the mysql
- database properties.
- "mssql_properties.js" file used to maintain SQL Server properties.
- "mysql_connection.js" file used to create and return mysql connection object.
- "generateToken.js" file used to geneerate the tokens.
- "token.js" file used to store the server side token.
- "auth.js" file used to compare the tokens.
- "login.js" file is used to develop the login rest api.
- "about.js" file is used to fetch the data from about table.
- "portfolio.js" file is used to fetch the data from "portfolio" collection.
- "contact.js" file is used to fetch the data from
- "contact" table.
- "logout.js" file is used to implement logout rest api.
- "server.js" file is the main server file.

Step 5.

Start the servers.

> nodemon server

> mongod

Step 6.

Test the following rest apis by using postman.

=> http://localhost:8080/login (POST)

=> http://localhost:8080/about (GET)

=> http://localhost:8080/portfolio(GET)

=> http://localhost:8080/contact (GET)

=> http://localhost:8080/logout (GET)

imports.js

```
module.exports = {
    express : require("express"),
    mysql   : require("mysql"),
    mssql   : require("mssql"),
    mongodb : require("mongodb"),
    bodyparser : require("body-parser"),
    cors : require("cors"),
    jwt : require("jwt-simple")  };
```

mysql_properties.js

```
module.exports = {
    host     :   "localhost",
    user     :   "root",
    password:   "root",
    database:   "miniproject" };
```

mssql_properties.js

```
module.exports = {
    server   :   "localhost",
    user     :   "sa",
    password:   "123",
    database:   "miniproject"
};
```

mysql_connection.js

```
module.exports = {
    server   :   "localhost",
    user     :   "sa",
    password:   "123",
    database:   "miniproject"
};
```

generateToken.js

```
module.exports = function(obj,password){
    return require("./imports").jwt.encode(obj,password);
};
```

token.js

```
module.exports = {
    "token" : ""
};
```

auth.js

```
/*
    executing particular business logic before rest api calls called
    as middleware
    "next" is the middleware in nodejs
    in general we will implement middleware by using arrow functions
*/
module.exports = (req,res,next)=>{
    if(req.header("token") == require("./token").token){
        next();
    }else{
        res.send("UnAuthorized User...!");
    }
};
```

login.js

```
module.exports = require("../common/imports").express
                 .Router()
                 .post("/",(req,res)=>{

  //get the connection object
  let conn = require("../common/mysql_connection");
  let connection = conn.getConnection();
```

```
  connection.connect();
  connection.query("select * from login_details where
uname='"+req.body.uname+"' and
upwd='"+req.body.upwd+"'",(err,records)=>{


    if(records.length>0){
        var token = require("../common/generateToken")({
            'uname':req.body.uname,
            'upwd':req.body.upwd
        },'hr@nareshit.in');
        require("../common/token").token = token;
        res.send({"login":"success","token":token});
    }else{
        res.send({"login":"fail"})
    }
  });
});
```

about.js

```
module.exports = require("../common/imports").express
                 .Router()
                 .get("/",
                      [require("../common/auth")],
                      (req,res)=>{
    //get the connection object
    let conn = require("../common/mysql_connection");
    let connection = conn.getConnection();
```

```
    connection.connect();

    connection.query(`select * from about`,

                                (err,records,fields)=>{

        if(err)

            throw err;

        else

            res.send(records);

    });

});
```

portfolio.js

```
module.exports = require("../common/imports").express

                 .Router()

.get("/",[require("../common/auth")],(req,res)=>{

    let nareshIT =
require("../common/imports").mongodb.MongoClient;

    nareshIT.connect("mongodb://localhost:27017/miniproject",

(err,db)=>{

        if(err)

            throw err;

        else{

            db.collection("portfolio")

              .find()

              .toArray((err,array)=>{

                if(err)
```

```
                    throw err;
                else
                    res.send(array);
            });
        }
    });
});
```

contact.js

```
module.exports = require("../common/imports").express
                 .Router()

.get("/",[require("../common/auth")],(req,res)=>{
    let mssql = require("../common/imports").mssql;
    mssql.connect(require("../common/mssql_properties"),(err)=>{
        if(err)
            throw err;
        else{
            let request = new mssql.Request();
            request.query(`select * from
contact`,(err,records)=>{
                if(err)
                    throw err;
                else{
                    res.send(records);
                }
                mssql.close();
            });
        }  });  });
```

logout.js

```
module.exports = require("../common/imports").express
                 .Router()

.get("/",[require("../common/auth")],(req,res)=>{
    //delete the server token
    require("../common/token").token = "";
    res.send({"logout":"success"});
});
```

server.js

```
let app = require("./common/imports").express();

let bodyparser = require("./common/imports").bodyparser;

app.use(bodyparser.json());

app.use(bodyparser.urlencoded({extended:false}));

app.use(require("./common/imports").cors());

app.use("/login",require("./login/login"));

app.use(require("./common/auth"));

app.use("/about",require("./about/about"));

app.use("/portfolio",require("./portfolio/portfolio"));

app.use("/contact",require("./contact/contact"));

app.use("/logout",require("./logout/logout"));

app.listen(8080);

console.log("Server Listening the port no.8080");
```