**MEAN Stack**

**Phase 1**

**Day 1**

**26-07-2021**

<https://github.com/Kaleakash/MEAN_Stack_TCS_July_2021_Batch.git>

MEAN Stack :

Mongo Db / MySQL Express JS Angular Framework Node JS

Phase 1

Git

HTML,CSS,JavaScript using ES5

Bootstrap

Section end and phase end projects.

Phase 2

Node JS Overview

TypeScript using ES6 features

Angular Framework

Section end and phase end projects

Phase 3

Node JS

Node JS modules http, util, fs, express js

Mongo DB database : No SQL Database

Mongodb and mongoose modules to connect the database through JavaScript (Node JS)

Socket programming

Section end and phase end projects

Phase 4

Docker

AWS Overview : EC2 and S3

Deploy the MEAN Stack project in EC2

Section end and phase end projects

Capstone project : Team 5 people

GIT :

Local Version control :

SVN:

Git is sub version control system.

Version control system that records changes on files or project or application.

Merge the two team code in one application.

Git provide local as well as remote repository (folder or directory).

**Open the terminal**

Check the git version using command as

Open the Terminal

git --version

Then create folder

Move inside a folder.

mkdir folderName

Then create file using command prompt or GUI and write some contents.

To create local git repository using command as

git init

to check the status of last command we have to use command as

git status

to add the untrack file from file system to staging area.

git add filename

git status

After this command file will move from file system to staging area.

To move file from staging area to local repository we have to run the command as

git commit –m “created first file”

create github account with your

git config --global user.email "you@example.com"git config --global user.name "Your Name"

if we do any changes in existing file or added new file or folder

Then run the command as

git status

git add .

git commit –m “commit message”

These command repeat again and again.

remote repository : github, aws(code commit), azure etc.

To push the data from local repository to remote repository we have to use the command as

git remote add origin URL

git push –u origin master/man

or

git push

or

git push –u origin HEAD

Another way to create the repository

git clone URL

if first time we want to download the data from remote repository we have to use

git clone URL

**Phase 1**

**Day 2**

**27-07-2021**

**git branch : git branch is a like pointer which hold more than one commit details.**

**Git commit : it is use to send the data from staging area to local repository is known a git commit.**

**Git staging are : it a buffer area created by git which hold the data before commit. It is a intermediate layer or memory between local system and local repository.**

**By default depending upon the version of git default branch created it may main or master**

Default master/main branch

Do some changes 🡪add/commit -🡪add/commit --🡪add/commit

A branch

Do some changes 🡪add/commit --🡪add/commit

After done all changes in user-defined if code is correct then merge user-defined branch into main/master branch else we will delete the branch.

To check default as well as user-defined branch names

git branch

To create new branch

git branch branchName

To switch from one branch to another branch

git checkout branchName

To merge user-defined branch code to current branch ie main/master

git merge user-definedBranchName

To delete user-defined branch

git branch –D branchName

git pull : it use to download latest data from existing remote repository.

git pull execute in main/master branch if you want to do changes even space or dot. Please create user-defined branch do the changes if any thing wrong switch to main/master branch and delete user-defined branch.

UI Technologies

Day 2 and Day 3 HTML/CSS

https://[www.google.com](http://www.google.com) URL : Uniform Resource Locator

http : protocol : hyper text transfer protocol : secure

www : world wide web

google : domain

com : commercial

req(http/https)------🡪

Client Server

🡨---res(http/https)----- HTML/HTML5

CSS/CSS3

JS (JavaScript)

**HTML/HTML5-**🡪 It use to display the content on browser.

CSS/CSS -🡪 Apply good look and feel or presentation logic on contents.

JavaScript 🡪 Event on contents or programming on web page.

basically if a web page was a body then html is the skeleton, css is the skin, and javascript is the organs

HTML : Hyper text Mark up language : it is use to create web page it may be static or dynamic.

HTML provide lot pre-defined tags or elements. HTML is not a case sensitive as well as not a structure.

Tag syntax

<tagName> opening tag

</tagName> closing tag

<tagName/> self closing tag

1. Html
2. Head
3. Body
4. Title
5. P

Open the notepad or any editor

Write the html code

<html>

<head>

<title>This is my simple web page</title>

</head>

<body>

<p>Welcome to My Simple Web Application </p>

</body>

</html>

Save the file with any name with extension .html

Make sure file extension must be .html

Then open in an browser.

**IDE**

Notepad ++

Bracket

ATOM

Eclipse

VS

**VS code**

Break tag <br/>

Heading tags

H1 to h6 heading tags

H1 means largest

H6 means smallest

Html 4 version (xhtml)

<!doctype html public url=”pathpath.**dtd**”>

Document type definition

dtd file contains the rules what is root tag name ie html, which contains two child tag head and body

body tag can contains more than one p as well as other tags.

html5 they remove dtd file

**<!doctype html> : this tag is use to give the instruction to browser we are going to html5 features this tag also optional.**

And added more tag to make html dynamic web page without depend on any other language.

**Hyperlink** : hyperlink is use to connect more than one web page.

<a href=”pageName/pageName.html”>Text</a>

a : anchor tag

href : hyper reference.

To add the image

Syntax

<img src=”ImageName.jpeg/gif/” />

Img : image

Src : source

**Phase 1**

**Day 3**

**28-07-2021**

List Tags

HTML provide different type of list tags

UnOrder list : ul : unorder list and li :list item

Order List : ol order list and li list item

Definition List dl : definition list, dt : definition term and dd : definition description

**Table Tags**

Table tag,

Tr : table row

Th : table heading

Td : table data

**EmpId Name Age heading**

100 Raj 21

101 Seeta 22

102 Meeta 23

**Attribute** : attribute is use to describe the properties of a tags.

Attribute we can use in the form of key-value pairs.

We can use value may in single quote or double quote or without quote.

We have to use attribute inside a opening tags.

Syntax

<tagname name1=”value1” name2=’value2’ name3=value3> </tagName>

**Form tags**

Login Page

UserName TextField

Password PasswordField

Submit Reset

Before HTML5

<input type="text/password/radio/checkbox/button/submit/reset/file"/>

After HTML5

<input type=”number/email/date/url” />

HTML form by default method is consider as GET

If method is GET data send through URL using URL re-direct technique

URL?key=value&key=value&key=value

Get method is not a secure.

If we want data must be secure we have to must method=”post”

If method is post data send through Request body part.

Div tag

Span

CSS :

CSS provide set of properties which help to apply good look and feel for the web page.

Using HTML we have to depending upon other tags. some times we can’t achieve that good look and feel base upon the client requirement.

Using HTML actual contents and formatting style combine in one place or page.

CSS mainly divided into three types

1. Inline CSS
2. Internal CSS or embedded CSS
3. External CSS

Inline CSS

Syntax

<tagName style=”property:value;property:value;property:value;”>Contents </tagName>

Using Inline Css applying style attribute for more than one tag is more complex. In line CSS is good if we want CSS for few or only one tag.

**Internal CSS or Embedded CSS**

<style type=”text/css”>

selector {property : value;property:value;}

</style>

We have to write the style tag in between head tag.

Div is known as division tag. Div tag is also known as container tag. Which can contains more than one other tags as well as another div tag. Div tag is use to represent particular part of web page.

**Types of selectors**

1. Universal selector : \* : all tags : \*{property:value}
2. Specific tag selector : tagName {property:value}
3. Local class selector : tagname.className {property:value}
4. Global class selector .className{property:value}
5. Id selector : #idName{property:value}
6. Child selector : parent Name childTagName {property:value}

Class selector and Id selector

class : means group of tags may be same type or different type. More than one tags can contains same class name but id must be unique

<div>

<p class=”p1” id=”a1”>First</p>

<p class=”p2” id=”a2”>Second</p>

<p class=”p1” id=”a3”>Third</p>

<p class=”p2” id=”a4”>Fourth</p>

</div>

Limitation of Internal CSS. The CSS rules apply for local that web page. But if we want CSS rules for globally accessible then we have to use external CSS.

styles.css

write CSS rules

in html web page

inside head tag

<link rel=”stylesheet” type=”text/css” href=”styles.css”/>

Box Model

**Phase 1**

**Day 4**

**26-07-2021**

**Box Model**

In html Every tags ie DOM (Document Object Model). Every tag is known as DOM elements.

Internally follow box model.

Margin-left

Margin-right

Margin-top

Margin-bottom

Border-left

Border-right

Border-top

Border-bottom

Padding-left

Padding-right

Padding-top

Padding-bottom

**JavaScript :**

**JavaScript using ES5 not ES6**

**ECMA Script : European Computer Manufacture Association**

ECMA is a concept.

OOPs

One of the implementation of ES5 or ES6 is JavaScript.

JavaScript was object based interpreter scripting language.

Object based Vs Object Oriented

JavaScript contains lot pre-defined object as well as we can create user-defined object not class concept.

Interpreter Vs Compiler :

Interpreter : check the code line by line

Compiler : it check all the code at time and convert into another format.

Using JavaScript we can do programming on web page.

If we want to write JavaScript code we have to use the script tag.

Syntax

<script type=”text/JavaScript”> opening tag type=”text/JavaScript –optional

</script> closing tag

We can write more than one script tag in html in between head as well as body tags.

To display the message through JavaScript we can to use document.write(“msg”);

document is pre-defined object and write is pre-defined functions.

In JavaScript it not mandatory every statement must be end with semicolon.

Variable and datatype

In JavaScript we can declare the variable using **var** keywords.

Syntax

var variablename;

var abc; // default value of variable is **undefined**

var m=10; //it is consider as number type

var n=10.10; // number type

var name=”Ravi Kumar”; // string consider

var result = true; // Boolean type consider

var obj = new Date(); // obj is consider as object reference.

**Operators**

Arithmetic operator : +, -, \*, /, %(remainder)

Logical : &&, ||, !

Conditional operator : >, >=, <, <=, ==, ===, !=

Increment and decrement : ++, --

Type of operator : typeOf

Ternary operator : condition ? true :false;

== and ===

typeof

ternary operator :

if statement

simple if

if else

if else if

if(condition){

true

}else {

false

}

switch statement

looping

while loop

do while loop

for loop

**function**

function is use to write the set of instruction to perform a specific task.

2 types

1. Pre-defined function
2. alert() : this function is use to display the pop message.
3. prompt() : This function is use to take the value through keyword.
4. eval() : it is use to convert string to number
   1. parseInt(): it take only number without decimal
   2. parseFloat(): with decimal
5. Confirm(): it contains 2 button ok and cancel. If user click ok it return true else return false.
6. User-defined function

In JavaScript we can write function in lot of ways.

1. Normal function declaration syntax

function functionName(parameterList) {

}

**Event :** Event is interaction between user and component (dom elements) or event provide bridge between html and JavaScript code.

JavaScript lot different type of events. All event in JavaScript start with on followed by event name.

Example

onClick

onDblClick : button group : button, radio button, checkbox

onMouseOver

onMouseOut : image or other tags

onKeyUp

onKeyDown : textfield

OnSubmit : validation

onChange : dropdown

onFocus : while entering in text field

onBlur : while exit from text field

etc

**DOM : Document Object Model**

**index.html**

**DOM Hierarchy will create**

<html>

<head>

<title>Simple Web Page</title>

</head>

<body>

<p>Welcome to My Web Page</p>

</body>

</html>

Html 🡪 root tag

Head body

Title p

textNode 🡪 Simple Web page text Node : Welcome to My Web Page

DOM API Document Object Model Application programming interface.

All language like Java, Python, C# as well as JavaScript provide DOM API which help to read, write and update dom (html tag contents ) dynamically.

**Phase 1**

**Day 15**

**30-07-2021**

**External JavaScript**

**If we want JavaScript code particularly for only one page then we can use internal JavaScript.**

**But if we want JavaScript function code can access more than one web page that time we can use external JS file**

**DOM Operation**

**Expression style function**

**Normal function we can call before declaration as well as after declaration.**

**But expression style function must be declare first then invocation.**

**Callback function : passing the function itself or function body or function name to another function as a parameter is know as callback function.**

**Arrow function : arrow function is part of ES6 features.**

**Arrow function is a short cut syntax for expression style function.**

**array :**

**array is use to store more than one value of same or different types.**

**syntax**

**var num1 = [10,20,30,40,50,60]; literal style**

**var num2 = new Array(10,20,30,40,50,60); object creation style**

**array start from index position 0 to size-1**

**array forEach() function takes callback function as a parameter which help to display the value one by one without taking help of any loop.**

**IIFE : Immediate Invoke function Expression**

**Syntax of IIFE function**

**(function declaration)(functionCall)**

**IIFE function we can’t do re-usability.**

**Array methods**

**splice(indexpostion, deleteCount, add elements/replace elements)**

**Day 6**

**02-08-2021**

**JavaScript provide two pre-defined collection class**

**It Set and Map (ES6).**

**Set : A set is a type of collection or data structure which help to store more than one value.**

**Set doesn’t allow duplicate.**

**for in loop : it retrieve the index position**

**for of loop : it retrieve value**

**Map : Map is a type of collection or data structure which help to store data in the form of key-value pairs. Key is unique and value may be duplicate.**

**ES6 features**

**let and const**

**from ES6 JavaScript we can use var,let and const keyword to declare the variables.**

**Using var keyword we can declare same variable once again ie re-declaration. Using let keyword we can’t do re-declaration.**

**var n=10;**

**n=20; re-assign**

**var n=30; re-declare**

**let m=40;**

**m=50; re-assign**

**let m=60; // Error**

**int a=10;**

**a=15;**

**int a=20; // Error**

**using var we can do global scope. But using let we can do local or block scope.**

**If we declare the variable using const we can’t change the value of that variable.**

**OOP : object oriented programming**

**objects**

**object is a any real world entity.**

**State or properties -🡪 have -🡪 variable/ fields**

**Person**

**Behaviour --🡪do/does -🡪 functions / methods**

**Bank**

**Car**

**Animal**

**Employee**

**Customer**

**Order**

**In JavaScript we can describe the object using different ways**

**1st way using function ES5 style**

**2nd way using literal style ES5 style**

**3rd way using class style ES6 style**

**this is a keyword which refer to current object.**

**Constructor : constructor is like a special function which help to create the memory.**

**It use to do initialization purpose.**

**In ES6 class must be contains only one constructor it may be empty or parameterized.**

**Literal style object creation is use if we want object with only properties not behaviour.**

**JSON : JavaScript Object Notation**

**Req(http)-🡪 Java (Spring boot) java(req)**

**Java**

**Client Amazon Web Application XML/JSON Google Pay**

**Asp.net**

**Php/python/asp.net(res) PayTM**

**🡨---Res(http) Php**

**Net Banking**

**Cash delivery**

**Python**

**Credit card**

**Web Service : Giving the service for web application when both application running using different technologies.**

**SOAP Web Service : Simple Object Access Protocol. : We can consume and produce only in the form of XML.**

**REST Full Web Service : We can consume and produce data in any format like xml, json, text, html or any other format.**

**­**

**JSON : JavaScript Object Notation : Json Store the data in the form of key-value pairs.**

**Where key must in double quote and value may be number, string, Boolean, array, complex object. Key must be unique. Using key we can get the value.**

**{“key1”:value1,”key2”:”value2”}**

**JavaScript provide pre-defined object ie JSON.**

**JavaScript provide JSON pre-defined object which help to convert string to json and json to string or object.**

**Day 6**

**03-08-2021**

**Web Storage : HTML5 provide one of the great features ie Web Storage.**

**Which help to share the data from one js file to another js file as well data store the**

**Browser or external drive memory.**

**sessionStorage : if we store the data in sessionStorage it store till session or browser open. Once close the browser or application the value from session storage get destroy.**

**localStorage: if we store the data in localStorage it store permanently. So we have to explicitly remove data.**

**sessionStorage.setItem(“key”,value);**

**localStorage.setItem(“key”,value);**

**sessionStorage.getItem(“key”)**

**localStorage.getItem(“key”);**

**sessionStorage.removeItem(“key”);**

**localStorage.removeItem(“key”);**

**synchronous and asynchronous**

**Synchronous statement execution**

**document.write(“1st statement”)**

**document.write(“2nd statement”)**

**document.write(“3rd statement”)**

**asynchronous statement execution**

**document.write(“1st statement”)**

**--🡪 async document.write(“2nd statement”) : this code execute independently.**

**document.write(“3rd statement”)**

**2nd statement execute independently**

**synchronous function call**

**fun1();**

**fun2();**

**fun3();**

**asynchronous function call**

**fun1();**

**async fun2(); : This code execute independently**

**fun3();**

**synchronous communication**

**Client Server**

**1st Req ----🡪**

**2nd req --🡪**

**3rd req -🡪**

**Client Server**

**asynchronous communication**

**Client Server**

**1st Req ----🡪**

**2nd req --🡪**

**3rd req -🡪 both request execute independently**

**Client Server**

**JavaScript provide few pre-defined function which help to do asynchronous operation.**

**setTimeout() : it call function only once after specific period of a time.**

**setInterval() : it will call again and again base upon the time provided in 2nd parameter.**

**clearTimeout(): it is use to stop the setInterval timer**

**Ajax : Asynchronous JavaScript and XML**

**XMLHttpRequest and ActiveXObject**

**asynchronous communication**

**Client Server**

**1st Req ----🡪**

**2nd req --🡪**

**3rd req -🡪 all request execute independently**

**Client Server**

**fetch() : it is pre-defined function provide by JavaScript which internally use Ajax to send and receive the data from server.**

**fetch() function return promise objects.**

**Promise is a pre-defined object which help to handle asynchronous event of data. Promise can be resolve(success) or reject (failure).**

**Creating user-defined promise object.**

**If we want to load the data from promise object we have to use then() and catch(). If promise resolve then call else catch().**

**Day 6**

**04-08-2021**

**AJAX**

**Bootstrap**

**Without bootstrap**

**We can use inline css, internal css or external css.**

**We can user-defined class with set of property.**

**Styles.css**

**.divFontClass {**

**Font-size:**

**Font-family**

**Set property**

**}**

**Bootstrap is a open source CSS framework which provide set of pre-defined css classes with respective all dom elements. Like p, div, button, table etc.**

**Bootstrap is first open source framework which help to make web page responsive web application.**

**Now way days we can make responsive web application using bootstrap or html5 features.**

**Adding bootstrap features to web page**

1. **Through URL (CDN)**
2. **Download the bootstrap file**
3. **Using Node JS**

**Div tags bootstrap classes**

**Container and container-fluid**

**Container : it is type of bootstrap pre-defined class which provide fixed width for the web page.**

**Container-fluid : it is type of bootstrap which use full width of web page.**

**Grid layout :**

**Bootstrap provide grid layout. Which help arrange the dom element or component in row and column format. According to grid layout each row divided into 12 columns.**

**Using grid layout we can arrange html dom element or component according screen size of device.**

**Xs : extra small : <576px**

**Sm : small : >=576px**

**Md: medium : >=768px**

**Lg : large : >=992px**

**Xl: extra large : >1200px**

**Form Validation**

**Using HTML5 features**

**Using JavaScript**

**When user click submit button or command button without writing username, password, min length, max length, format of phone number , email etc.**

**MEAN Stack**

**Phase 2**

**Day 1**

**06-08-2021**

**Overview of Node js**

**Typescript**

**webpack**

**babel**

**Angular Framework**

**Node JS Overview**

**jQuery**

**Ext JS**

**Coffee JS**

**Angular JS**

**Angular Framework**

**D3 JS**

**React JS**

**Vue JS**

**Etc**

**To do improvement on DOM. Read, write and update HTML content on web page.**

**Node JS is a run time environment for the JavaScript library or JavaScript framework.**

**Node JS is not a library or not a framework. It is a run time environment for JavaScript application.**

**Before Node JS JavaScript mainly use for client side scripting language**

**After Node JS JavaScript also known as Client side as well as Server side scripting language.**

**Before Node JS Front end technologies backend technologies**

**HTML5/CSS3/JavaScript and bootstrap ------------------🡪 Java (Spring boot)**

**Asp.net**

**Php**

**Python**

**Node**

**Front end backend**

**JavaScript**

**Node JS provide lot of pre-defined module with the help of those module we can create dynamic web application, file handling programming, REST API, connecting to database(mysql or mongo db database), security , networking using JavaScript etc.**

**REST API : Representational State Transfer Application Programming Interface.**

**Please create node js folder**

**And open the terminal**

**Check node version command**

**node --version**

**Node JS doesn’t provide document and window object.**

**TypeScript : typescript is a type of scripting language. Which also known as super set of JavaScript.**

**TypeScript all features of ES6.**

**Typescript ie ts we can’t include in html page because browser can’t understand typescript.**

**So we have to convert ts file to js file using transpiler.**

**Transpiler also type of compiler which help to convert from one file to another file format.**

**tsc ( typescript compiler).**

**With node JS by default npm command enable**

**node package manager ( using npm command we can install any external node js module).**

**Syntax to install node js external module**

**npm install –g moduleName (globally)**

**Syntax to install typescript external module**

**Window user**

**npm install –g typescript**

**unix as well as mac user**

**sudo npm install –g typescript**

**after install**

**now check the version of tsc**

**tsc --version**

**create separate folder with name typescript program**

**then create typescript file**

**demo.ts**

**console.log(“Welcome to Typescript”);**

**to convert ts to js fie we have to use the command as**

**tsc demo.ts**

**Typescript support data types.**

**Syntax**

**let variableName:datatype;**

**let variableName:datatype=value;**

**array : In JavaScript array can store same type as well as other types of values.**

**But in Typescript with help of data types we can create array is use to store same type of values.**

**Generic type**

**Let variableName:Array<Type>;**

**ES6 JavaScript as well as Typescript we can use in loop and of loop.**

**In loop : in loop provide the index number of array elements.**

**of loop : on of loop we can get the value .**

**Typescript function types**

1. **Function with number parameter must be match**
2. **Function with number of parameter and type of parameter must be match.**
3. **Function with specific return type like number, string, Boolean or no return type void.**
4. **Function with optional parameter**
5. **Function with default initialization**
6. **Function with rest operator or parameter.**

**MEAN Stack**

**Phase 2**

**Day 2**

**09-08-2021**

**Object and class**

**Object is a any real world entity**

**object creation using ES6 in typescript**

**parameterized constructor**

**constructor short cut initialization**

**Inheritance : Inheritance is use to inherits the properties and behaviour of old class to new class.**

**class OldClassname { super class, base or parent class**

**properties**

**behaviour**

**}**

**class Newclass extends OldClassName{ sub class, derived class or child class.**

**Properties**

**Behaviour**

**}**

**With help of sub class object we can call super class all function as well as it own function.**

**class Manager extends Employee {**

**}**

**class Employee {**

**id,name,age,Address add**

**}**

**class Address {**

**}**

**class Programmer extends Employee {**

**}**

**Manager is a Employee**

**Programmer is a Employee**

**Employee has a Address**

**Typescript support interface.**

**Interface contains incomplete function or function without body.**

**Interface is use to provide specification.**

**Class always implements the interface. The class which implements interface must be provide the body for all incomplete function which belong to that interface.**

**In Typescript we use interface with properties to create the object literal is a type of interface type.**

**TypeScript support import and export concept with the help of these keyword it can allow to access one file properties and functionality in another files.**

**Modules : modules is a collection of variable, functions, classes, interfaces. Module is a like a package.**

**In typescript file name itself is consider as module.**

**export keyword is use to allow access that function, variable, class or interface in another file.**

**Typescript provide tsconfig.json configuration file which hold all configuration details for the typescript projects.**

**Syntax to create the tsconfig.json file**

**tsc --init**

**Angular Framework**

**To Create Angular Project**

**We have to enable ng command.**

**npm install –g @angular/cli**

**sudo npm install –g @angular/cli**

**After installation successfully**

**ng --version (next generation)**

**back ticks and string template :ES6 features.**

**Using back tricks we have use multi line statement and inside back ticks we have access variable or property name using string template ${variableName}**

**HTML, JavaScript and Typescript**

**Create the application using Typescript convert to JavaScript and include JS file in**

**Html page.**

**MEAN Stack**

**Phase 2**

**Day 3**

**10-08-2021**

**please check your node –version**

**ng install**

**to create new project after installation**

**ng new project-name**

**ng new demo-app**

**Routing : No**

**Styling : CSS**

**Angular JS**

**Base upon HTML, CSS, JavaScript ES5 as well as ES6 features.**

**Angular Framework 2 to 12 Version**

**HTML/HTML5,CSS/CSS3 and TypeScript and Node JS**

**UI Technologies**

**Read, Write and Update DOM properly.**

**Angular is a open source framework which help to Create SPA (Single Page Application).**

**Angular is a part of Google.**

**Library Vs Framework**

**jQuery**

**React JS**

**They are library**

**Every external library for specific purpose. Library doesn’t use for multipurpose.**

**Framework use multipurpose.**

**Library is light weighted Framework are heavy weighted.**

**Library doesn’t follow any rules and regulation. But framework allow rules and regulation.**

**Design pattern: best practise or solution for repeating problem.**

**The implementation of design pattern is taken care by framework.**

**If you are developing small application library is good. If you going to develop enterprise application Framework is good.**

**MVC, Singleton design pattern, component base, DI and IOC etc.**

**Multi page application**

**Index.html home.html**

**Hyperlink**

**Submit button**

**Normal button with JavaScript**

**When we move from one page to another page whole DOM get loaded in buffer memory.**

**Single Page Application**

**Rather than loaded whole page it can load only part of the page using component concept.**

**Component : it control the view or part of the view of web page.**

****

**Creating angular project manually is complex.**

**Google people provided Angular CLI.**

**Command line interface.**

**Node js required**

**node --version**

**npm --version (node package manager).**

**npm install –g @angular/cli : this command is use to enable ng command.**

**sudo npm install –g @angular/cli : mac or unix users.**

**Angular**

**ng --version**

**ng new project-name**

**ng new demo-app**

**routing 🡪 no**

**styling 🡪 css**

**after project created successfully**

**move inside a project folder using cd command**

**cd project-name**

**cd demo-app**

**open the project using code . or open project in VSCode. (please open complete angular project).**

**Then to run the project use command as**

**ng serve if ask policies option yes/no : you can enter yes or no**

**after compiled project 100%**

**open the browser and write** [**http://localhost:4200**](http://localhost:4200)

**or**

**ng serve –o : After compiled 100% project it automatically open the default browser with url as** [**http://localhost:4200**](http://localhost:4200)

**open the project in VS code ( open complete angular project in VS Code with open folder option).**

**expand the src folder**

**expand the app folder**

**open app.component.html page**

**please remove pre-defined html code present in this file.**

**inside this html page please write the html code which we write**

**in body tags. Don’t write !docType, html, head, meta and body tags.**

**open app.component.ts**

**write one or more variable with default value.**

**To display those variable value in html page**

**<p>Name is {{variableName}}</p>**

**Open app.component.css : this file is like a external CSS file.**

**Decorator : it is a type of special function which help to add extra behaviour to class or properties or functions. Decorator is part of typescript. Decorator also know meta-data(data about data).**

**Decorator is like a annotation in Java.**

**All decorator start with @ symbol followed by decorator name.**

**@Component**

**@NgModel**

**@Input**

**@Output**

**@Injectable**

**@Pipe**

**Etc**

**Angular created lot of pre-defined decorator which help to make the class is type of special class.**

**Component control the view or part of view of web page.**

**@Component**

**selector : “app-root” : it is consider as user-defined tags. <app-root></app-root>**

**Using Angular we are creating user-defined tags with help of @Component decorator.**

**P, div, h1 to h6.**

**<p>Welcome to HTML Page</p> pre-defined**

**<myTag></myTag> user-defined**

**templateUrl : This property connect to HTML code or html page.**

**So wherever we use selector as a user-defined tags the content present in html page it display.**

**styleUrls: It is use to connected the external css file like link tag in normal html page with external CSS page. It is optional.**

**Now open app.module.ts file**

**Angular use @NgModule decorator to make this class is a type of module class.**

**According angular module is a collection of more than one component and more.**

**Properties**

**declaration : all component declaration must be provide inside this properties.**

**Import : this properties is use to import pre-defined as well as user-defined modules.**

**browserModule : this module is use to display the content on web page.**

**Provider : This properties is use to provide angular service class details.**

**Bootstrap : This properties is use to provide parent component to load as when angular application start.**

**Create two new project (don’t create nested projects). (outside demo-app).**

**ng new angular-data-binding**

**ng new angular-forms**

**no routing and styling css**

**so we create two new apps besides demo-app(not side).**

**MEAN Stack**

**Phase 2**

**Day 4**

**11-08-2021**

**To run the project**

**ng serve –o**

**We can create the component using ng command**

**Syntax**

**ng generate component componentName**

**or**

**ng g c componentName**

**Data binding : Data binding is use to share the data between html (template) to component (typescript file) and vice-versa. It provide bridge between component to template.**

**2 types**

1. **One way data binding** 
   1. **String interpolation -🡪**

**Component ------------------🡪 View or Template**

**{{}}**

**Syntax**

**{{variableName}} {{name}}**

**{{expression}} {{5+6}}**

**{{functionCall}} {{sayHello()}}**

* 1. **Property binding**

**Component -----------------🡪View or template**

**[]**

**<input type=”text” [value]=”variableName”/>**

**<input type=”text” value=”lname”/> in html**

**<input type=”text” [value]=”lname”/> in angular it is known property binding.**

**Angular search variable name as lname inside a component and that value display inside a text fields.**

**<div [innerText]=”lname”></div>**

**<p [innerText]=”lname”></p>**

**<span [innerText]=”lname”></span>**

**In String interpolation everything consider as string type.**

**But in property binding we can use other data type rather than string also.**

**If you want to display only output please use string interpolation. If you want to do any dynamic dom operation we can use property binding.**

* 1. **Event binding :**

**Template ------------------🡪 Component**

**()**

**Angular use same event provided by JavaScript. Only different angular remove pre-fix ie on keyword and event name wrap with ().**

**JavaScript event Angular Event**

**onClick (click)**

**onDblClick (dblclick)**

**onMouseOver (mouseOver)**

**onSubmit (ngSubmit)**

**onChange**

**onLoad**

**onUnload etc**

**using angular event we call Typscript function which is part of component without creating the object of that class.**

**using event we can change the properties value in components.**

**Template reference : Angular provide template reference which help to pass the value of textfield, password field, radio button etc to component**

**Syntax**

**<input type=”text” #referenceName/>**

**We can achieve two way data binding with combination of event binding and string interpolation or property binding.**

**Event binding**

**Template -------------------🡪Component**

**String interpolation or property binding**

**Component ------------------------🡪Template**

1. **Two way data binding**

**In template if we do any change it update in component and vice-versa.**

**[()]**

**ngModel is use to achieve two way data binding.**

**Syntax**

**<input type=”text” [(ngModel)]=”variableName”/>**

**ngModel is a pre-defined attribute part of FormsModule. So we have to import FormsModule inside app.module.ts in import section.**

**Angular Forms**

**If we want pass the value from template to component we are using template reference.**

**Using template reference more than one dom reference become more complex. To overcome this problem angular provided forms features.**

**So using Angular forms we can pass more than one value inside a container (reference).**

**Angular support two types of forms**

1. **Template Driven Form : template -----------> Component**

**Good for simple type of forms.**

**More coding on template or html side.**

1. **Model Driven Form or reactive forms. Component -------🡪 Template**

**Good for complex type for forms.**

**More code on component side.**

**Login page.**

**ng g c tdf-login-page**

**ng g c mdf-login-page**

**In Template Driven form we have to create the form reference.**

**<form #loginRef=”ngForm”>**

**</form>**

**ngForm is a pre-defined attribute part of FormsModule. So we have to import FormsModule in app.module.ts file inside a import sections.**

**MEAN Stack**

**Phase 2**

**Day 5**

**12-08-2021**

**In model Driven form first we have write code in Ts file.**

**According model driven form TextField, PasswordField, radiobutton, checkbox etc are consider as FormControl. So if you want to create any FormControl is must be inside a FormGroup.**

**FormGroup is a collection of more than one FormControl.**

**Angular provide pre-defined API ie FormGroup and FormControl**

**Login Page FormGroup**

**UserName TextField FormControl**

**Password PasswordField FormControl**

**Submit Reset**

**In Reactive form or model driven form we have to create the reference of FormGroup and FormControl**

loginRef = new FormGroup({

    user:new FormControl(),

    pass:new FormControl()

  })

**FormGroup and FormControl is a part of @angular/forms so we have to import it**

import { FormControl, FormGroup } from '@angular/forms';

**Then these reference we have to use in template**

<div>

    <h2>Login Page using Model Driven Form</h2>

    <form [formGroup]="loginRef">

        <label>UserName</label>

        <input type="text" formControlName="user"/><br/>

        <label>Password</label>

        <input type="password" formControlName="pass"/><br/>

    </form>

</div>

**formGroup and formControlName is a pre-defined attribute part of ReactiveFormsModule.**

**So we have to import ReactiveFormsModule in app.module.ts file in imports section.**

**Form Validation :**

**Without writing all forms fields when user click on submit button the request will pass to server side technologies in HTML and JavaScript.**

**But In Angular we are sending the data to component.**

**Angular Forms Validation**

**Angular provided set of pre-defined classes to do the form validation**

**ng-valid**

**ng-invalid**

**ng-touched**

**ng-untouched**

**ng-dirty**

**ng-pristine**

**State class if true class if false**

**Control value is valid ng-valid ng-invalid**

**Control value has ng-dirty ng-pristine**

**Changed**

**Control has been ng-touched ng-untouched**

**Visited**

**ng new types-of-directives**

**Angular Directives : Using Angular directives we can add extra behaviour or functionality to DOM(HTML code).**

**3 types of directives**

1. **Component directive: Using this directive we are creating user-defined tag with help of selector. The component connect to html page using templateUrl. The template page contains static as we as well as dynamic data with the help of data binding.**

**@Componnet({**

**selector:”my-tag”,**

**templateUrl:”./filename.html”**

**})**

**class MyComponnet {**

**msg:string=””;**

**}**

1. **Structure directive : using structure directive we can add or remove dom elements from html page.**

**\*ngIf**

**\*ngFor**

1. **Attribute directive : using attribute directive we can apply dynamic styling for web page**

**ngStyle inline css**

**ngClass external css**

**now move inside a project folder**

**cd types-of-directives**

**ng g c structure-directive**

**ng g c attribute-directive**

**conditional statement in template**

**<div \*ngIf=”boolenValue”>**

**</div>**

**Looping in template**

**<div \*ngFor=”let variableName of arrayName”>**

**<p>{{variableName}}</p>**

**</div>**

**Please create new project**

**ng new angular-service**

**routing : no**

**styling : css**

**MEAN Stack**

**Phase 2**

**Day 6**

**13-08-2021**

**Angular service**

**If we write any logic (business logic) inside a component it may be simple or complex that code local to that components.**

**Same logic we can’t access in another components**

**Template component class service class**

**First-component.html first-component.ts**

**Variables and function**

**Business logic**

**Second-component.html second-component.ts**

**Variables and functions**

**Using angular service we can achieve separation of concern. The business logic written in service class globally can access by all components.**

**Angular Service divided into two types**

1. **User-defined service** 
   1. **Create service class object using new keyword.**
   2. **Creating service class object using DI (Dependency Injection).**
2. **Pre-defined service**

**Open angular-service project**

**Create two components**

**ng g c first**

**ng g c second**

**MVC : Model View Controller**

**Service Template Component**

**Component is a intermediate between template and service.**

**IOC : Inversion of control :**

**It is design pattern. In place creating and maintaining any resources. Allow to create and maintain by container(container is a engine part of server etc). pull from container whenever you required.**

**Rather than creating object of any class explicitly allow to create by container and pull from container.**

**IOC is concept.**

**DI: Dependency Injection**

**DI is a implementation of IOC.**

**We can achieve DI 3 ways**

1. **Setter base DI**
2. **Constructor Base DI**
3. **Interface base DI**

**In Angular We can achieve DI using constructor base.**

**If we want to create Service class using DI concept**

1. **First we have to create user-defined class with decorator @Injectable**
2. **Service class details we have to provide in provider attribute in app.modue.ts file.**
3. **Then we have to achieve DI using constructor in every component if require.**

**All component details you have to provide in declarations properties in app.module.ts file**

**And all service class details we have to provide in providers attribute in app.module.ts file.**

**Pre-defined service**

**Angular provided pre-defined API ie HttpClient. Using HttpClient we can call backend technologies REST API Service develop in any language.**

**HttpClient allow to call all Http protocol methods like get(), post(), put() and delete() etc.**

**RxJS : Reactive JavaScript**

**Steps to call REST API using HttpClient**

1. **We have to do DI for HttpClient in side a service class using constructor.**
2. **HttpClient API is a part of HttpClientModule. So we have to import HttpClientModule in app.module.ts file insider a imports section.**

**Observable Vs Promise**

**HttpClient all method(get,post,put,delete) return type is Observable. So if you want to load the data we have to use subscribe() function.**

**subscribe() function takes 3 parameter as a callback function.**

**1st parameter is next() to load the data one by one from REST API. like then in promise**

**2nd parameter is error() if any error generate at beginning or middle or end this function get call. Like catch in promise**

**3rd parameter completed. After loaded all data successfully third parameter get call.**

**Create new component**

**ng g c fake**

**So we have to create model class / interface which use to map the json data.**

**MEAN Stack**

**Phase 2**

**Day 7**

**16-08-2021**

**ng new component-communication**

**routing –no**

**styling –css**

**Every component connected through html page**

**If component contains any variable (may be number, string or array) we can access those properties within that component or that component’s html page.**

**But some if we want to share the value from one component to another component we have to check the relationship between two component and using some technique we can share the value between two components.**

1. **Parent – Child Relationship --🡪 with help of @Input decorator we can share the value from parent to child component.**
2. **Child – parent relationship 🡪 with help of @Output and EventEmitter we can share the value from child to parent. Or @ViewChild we can access child properties and behaviour in parent component.**
3. **Sibling relationship 🡪 sessionStorage or localStorage part html5 and JavaScript.**

**With help of service class with @Injectable decorator.**

****

**In new project create two component**

**ng g c child1**

**ng g c child2**

**run the application**

**ng serve –o**

**ng g c child3**

**ng g c child4**

**creating service class object using ng command**

**ng g s shared**

create new project

ng new angular-routing

routing -🡪 Yes

style 🡪 css

Angular routing is use navigate from one component to another component depending upon path provided in routing file.

Using routing we are replacing one component’s template by another component’s template.

Angular-routing project

ng g c about-us

ng g c contact-us

ng g c login

ng g c dashboard

while creating project when we routing option as yes.

It create app-routing.module.ts

Angular provided pre-defined tag ie

<router-outlet></router-outlet>

This tag is behave like a place holder which help to load the component contents base upon the

Path provided in routing file.

Write the rules in route variable

const routes: Routes = [

 {path:"aboutus",component:AboutUsComponent},

 {path:"contactus",component:ContactUsComponent},

 {path:"login",component:LoginComponent}

];

And provide the <router-outlet></router-outlet> tag in parent component html page to load the content base upon the path math.

**MEAN Stack**

**Phase 2**

**Day 8**

**17-08-2021**

Programmatically or conditionally routing.

To do conditional routing angular provide Router pre-defined which contains set of methods

Which help to navigate from one component to another component with conditions.

Routing with path param : it use to pass the value from one component to another component.

To receive the value from router path we have to do the DI for ActivatedRoute

Adding bootstrap features of Angular application.

Please create angular new with name

ng new angular-pwa

Routing – yes

Style – css

Angular PWA ( Progressive Web Application).

Progress Web application that has se of capabilities (similar to native application) which provides an app like a experience to users. PWA need to meet set of essential environment.

Progressive : work for every user, regardless of browser choice because they are build with progressive enhancement.

Responsive :fit for an device like desktop, laptop, mobile or tablet.

Angular provide their own CSS framework ie

Angular material

Bootstrap is open source framework we can use any library or framework.

adding angular material features to angular projects.

ng add @angular/material

add all styling effects

now create new component

ng g c button-example

ng g c login : login component

ng g s login : login service class create

ng g class login : command to create model class

ng g interface login : command to create model interface

login.json file inside assets folder.

[

    {"user":"Raj","pass":"123"},

    {"user":"Ajay","pass":"456"},

    {"user":"Reeta","pass":"789"},

    {"user":"Veeta","pass":"001"}

]

Adding angular material

ng add @angular/materials

Adding pwa Features to project

ng add @angular/pwa

angular project by default port number 4200

in development mode.

After development we have to create build file and those file we have to give to admin

They will deploy in actual server in production environment.

ng build : this command is use to build the project

after build you can see dist folder inside project directory.

We have to give this dist folder to backend technologies or admin they can deploy this application on actual server

Tomcat Server

Web Logic Server

IIS Server

We can deploy dist folder in AWS or any cloud platform.

Move inside dist and project folder

Node js provide pre-defined module it http-server which help to run html page in web server.

**npm install http-server –g**

**the run http-server module to run the application**

**Phase 3 :**

**Day 1**

**20-08-2021**

**Node JS**

**Node JS Overview**

**REPL Terminal**

**Node JS Example**

**Type of modules**

**Core**

**User-defined module or local module**

**External module**

**Fs module**

**readline**

**readline-sync**

http module

express module

body-parser

Creating REST API using Express JS

Socket Io programming

Mongo DB Database

CRUD Operation :insert, delete, update and retrieve data , create

Relationship in mongo db

Aggregate function in mongo db.

Connecting mongo db using node js with help of Mongo DB and Mongoose

Express MVC

Connection Angular Framework with Express JS with Mongoose with Mongo DB module

CRUD Operation

Node JS : Node JS is a run time environment for JavaScript library and framework.

Before Node JS JavaScript is known as client side scripting language.

But after node JS JavaScript can be use client side as well as server side scripting language.

Front End Technologies Backend Technologies

HTML/HTML5 Java

CSS/CSS3 Asp.net

JavaScript ES5 and ES6 Php

Bootstrap Python

Node JS

Node js provide lot of pre-defined modules those module may be internal or external. With the help of those modules we can do file handling, creating server side technologies, creating REST API, connecting database (Mongo db or SQL mysql or oracle) using JavaScript.

Node ‘s goal is to provide an easy way to build scalable network programming or application.

By default every JavaScript contains great features ie callback and asynchronous operations.

REPL Terminal : Read Eval Print Loop

In node JS we can’t use window object and document objects.

Node JS Modules

Module in Node JS is a simple or complex functionality organized in single or multiple files which can be reuse through Node JS Application.

Type of Modules

1. Core Module
2. Local module or user-defined module
3. External module

Fs module : file system : fs is a type of core module which help to do file handling program may be synchronously or asynchronously.

Syntax to load the core or local or external module

Let/var refereceName = require(“module”)

Node js provided pre-defined function ie require which help to load the modules.

let referenceName = require(“moduleName”);

readline : it is type of core module which help to receive the value through keyboards asynchronously.

Phase 3

Day 2

23-08-2021

Fs module

readline : taking the value through keyword asynchronously

readline-sync : It is a external node js module which help to take the value through keyboards synchronously.

npm install moduleName : locally

npm install moduleName –g : globally

npm install readline-sync : locally

or

npm install readline-sync –g : globally

in node js we have to create configuration file ie package.json

to create package.json file

npm init

it ask package name : give some meaning full name

and that enter continuously and enter yes.

If we install all modules locally node js provide all module details in package.json file with properties as dependencies.

Using package.json file we can

Debug node js application

We run node js application using command as

node filename.js

debugger is a keyword provided by JavaScript which help to make the break point.

After added debugger keyword after set of statement to run the application we have to use the command as

node debug filename.js

once you enter in debug mode : to move next statement we have to use the keyword as

next

if you want to jump from one break point (debugger statement) to another break point (debugger) we have to use the command as

cont

node debug filename.js deprecated

node --inspect simple.js

node --inspect=127.0.0.1:9230 simple.js if debugger port is not free you can use this command to run the debugger sever on different port number.

URL module : node js provide pre-defined core module is url module which help to extract the details from URL (Uniform resource locator) like protocol, host name, url and query data.

http module : http is a pre-defined core module which help to create web application as well as server using node js application.

Java

Python

Php

Asp

Web application we have to deploy this application on server like tomcat server, web logic service, IIS server etc.

Phase 3

Day 3

24-08-2021

Using http module opening page content is very complex.

ES6 back ticks and string template features to display html page contents.

MEAN Stack :

Mongo Express Angular Node

Phase 3

Day 4

25-08-2021

Express Framework or JS.

Http is a node js core module with help of http module to develop enterprise application is very difficult.

http modules doesn’t support http protocol method like get, post, put and delete etc.

http module doesn’t support REST API.

http modules doesn’t provide features to open the view page.

Node JS use external module like Express. Express is a type of external module which also known as node JS framework which help develop the enterprise application using node js

Express internally use http module and provide extra features.

Node js web framework

npm install –g express globally

or

npm install express locally

Create the express module folder and create the package.json file using command as

npm init or npm init –y

now install express module

npm install express

express js support all http protocol method

get, post , put and delete etc.

\_\_dirname : it is a global property provided by node js which help to find the current directory path.

To receive the value of text field in express js syntax

Let variableName = request.query.textfieldName;

If form method is post data will send through body part of http request.

To receive the data from request body in express js we have to use

request.query : for get method

request.body : for post method

in node js (express js) we have to use another module ie body-parser.

This module provide few function which help to enable the data from http request body part.

app.use(middlewareModule);

app is a reference of express module which provide use pre-defined function which help to add middleware module or application. Middleware means before request reach to server application we want to perform some task.

Client middleware Server

Get

Post

Old version of express js doesn’t contains body-parser module we were installed separately.

But in new version of express js body-parser module added.

Phase 3

Day 5

25-08-2021

Web Service : Giving the service for web application when both the application running using different technologies.

Online shopping Paytm python google pay

Amazon (Spring boot) payment Phone pay asp.net

Online shopping application gate way Credit card php

Debit card java

Xml Net banking cgi

Json Paypal

Using XML/JSON we can send and receive the data from one technology to another technology.

1. SOAP Web Service : Simple Object Access protocol : in SOAP web service we can consume and produce the data only in the form of XML.
2. REST Full Web Service : In Rest Full Web Service we can consume and produce data in format like xml, json, plan text or html etc.

XML : eXtensible Mark up of language

XML heavy

In the form of tags base.

JSON : Java Script Object Notation : in the form key value pairs

Light weighted.

REST Representational State Transfer

Using Express JS we develop the application

: View HTML : in Plain html we can use only static contents.

Express JS : Express JS view engine: those engine are dynamic

Pug

Haml.js

Etc

In Express JS engine we can use dynamic coding.

View tightly coupled or bind with banked technologies ie Express JS.

Using REST API we have develop only backend technologies

Those REST API can call by any other technologies

Like Angular, React JS, Java, Asp.net, Php as well as Python etc

URL : store, retrieve, delete and update

JSON/XML

Create new folder

Express REST API

Create package.json file using command

npm init

npm install express

According to REST API we have to use http protocol methods

Get :

Get method we can test using browser URL, hyperlink or form with get method

get Resources

Select query

Resources always refer to entity or tables or objects

Customer, Employee, Manager, order,

Get method with pass the data to Express REST API

1. Query param

URL?key=value : single value

URL?key=value&key=value&key=value : multiple value

HTML form with get method internally use query param concept.

Query param concept is good if view is plain html.

If view is angular or react to append the value through URL is very complex.

1. Path param

URL/path/v1--🡪 single value

url/path/v1/v2/v3 multiple value

Post method : Store resources : employee records, customer records, account details. Etc.

Post method we can check with form with post method

Using Angular

Using React

Using any rest Client application ie java, .net, python etc.

To test this function we can use browser plugin etc postman client or any other plugin etc.

Open the browser and check Rest Client plugin

Put method : update resources :

Update employee salary using empid

Update customer age using cid

Update address and phone number using customer name or customer id

Normal html form doesn’t support put method.

Delete method :

This method is use to delete the resources

Delete customer info using customer id

Delete employee info using employee id

Delete order details using orderId

In Delete we have to use path param to pass the id.

Employee

Customer

cid cname age

Product

Create Folder Customer CRUD Operation

npm init

npm install express

Phase 3

Day 6

27-08-2021

Create new angular project inside node JS or

ng new customer-crud-operation

after project create move inside a customer-crud-operation folder

run the project

ng serve –o

**Please make sure you are insider a angular project folder.**

create component

ng g c customer

create service class

ng g s customer

create model class

ng g class customer

open app.module.ts file

import these two modules in import section.

HttpClientModule

ReactiveFormsModule

Open customer.ts file

Write constructor with variable (variable name must be match with backend technologies variable name like json key names).

Open customer.service.ts

has been blocked by CORS policy

CORS : Cross Origin Resource Sharing

Angular application --🡪 running port number 4200

Express Application -🡪 running port number 9090

Two domain or server are communicating to each other.

Cors block the communication between two domain through browser.

So we have to enable cors features in backend technologies

Express JS

Java

Python

To enable in node JS with express we have to install

Cors module

npm install cors

template (html)-------🡪Component ------🡪User defined service -🡪HttpClient

🡪Node JS express JS Application --🡪

Phase 3

Day 7

30-08-2021

Socket programming

**Socket.io is a library which help to do socket programming on web application.**

**Socket programming is a way to connecting more than one machine or node on a network environment to communicate with each other. Using socket programming we can do bi-directional communication. Using socket we can achieve duplex communication.**

**Using http protocol we can send the request to server and base upon the request server will give response to use.**

**Socket programming using net module**

**Web Socket**

**Socket.io**

**Node JS provide great features non-blocking io operation in networking environment.**

**Callback and asynchronous communication.**

Node js provide pre-defined module ie **net module** . which help to creating chatting or we can send the data from one node to another node or one machine to another machine(both machine in one network environment).

Using node module client as well as server are node js application.

Web Socket : Socket programming on web application. So client can be browser application.

With http protocol we are using ws protocol.

To do the web socket we have to install two external module

express and express-ws

create folder web socket programming

npm init

then install

npm install express express-ws

JavaScript provided pre-defined object ie WebSocket which help to connect the server this WebSocket reference to share the data from client to server and vice-versa.

Socket.io

Web Socket is use to do Socket programming on web application. Web Socket is a API. Socket. Io is a library which internally use Web Socket features.

Web Socket is like a JavaScript

Socket.io is like a jQuery

In socket io we require three modules

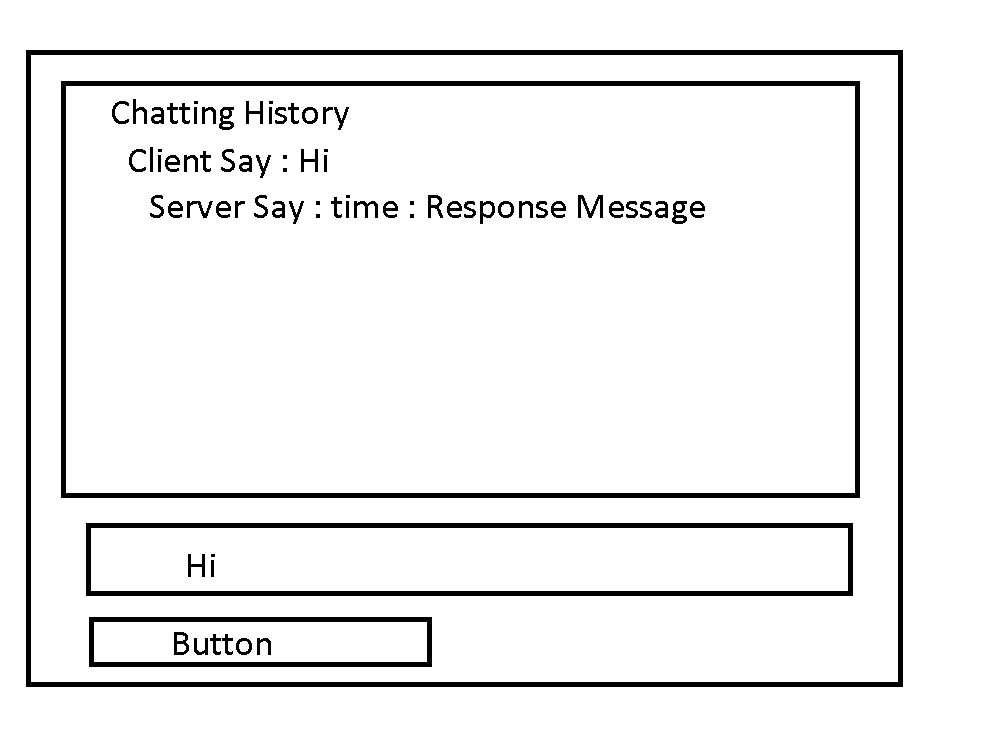
http module, express module and socket.io

create new folder socket.io programming

create package.json file using command as npm init

npm install express

npm install socket.io



Phase 3 :

31-08-2021

Limitation of file base system

File system : using fs module in node JS.

In file system we can store same data again and again ie data redundancy (duplicate records).

To do CRUD operation (insert(create), read, update and Delete) very difficult in file base system.

Data is not secure.

**Database system**

**Data : raw facts**

**Information : meaning full data or processed data.**

**Database : : storing the data in table format using column and rows.**

**DBMS : Database management system : it is a software which help to store the data in table format.**

**12 rules : Codd’s rules**

**RDBMS : Relational database management system.**

**MySql**

**Oracle**

**Db2**

**SQL Server**

**Postgresql**

**SQL : structure query language.**

**10% to 20% query change when we move from oracle to mysql or postgresql**

**No SQL**

All RDBMS database are schema base Database

Create the database

Table -🡪Employee

Id Name Age city phno

Number varchar(10) float

1 Raj 23 null null

2 Ravi 25 null null

3 Ramesh null Bangalore null

4 Raju null null 991022

Angular -----🡪Json ---🡪Express -----🡪MySql/oracle : We have to convert json data into query format.

Schema less and help to store the data in json format.

No SQL Database

Key-value -🡪 redis

Graph database 🡪 Neo4j

Document Oriented 🡪 Mongo DB

Column family 🡪 Cassandra, HBase

Mongo DB is a open source no sql database which help to store the data using document concept with json form.

Window user in C drive please create data folder-🡪 db folder

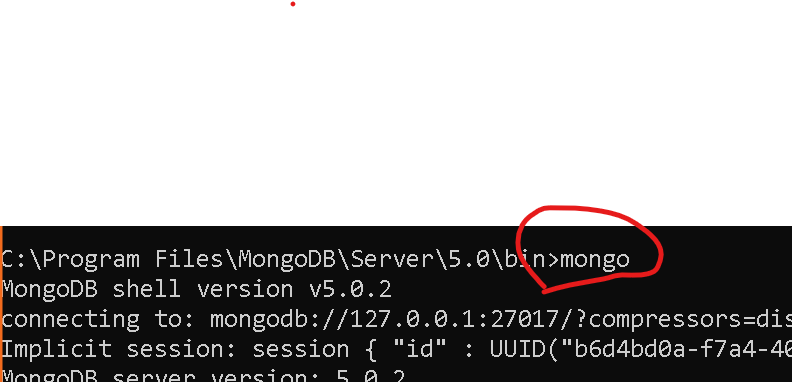
mongod command is use to start server



Then open another command prompt in same location

To get the mongo db terminal

Run the command as **mongo**



**Mongo DB commands**

Show dbs

**or**

Show databases

Create database databaseName : mysql

use databaseName : this command is use to create and switch to new database if database is not present. If database already exits it switch to that database.

According mongo db database contains group of collection. In mongo Db table is known as collection.

To check collection details in mongo db we have to use the command as

Show collections

Or

Show tables

Syntax to create the collection (tables)

db.createCollection(“Sample”);

In Mongo DB in collection we can store more than one documents. In mongo Db records or rows is known as document.

RDBMS MongoDB

Database Database

Table collection

Row or records document.

To insert document inside a collection

db.CollectionName.insert({jsonFormatData});

db.collectionName.insert({key:value,key:”value”,key:value})

db.Sample.insert({name:”Ravi”})

To view all documents from collection

db.CollectionName.find();

Primary key : in RDBMS : primary key is a type of constraints in RDBMS which help to store the unique records.

In Mongo DB \_id is like a primary key. Whenever we insert any document inside a collection automatically unique id created using ObjectID API.

If you want to insert our own \_id value we can insert it. But we can’t change \_id property name.

Inserting the document in a collection name

🡪 Emp

\_Id Name Salary City

db.Emp.insert({id:100,name:”Raj”,salary:12000,city:”Bangalore”})

To retrieve the specific document from a collection with index position.

db.Emp.find()[0] : whole document.

to retrieve the specific field value using index position form a collection.

db.Emp.find()[4].name;

db.Emp.find()[5].city;

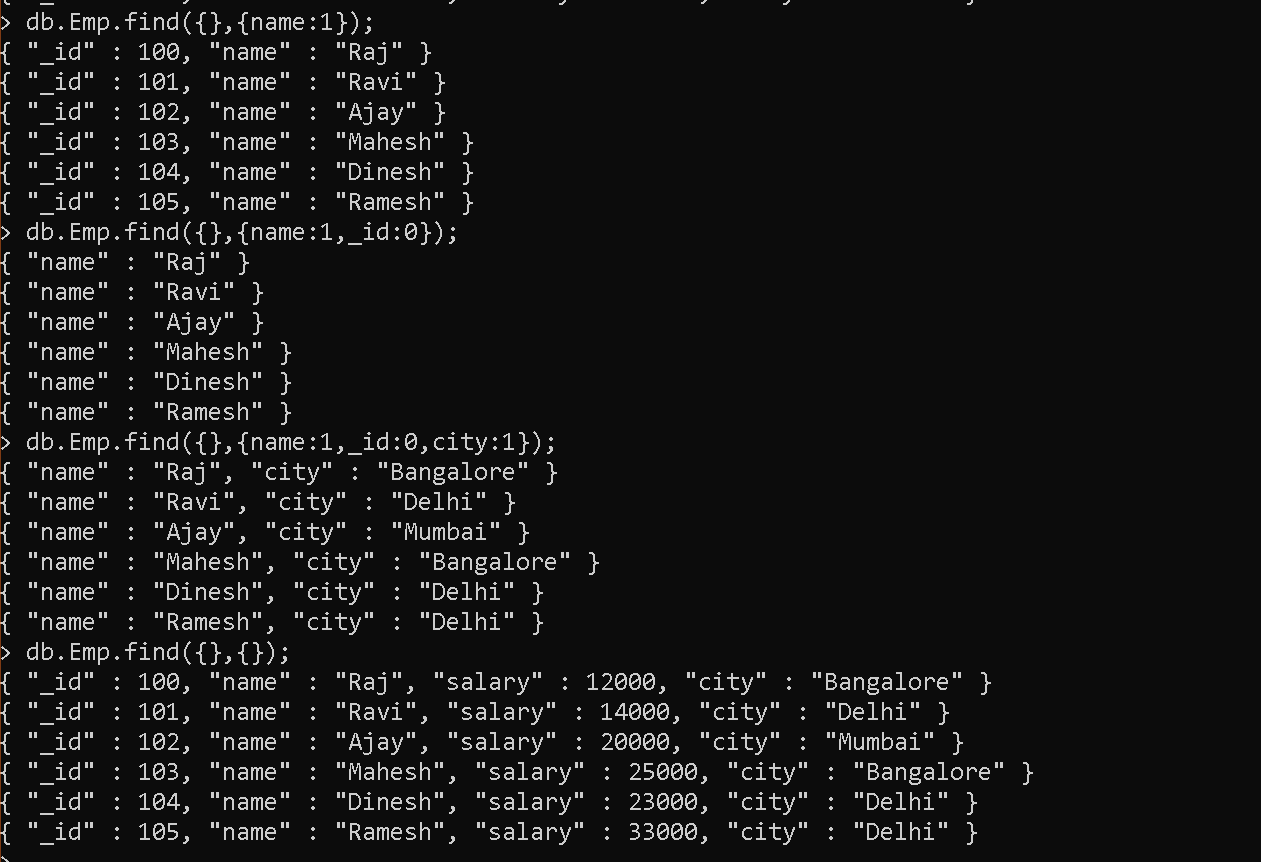
To retrieve specific fields from a documents.

db.CollectionName.find({condition},{fieldname:1}) : 1 is true , 0 is false.

db.Emp.find({},{name:1}); : it display name and \_id

db.Emp.find({},{name:1,\_id:0}); : it display only name

db.Emp.find({},{name:1,\_id:0,city:1}); : it display name and city



limit() : this function is use to display the n number of documents from a collection.

db.Emp.find().limit(3);

skip() : this function is use to skip n number of document from a collection.

db.Emp.find().limit(4);

db.Emp.find().skip(2).limit(2);

sort()

1: means ascending order

-1 : means descending order

db.Emp.find().sort({name:1}); : sort name ascending order

db.Emp.find().sort({name:-1}); : sort name descending order.

db.Emp.find({},{city:1,salary:1,\_id:0}).sort({city:1,salary:-1})

retrieve with conditions like a filter the documents.

db.CollectionName.find({condition}{fields});

check the equality

db.Emp.find({name:"Raj"})

db.Emp.find({\_id:102})

db.Emp.find({salary:20000})

db.Emp.find({city:'Bangalore'})

relational operators

db.Emp.find({salary:{$gt:20000}})

db.Emp.find({salary:{$gte:20000}})

db.Emp.find({salary:{$lt:20000}})

db.Emp.find({salary:{$lte:20000}})

db.Emp.find({salary:{$eq:20000}})

db.Emp.find({salary:{$ne:20000}})

To make two condition we have to use

$and : both the conditions satisfies

db.Emp.find({$and:[{name:"Raj"},{salary:12000}]});

$or : any one conditions satisfies

db.Emp.find({$or:[{name:"Raj"},{salary:25000}]});

update document values

db.CollectionName.update({condition},{$set:{key:value,key:value}});

db.Emp.update({\_id:100},{$set:{salary:13000}}); using \_id condition we have to use update.

db.Emp.updateMany({city:"Delhi"},{$set:{salary:35000}});

using non \_id property then use updateMany

remove document

db.collectionName.remove({conditions});

db.Emp.remove({\_id:100})

db.Emp.remove({city:"Delhi"})

to remove all document as well as collection we can run this command

**db.Sample.drop();**

Phase 3

01-09-2021

**Collection Relationship**

RDBMS

We have to make relationship between two tables using primary key and foreign key.

Table :

Trainer\_Student

SkillSet

C\_C++\_Java

TId TName Tech SId SName Age

1 Raj Java 100 Seeta 21

1 Raj Java 101 Reeta 22

1 Raj Java 102 Meeta 23

2 Ravi Python 103 Keeta 24

2 Ravi Pytho 104 Geeta 25

One to many relationship

Trainer

PK

TID TName Tech

1 Raj Java

2 Ravi Python

Student

Pk FK

SID SName Age TSID

100 Seeta 21 1

101 Reeta 22 1

102 Meeta 23 1

103 keeta 24 2

104 Geeta 25 2

One – to – many relationship

Mongo Relationship

2 ways

1. Embedded Style
2. Linking style

**Embedded Style (only one collection ): collection within another collection.**

Employee to Address -🡪 One – to – One

Employee to Project -🡪 One – to - Many

Employee

100 Raj 21

Address

Bangalore Kar

Projects

Java Web

Python AI

Angular Web

{\_id:100,name:”Raj”,age:21,address:{city:”Bangalore”,state:”Kar”},

projects:[{pname:”Java”,type:”web”},

{pname:”Python”,type”:”AI”},

{pname:”Angular”,type:”web”}]}

In Json value can be number, string, Boolean, array, complex object or array of objects.

db.Employee.insert({\_id:100,name:"Ravi",salary:24000,address:{city:"Bangalore",state:"Kar"}});

db.Employee.insert({\_id:101,name:"Ramesh",salary:26000,address:{city:"Mumbai",state:"Mh"}},project:[{pname:"Java",type:"Web"},{pname:"Python",type:"AI"}]);

db.Employee.insert({\_id:102,name:"Ajay",salary:32000,address:{city:"Pune",state:"Mh"},project:[{pname:"Java",type:"Mobile"},{pname:"Python",type:"Machine Learning"}]});

**Linking style (separate collections)**

In Student collection we store complete trainer documents.

Trainer

db.Trainer.insert({\_id:100,tname:"Raj",tech:"Java"});

db.Trainer.insert({\_id:101,tname:"Ravi",tech:"Python"});

Students

db.Student.insert({\_id:1,sname:"Seeta",age:21,tsid:db.Trainer.find()[0]});

db.Student.insert({\_id:2,sname:"Reeta",age:22,tsid:db.Trainer.find()[0]});

db.Student.insert({\_id:3,sname:"Meeta",age:23,tsid:db.Trainer.find()[1]});

db.Student.insert({\_id:4,sname:"Leeta",age:25,tsid:db.Trainer.find()[1]});

db.Student.insert({\_id:5,sname:"Jeeta",age:26,tsid:[db.Trainer.find()[0],db.Trainer.find()[1]]});

In Student collection we store only trainer Id .

Trainer

db.Trainer.insert({\_id:100,tname:"Raj",tech:"Java"});

db.Trainer.insert({\_id:101,tname:"Ravi",tech:"Python"})

StudentsInfo

db.StudentInfo.insert({\_id:1,sname:"Seeta",age:21,tsid:db.Trainer.find()[0].\_id});

db.StudentInfo.insert({\_id:2,sname:"Reeta",age:22,tsid:db.Trainer.find()[0] .\_id });

db.StudentInfo.insert({\_id:3,sname:"Meeta",age:23,tsid:db.Trainer.find()[1] .\_id });

db.StudentInfo.insert({\_id:4,sname:"Leeta",age:25,tsid:db.Trainer.find()[1].\_id});

db.StudentInfo.insert({\_id:5,sname:"Jeeta",age:26,tsid:[db.Trainer.find()[0] .\_id,db.Trainer.find()[1] .\_id]});

retrieve document from two collection using aggregate with lookup operator

db.Trainer.aggregate([

{

$lookup: {

from :"StudentInfo",

localField:"\_id",

foreignField:"tsid",

as:"StudentsDetails"

}

}

]).pretty()

db.StudentInfo.aggregate([

{

$lookup: {

from :"Trainer",

localField:"tsid",

foreignField:"\_id",

as:"TrainerDetails"

}

}

]).pretty()

retrieve the documents from a collection with condition (complex property).

Complex property

db.Employee.find({"address.city":"Pune"}).pretty();

complex array

any position

db.Employee.find({"project.pname":"Python"}).pretty();

specific index position

db.Employee.find({"project.0.pname":"Python"}).pretty();

Aggregate functions : aggregate function is use to group multiple document and then perform aggregate operation like(sum, max, min, avg and count) on it and after that it return a single result to the end user.

db.Employees.insertMany([

{\_id:1,name:"Raj",salary:24000,deptId:100,city:"Bangalore"},

{\_id:2,name:"Ravi",salary:25000,deptId:200,city:"Delhi"},

{\_id:3,name:"Ramesh",salary:27000,deptId:100,city:"Mumbai"},

{\_id:4,name:"Ajay",salary:23000,deptId:200,city:"Delhi"},

{\_id:5,name:"Seeta",salary:20000,deptId:300,city:"Bangalore"},

{\_id:6,name:"Reeta",salary:21000,deptId:300,city:"Delhi"},

{\_id:7,name:"Meeta",salary:34000,deptId:100,city:"Mumbai"},

{\_id:8,name:"Dinesh",salary:44000,deptId:200,city:"Delhi"},

{\_id:9,name:"Ali",salary:40000,deptId:200,city:"Bangalore"},

{\_id:10,name:"Raju",salary:54000,deptId:100,city:"Mumbai"},

{\_id:11,name:"Ramesh",salary:24000,deptId:200,city:"Delhi"},

{\_id:12,name:"Vijay",salary:42000,deptId:200,city:"Mumbai"},

{\_id:13,name:"Ram",salary:46000,deptId:300,city:"Mumbai"},

{\_id:14,name:"Laximan",salary:44000,deptId:200,city:"Delhi"}

])

db.Employees.aggregate([{$group:{\_id:"$city"}}]);

db.Employees.aggregate([{$group:{\_id:"$deptId"}}]);

Total salary of all 13 documents.

db.Employees.aggregate([{$group:{\_id:"City",totalSalary:{$sum:"$salary"}}}]);

`

total salary group by city

db.Employees.aggregate([{$group:{\_id:"$city",totalSalary:{$sum:"$salary"}}}]);

Average salary

db.Employees.aggregate([{$group:{\_id:"$city",avgSalary:{$avg:"$salary"}}}]);

minimum Salary

db.Employees.aggregate([{$group:{\_id:"$city",minSalary:{$min:"$salary"}}}]);

Maximum Salary

db.Employees.aggregate([{$group:{\_id:"$city",maxSalary:{$max:"$salary"}}}]);

count

db.Employees.aggregate([{$group:{\_id:"$city",numberOfEmp:{$sum:1}}}]);

connecting mongo db database using node js mongodb and mongoose modules

Phase 3 : 02-09-2021

Connecting mongodb database through node js application.

1. Using mongodb external node module
2. Using mongoose external node module

Express JS(REST API) with Mongoose module

Mongodb module

Create a folder with name Node JS with mongodb module

Create package.json file using npm init

npm install mongodb

please run mongod and mongo command insider database bin folder

mongod -🡪 mongodb database running (few machine database can run by default )

mongo 🡪 database terminal running

another 🡪 to run node js application

**Mongoose module**

Mongoose is an Object Data Modelling (ODM) library for mongo DB and Node js application.

It manage a relationship between data, provides schema validation, and is use to translate between object in code and the representation of those object in mongo db.

Mongo DB database is schema less.

Node js provide mongodb external module which help to store, retrieve, update and delete documents in collections.

Customer,

Product

Order

Employee

Login

Schema : Schema is use to provide the rules for collection ie attribute names and type of values the attribute store.

Model : Using schema we will create the model . Which help to do the operation on collection ie insert, delete, update and retrieve.

Mongodb is like a JDBC

Mongoose is like a hibernate or jpa (ORM)

Create folder

Node JS with mongoose module

Create the package.json file using command npm init

npm install mongoose

Phase 3

03-09-2021

MVC : Model View Controller

MEAN :

View --🡪Angular

Front end side

Template -----🡪 Component -----------🡪 Service ----🡪 HttpClient

Insert / Delete / Update or Retrieve

Backend Side

app.js/server.js ------🡪router file ---🡪controller 🡪 model file ---🡪database

app.js :

1. This file is responsible to load all modules, express, bodyParser, cors, mongoose module
2. Create the reference of express module.
3. Add middleware etc enable body data from request using bodyParser or other way, enable cors origin or any other middleware.
4. Connect the database.
5. Run the application on particular port number.
6. match the main path of the application.
7. Then pass the request to particular router file.

router.js

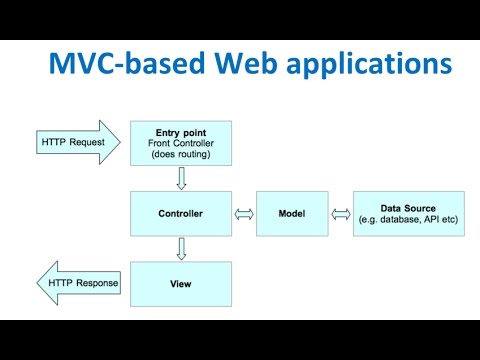
1. In this file we match sub path and http protocol methods base upon the request.
2. Depending upon the request we will call particular controller method.

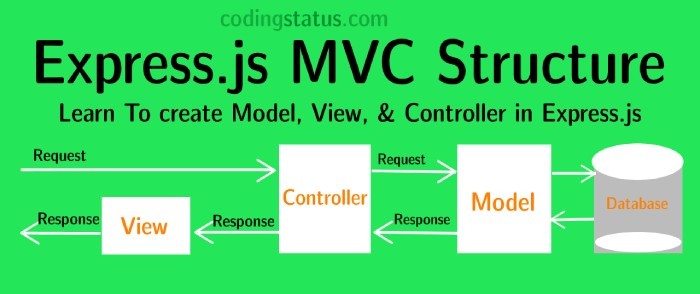
Controller.js

1. Controller take the help of model file and do the operation on collection depending upon the request receive from router file.
2. In this file we will do all database operation like insert, delete, update and retrieve.

Model.js

1. This file take the help of mongoose module.
2. Create schema (Schema help us to create the structure of collection).
3. Using schema we will create the model.





Create the folder

**MVC**

**Sub folder**

**Front end**

**Back end**

**Backend folder**

create the package.json file

npm init

npm install express cors mongoose

open the VS code

create the folders.

router

controller

model

inside model we will create one file

product.model.js

inside a controller folder

create controller file

product.controller.js

Inside router folder

Create router file

product.router.js

now create the app.js file (main entry server program)

after written code in app.js file

run the mongo db database using command mongod

Then run app.js