**Day 1 : 03/01/2022**

**Phase 3**

**Create scalable and dynamic web site**

**Scripting language**

**Client side and server side scripting language**

**What is node js**

**Node JS modules**

**Types of module**

**Core module**

**User-defined module**

**External module**

**Fs module**

**http module**

**url module**

**express module**

**rest full web service using express module**

**mongo db database**

**basic and adv mongo db database query**

**connecting mongo db database using mongodb and mongoose module**

**express mvc**

**MEAN Stack**

**Front end angular**

**Backend express and mongo db database**

**Socket.io programming**

**Front end side**

**Html /html 5 web page**

**Css /css 3 formatting style or presentation logic**

**Bootstrap**

**JavaScript : Validation on client and dynamic web page**

**Or action on web page or event on web page.**

**jQuery**

**Backend technologies**

**Java (JEE) : Servlet/JSP or Spring framework or spring boot**

**Asp.net**

**Php**

**Python**

**Node JS**

**Before Node JS lot of library and framework using JavaScript**

**jQuery**

**Angular JS**

**Angular Framework**

**React JS**

**Vue JS**

**Backbone js**

**Ext js**

**Coffee js**

**Etc**

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

**Before NODE JS we were running JavaScript program using browser. Browser contains run time environment for Java Script (client side scripting language).**

**Node Js contains lot of pre-defined module that may be core module or external module which help to do operation using JavaScript**

1. **File handling program**
2. **Creating dynamic web application**
3. **Creating rest full web service**
4. **Connection database may be my sql or mongo db**

**Etc**

**REPL terminal: read eval print loop**

**In node js program we can’t use document and window object.**

**Means js doesn’t provide BOM and DOM**

**Browser object model**

**Document object model**

**BOM and DOM available in client side scripting language not server side scripting language.**

**Node js provided pre-defined object ie global object**

**console.**

**Node JS FS Module**

**Fs means file system**

**Node Js provide lot of modules**

**Modules : modules is a combination of one or more than one files. Which help to do re-usability.**

**We connection one module to another module using require or import and export keywords.**

**In node js modules are divided into 3 types**

1. **Core modules (by default available with node js software).**
2. **User-defined module**
3. **External module**

**FS module : It is a type of core module which help to do file handling program synchronously or asynchronously.**

**let/var referenceName = require(“moduleName”);**

**read and write operation using asynchronously as well as asynchronously.**

**We store and retrieve data in string format.**

**We want to store the JS objet**

**We have to convert into json format.**

**In JavaScript we can create the object using**

1. **Function style**
2. **Class style**
3. **Literal style**

**JSON.stringify() method code help to convert JS object to string format.**

**Day 2 : 04/01/2022**

**Taking the value through keyboards in Node JS**

**readline : readline is a type of core module which help to take the value through keyboards in node js. Readline method are asynchronous methods.**

**Node js provided pre-defined global object is process**

**readline-sync it is external module which help to take the value through keyboards synchronously.**

**Syntax to install external module**

**Npm install –g moduleName globally**

**Or**

**Npm install modulename locally**

**http : hyper text transfer protocol.**

**Node js provide one of the pre-defined core module ie http which help to create the server side program using JavaScript.**

**Java (Spring framework or spring boot)**

**.net (asp .net)**

**Php**

**Python with django framework.**

**To run above application we require server.**

**Server is a like a engine which contains container which is responsible to execute java or asp.net or php or python.**

**Tomcat**

**WebLogic**

**IIS server**

**Apache**

**Mamp**

**Etc**

**XAMPP**

**All above server is thread base server.**

**Program : set of instruction to perform specific task.**

**Processor :processor is responsible to execute the code.**

**Process : time taken to execute the code or program in execution.**

**Thread : it is small execution of a code with in process.**

**Thread also known as light weighted process.**

**Multi tasking**

**Process base**

**Thread base**

**Multi tasking using thread base is faster than process base.**

**JavaScript is a not a multi threaded base scripting language it is a single thread scripting language.**

**By default all server are thread base server.**

**class Booking {**

**avl =1;**

**}**

**10 client send the request at the same time to this application.**

**1st client**

**2nd client**

**3rd client**

**10th client**

**If sever side technologies is multi threading for each client rather than creating separate memory it will create one memory and each client consider as a one thread.**

**thread can be lock or block.**

**Server can response concurrently 1000 or 10000 0r 100000 or 1000000 client at the same time.**

**Server has 100 client ( 100 thread created)**

**101**

**Node JS providing one of the great features ie**

**Event loop architecture**

**Create the server side program using http module with node js**

**url module : node js provided one of the pre-define core module ie url module which help to provide URL details.**

**When we use urlRef.parse(url) The query property consider as a string.**

**urlRef.parse(url,true); The query property consider as a reference.**

**http module with route concept**

**Day 3 :**

**05/01/2022**

**Node JS provided lot of pre-defined external modules**

**Which help to create the web page.**

**Express module : Express is a type of third party module which internally use http module and wrap this module and provide extra functionality to develop web application using node js.**

**While creating node js application we have to depends upon lot of external module.**

**Those external module we can install locally or globally.**

**If we install the module locally in the current folder node\_module will download and it contains all necessary files which help to develop the application.**

**package.json it is type of json file which hold configuration details about the node js projects.**

**Command to create the package.json file**

**npm init**

**when we run npm install command. Node js search package.json file in current directory and it download all dependencies in current machine available in packge.json file.**

**Node js provided pre-defined property ie**

**\_\_dirname : this is use to give the current directory path.**

**To enable the request body data in express js we have to use middleware. Middleware means intermediate between client and server.**

**Middleware module name is body-parser.**

**Old version of express js we have to download the body-parser module separately but new version of expression js this module available in express js module.**

**npm install body-parser**

**Day 4 :**

**06/01/2022**

**View is normal html page.**

**If we want to make dynamic view.**

**Express JS introduce View engine.**

**Those view engine are dynamic. So we can do any programming on that view.**

**If we use pug or jade or other view engine those view tightly coupled with express js application.**

**Java technologies**

**Amazon shopping application**

**Payment gateway**

**Credit card python**

**Debit card asp.net**

**Net banking php**

**Google pay java**

**Phone pay python**

**Paytm node express js**

**XML :eXtensible markup language**

**XML is heavy**

**JSON JavaScript Object Notation.**

**JSON is light weighted.**

**Web Service : Giving the service for web application when both the application running using different technologies and in same OS or different os.**

1. **SOAP base web service : Simple Object Access Protocol. In SOAP web service we can share the data only in the form of XML.**
2. **RESTfull Web Service : Representational state transfer protocol. Using Restfull web service we can share the data in any format ie xml or json or plain text or html or any other format.**

**Using Rest Full web service exposing our resources as a web service. So if we expose express js as a rest full web service. Any application can all our application**

**Like Java, Python, Asp.net, Angular , React js or any rest client application.**

**If we make express js as a rest full web service**

**Those service we can all using Angular.**

**So View – Frontend – Angular**

**Backend – express js work independently.**

**REST API (Application Programming interface).**

**According to REST API we have to work on http methods**

**Resource : it can be any entity like**

**Employee, Product, Order, Manager, Customer, Bank, Account etc.**

**Get method : get the resources**

**Get Employee details, get product details.**

**Get Employee details using specific property like id, age , salary desg etc.**

**Select query**

**Select \* from employee**

**Select \* from employee where age > 21;**

**Select \* from employee where name like ‘Ravi’;**

**Post method : create the resource**

**Storing employee details**

**Storing customer information**

**Insert query**

**Put method : update the resource**

**We update all property of resource using another property.**

**Employee id,name,age**

**We update name and age using id property**

**Update query**

**patch method : update the resource**

**we update partial property of resource using another property**

**Employee id,name,age**

**We update age using id property but not name**

**Update query**

**Delete method : delete resource**

**Delete employee details using id**

**Delete query**

**Create the folder Express JS REST API**

**Create the package.json file using npm init command**

**npm install express**

**get REST API method we can test through browser.**

**get method**

1. **Get data in string format**
2. **Get data in json format**
3. **Get employee details in json format**
4. **Get all employee details in json format**

**While calling rest api by any technologies like java or python or angular if they want to pass the value to rest api so we can use two technique.**

1. **Query param**
2. **Sending single value**

**URL?key=value**

1. **Sending multiple value**

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

**Path param**

1. **Sending single value**

**URL/v1**

**url/Ravi**

1. **Sending multiple value**

**URL/v1/v2/v3**

**url/100/Ramesh/21**

**if client application is normal html page**

**then can use query param. Because html form with get method internally use query param concept**

**If client is angular or react or other technologies then we can use path params.**

**Post method :**

**Post method is use to store the data or resources.**

**We can’t test post, put, patch and delete methods through URL.**

**To receive the data as json format from request body we have to use middleware.**

**Crud operation on entity product or employee or customer**

**Product id, name, price, images**

**Create the folder Product CRUD Operation folder**

**Create two sub folder**

**Backend**

**Create package.json file using command as npm init**

**And install**

**npm install express**

**5 Rest API Created**

1. **Get all product details**
2. **Get product info using pid**
3. **Store product information**
4. **Update product price using pid**
5. **Delete product info using pid**

**Frontend**

**Angular : using angular framework we will call these REST API.**

**In front end folder create angular project using command as**

**ng new angular-product-crud**

**routing 🡪 yes**

**styling 🡪 css**

**Once project created please run this command to run the angular project.**

**ng serve –o**

**we are going to call backend service ie product service which contains 5 REST API.**

**In Angular first we have to create the product component, product service and product model class.**

**ng g c product this command is use to create component**

**ng g s product this command is use to create service**

**ng g class product this command is use to create the model**

**formGroup and formControlName are pre-defined attribute part of ReactiveFormsModule**

**We have to import this module in app.module.ts file**

**DOM Event**

**<input type=”button” value=”click”**

**onClick=”fun1()”/>**

**fun1 function is a part of javascript file**

**Angular Event**

**<input type=”button” value=”click”**

**(click)=”fun2()”/>**

**Fun2 function is a part of component ie typescript file**

**Event binding is a type of one way data binding ie template ----🡪 Component**

**()**

**Property binding is a type of one way data binding ie Component ---🡪 Template**

**[]**

**HttpClient api is a part of HttpClientModule so we have to import HttpClientModule in app.module.ts file.**

**We are running two server application**

**One is backend server using express js with port number 9090.**

**Another one is front server using angular framework with port number 4200**

**CORS : Cross Origin Resource Sharing**

**In Backend technologies we have to enable cors policy.**

**Node js provided external module ie cors.**

**We have to install this module and use as middleware to enable the cors policy.**

**11-01-2021**

**To store the information permanently we are using file system.**

**Node JS fs module to store and retrieve the data.**

**Limitation of file base system**

1. **File system is not consistence. Format of the file**

**Id/name/salary**

**Id Name Salary**

**Id\_Name\_Salary**

1. **Data redundancy means duplicate records we can store.**
2. **Security. File security read or write mode.**

**Data : data is known as raw fact.**

**Information : processed data or meaningful data.**

**Database We are storing the data in table format. Schema. It is a software which help to store the data in table format.**

**DBMS Database management system**

**RDBMS Relational database management system.**

**Codd’s rules 12 rules.**

**Database : My SQL or oracle or POSTGres or db2 or any other database.**

**Excel sheet or open excel or excel software.**

**DBMS**

**Srno Name Age**

**100 Ravi 21**

**101 Ramesh 22**

**100 Ajay 23**

**StudentTrainerDetails**

**TId TName Tech Sid SName Age**

**1 Raj Java 100 Reeta 21**

**1 Raj Java 101 Meeta 22**

**1 Raj Java 102 Leeta 23**

**1 Raj Java 103 Meeta 24**

**Trainer**

**PK**

**TI TName Tech**

**1 Raj Java**

**Student**

**PK FK**

**Sid SName Age TSId**

**100 Reeta 21 1**

**101 Meeta 22 1**

**102 Leeta 23 1**

**No SQL Database**

**Not only SQL**

**Mongo DB database : Mongo DB is a type of No SQL open source document base schema less database.**

**Customer in RDBMS**

**Cid Name Age city PhNumber**

**100 Ravi 21 null null**

**101 Ramesh 22 null null**

**102 Ajay 23 Bangalore null**

**103 Mahesh 24 null 1234**

**In Express JS we have to convert JS object into table format.**

**We if retrieve query or records from RDBMS we have to convert all query in JS or JSON Format in Express js or node js application.**

**After installation of to run the server we have to**

**Use the command as**

**mongod**

**then you have to run the command as**

**mongo**

**To run the mongo shell**

**Once you connected database using mongo command**

**To check all database present in mongo db database we have to command is**

**show dbs;**

**or**

**show databases;**

**command to create the database**

**use meanbatch2;**

**This command is use to create the database if database not present else it switch to existing database.**

**In mongo DB table is known as collection.**

**To check collection or table present in database we have to use the command as**

**Show collections;**

**Or**

**Show tables;**

**Command to create the collection**

**db.createCollection("Sample");**

**in Mongo DB record is known as document.**

**So collection is use to store more than one document.**

**db.collectionName.insert({key1:value1,key2:value})**

**db.Sample.insert({name:"Ravi"});**

**To view the documents from a collection.**

**db.Sample.find();**

**mongo db internally create \_id as a pre-defined property with unique value. If you want to pass user-defined value you can insert it. But you can’t change field name or property name.**

**in mongo DB we can insert the document in collection without creating the collection. If collection already present it will insert in existing collection else it will create.**

**If we want to retrieve specific document from a collection using index position.**

**db.Emp.find()[1];**

**it will display complete document from 1 index position**

**db.Emp.find()[2].age;**

**it will display 2 index position name property value.**

**To retrieve one field or more than one fields value from a collection.**

**db.collectionName.find({condition},{key1:1})**

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

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

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

**below query is use to retrieve more than field with index position**

**db.Emp.find({},{name:1,age:1,\_id:0})[1];**

**condition to filed the documents like a where clause in RDBMS**

**db.collectionName.find({condition});**

**operators**

**db.Emp.find({age:{$gt:25}});**

**db.Emp.find({age:{$gte:25}});**

**db.Emp.find({age:{$lt:25}});**

**db.Emp.find({age:{$lte:25}});**

**db.Emp.find({age:{$eq:25}});**

**db.Emp.find({age:{$ne:25}});**

**to check more than one condition with and / or operator**

**db.Emp.find({$and:[{name:"Ajay"},{age:21}]});**

**db.Emp.find({$or:[{name:"Ajay"},{age:22}]});**

**sort the document using any field in ascending or descending order.**

**db.Emp.find().sort({age:1}) ascending order**

**db.Emp.find().sort({age:-1}) descending order**

**update document**

**db.collectionName.update({condition},{$set:{key:value}}**

**)**

**db.Emp.update({city:"Bangalore"},{$set:{city:"Mysore"}});**

**it update only one document**

**db.Emp.updateMany({city:"Bangalore"},{$set:{city:"Mysore"}});**

**This will update many document.**

**Remove document**

**db.Sample.remove({}); This query remove all document from a collection without conditions.**

**db.Emp.remove({\_id:1}); This query remove document with conditions.**

**Storing array value in collection**

**db.Student.insert({\_id:1,sname:"Ravi",age:18,sub:["Math","GK","English"]});**

**db.Student.insert({\_id:2,sname:"Ramesh",age:17,sub:["Math","Bio","Computer"]});**

**db.Student.insert({\_id:3,sname:"Ajay",age:19,sub:["Phy","Chem","Maths"]});**

**retrieve document from a collection with array value.**

**db.Student.find({sub:"Math"})**

**Monogo DB Relationship**

**One to one one mean pk and many mean fk**

**One to many**

**Many to one**

**Many to many**

**In mongo db we can achieve relationship using**

**Two ways**

**Embedded style relationship only one collection**

**Employee**

**Id, name, salary**

**Address**

**City, state**

**One to one (one employee has only one address)**

**db.Employee.insert({\_id:1,name:"Ramesh",salary:25000,address:{city:"Bangalore",state:"Kar"}});**

**one to many (one employee can have more than one address)**

**db.Employee.insert({\_id:3,name:"Ajay",salary:22000,address:{city:"Bangalore",state:"Kar"},projects:[{pid:1111,tech:"Java"},{pid:2222:"Python"}]});**

**one to many (one employee can work in many projects)**

**db.Employee.insert({\_id:3,name:"Ajay",salary:22000,address:{city:"Bangalore",state:"Kar"},projects:[{pid:1111,tech:"Java"},{pid:2222,tech:"Python"}]});**

**condition for complex property**

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

**Linking style relationship we can use more than one collection**

**Trainer**

**\_id TName tech**

**1 Raj Java**

**2 Ravi Python**

**3 Ramesh Angular**

**db.Trainer.insert({\_id:1,tname:"Raj",tech:"Java"});**

**db.Trainer.insert({\_id:2,tname:"Ravi",tech:"Python"});**

**db.Trainer.insert({\_id:3,tname:"Ramesh",tech:"Angular"});**

**Student1**

**\_id SName Age tsid like FK not FK**

**100 Seeta 21 1**

**101 Reeta 22 1**

**102 Meeta 23 2**

**103 Keeta 24 2**

**104 Leeta 25 3,1**

**db.Student1.insert({\_id:100,sname:"Seeta",age:21,tsid:db.Trainer.find()[0].\_id})**

**db.Student1.insert({\_id:101,sname:"Reeta",age:22,tsid:db.Trainer.find()[0].\_id})**

**db.Student1.insert({\_id:102,sname:"Meeta",age:23,tsid:db.Trainer.find()[1].\_id})**

**db.Student1.insert({\_id:103,sname:"Keeta",age:23,tsid:db.Trainer.find()[1].\_id})**

**db.Student1.insert({\_id:104,sname:"Leeta",age:23,tsid:[db.Trainer.find()[1].\_id,db.Trainer.find()[0].\_id]});**

**db.Student1.insert({\_id:105,sname:"Yeeta",age:23,tsid:[db.Trainer.find()[1].\_id,db.Trainer.find()[2].\_id]})**

**Student2**

**\_id SName Age trainers**

**100 Seeta 21 1,Raj,Java**

**101 Reeta 22 1,Raj,Java**

**102 Meeta 23 2,Ravi,Python**

**103 Keeta 24 2,Ravi,Python**

**104 Leeta 25 [{3,Ramesh,Angular}**

**,{1,Raj,Java}]**

**db.Student2.insert({\_id:100,sname:"Seeta",age:21,trainers:db.Trainer.find()[0]});**

**db.Student2.insert({\_id:101,sname:"Reeta",age:22,trainers:db.Trainer.find()[0]});**

**db.Student2.insert({\_id:102,sname:"Meeta",age:23,trainers:db.Trainer.find()[1]});**

**db.Student2.insert({\_id:103,sname:"Keeta",age:24,trainers:db.Trainer.find()[1]});**

**db.Student2.insert({\_id:104,sname:"Leeta",age:25,trainers:[db.Trainer.find()[2],db.Trainer.find()[1]]});**

**db.Student2.insert({\_id:105,sname:"Yeeta",age:26,trainers:[db.Trainer.find()[1],db.Trainer.find()[2]]});**

**if we want to retrieve more than one fields from more than one collection then we have to use aggregate function with lookup operator**

**db.Student1.aggregate([{$lookup:{from:"Trainer",localField:"tsid",foreignField:"\_id",as :"TrainerInfo"}}]).pretty();**

**13-01-2022**

**Aggregate operator :**

**Mongo DB using aggregate operator groups multiple document and then perform some aggregate operation on those documents and it return the result.**

**Making the group by deptId**

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

**Making the group by city**

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

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

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

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

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

**connection mongo db database using node js application**

1. **Using mongo db module**
2. **Using mongoose module**

**Using mongo db module connecting mongo db database.**

**Mongo db is a external module we have to install it using command as**

**npm install mongodb**

**so first we have to create package.json file using command as npm init**

**mongoose :mongoose is a external module which internally follow ODM (Object Data Modeling) concept.**

**Using mongoose we an provide schema for the collection.**

**ORM**

**Mongoose internally use mongodb module only to connect the database. Mongoose module wrap mongo db module and provide extra features to develop enterprise application.**

**Mongo db module use native api driver to connect the database.**

**Create the folder as mongoose db module**

**Then create the package.json file using npm init command.**

**npm install mongoose**

**in mongoose we have to create the Schema. Schema help to provide the Structure for the collection.**

**Once schema is ready now we have to define the model.**

**Model take the help of schema and provide the collection name and using the model reference we can do all operation on collection in database.**

**By default mongoose collection name consider as plural names and in lower case.**

**17-01-2022**

**Socket io : Socket io is a library which is base upon Web Socket which help to do two way communication on web application.**

**Web Socket is a API provided by javascript as well as backend technologies like Express JS or Java or Python to do socket programming on web application.**

**Socket programming is a way of connecting two machine or devices or nodes on a network environment to communicate to each others.**

**One node or machine running on port number with specific ip address (localhost if same machine). While another node or machine reach out or try to connect that port number with ip address to do two way communication.**

**Client Server application**

**To do the socket programming node js provided pre-defined core module ie net module to do socket programming.**

**Web Socket : Socket programming on web application.**

**Normally using Express JS we can achieve one way communication But with Web Socket we can achieve two way communication.**

**Backend technologies express JS**

**express and express-ws**

**Front end technologies : JavaScript**

**JavaScript provided pre-defined object it WebSocket to do two way communication.**

**First create the folder as web socket programming**

**npm init to create the package.json file**

**install two modules**

**ie express and express-ws**

**Web Socket is a API which help to achieve two way communication on web application.**

**Socket io socket is a JavaScript external library which is base upon Web Socket which help do two way communication on web application.**

**Web Socket -🡪 JavaScript**

**Socket.io -🡪 jQuery**

**Socket io library internally use http module.**

**Create the folder as socket io app**

**Create the package.json file using the command as**

**npm init**

**npm install socket.io**