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# W03:

# JAVASCRIPT

## 1. THEORY

### 2. Function

- a. Function Statement
- b. Function Expression
- c. Function Declaration
- d. Anonymous function
- e. Named Function Expression
- f. Functional Programming
- g. Higher order function
- h. First class function

3. Advantages and disadvantages of JS

4. Scope, Lexical scope

5. Prototype

### 6. Closure

- a. Disadvantage
- b. Uses

7. Garbage collection

### 8. Hoisting

- a. TDZ
- b. let, const vs var
- c. Function vs arrow function

9. Call Apply Bind

10. This Keyword

### 11. String Methods

- a. Length
- b. toUpperCase, LowerCase
- c. Trim
- d. Pad
- e. charAt
- f. Split
- g. Concat
- h. substring

### 12. Array Methods

- a. Map
- b. Filter
- c. Reduce
- d. Find
- e. Sort
- f. Foreach

- g. Push
- h. Pop
- i. Shift
- j. Unshift
- k. Slice
- l. Splice

### 13. Object Methods

- a. freeze

14. Callback and callback hell

### 15. Promise

- a. Promise.all
- b. Promise.allSettled
- c. Promise.race
- d. Thenable
- e. Finally
- f. Catch

16. Async await

17. Spread and Rest Operator

18. DOM, BOM

19. Call stack

20. Event loop

### 21. ES6 and its features

- a. Let, Var, Const
- b. Ternary operator
- c. Arrow function
- d. Template literals
- e. Default Parameters
- f. Classes
- g. Modules
- h. Iterators
- i. Object & Array Destructuring

### 22. Primitive and non-primitive

- a. Pass by value and pass by reference

23. Message queue

24. Life

25. Generator

### 26. Prototype

- a. Prototype chain
- b. Prototypal Inheritance

27. JavaScript is dynamically types

28. Currying

### 29. Type Casting

- a. Implicit (Coercion)
- b. Explicit (Conversion)

30. Microtask queue

31. Shallow copy

32. Deep copy

33. Immutable

### 34. VS

- a. == and ===
- b. Let, const, var
- c. Synchronous vs asynchronous
- d. While vs do while
- e. Foreach Vs Map
- f. Parameters, Arguments
- g. for in, for of
- h. Undefined, Null
- i. Keywords & Identifiers

# W04:

# NODE.JS

# EXPRESS

## THEORY

1. What is Node.js
2. why v8 Engine
3. Advantages & Disadvantages of Node.js
4. How node works
5. Node Module System
6. REPL, Cli
7. NPX
8. Globals
  - a. \_\_dirname
  - b. \_\_filename
  - c. Module**
  - d. Process

## 9. Modules

- a. Core Modules.**
- b. local Modules.
- c. Third-party Modules.
- d. module.exports: {}
- e. require
- f. ESM
  - i. import and export

## 10. NPM

- a. local and global
- b. npm init
- c. npm install or i

## 11. Nodemon

- a. scripts
  - i. start
  - ii. dev
- b. npm run dev

## 12. package.json

## 13. package-lock.json

## 14. Event loop

## 15. Event Queue

## 16. Events

- a. Events emitter
- b. Http module

## 17. Streams

- a. type of streams
  - i. writable, readable, duplex, transform
- b. createReadStream()
- c. pipe()

## 18. HTTP

- a. https
- b. How does it work?
- c. request response cycle
- d. Stateless protocol
  - i. Local storage, Sessions and Cookies
- e. Request
  - i. General (start line)
    1. method/target/version
  - ii. header
  - iii. body
- f. Response
  - i. General (start line)
    1. version/statuscode/statustext
  - ii. header
    1. content type
  - iii. body
    1. requested resource

## g. HTTP Methods

- i. GET
- ii. POST
- iii. PUT
- iv. DELETE
- h. Idempotent
- i. Headers
- j. Status code
  - i. 1xx: Informational
  - ii. 2xx: Success
    1. 200 - Success
    2. 201 - Success and created
  - iii. 3xx: Redirect
    1. 301: moved to new URL

- 2. 304: not changed
- iv. 4xx: Client Error
  - 1. 401: Unauthorised
  - 2. 402: 402 Payment Required
  - 3. 403: Forbidden
  - 4. 404: page not found
- v. 5xx: Server Error
- k. MIME type
- l. HTTP v2
- m. TCP and IP

## 19. EXPRESS

20. npm install express --save

21. app = express()

- a. get()
  - i. status()
  - ii. send()
  - iii. sendFile()
- b. post()
  - i. express.urlencoded()
  - ii. Form vs JS
- c. put()
- d. patch()
- e. delete()
- f. all()
- g. use()
- h. listen()

22. Static files

- a. public
- b. express.static()

## 23. API

- a. json()

24. Params, Query String

25. Route Parameter

26. Query string/url Parameter

## 27. Middleware

- a. what is middleware
- b. used for what?
- c. req, res, next
- d. next()
- e. app.use in middleware
- f. passing two middleware
- g. external

- i. morgan npm

## 28. Routing

- a. router
- b. express.Router()

## 29. Core Express

### a. Session

- i. i express-session
- ii. secret
- iii. resave
- iv. saveUninitialized
- v. destroy()

### b. Cookies

- i. i cookie-parser
- c. Core middleware
- d. Core routing
- e. Build own API
- f. Core views
- g. database integration

## 30. EJS

- a. i ejs
- b. server side rendering
- c. view engine
- d. render()
- e. <% %>, <%- %>, <%= %>
- f. partials

## 31. Rest API

- a. RESTful

32. fragment identifier

## 33. VS

34. API vs HTTP

35. API vs SSR

36. HTTP vs HTTPS

37. URIs vs URLs vs URNs

38. Session vs Cookies

39. GET vs POST

40. PUT vs PATCH

41. SSL vs TLS

## 42. GOOD TO KNOW

## 43. Build-in Modules (only imp)

- a. os
- b. path
  - i. join()
  - ii. basename()
  - iii. resolve()
- c. fs
  - i. fs sync

- ii. - readFileSync()
- iii. - writeFileSync()
- iv. **fs async**
- v. - readFile()
- vi. - writeFile()
- d. http
  - i. createServer()
    - 1. url
    - 2. listen()
    - 3. write()
    - 4. writeHead()
    - 5. end()
- e. util
  - i. promisify
- f. events
  - i. on()

# W05:

# MONGODB

## 1. THEORY

2. What is Database?
3. SQL(relational) vs NoSQL ( )
4. What is MongoDB?
5. Run on JS Engine
6. How does mongoDB work?
7. Non-relational Document based
8. Advantage and Disadvantages
9. BSON
10. MongoDB Structure
11. MongoDB architecture
12. JSON vs BSON
13. MongoDB shell
14. CRUD Operations
15. Cursor, Iterate a Cursor
16. Time to Leave
17. Maximum Document Size : 16Mb

- a. GridFS

## 18. Data types in MongoDB (BSON)

- a. ObjectId
  - i. timestamp
  - ii. random value
  - iii. incrementing counter
- b. String
- c. Int, longInt, Double
- d. Array, Object
- e. Boolean
- f. Date
- g. Decimal128
- h. Regex
- i. Javascript
  - i. with scope
  - ii. without scope
- j. MinKey, MaxKey
- k. Binary data

## 19. Cursor

- a. cursor methods
- b. - toArray
- c. - forEach

## 20. Collection

- a. db
- b. db.createCollection(collection Name)
- c. show collections
- d. renaming Collection

## 21. Documents

- a. adding new Documents
- b. Nested Documents
  - i. advantage

## 22. Inserting Document

23. Insert One and Many
24. what are the additional methods used for inserting

## 25. Finding / Querying

- a. find()
  - i. iterate (it)
  - ii. pretty()
- b. findOne({ filter })
- c. finding In nested Array
  - i. "field.field"
  - ii. match
  - iii. exact match
  - iv. multiple match
- d. Array
  - i. finding in specific order
  - ii. without regard to order
  - iii. query by array index
  - iv. query by array length
- e. Projection
  - i. explicitly include fields
- f. Null, \$type: 10, \$exists

## 26. Filtering

- a. find( filter )
- b. find( {filter}, {fieldsToGet} )

## 27. Method Chaining

- a. count()
- b. limit()
- c. sort( 1 or -1 )
- d. skip()

## 28. Operators (denoted by \$)

- a. {\$gt: number} \$gte
- b. \$lt, \$lte
- c. \$or \$and \$not
- d. \$in: [1,2,3], \$nin: [1,2]
- e. \$all
- f. \$set, \$unset

- g. \$elemMatch
- h. \$slice
- i. \$size
- j. \$inc: 1, \$inc: -1
- k. \$pull, \$push
- l. \$each [1, 2]
- m. \$eq, \$ne
- n. \$currentDate
- o. \$exists
- p. \$expr**
- q. \$rename

## 29. Deleting

- a. deleteOne({ *field: value* })
- b. deleteMany()
- c. remove()

## 30. Updating

- a. updateOne( {*whichObject*}, {*\$set: {field: value, field: value}* } )
- b. updateMany()
- c. replaceOne()
- d. incrementing & decrementing
- e. adding and remove from array
- f. upsert

## 31. bulkWrite()

- a. ordered: false
- b. ordered vs unordered

## 32. Commands

- a. mongosh
- b. db
- c. show dbs
- d. db.stats

## 33. Aggregation

- a. How does it work
- b. advantages
- c. distinct
- d. Aggregate stages**
  - i. \$match
  - ii. \$group
    - 1. grouping by
    - 2. -nested field
    - 3. -multiple field
  - iii. \$sort
  - iv. \$count

- v. - other ways to count
- vi. - client and server side count
- vii. \$limit, \$skip
- viii. \$out
- ix. \$project
- x. \$lookup
- xi. \$unwind
- xii. allowDiskUse: true

## e. "\$name" vs "name"

## f. Accumulators Operators

- i. \$sum, \$avg, \$max, \$min

## g. Unary Operators

- i. \$type, \$lt, \$gt, \$or, \$and, \$multiply

## h. Aggregation Pipeline

- i. How does aggregation pipeline work?
- ii. memory limit : 100mb
  - 1. spill to disk

## i. Map Reduce

- i. for what is it used?
- ii. find sum, avg

## 34. Indexes

- a. pros and cons of Indexes
- b. createIndex({ *field: value* })
- c. options when creating Index
  - i. background: true
  - ii. unique: true
  - iii. name: "<*indexName*>"
- d. getIndex()
- e. dropIndex(), dropIndexes
- f. reIndex()
- g. rename Index
- h. hiding index

## i. Types of Indexes

- i. Single Field Index
- ii. Compound Index
- iii. Multikey Index
- iv. Text Index
- v. Geospatial, Hashed, Clustered Index

## 35. Schema

- a. pros and cons of using schema



- b. optional schema

### 36. Relationships

- a. embedding
- b. referencing
- c. one-to-one
- d. one-to-many
- e. one-to-squillions
- f. many-to-many

### 37. Replication

- a. replica set
- b. advantage and disadvantages of replication
- c. primary and secondary nodes
- d. arbiter
- e. Replication lag
- f. operation log (oplog)
- g. types of replication

### 38. Sharding

- a. advantages and disadvantages
- b. **Sharding Architecture**
  - i. What is Mongos/Router
  - ii. Config Server
- c. **Types of sharding**
  - i. Hashed sharding
  - ii. Ranged sharding
  - iii. Zone Sharding
- d. **Shard key**
  - i. shard hotspots
  - ii. normal shard key
  - iii. hashed shard key
- e. Vertical and horizontal scaling
- f. Zones
- g. mongos
- h. auto balancer

### 39. Cluster

- a. types of cluster
- b. config servers

### 40. Data Modeling

- a. linking vs embedding

### 41. Transactions

- a. ACID Transaction
- b. A- Atomicity
- c. C- Consistency
- d. I - Isolation

- e. D - Durability

### 42. VS

- a. \$or vs \$in
- b. drop() vs remove()
- c. findAndModify() vs findOneAndUpdate()
- d. Primary key vs secondary key
- e. join vs lookup
- f. dot notation vs nested form
- g. \$currentDate vs \$\$NOW
- h. delete() vs remove()
- i. bulkWrite vs InsertMany
- j. replace vs update
- k. shard vs node vs cluster
- l. Aggregation Pipeline vs Map Reduce
- m. vertical scalability vs horizontal scalability
- n. load balancer vs sharding
- o. odm vs driver
- p. stage operator vs accumulator operator
- q. normal shard key vs hashed shard key
- r. aggregate([\$count:"total"]) vs find({}).count()
- s. replication vs replica set
- t. transaction vs query
- u. scaling up vs scaling down
- v. config servers vs mongos

43. What is a MongoDB driver?

### 44. INTERVIEW QUESTION

- 45. What to do when your quireing becomes slow?
- 46. What to do when your files are getting very big?
- 47. How to condense large volumes of data?
- 48. How to search for text in MongoDB?
- 49. How does MongoDB schema changes?

### 50. GOOD TO KNOW

- 51. Atomicity
- 52. Type Bracketing
- 53. Dot Notation

- 54. Cursor behaviour
- 55. Aggregation Pipeline
- 56. Retryable Writes and Reads
- 57. MongoDB CRUD Concepts
- 58. B-Tree
- 59. ACID compliance
- 60. Mongoose
- 61. Network Components
  - a. load balancer
  - b. firewall
- 62. CAP Theorem
- 63. Mongo Utilities
  - a. mongoexport
  - b. mongoimport
  - c. mongodump
  - d. mongorestore
  - e. mongostat
  - f. mongotop
  - g. mongooplog

# OTHERS

## 1. SASS

2. @import  
"../node\_modules/bootstrap/scss/bootstrap";
3. @use & @forward