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- d. **Optimizations**
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 - e. Promise.any
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 - h. Thenable
 - i. Finally
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 - k. immutable
 - l. promisify
 - m. pros and cons
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 - b. error handling in async await
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 - a. both are used for optimising performance of a web app
 - b. by limiting the rate of API calls
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- 36. **ES6 and its features**
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 - e. Default Parameters
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 - h. Iterators
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 - b. how to make these copies
 - c. pros and cons
 - d. Mutable vs Immutable
 - e. Object.freeze()
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- 52. Function recursion
- 53. [Symbol.iterator]
- 54. Truthy and falsy value
- 55. Strict mode in JS
- 56. this substitution

57. **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
- j. Type casting vs Type coercion
- k. textContent vs innerText
- l. identifiers vs variables
- m. defer vs async

58. **Good to Know**

- 59. interpreted and compiled doe
- 60. Server-side vs client-side code

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1. What is Node.js
2. why v8 Engine
3. Advantages & Disadvantages of Node.js
4. How node works
5. Node Module System
6. Concurrency vs parallelism
7. REPL, Cli
 - a. _
8. NPX
9. Globals
 - a. __dirname
 - b. __filename
 - c. **Module**
 - d. Process
10. **Modules**
 - a. **Core Modules.**
 - b. local Modules.
 - c. Third-party Modules.
 - d. module.exports: {}
 - e. require
 - f. ESM
 - i. import and export
11. **NPM**
 - a. local and global
 - b. npm init
 - c. npm install or i
12. Nodemon
 - a. scripts
 - i. start
 - ii. dev
 - b. npm run dev
13. package.json
14. package-lock.json
15. Event loop
16. Event Queue
17. Events
 - a. **Events emitter**
 - b. Http module
18. **Streams**
 - a. type of streams
 - i. writable, readable, duplex, transform
 - b. createReadStream()
 - c. pipe()
 - d. Buffers
19. **Cron-job**
 - a. * * * * *
 - b. 1st* = second
 - c. 2nd* = minute
 - d. 3rd* = hour
 - e. 4th* = day of month
 - f. 5th* = month
 - g. 6th* = day of week
 - h. or, range selector
 - i. time zone
 - j. validation
20. **CORS**
 - a. preflight request
 - i. header
 - ii. accept-control-allow-or-igin: *
 - iii. accept-control-allow-methods: *
21. Cluster
22. Multithreading in node.js
 - a. require('worker_threads')
 - b. new Worker
23. thread pool
24. worker thread
 - a. creating worker,
 - b. parent port
25. cluster vs workerthread
26. child process
 - a. methods
 - b. - fork
 - c. - exec
 - d. - execFile
 - e. - spawn
 - f. spawn vs fork
 - g. child_process.fork() vs cluster.fork()

27. HTTP

- a. https
- b. How does it work?
- c. default port
- d. request response cycle
- e. Stateless protocol
 - i. Local storage, Sessions and Cookies
- f. Request
 - i. General (start line)
 - 1. method/target/version
 - ii. header
 - iii. body
- g. Response
 - i. General (start line)
 - 1. version/statuscode/statustext
 - ii. header
 - 1. content type
 - iii. body
 - 1. requested resource
- h. **HTTP Methods**
 - i. GET
 - ii. POST
 - iii. PUT
 - iv. PATCH
 - v. DELETE
 - vi. HEAD
 - vii. CONNECT
 - viii. OPTIONS
 - ix. TRACE
- i. Idempotent
- j. Safe Methods
- k. User-Agent
- l. Headers
- m. writeHead vs setHead
- n. 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: Payment Required
 - 3. 403: Forbidden
 - 4. 404: Page not found
- v. 5xx: Server Error
 - o. MIME type
 - p. HTTP v2
 - q. TCP and IP

28. XSS

29. CSRF

- a. referral header

30. SQL injection

- a. prepared statements

31. Express

32. npm install express --save

33. 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()

34. Static files

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

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38. Query string/url Parameter

39. Path params

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- b. used for what?
- c. req, res, next
- d. next()
- e. app.use in middleware
- f. passing two middleware
- g. **Types of Middleware**
 - i. Application-level middleware
 - ii. Third party middleware
 - 1. morgan
 - 2. multer
 - iii. Router-level middleware
 - iv. Built-in middleware
 - v. Error-handling middleware
 - 1. err.statusCode
 - 2. err.message

41. **Routing**

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

42. **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

43. **EJS**

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

f. partials

44. **Rest API**

a. RESTful

45. fragment identifier

46. **VS**

47. API vs HTTP

48. API vs SSR

49. HTTP vs HTTPS

50. URIs vs URLs vs URNs

51. Session vs Cookies

52. GET vs POST

53. PUT vs PATCH

54. SSL vs TLS

55. **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()

MONGODB

1. Theory

2. SQL(relational) vs
3. 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.

18. Storage engines

a. types

- i. WiredTi
 - ii. ger engine
 - iii. In-memory engine
 - iv. MMAPv1
- b. GridFS
- c. Journal

19. 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

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k. Binary data

20. Cursor

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

21. Collection

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

22. Documents

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

23. Inserting Document

24. Insert One and Many

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 - 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

27. Filtering

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

28. Method Chaining

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

d. skip()

29. **Operators** (denoted by \$)

- a. {\$gt: number} \$gte
- b. \$lt, \$lte
- c. \$eq, \$ne
- d. \$or \$and \$not
- e. \$in: [1,2,3], \$nin: [1,2]
- f. \$all
- g. \$set, \$unset
- h. **\$elemMatch**
- i. \$slice
- j. \$size
- k. \$inc: 1, \$inc: -1
- l. \$pull, \$push
- m. \$each [1, 2]
- n. \$eq, \$ne
- o. \$currentDate
- p. \$exists
- q. **\$expr**
- r. **\$cond**
- s. \$rename
- t. \$min, \$max
- u. \$mul
- v. \$ifNull
- w. **Array Operator**

- i. \$push
- ii. \$each
- iii. \$pull
- iv. \$pullAll
- v. \$pop
- vi. \$
- vii. \$elemMatch

30. **Deleting**

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

31. **Updating**

- a. updateOne({*whichObject* } ,
{\$set: {*field: value*, *field: value* }
})
- b. **Operators**
 - i. \$set
 - ii. \$unset
 - iii. \$rename

- c. updateMany()
- d. replaceOne()
- e. incrementing & decrementing
- f. adding and remove from array
- g. upsert
- h. update() vs updateOne()
- i. updateOne vs replaceOne

32. **bulkWrite()**

- a. ordered: false
- b. ordered vs unordered
- c. advantages and disadvantages

33. **Commands**

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

34. **Aggregation**

- a. How does it work
- b. advantages
- c. types of aggregation
- d. distinct
- e. **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 counting
 - vii. \$limit, \$skip
 - viii. \$out
 - ix. \$project
 - x. \$lookup
 - xi. \$unwind
 - xii. allowDiskUse: true
- f. "\$name" vs "name"
- g. **Accumulator Operators**
 - i. \$sum, \$avg, \$max, \$min

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

i. **Aggregation Pipeline**

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

j. Batch sizing

k. Iterator Size

l. Query routing

m. **Map Reduce**

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

35. **Indexes**

- a. pros and cons of Indexes
- b. createIndex({ *filed: 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

36. **Schema**

- a. pros and cons of using schema
- b. optional schema
- c. validation action

37. **Relationships**

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

38. **Replication**

- a. replica set
- b. advantage and disadvantages of replication
- c. **Replication Architecture**
 - i. primary and secondary nodes
 - ii. arbiter
 - iii. process of election
 - iv. heartbeat
- d. Process of Election
- e. Replication lag
- f. operation log (oplog)
- g. **Types of replication**
 - i. Asynchronous Replication
 - ii. Synchronous Replication
 - iii. Majority Commit
 - iv. etc...

39. **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
- i. scatter-gather

40. **Cluster**

- a. types of cluster
- b. config servers

41. **Data Modeling**

- a. embedded data model
- b. reference data model
- c. linking vs embedding

42. **Transactions**

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

43. **VS**

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

44. What is a MongoDB driver?

45. Capped collection and it's advantages

46. Profiler

47. Explain

48. Soft deleting

49. **Interview Question**

50. What to do when your quireing becomes slow?

51. What to do when your files are getting very big?

52. How to condense large volumes of data?

53. How to search for text in MongoDB?

54. How does MongoDB schema change?

55. How can we Backup and Restore in MongoDB?

56. What are the pros and cons of Normalising Data in MongoDB

57. **Good to Know**

58. Atomicity

59. Type Bracketing

60. Dot Notation

61. Cursor behaviour

62. Aggregation Pipeline

63. Retryable Writes and Reads

64. MongoDB CRUD Concepts

65. B-Tree

66. ACID compliance

67. Mongoose

68. Network Components

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b. firewall

69. **CAP Theorem**

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b. availability

c. partition tolerance

70. Firewall

71. **Mongo Utilities**

a. mongoexport

b. mongoimport

c. mongodump

d. mongorestore

- e. mongostat
- f. mongotop
- g. mongooplog

72. Clustered collections

73. WAL

REACT

1. Set up

2. npx create-react-app <appName >
3. components
 - a. default is App
4. rafce, tsrafce
5. calling function on button click
 - a. without parameter
 - b. with parameter
6. Fragments
7. Children Prop

8. Theory

9. What is React
10. DOM
 - a. DOM vs Virtual DOM
 - b. Reconciliation
 - i. working
 - c. Diffing Algorithm
 - d. React Fibre
 - i. incremental rendering
 - e. Shadow DOM
11. Dynamic rendering
12. props vs state
13. Server Side vs Client Side
Rendering in React
14. Synthetic Events
15. Life Cycle
16. View Oriented
17. Memoization
18. Pure functions
19. Strict Mode
20. SPAs vs MPAs
21. CSR vs SSR
22. Static vs Dynamic rendering
 - a. ISR, SPA
23. **Components**
 - a. A React render tree
 - i. top-level components
 - ii. leaf components
 - b. Props
 - i. immutable
 - c. Forwarding props

- d. children
- e. Importance of making them pure
- f. local mutation

24. JSX

- a. Rules of JSX
- b. Fragment
- c. JavaScript in JSX
- d. HTML VS JSX

25. Conditional rendering

26. Key

27. UI as a tree

- a. Render trees
- b. Module Dependency Tree
- c. Bundler
 - i. eg: Webpack
 - ii. Compiling
 - iii. Loader
 - iv. Code splitting

28. Rendering steps

- a. Triggering
- b. Rendering
- c. Committing

29. Rerendering

30. Batching updates

31. State

- a. Behaviour
- b. Queueing updates
- c. Updater function
- d. Updating object
- e. local var vs state var
- f. local mutation
- g. Lifting state
- h. Reducer

32. Declarative vs Imperative UI

33. Event handlers

- a. onClick, onSubmit etc...d
- b. Stopping propagation
- c. Preventing default

34. Lifecycle Methods

- a. What is Mounting, Unmounting

b. Phases

- c. - Mounting phase
 - i. constructor

- ii. render
 - iii. getDerivedStateFromProps
 - iv. componentDidMount
- d. - Updating phase
 - i. shouldComponentUpdate
 - ii. componentWillUpdate
 - iii. componentDidUpdate
 - 1. getSnapshotBeforeUpdate
- e. - Unmounting phase
 - i. componentWillUnmount
- f. - Error Handling
 - i. getDerivedStateFromError
 - ii. componentDidCatch

35. Hooks

- a. useState
 - i. changeValue
 - ii. changeValueWithFunction
- b. useRef
 - i. html
 - ii. useState vs useRef
 - iii. forwardRef
 - iv. useImperativeHandle
 - v. flushSync
- c. **useEffect**
 - i. dependency
 - ii. return in useEffect
 - iii. useLayoutEffect
- d. useMemo
 - i. sample
 - ii. recache
 - iii. pros and cons
 - iv. referential equality
- e. useHistory
 - i. push
 - ii. pop
 - iii. replace
 - iv. Redirect
- f. useNavigate
 - i. navigate()

- 1. route
 - 2. -1, 1
- g. useCallback
 - i. sample
 - ii. useMemo vs useCallback
 - iii. uses
- h. useContext
 - i. sample
- i. useReducer
- j. Create custom hooks**
 - i. useDebugValue
- k. useTransition
- l. useDeferredValue
- m. useId
 - i. sample
- n. useImperativeHandle

36. Props

- a. default prop
- b. PropDrilling
- c. Children

37. Components

- a. Creating Components
- b. Controlled vs Uncontrolled Components
 - i. Inputs
- c. Higher order components
- d. Pure components

38. React Router

- a. install
- b. Hooks**
 - i. useHistory
 - ii. useNavigate
- c. use
- d. Link**
 - i. replace
 - ii. reloadDocument
 - iii. state={}
 - iv. - useLocation()
- v. NavLink**
 - 1. -isActive
 - 2. end
- vi. Navigate**
 - 1. useNavigate
 - 2. navigate(-1)

e. Types of Router

- i. BrowserRouter
 - ii. HashRouter
 - iii. HistoryRouter
 - iv. MemoryRouter
 - v. StaticRouter
 - vi. NativeRouter
- f. params (:id)
- g. `const {<name>} = useParams()`
- h. `useSearchParams`

i. Nesting Routes

- i. index
- ii. location
- iii. shared element with children
- iv. outlet
- v. - `useOutletContext()`
- vi. Nesting in separate file
- vii. `useRoute`

39. Good to Know

- 40. Immer
- 41. `Object.entries(e)`
- 42. Icons
- 43. Experimental Hooks
 - a. `useEffectEvent`
 - b. `use`
 - c. `useFormStatus`
- 44. `useOptimistic`

45. Week 2

- 46. Render props
- 47. Higher order components
- 48. Custom hooks
- 49. Code splitting
 - a. Route based
 - b. Component based
 - c. `React.lazy`
- 50. Higher order comps

51. Lazy Loading

- i. fallback ui
- ii. suspense
- iii. **Error boundaries**
 - iv. `componentDidCatch`
 - v. Fallback UI

- vi. Nested & Propagation

52. `useReducer`

- a. `dispatch`
- b. `useReducer` vs `useState`
- c. `useReducer` vs `redux`
- d. payload

53. `PropTypes`

- a. `types => name, string, any`
- b. required, optional,
- c. node, element type
- d. `oneof`, `shape`
- e. `PropTypes` vs `Typescript`

54. `useMemo` vs `useCallback`

- a. `React.Memo` vs `useMemo`
- b. Object reference
- c. Pros and cons of memoization

55. Context API

- a. Provider
- b. Consumer
- c. `useContext`
- d. `useReducer`

56. Webpack

- a. Module Bundler
- b. Code Splitting
- c. Webpack Dev Server
- d. Hot Module Replacement (HMR)
- e. Tree Shaking

57. Babel

- a. Transpilation
- b. Plugins
- c. Runtime Polyfills
- d. Dynamic Import

58. `useDeferredValue`

59. `useTransition`

60. Others

- a. forward ref
- b. `useDebugValue`
- c. `useImperativeHandle`
- d. Axios interceptor
- e. Concurrent Requests
 - i. `axios.all()`, `axi`
 - ii. `os.spread()`

iii. cancel Token

W19 REDUX

61. Theory

- 62. Why, what
- 63. Redux
- 64. How redux stores data
- 65. Architecture
- 66. Store
- 67. pros and cons
- 68. Redux store
- 69. Middleware
- 70. Calling APIs
- 71. React reducer vs Redux

72. Store

- a. dispatch
- b. subscribe
 - i. unsubscribe
- c. getState
- d. replaceReducer
- e. Store enhancer

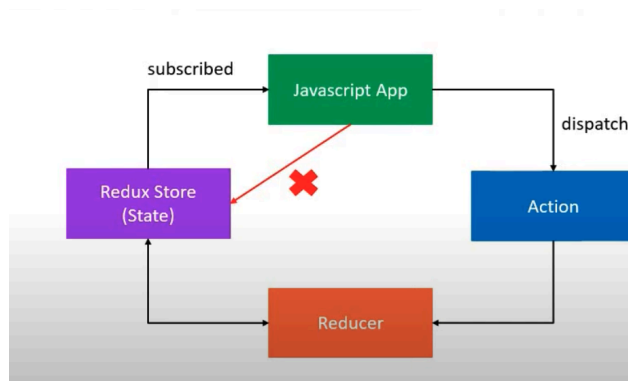
73. Action

- a. Action creator

74. Reducer

- a. rules

75. Redux flow



76. Redux principles

- a. Store
- b. Action
- c. Reducer

77. Selectors

- a. Memoized selector

78. Middleware

- a. - Logger, crash reporting
- b. - Perform async tasks

- c. applyMiddleware
- d. Redux Thunk
 - i. Thunk vs saga
 - ii. Payload creator
- e. Adding multiple middleware

79. Slice

- a. init state
- b. reducers
- c. extraReducers

80. Redux toolkit

- a. Nanoid
- b. Redux Query.

81. Normalizing Data

- a. Normalized state
- b. createEntityAdapter
- c. shallowEqual, reference equality

82. Serializing

83. Hydrating

84. redux vs flux

85. saga vs thunk

86. Other

87. Immer and the working of Immer in redux.

88. Access store outside of redux components

89. Flux by fb

90. Log rocket

91. createAsyncThunk

92. createEntityAdapter

93. createSelector

94. createListenerMiddleware

95. JWT

96. What?

97. Structure

- a. Header
- b. Payload
 - i. iat
 - ii. exp/eat
- c. Signature

98. Authentication working

99. Pros and cons

100. Expiration Time

101. Bearer token

- 102. Revocation
- 103. refresh token
- 104. Authentication vs Authorization
- 105. Types of Claims
 - a. public
 - b. registered
 - c. private

DSA

1. Algorithms

- **Search**
- Binary Search(recursive also)
- Linear Search

2. Recursion

3. Iterative & recursive

4. Virtual memory

5. Amortised residing

6. Dynamic programing

- Memoize approach
- Bottom up approach

7. Problems

- Factorial, fibonacci, prime number (with and without recursion)

8. Complexity Analysis

- Time complexity
- Space complexity

9. Asymptotic Notations

- Ranking
- Big O notation
- Omega Notation
- Theta Notation

10. Memory

11. Memory Allocation

- Bit vs byte
- Memory address
- Contiguous memory allocation
- Non-contiguous memory allocation
- **Stack**
 - i. Primitive types are stored in stack
- **Heap**
 - i. Reference type are stored in heap
 - ii. Eg: Arr, fun, obj

12. Memory Leak

- Symptoms
- **Garbage Collections**

i. Process

- Reasons for memory leak
- How to debug

13. Big O Notation

- Linear time complexity
- Constant time complexity
- Quadratic time complexity
- Qubic
- Logarithmic complexity
- Exponential complexity

14. Operations in normal array

- Init
- Set
- Get
- Traverse
- Insert
- Delete

15. Data Structures

16. What is DS?

17. Advantages and Disadvantages

18. Examples

- DOM
- Undu & Redo
- Os job scheduling

19. Dynamic Array

- It's working and memory allocation?
- Set

20. Linked List

- Advantages and disadvantages
- Applications
- **Creating a linked list**
- **Operation**
 - i. Init
 - ii. Set
 - iii. Get
 - iv. Traverse
 - v. Insert
 - vi. Delete
- Singly Linked List
- Double linked list
- Circular linked list
- Array vs linked list

21. OTHERS

22. Build in DS in JS

- **Array**
 - i. Push, pop, shift, unshift, forEach, map, filter, reduce, concat, slice, splice, sort()
 - ii. some(), every(), find(), findIndex(), fill(), flat(), reverse(), sort()
- **Objects**
 - i. Insert, Remove, Access, Search,
 - ii. Object.keys(), Object.values(), Object.entries()
- **Sets**
 - i. add, has, delete, size, clear
- **Maps**
 - i. set, get, has, delete, size, clear
- Array vs Set
- Object vs Map
- **Strings**
 - i. Primitive and object string
 - ii. Escape char
 - iii. ASCII
 - 1. 32 - Space
 - 2. 48-57 == (0-9)
 - 3. 65-90 == (A-Z)
 - 4. 97-122 == (a-z)
 - iv. Unicode
 - v. UTF-8

23. Custom DS

- Stacks
- Queue
- Circular queues
- Linked lists
- Hash tables
- Trees
- Graphs

24. Trees

- **Binary tree**
 - i. Complete binary tree
 - ii. Full binary tree
 - iii. Perfect binary tree
- **Heap**
 - i. Features
 - ii. Min Heap
 - 1. Creating Heap
 - 2. Insrt
 - 3. Dlt
 - iii. Max Heap

Week 2

25.Algorithms

- **Sorting**
- Bubble sort
- Insertion sort
- Quick sort
 - i. Divide and conquer
 - ii. Partition method
- **iii. Pivot selection**
- iv. Last, first
- v. average/median
- Heap sort
- Merge sort
 - i. Divide and conquer
- Merge vs Quick sort

26.Data Structures

27. Stacks

- LIFO
- Push, pop
- Stack underflow
- Stack overflow
- Use cases
- **Types of Stack**
- Linear Stack
- Dynamic Stack
- Array-based
- Linked list based

28. Queue

- FIFO
- Enqueue
- Dequeue
- Peek

- Priority queue
- Circular queue
- Uses
- **Types of Queue**
- - Linear Queue
- - Circular Queue
- - Priority Queue
- - Dequeue (Double ended queue)
 - i. Input restricted
 - ii. Output restricted
- - Blocking Queue
- - Concurrent Queue
- - Delay Queue

29. Hash Table

- Searching $O(1)$
- Hash function
- Collision
- Dynamic restructuring
- Uses
- Load factor
- **Operations**
- Init
- Insert
- Search
- Delete
- Traverser
- **Please Note**
- Week set, week map
- **Collisions Handling**
- - Separate Chaining
- - Open Addressing
 - i. Linear Probing
 - ii. Quadratic Probing
 - iii. Double Hashing
 - iv. Clustering
- - Cuckoo hashing
- - Robin Hood hashing

30. SHA: Secure Hashing Algorithm

Week 3

31. Linear, non-linear, hierarchical

32. Data Structures

33. Tree

- Features
- Uses
- parent, child, root, leaf, sibling, ancestor, descendent, path, distance, degree, dept, height, edge, subtree
- **Types of trees on nodes**
- - Binary tree
- - Ternary tree
- - K-array tree
- - Threaded binary tree
- **Types of trees on structure**
- - Complete tree
- - Full tree
- - Perfect tree
- - **Degenerated**
 - i. Left-skew
 - ii. Right-skew

34. Binary Search Tree (BST)

- BST vs BT
- Uses
- Balanced vs unbalanced tree
- Properties of BST
- **Operations**
- - Inserting
- - Deletion
- - **Traversal**
 - i. **DFS**
 - ii. - InOrder
 - iii. - PreOrder
 - iv. - PostOrder
 - v. **BFS**

35. Balanced Search Tree

- AVL tree
- Red-black tree
- Prefix tree
- M-way search tree
- - B Tree
- - B+ Tree
- Merkle Tree
- Red-black tree vs AVL

36. Heap

- Min Heap
 - i. **To get value of**
 - ii. - Left child

- iii. - Right child
- iv. - Parent
- v. Operations**
- vi. - Init/ Heapify
- vii. - Insert
- viii. - Delete

- o Max Heap
- o Heapify
 - i. Bottom-up
 - ii. Top-down
- o DE PQ

37. Trie

- o String vs Trie
- o **Operations**
- o - Init
- o - Insertion
- o - Delete
- o - Search
- o Prefix and Suffix tree
- o - terminator char
- o **Compressed Trie**
- o - Radix Tree (Patricia Trie)

38. Graph

- o Vertex, Edge
- o - Adjacency list, matrix
- o **Types**
- o - Unidirectional (Direct graph)
- o - Bidirectional (Un Directed graph)
- o - Cyclic
- o - Disconnected
- o - Weighted Graph
- o - Unweighted Graph
- o - Bipartite Graph
- o **Traversal**
 - i. BFS
 - ii. DFS
- o River size problem

39. Algorithms

- 40. Greedy method
- 41. Kruskal's Algorithm
- 42. Prim's Algorithm
- 43. Dijkstra's Algorithm
- 44. Bellman-Ford Algorithm

- 45. Topological Sorting
- 46. Floyd-Warshall Algorithm
- 47. Bipartite Graph Checking
- 48. Max Flow (Ford-Fulkerson Algorithm)

49. Question

- 50. Graph vs Tree
- 51. Forest (in Tree)
- 52. Forest > Graph > Tree > Linked list

53. Operators

- o Binary operators
- o Priority
- o Infix
- o Prefix (Polish notation)
- o Postfix (Reverse Polish notation)

General

- 1. How does Logarithms work
- 2. File structure vs Data Structure
- 3. Where is the DS used?
- 4. Void vs null
- 5. Dynamic data structure
 - a. Uses
 - b. Example
- 6. Dynamic memory management/ allocations
- 7. Heap be used over a stack
- 8. Data abstraction
- 9. Post fix expression
- 10. Signed number
- 11. Pointers in DS
 - a. Uses
- 12. Huffman's algorithm working
- 13. What is recursive algorithm
 - a. Divide and conquer on recursion
- 14. Which is the fastest sorting algorithm available?
- 15. Multi linked
- 16. Sparse matrices
- 17. Disadvantages of implementing queues using arrays
- 18. Void pointer
- 19. Lexical analysis
 - a. Lexeme

b. Pattern

HOSTING

1. Nginx

2. Commands

- a. systemctl nginx status
- b. restart and reload

3. Context

- a. Eg: http, events, server
- b. Worker process and connection
 - i. root, alias, try_files
- c. Directive & block
- d. Location block

4. Master Process

5. Worker Process

6. Firewall

7. DDOS protection

8. K8s IC

9. Sidecar proxy

10. Virtual host

11. Brute force

12. WAF

13. UFW

14. TCP vs UDP

15. Load Balancing

- a. Round robin
- b. Least connection
- c. IP hash

16. Caching

17. Proxy

- a. Proxy server
- b. Reverse proxy
- c. Forward proxy
- d. Load balancer vs reverse proxy

18. Nginx vs Apache

19.SSH

20.How does it work??

21. Private key

22.Public key

23. SSL

24.How does it work??

25. Linux

26. apt

27. rm

28. mkdir

29. touch

30. mv

31. nano

32. more, less

33. head, tail

34. >, <

35. /

a. bin

b. boot

c. dev

d. etc

e. home

f. root

g. lib

h. var

GIT

54. THEORY

55. **Centralised** Version control system
vs **Distributed** Version control
system

56. Config

57. Working directory

58. Staging area

59. git init

60. git clone

61. git status

62. git log

63. Creating Version

- git add *file*
 - i. git add - - all
 - ii. git add .
- **git commit**
 - i. -m "<message>"
 - ii. Commit without staging
- commit id
 - i. check sum
 - ii. **content**
 1. author details
 2. preview details
 3. date
 4. etc..
 - iii. sha-1 hash
- label
- **branch**

64. touch

65. git log

- git log
- git log - - all
- git log -p -1
- git log graph

66. git diff

67. git diff -staged

68. Restore

- git restore
- git restore -staged

69. Branching

- git branch <branchName>

- git branch
- git branch -all
- Creating branch
- Deleting branch
- git checkout vs git switch
- switching b/w branches
- commit id
- branch name

70. Stashing

- git stash
- git stash apply
- git stash drop
- git stash list

71. Merging

72. git merge <branchName>

73. Types of merging

- fast-forward merge
- **recursive merge**
 - i. conflict

74. Git server

- git remote add <name> <url>
 - i. git remote
 - ii. git remote -v
- git push <remoteName>
<branchName>
- git push set upstream
- **Cloning**
- git clone <url>
- git pull
- pull vs pull request?
- pull vs fetch

75. Tags

- Simplified
- Annotated
- git tag
- Should Pushing tags

76. Forking

77. git rebase

78. vim .gitignore

79. gist

80. ci cd

81. git projects

82. GOOD TO KNOW

83. rebase

84. tree

SQL:

Postgres

1. Theory

2. SQL vs NoSQL (Relational vs non-relational)
3. Web-scaled
4. When to use SQL and NoSQL
5. Expression, Statement, Operators

6. Data types SQL

- a. null, bit
- b. int, real / float
- c. char, varchar, text
- d. boolean
- e. date, datetime, timestamp
- f. xml/json
- g. – char vs varchar vs text
- h. – datetime vs timestamp
- i. – JSON vs JSONB

7. Operators

- a. Arithmetic, Logical, Comparison, Bitwise
8. Primitives: Integer, Numeric, String, Boolean
9. Structured: Date/Time, Array, Range / Multirange, UUID
10. Document: JSON/JSONB, XML, Key-value (Hstore)
11. Geometry: Point, Line, Circle, Polygon
12. Customizations: Composite, Custom Types

13. Postgres

14. Forks
15. client/server model
16. **Data types Unique to Postgres**
 - a. interval
 - b. point
 - c. bigserial
 - d. etc...
17. Database cluster

18. Constraints

- a. UNIQUE
- b. NOT NULL
- c. PRIMARY KEY
 - i. as UUID
- d. FOREIGN KEY
- e. CHECK (<condition>)
- f. - Adding & removing constraints after creating table

19. Commands

- a. list db
- b. to connect
- c. list tables
- d. Move to super
- e. list specific table
- f. List current table
20. Creating
 - a. Database
 - b. Table
21. Drop
 - a. Drop DB
 - b. Drop Table
 - c. Drop constraints
22. Commands
 - i. – or /* */

b. Database migration

 - i. Add, Delete, Migration
 - ii. Up migration
 - iii. Dow migration
23. **Functions**
 - a. SELECT
 - i. LIMIT
 - ii. FETCH
 - iii. OFFSET
 - iv. AS
 - v. DISTINCT
 - vi. GROUP BY
 1. HAVING
 2. GROUPING SETS
 3. ROLLUP
 4. CUBE
 - vii. Having vs Where
 - viii. Limit vs Fetch
 - b. FROM

- c. WHERE
 - i. AND, OR
 - ii. LIKE, ILIKE
 - iii. BETWEEN
 - iv. IN
 - v. IS NULL, IS NOT NULL

- d. ORDER BY
 - i. DESC, ASC

e. DELETE

- f. DELETING FOREIGN KEY
 - i. CASCADE

- g. UPDATE
 - i. SET

h. RENAME COLUMN

- i. **JOIN**
 - i. INNER JOIN
 - 1. ON
 - ii. LEFT JOIN
 - iii. RIGHT JOIN
 - iv. FULL JOIN (FULL OUTER JOIN)
 - v. SELF JOIN
 - vi. CROSS JOIN
 - vii. NATURAL JOIN

- j. **VIEWS**
 - i. Pros and Cons
 - ii. CREATE VIEW
 - iii. Materialized View
 - 1. Write amplification

k. UNION

l. COALESCE

m. NULLIF

- n. Index
 - i. multi index

24. AUTO_INCREMENT

25. ON CONFLICT

- a. DO NOTHING

b. Upserting

- c. - DO UPDATE
 - i. EXCLUDED

26. Date functions

- a. INTERVAL vs AGE

27. Aggregate functions

- a. AVG, MIN, MAX, SUM, ROUND, COUNT, CONCAT

28. Scalar Functions

- a. LCASE, CASE, LEN, MID, ROUND, NOW, FORMAT ,
- b. INITCAP , LEFT , RIGHT , CONCAT , ABS , CEIL , FLOOR,
- c. UPPER AND LOWER in psql.

29. Aggregate vs Scalar

30. Window function

- a. OVER
- b. - PARTITION BY, RANK, LEAD, LAG
- c. CASE

31. SQL Commands

a. DDL

- i. CREATE, ALTER, DROP, TRUNCATE
- ii. DROP vs TRUNCATE

b. DML

- i. INSERT, SELECT, UPDATE, DELETE

c. DCL

GRANT, REVOKE

d. TCL

- i. COMMIT
- ii. ROLLBACK
- iii. SAVE POINT

e. DQL

- i. SELECT

32. 3-Schema architecture

- a. Internal level
- b. Conceptual level
- c. External level

33. BIGINT VS BIGSERIAL

34. Combining queries

- a. UNION, UNION ALL
- b. INTERSECT, INTERSECT ALL
- c. EXCEPT, EXCEPT ALL

35. Normalisation

a. Levels

- i. 1NF, 2NF, 3NF etc..
- ii. BCNF

b. Anomalies

- c. - Insertion anomalies

- i. Data redundancy
 - ii. Missing data
- d. - Deletion anomalies
 - i. Losing data
- e. - Updation anomalies
 - i. inconsistency
 - ii. Updating values on so many records unnecessarily

36. Relationship

- a. one to one
- b. one to many
- c. many to may

37. Transaction & ACID

38. - Transaction

- a. COMMIT
- b. ROLLBACK
- c. SAVE POINT
 - i. RELEASE SAVEPOINT
- d. LOCK
 - i. Exclusive Locks (X-Locks)
 - ii. Shared Locks (S-Locks)
 - iii. Update Locks (U-Locks)
 - iv. Intent Locks
 - v. Read and Write Locks

39. - ACID

- a. - Atomicity
- b. - Consistency
 - i. Consistency in data
 - ii. Consistency in reads
- c. - Isolation
 - i. Read phenomena**
 - ii. - Dirty reads
 - iii. - Non-repeatable reads
 - iv. - Phantom reads
 - 1. Serialotions
 - v. - (Lost updates)
 - vi. Isolation level**
 - vii. - Read uncommitted
 - viii. - Read committed
 - ix. - Repeatable Reads
 - x. - Transactions are Serialized
- d. - Durability

- e. How to implement ACID properties

- 40. EXPLAIN
- 41. Heap Scan
- 42. Parallel Scan
- 43. Planner

44. Other theory and functions

- 45. COPY
- 46. OLTP
- 47. MUCC

48. Pendingings

- 49. Delete vs truncate
- 50. candidate key vs super key
- 51. stored procedure
- 52. ER diagram.
- 53. Practice nested queries.

MICROSERVI CE

Concepts & Theory

20. What is a service?
21. Monolithic arch
 - a. pros and cons
22. Microservice arch
 - a. pros and cons
23. **Monolithic vs Microservice**
 - a. deployment, scalability, reliability, development, flexibility, debugging
24. Security
25. **Cloud computing**
 - a. Public IP address
 - b. On-premises
 - c. IaaS, PaaS, SaaS (Serverless computer), SaaS
 - d. Private cloud
 - e. Hybrid cloud
26. Scaling
27. Blue Green Deployment
28. Cloud Native vs Cloud Ready
29. Event-Driven Architecture
 - a. Event producer
 - b. Event broker
 - c. consumer
 - d. pub/sub
 - e. eventual consistency
 - f. cache layer
 - g. idempotent
30. 12 Factor App
 - a. Codebase
 - b. Dependencies
 - c. Config
 - d. Backing services
 - e. Build, release, run
 - f. Processes
 - g. Port binding
 - h. Concurrency
 - i. Disposability
 - j. Dev/prod parity
 - k. Logs
 - l. Admin processes
31. Load balancing
 - a. Round robin
 - b. Least connection
 - c. IP hash
32. Service Registry
33. Failed fast
34. Service Discovery
35. **Tools**
 - a. OS
 - b. language
 - c. API management
 - i. Postman
 - d. messaging
 - i. kafka
 - ii. rabbitMQ
 - e. toolkits
 - i. fabric8
 - ii. seneca
 - f. orchestration
 - i. kubernetes
 - ii. Istio
 - g. monitoring
 - i. prometheus
 - ii. logstash
 - h. serverless tools
 - i. claudia
 - ii. AWS lambda
36. **Principles behind microservices**
 - a. Independent and autonomous service
 - b. Scalability
 - c. Decentralisation
 - d. Resilient services
 - e. Real time load balancing
 - f. Availability
 - g. CI/CD
 - h. Continuous monitoring
 - i. Seamless API integration
 - j. Isolation from failures
 - k. Auto provisioning

37. **Security**

- a. Defence in depth mechanism
- b. Token and API gateway
- c. Distributed tracing
- d. First session
- e. Mutual SSL
- f. OAuth

38. API gateway

- a. client performance
- b. security
- c. rate limiting
- d. monitoring logging
- e. BFF

39. SOA vs Microservices

40. **Communication**

- a. Types
 - i. synchronous blocking communication
 - ii. asynchronous non blocking communication
- b. Request response
 - i. REST over HTTP
 - ii. RPC
- c. Event driven
 - i. kafka

Design Patterns

1. need?

2. Aggregator

3. **API gateway**

- 4. Chained or chain of responsibility
- 5. Asynchronous messaging
- 6. Orchestration vs Choreography

7. **Database pattern**

- a. Database Per Service
- b. Shared Database

8. Event sourcing

9. Branch

10. Multi-tenant

- a. pros and cons

11. **CQRS**

12. **Circuit breaker**

13. SAGA

a. Choreography

b. Orchestration

14. Decomposition

- a. Vine or Strangle

15. **Database**

a. Decentralised Data Management

- i. pros and cons

b. **Data Consistency in microservice**

- i. Saga Pattern
- ii. Event-Driven Architecture
- iii. CQRS
- iv. Idempotent Operations
- v. Consistency Models

c. Database per Microservice

d. Shared Database

e. Data Virtualization

f. Distributed Data Mesh

16. **CI/CD**

a. Github actions

b. pros and cons

c. running in parallel

d. **Testing**

- i. unit tests, integration tests, and end-to-end tests.

e. Artefact Repository

- i. JFrog

17. **Github actions**

a. Workflows

b. Events

c. Jobs

d. Actions

e. Runners

f. Using variables in your workflows

g. Sharing data between jobs

- i. artefacts
 - 1. actions/download-artifact

h. Literals

i. Contexts

- i. uses

- ii. Context availability
- iii. github context
- iv. env context
- v. var context
- vi. job context
- j. Polyglot Persistence

18. - commands

- a. name
- b. on
 - i. push
 - 1. branches
- c. jobs
 - i. needs
 - ii. steps
 - iii. uses
 - iv. with
 - v. run
 - vi. if
 - vii. matrix
 - viii. outputs

19. Transactions in microservice

- a. Two-phase commit
 - i. voting phase
 - ii. commit phase
 - iii. pros and cons
- b. SAGA
 - i. backward recovery
 - ii. forward recovery
- c. correlation id
- d. imp of logging and monitoring

Docker

1. What, Why, When
2. Architecture
 - a. client and server
 - b. - server => docker engine
3. Container
 - a. kernel namespaces
 - b. C groups
 - c. Container vs Virtual machine
4. Images & Container
 - a. image vs container
 - b. Isolated process
5. **Images**
 - a. Image layers
 - b. - base image layer
 - c. - instruction layers
 - d. - writable container layer
 - e. Layer caching
6. docker run <ubuntu> vs docker pull <ubuntu>
7. Port mapping
8. Data persistence
9. DB Migration
10. Bind mounts.
11. run, start, rm
12. -t, -p

13. Commands

14. docker init
15. docker tag
16. docker build
 - a. -t
 - b. buildx
17. docker run
 - a. --name
 - b. -it
 - c. -e
 - d. -d
 - e. -p
 - i. port mapping
 - f. --net
 - g. --rm

18. docker container
 - a. ls
 - b. stop
 - i. -t
 - c. prune
 - d. rm
 - i. -f
19. docker logs <container>
 - a. --follow/ -f
20. docker image
 - a. ls
 - b. history
 - i. --no-trunc
21. docker network
 - a. ls
 - b. create <name>
 - i. -d
 - ii. --subnet
 - iii. --gateway
22. **Manage containers**
 - a. Docker container ls || docker ps
 - b. Docker container ls -a || docker ps -a
 - c. * Start
 - d. * Stop
 - e. * Restart
 - f. * rm
 - g. Docker system prune -a
23. **Network commands**
 - a. Docker network ls
 - b. Docker inspect bridge
24. **Volume**
 - a. types
 - b. - bind mounts.
 - c. - volume mounts/ named volumes
 - d. bind vs named mounts
 - e. scratch space
 - f. Volume claim
 - g. docker volume
 - i. create
 - ii. inspect
 - h. docker rm -f
25. dockerignore

26. **Docker hub**

- a. docker
 - i. pull
 - ii. push
 - iii. rmi

- b. Host
- c. None
- d. overlay
- e. macvlan
- f. IPvlan

27. **Docker compose**

- a. docker compose
 - i. up
 - ii. down
 - iii. watch
 - iv. ps
- b. services
 - i. image
 - ii. ports
 - iii. environment
 - iv. restart
 - 1. always
 - 2. on-failure
 - 3. unless-stopped
 - v. depends_on
 - vi. resources
 - 1. limits
 - 2. reservations
 - vii. volume mapping
 - 1. read only, write only
- c. networks
- d. secrets
- e. volumes
 - i. driver

30. Docker daemon

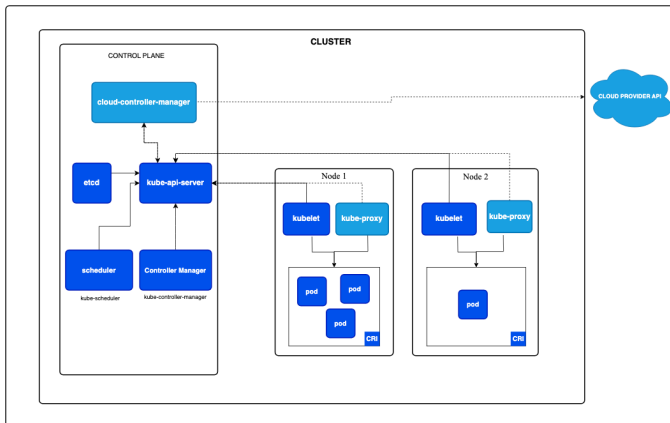
28. **Dockerfile**

- a. FROM
- b. COPY
- c. WORKDIR
- d. RUN
- e. CMD
- f. EXPOSE
- g. ENTRYPOINT
- h. ENV
- i. ARG
- j. USER
- k. LABEL
- l. RUN VS CMD

29. **Docker network**

- a. Bridge

Kubernetes



31. aka k8s
32. pros
 - a. other pros from doc
33. imperative vs declarative
34. self heading/ auto-heal
35. scaling, auto-scale
 - a. HorizontalPodAutoscaler
36. cluster
37. context
38. namespaces
39. annotation
40. namespaces vs annotation vs labels
41. Finalizers
42. Node
 - a. master node
 - b. worker node
 - c. node pool
 - d. Node status
 - e. Node heartbeats
 - f. Node controller
 - i. what it does
 - ii. CIDR block
 - g. Node topology
 - h. Graceful node shutdown
 - i. grace period
 - ii. non-graceful shutdown

43. Pod

- a. communicate via
- b. ephemeral
- c. atomic
- d. scaling
- e. **Pods life cycle**

- i. when creating
- ii. when deleting
 1. grace period

f. Pod state

- i. pending
- ii. running
- iii. succeeded
- iv. failed
- v. unknow
- vi. CrashLoopBackOff

g. init container

h. Multi container pods

- i. sidecar pattern
- ii. ambassador pattern
- iii. adaptor pattern

44. Container

- a. Images
- b. - Serial and parallel image pulls
- c. - image pull policy
- d. Container Environment
- e. Container Lifecycle Hooks
 - i. PostStart
 - ii. PreStop

45. Kubelet

46. Selectors

- a. metadata > labels
- b. spec > selector

47. Workloads

- a. pod
- b. replicaSet
 - i. self-heading
 - ii. template
- c. deployment
 - i. replicas
 - ii. revisionHistoryLimit

iii. Strategy

1. RollingUpdate

2. - maxSurge
3. - maxUnavailable
4. - default
5. - rollback
6. - rollout

7. Recreate

- d. daemonSet

- i. daemon controller
 - ii. uses
 - iii. spec > toleration
- e. statefulSet
 - i. persistent identifier
 - ii. creation & deletion
 - iii. uses
 - iv. headless service
- f. job, cron job
- g. replicaSet vs deployment
- h. pods vs deployment

48. Volumes

- a. persistent volume
 - i. claim
 - ii. HostPath
 - iii. drawback
 - iv. reclaim policies
 - 1. delete (default)
 - 2. retain
 - v. access modes
 - 1. ReadWriteMany
 - 2. ReadOnlyMany
 - 3. ReadWriteOnce
 - vi. states
 - 1. available
 - 2. bound
 - 3. released
 - 4. failed
- b. storage class
- c. static and dynamic

49. Objects

50. ConfigMap

- a. static
- b. solve static with volume

51. Secret

- a. type

52. Service

- a. clusterIP
 - i. port
 - ii. targetPort
- b. nodePort
- c. load balancer
 - i. L4
 - ii. round robin
- d. ingress

- i. L7

53. NodePort

54. k8s Cluster arch

a. Node

- i. container runtime
 - 1. containerized
 - 2. CRI-O
- ii. kubelet
- iii. kube proxy

b. Control Plane / Master node

- i. kube-api server
- ii. kube-scheduler
 - 1. factor when scheduling
- iii. Kube controller manager
 - 1. built-in controllers
 - 2. Node controller
 - 3. job controller
 - 4. endpointSlice controller
 - 5. serviceAccount controller
- iv. Cloud controller manager
- v. ETCD
- vi. Addons
- vii. - DNS
- viii. - WEBUI (dashboard)
- ix. - cluster level logging
- x. - container resource monitoring

55. Cluster > Node > pod > container

56. CRI

57. Garbage Collection

58. Mixed Version Proxy

59. KubeCTL

60. Minikube

- a. rollout

61. Open Service Broker.

62. Ingress

63. Docker Swarm vs Kubernetes

64. Security

65. Image

- a. Untrusted registries
- b. Vulnerabilities in tools of OS or libraries

66. Authentication & Authorization

67. practices

- a. use linear images
- b. image scanning
- c. don't use root user
- d. manage user and permission
 - i. RBAC

68. statefulSet

- a. master
- b. slave

69. Yaml

70. apiVersion

71. kind

72. metdat

- a. name
- b. label
- c. namespace

73. spec

- a. containers

74. Commands k8s

- a. alias k=kubernetes
- b. k get
 - i. pods
 - ii. svc
 - iii. deploy
- c. k delete -f
<deployment.yaml> -f
<service.yaml>
- d. k exec <pod> – nslookup
<svc>

75. k config

- a. current-context
- b. get-contexts
- c. use-context <name>
- d. delete-context <name>

76. namespace

- a. k get ns or namespace
- b. k create ns <name>
- c. k delete ns <name>

- d. k config set-context --current
--ns=<namespace>
- e. k get pods -n <namespace>

77. node

- a. k get nodes
- b. k describe node

78. Probes

- a. startup
- b. readiness
- c. liveness

79. Good to know

80. grep

81. docker compose watch -

<https://www.youtube.com/live/I-htDVxmFGM?si=5Um3NCnMi0BeAgCz>

82. chroot

83. Service Mesh

Message Broker

Kafka

1. used as key value but stored as binary in kafka
2. default port
3. serialisation and deserialization
4. pros and cons
5. Kafka cluster
 - a. Fault Tolerance
 - b. Scalability
 - c. Distributed Processing
6. **Kafka Broker**
 - a. topics
 - i. compacted topics
 - b. partitions
 - i. leader
 - ii. follower
 - iii. replication
 1. replication factor
 2. key
 - c. segments
7. **Producer**
 - a. record
 - i. header
 - ii. key
 - iii. value
 - iv. timestamp
 - b. retention period
 - c. ack/nack
 - i. no acks
 - ii. leader acks
 - iii. all acks
8. **Consumer**
 - a. Queue vs Pub Sub
 - b. Consumer group
9. Offset
10. Connectors
11. At most once
12. At least once

13. Exactly once
14. Exactly-Once Semantics
 - a. Idempotent
 - b. Two-Phase Commit
 - c. alt
15. Persistent storage
16. Stream processing
17. Distributed system
 - a. leader
 - b. follower
 - c. zoo keeper
 - i. Metadata Management
 - ii. Leader Election
 - iii. Synchronisation
 - iv. Heartbeats and Timeouts
 - v. Monitoring
 - vi. default port
 - vii. gossip
18. long polling
19. Kafka Connect

RabbitMQ

84. TCP
85. HTTPv2
86. AMQP
87. RabbitMQ server
 - a. default port
 - b. Exchange Queues
88. Heartbeats
89. Connection pool
90. Channels
 - a. Multiplexing
 - b. Concurrency
91. Message TTL
92. Message Acknowledgment
 - a. **Strategies**
 - b. Automatic Acknowledgment (Ack)
 - c. Positive Acknowledgment
 - d. Negative Acknowledgment (Nack)
 - e. Rejection with Requeue

- f. Rejection without Requeue

93. Exchanges

- a. Fanout exchange
 - i. pros and cons
 - ii. uses
- b. Direct exchange
 - i. pros and cons
 - ii. uses
- c. Header exchange
 - i. pros and cons
 - ii. uses
- d. Topics exchange
 - i. pros and cons
 - ii. uses
- e. Dead Letter Exchanges and Queues

94. Polyglot persistence

95. Durability

- a. Durable Queues
- b. Persistence message
- c. Combined Durability
- d. rabbitMQ

96. Routing Key

97. Request response

- a. architecture
- b. breaks
- c. pros and cons

98. Publish subscribe (pub/sub) model

- a. Queue/Channels/Topics
- b. Publisher/producer
- c. Consumer
- d. pros and cons

99. Multiplexing

100. Channel

101. Push model

gRPC

102. why?

103. http

104. protobuf

105. Unary gRPC

106. Server streaming

107. Client streaming

108. Bidirectional

TYPESCRIPT

16. Generics

Git Repo

[Fore more info click here](#)

Theory

1. What is typescript
2. Disadvantages
3. Statically typed language
4. **Compiling project**
 - a. tcs index.ts
5. setting type
 - a. let age: number 20
6. Types
 - a. implicit types an explicit types
 - b. any type
 - c. You will lose type case (It's not recommend to use any)
 - d. unknown
 - e. never
 - f. enum
 - g. Tuple
7. Objects
 - a. Readyone
 - b. Method
 - c. Specitif valus
 - d. Return type
8. Type alias
9. Union type
10. Type intersection
11. Literal types
12. Nullalbe type
13. Optione property, element, call
14. Interface
 - a. Reopening interface
 - b. Inheritance
15. Class
 - a. Modifiers
 - b. Getters and setters
 - c. Abstand class
 - d. Overrifdienr
 - e. Diff b/w class and abstand class

NEXT.JS

17. Theory

18. Prerendering

- a. SSG (Static site generation)
- b. SSR (Server side rendering)
- c. Suspense SSR Arch
 - i. HTML streaming
 - ii. Selective hydration
- d. ISR (Incremental site generation)
- e. RSC (React server components)
- f. Pros and cons

19. Routing

- a. file based
- b. app based
- c. how to route
- d. dynamic route
- e. Catch all segments [...<slug>]
 - i. optional catch all [...]]
- f. Navigation
 - i. Link component
 - 1. replace
 - ii. usePathname
 - 1. startWith
 - iii. useRouter
 - 1. push()
 - 2. replace()
 - 3. back()
 - 4. forward()
- g. Parallel Routes
 - i. slots (@)
 - ii. pros and cons
 - iii. default.tsx
- h. Conditional Routes
- i. Intercepting Routes
 - i. (<route>
 - ii. (<route>
 - iii. (<route>
 - iv. (<route>

20. Routing metadata

- a. why?
- b. static vs dynamic metadata

- c. priority
- d. layout vs page metadata
- e. title metadata
 - i. absolute
 - ii. default
 - iii. template

21. Pages

- a. not-found.tsx & notFound()
- b. loading.tsx
- c. error.tsx
 - i. Error boundary
 - ii. error object
 - iii. reset
 - iv. error bubbling
- d. File colocation
- e. private folder
 - i. –
 - ii. advantages
 - iii. %5F
- f. Route groups

22. Layout

- a. nested layout
- b. route group layout

23. Templates

- a. why?
- b. templates vs layout
- c. using both

24. Component hierarchy

- a. Layout > Template > Error Boundary > Suspense > Error Boundary (not found) > Page

25. Route Handlers

26. RSC (React server component)

27. API routes

28. Rendering

- a. client side
- b. server side

29. Data fetching

30. Styling

31. Optimization

32. Layouting

33. Loading state

34. Error bordering

35. SEO

- a. Metadata
- 36. Fetching data
 - a. Using server comp
 - b. In parallel
 - c. Fetch data where It's used
 - d. Streaming and suspense
- 37. Deduplication
- 38. Caching
 - a. ISR (Incremental site generation)
 - b. {cache: force-cache}
 - c. {cache: no-store}
 - d. {next: {revalidate: 60}}
- 39. Dynamic params

CLEAN CODE

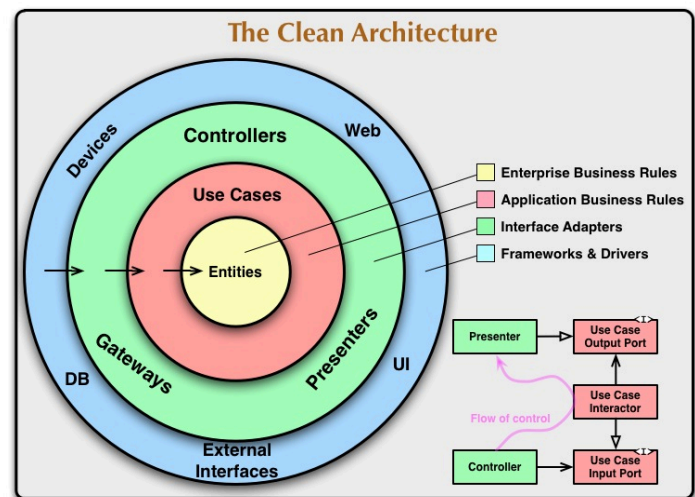
1. You are not done when it work
2. Invest the time to spend to write the program to make the program clean
3. Clean code what is expect when to read the code
4. Function should be verb (not noun)
5. **Function**

- a. Every things in the function should have the same abstraction
- b. Functions should be small
- c. Function should not have more than 3 params
- d. Don't pass boolean to a function
- e. Avoid switch statement
- f. The should not any side effect
- g. If a function return void, it should have side effects
- h. if a function returns a value, it should not have side effects

6. File should be <100 lines

7. SOLID Design Principles

8. - Single responsibility
9. - Open-closed
10. - Liskov substitution
11. - Interface segregation
12. - Dependency inversion



CLEAN ARCHITECTURE

1. Things

2. Dependency Inversion Principle
3. Interface adapters
- 4.
5. Entities
 - a. They have no dependency
6. Use cases
 - a. they only depend on entities
 - b. Interactor
 - c. Interface
7. Controllers
8. Gateway
9. Presenter
10. Devices
11. Web
12. Database
13. UI
14. External Interface


15. Related Topics

16. Dependency Injection

17. Rules

18. Data flow from outside to inside

19.Videos

20.  Using Clean Architecture for M...

OTHERS

1. SASS

2. @import
"../node_modules/bootstrap/scss/bootstrap";
3. @use & @forward

4. REST API

5. it's about communication
6. RESTful
7. pros
 - a. simple & standardised
 - b. scalable & stateless
 - c. high performance due to cachings

8. Request

- a. General (start line)
 - i. method/target/version
- b. operation: get, post, put, delete
- c. endpoint
- d. header
 - i. API key
 - ii. authentication data
- e. body/ parameter

9. Response

- a. General (start line)
 - i. version/statuscode/statustext
- b. header
 - i. content type
- c. body
 - i. requested resource

10. HTTP Methods

- a. GET
 - b. POST
 - c. PUT
 - d. DELETE
11. Idempotent
 12. Headers
 13. Status code
 - a. 1xx: Informational
 - b. 2xx: Success

- i. 200 - Success
 - ii. 201 - Success and created
 - c. 3xx: Redirect
 - i. 301: moved to new URL
 - ii. 304: not changed
 - d. 4xx: Client Error
 - i. 401: Unauthorised
 - ii. 402: 402 Payment Required
 - iii. 403: Forbidden
 - iv. 404: page not found
 - e. 5xx: Server Error

14. MIME type

15. HTTP v2

16. TCP and IP

17. CI CD (git)

18. JSDoc

19. /**
* function description
* @param {string} description
*/

20. Params

21. Returns

22. Sequelize

23. Testin

24. Swagger