Folder Structures

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        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. cont {<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. useDeferedValue
59. useTransition

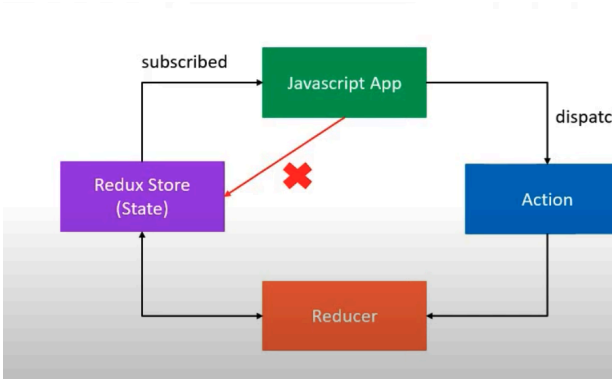
60. Others

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 resizing
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
- Monotonic stack

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 tre
    - **- Degrenarted**
        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
- Max Heap
- Heapfity
    i. Bottom-up
    ii. Top-down
- DEPQ

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

38. **Graph**
    - Vertex, Edge
    - - Adjacency list, matrix
    - **Types**
    - - Unidirectional (Direct graph)
    - - Bidirectional (Un DIrected graph)
    - - Cyclic
    - - Disconnected
    - - Weighted Graph
    - - Unweighted Graph
    - - Bipartite Graph
    - **Traversal**
        i. BFS
        ii. DFS
    - 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
    - Binary operators
    - Priority
    - Infix
    - Prefix (Polish notation)
    - 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. Contex
    a. Eg: http, events, server
    b. Worker process and connection
    c. Directive & block
    d. Location block
        i. root, alias, try_files
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. **Pendings**
49. Delete vs truncate
50. candidate key vs super key
51. stored procedure
52. ER diagram.
53. Practice nested queries.

MICROSERVICE

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, Cass, Pass, Faas (Server less computer), Saas
    d. Private could
    e. Hybridge 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. CICD
    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

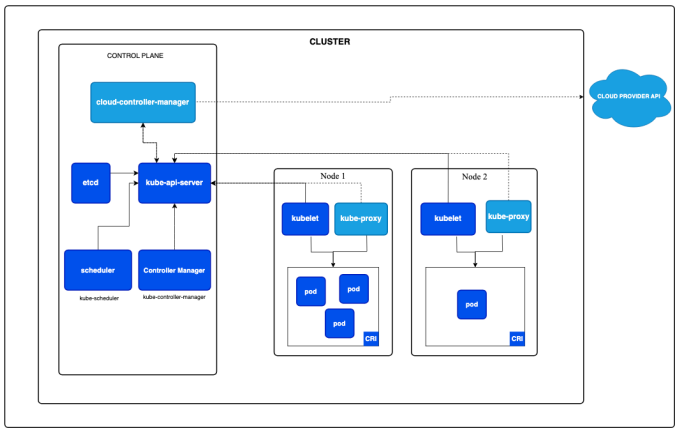
1. What, Why, When
2. Architecture
    a. client and server
    b. - server => docker engine
3. Container
    a. kernel namespaces
    b. C groups
    c. Container vs Virtual machine
4. Images & Container
    a. image vs container
    b. Isolated process
5. **Images**
    a. Image layers
    b. - base 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
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
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
    b. Host
    c. None
    d. overlay
    e. macvlan
    f. IPvlan
30. Docker daemon

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. Steam 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. protobuffer
105. Unary gRPC
106. Server streaming
107. Client streaming
108. Bidirectional

TYPESCRIPT

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
16. Generics

NEXT.JS

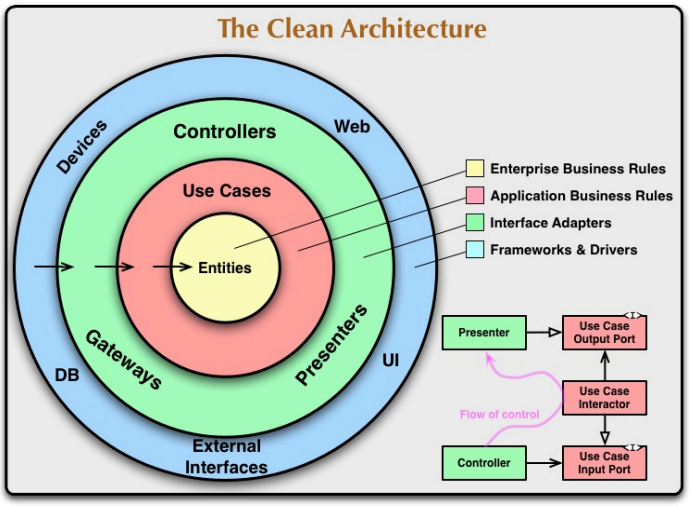
17. **Theory**
18. Prerendering
    a. SSG (Static site generation)
    b. SSR (Server side rendering)
    c. Suspense SSR Arch
        i. HTML streaming
        ii. Selective hydration
    d. ISR (Incremental site generation)
    e. RSC (React server components)
    f. Pros and cons
19. **Routing**
    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 > Erro Boudy (not found) > Page
25. Route Handlers
26. RSC (React server component)
27. API routes
28. Rending
    a. client side
    b. server side
29. Date 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 ...

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**