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.