

Basic SQL

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This contains the basic in SQL/Databases one should be familiar with for Software Developer/Data Analyst/Data Scientist role.

1. Need for Databases
2. DBMS/RDBMS
3. SQL
4. **Types of Commands**
 - (a) DDL
 - (b) DML
5. Databases
6. Tables
 - (a) Rows
 - (b) Columns
 - (c) System Generated Tables
 - (d) User Defined Tables
7. **Constraints**
 - (a) Unique
 - (b) Check
 - (c) Not NULL
 - (d) Primary Key
 - (e) Foreign Key
 - (f) Default
8. AUTO-INCREMENT/IDENTITY
9. Cardinality in Databases
10. **Queries**
 - (a) CREATE
 - (b) SELECT (SELECT INTO)
 - (c) UPDATE
 - (d) DELETE
11. LIMIT
12. Joins and Types
 - (a) Inner Join

- (b) Outer Join
 - i. Left Outer
 - ii. Right Outer
 - iii. Full Outer
- (c) Self Join
- (d) Cross Join

13. Handling NULL values

- (a) CASE Statement
- (b) COALESCE
- (c) ISNULL() or NVL()

14. GROUP BY & HAVING

15. Aggregate Functions

- (a) COUNT
- (b) SUM
- (c) MAX
- (d) MIN
- (e) AVG

16. CASE Statement

17. UNION ALL (Contains Duplicates)

18. UNION (Slower)

19. Joins vs UNION

20. **Normalization** (Normal Forms)

- (a) 1NF (No comma separated values in a single column and no repeating columns and contains PK)
- (b) 2NF (1NF + no redundant data and connect tables with a FK)
- (c) 3NF (1NF + 2NF + remove columns not fully dependant on PK)
- (d) 4NF
- (e) 5NF
- (f) BCNF

21. Indexes and Types

- (a) Clustered (Page Numbers)
- (b) Non-Clustered (Table of Contents)
- (c) Unique

22. Cursor

23. Views and Types

24. Triggers and Types

25. Stored Procedure (SP)

- (a) System Generated
- (b) User Defined

26. Temporary Tables
 - (a) Local Temporary
 - (b) Global Temporary
27. Derived Table
28. Common Table Expression (CTE)
 - Normal CTE
 - Recursive CTE
29. Sub-Queries
 - (a) Normal
 - (b) Correlated
30. String Functions (UPPER, LOWER)
31. Datetime Functions
32. MERGE (Upsert)
33. INTERSECT
34. MINUS
35. LOCKS
36. EXCEPT
37. Blocking Queries
38. ROLLUP, CUBE. GROUPING SETS
39. **Window Functions**
 - OVER
 - PARTITION BY
 - ROW_NUMBER
 - RANK
 - DENSE_RANK
 - LEAD and LAG (SQL Server)
40. Database Partitioning vs Indexing
41. OLTP vs OLAP
42. Transactional Databases
43. Data Warehouse <https://aws.amazon.com/data-warehouse/>
44. **Schemas in DW**
 - STAR
 - Snowflake