

# Basic SQL

Pramod Duvvuri

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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. Joins and Types
  - (a) Inner Join
  - (b) Outer Join

- i. Left Outer
  - ii. Right Outer
  - iii. Full Outer
- (c) Self Join
- (d) Cross Join
- 12. Handling NULL values
  - (a) CASE Statement
  - (b) COALESCE
  - (c) ISNULL() or NVL()
- 13. GROUP BY & HAVING
- 14. Aggregate Functions
  - (a) COUNT
  - (b) SUM
  - (c) MAX
  - (d) MIN
  - (e) AVG
- 15. CASE Statement
- 16. UNION ALL (Contains Duplicates)
- 17. UNION (Slower)
- 18. Joins vs UNION
- 19. **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
- 20. Indexes and Types
  - (a) Clustered (Page Numbers)
  - (b) Non-Clustered (Table of Contents)
  - (c) Unique
- 21. Cursor
- 22. Views and Types
- 23. Triggers and Types
- 24. Stored Procedure (SP)
  - (a) System Generated
  - (b) User Defined
- 25. Temporary Tables

- (a) Local Temporary
- (b) Global Temporary

26. Derived Table

27. Common Table Expression (CTE)

- Normal CTE
- Recursive CTE

28. Sub-Queries

- (a) Normal
- (b) Correlated

29. String Functions (UPPER, LOWER)

30. Datetime Functions

31. MERGE

32. INTERSECT

33. MINUS

34. LOCKS

35. EXCEPT

36. Blocking Queries

37. ROLLUP, CUBE. GROUPING SETS

38. **Window Functions**

- OVER
- PARTITION BY
- ROW\_NUMBER
- RANK
- DENSE\_RANK
- LEAD and LAG (SQL Server)

39. OLTP vs OLAP

40. Transactional Databases

41. Data Warehouse <https://aws.amazon.com/data-warehouse/>

42. **Schemas in DW**

- STAR Schema
- Snowflake Schema