

# Basic SQL

Pramod Duvvuri

March 18, 2019

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) Candidate Key
  - (f) Foreign Key
  - (g) 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 - if where clause is present then it's an Inner Join otherwise a cartesian product is the result

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
- (d) View Indexes

22. Cursor

23. Views and Types

24. Triggers (INSERT/UPDATE/DELETE)

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. **Schemas in DW**
- STAR
  - Snowflake