Basic SQL Concepts

1. **Introduction to SQL**
    - What is SQL?
    - Importance in data engineering.
    - SQL databases vs. NoSQL databases.
2. **SQL Basics**
    - SELECT statement.
    - FROM clause.
    - WHERE clause.
    - DISTINCT keyword.
3. **Data Types**
    - Common SQL data types (e.g., INT, VARCHAR, DATE).
    - Data type constraints.

Intermediate SQL Concepts

4. **SQL Functions**
    - Aggregate functions (COUNT, SUM, AVG, MIN, MAX).
    - Scalar functions (UCASE, LCASE, ROUND, NOW).
    - Date and time functions.
5. **Joins**
    - INNER JOIN.
    - LEFT JOIN.
    - RIGHT JOIN.
    - FULL JOIN.
    - CROSS JOIN.
    - Self-joins.
6. **Grouping and Aggregating Data**
    - GROUP BY clause.
    - HAVING clause.
    - Using aggregate functions with GROUP BY.
7. **Subqueries**
    - Simple subqueries.
    - Correlated subqueries.

- Using subqueries in SELECT, FROM, and WHERE clauses.

Advanced SQL Concepts

8. **Set Operations**
    - UNION and UNION ALL.
    - INTERSECT.
    - EXCEPT.
9. **Window Functions**
    - OVER() clause.
    - PARTITION BY.
    - ROW_NUMBER(), RANK(), DENSE_RANK().
    - LEAD() and LAG().
10. **Advanced Joins and Complex Queries**
    - Multiple joins.
    - Nested joins.
    - Common Table Expressions (CTEs).
11. **Indexes and Performance Tuning**
    - Importance of indexes.
    - Creating and managing indexes.
    - Query optimization techniques.

Data Manipulation

12. **Data Insertion, Updating, and Deletion**
    - INSERT INTO.
    - UPDATE.
    - DELETE.
    - MERGE statement.
13. **Transactions and Concurrency Control**
    - ACID properties.
    - BEGIN, COMMIT, and ROLLBACK.
    - Isolation levels.

SQL in Data Engineering Context

14. **ETL Processes**

- Extracting data using SQL.
- Transforming data with SQL.
- Loading data into target databases.

15. **Working with Large Datasets**

    - Partitioning tables.
    - Managing large datasets in SQL.

16. **Data Integration**

    - Connecting SQL databases with other data sources.
    - Using SQL with Azure Data Factory.

17. **Data Warehousing Concepts**

    - Star and snowflake schemas.
    - Fact and dimension tables.
    - Writing queries for data warehouses.

Hands-On Practice

18. **Practical Exercises and Projects**
    - Real-world data sets.
    - Building ETL pipelines.
    - Data cleaning and transformation tasks.
    - Creating reports and dashboards.