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**Batch:** Data Engineering

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**Topics:**

1. What is a Database and Datawaehousing?
2. SQL and it’s languages?

**RDBMS (Relational Database Management System):**

**Definition:** RDBMS is a type of database management system that stores data in the form of tables and establishes relationships between them. It follows the principles of the relational model proposed by E.F. Codd.

**Features:**

* **Tables:** Data is organized into tables.
* **Rows and Columns:** Tables consist of rows and columns.
* **Primary Key:** Each table has a primary key that uniquely identifies each record.
* **Foreign Key:** Establishes relationships between tables.
* **ACID Properties:** Ensures data integrity through Atomicity, Consistency, Isolation, and Durability.

**Data Warehousing:**

**Definition:** Data warehousing is the process of collecting, storing, and managing data from different sources to provide meaningful business insights. It involves the integration of data from various sources into a central repository for analysis and reporting.

**Features:**

* ETL (Extract, Transform, Load) processes for data integration.
* Data aggregation and summarization for reporting.
* Historical data storage for trend analysis.
* Support for decision-making and business intelligence.

**OLAP (Online Analytical Processing) - OLTP (Online Transaction Processing):**

**OLAP:**

**Definition:** OLAP is designed for complex queries and multidimensional analysis. It enables users to interactively analyse and explore data to gain insights.

**Features:**

* Multidimensional data representation (cubes).
* Aggregation and drill-down capabilities.
* Supports complex queries for business analysis.

**OLTP:**

Definition: OLTP focuses on transaction-oriented tasks, handling day-to-day operations such as data entry, updating, and retrieval in real-time.

**Features:**

* Fast response time for individual transactions.
* Normalized data structure for efficient storage.
* Concurrency control to handle multiple transactions simultaneously.

**SQL (Structured Query Language):**

**Definition:** SQL is a domain-specific language used for managing and manipulating relational databases. It provides a standard way to interact with databases.

**Features:**

Data Query Language (DQL): SELECT statement for querying data.

Data Definition Language (DDL): CREATE, ALTER, DROP statements for defining and modifying database structures.

Data Manipulation Language (DML): INSERT, UPDATE, DELETE statements for manipulating data.

Data Control Language (DCL): GRANT, REVOKE statements for access control.

Transaction Control Language (TCL): COMMIT, ROLLBACK statements for transaction management.