

01 SQL INTRO

Fields = Columns

Records = Tuples = Rows

RDBMS

WHAT IS A DATABASE?

Ans. A database is an organized collection of structured information, typically stored electronically in a computer system. It allows for efficient storage, retrieval, and management of data. Database objects are structures within a database that are used to store or reference data. Common examples include tables, views, indexes, stored procedures, and triggers. These objects help in organizing, retrieving, and managing the data effectively.

SQL

SQL (Structured Query Language):

- SQL is a standard language used for managing and manipulating relational databases.
- It provides a set of commands for querying, updating, and managing databases.
- SQL is not specific to any particular database system and can be used with various relational database management systems (RDBMS) such as MySQL, PostgreSQL, SQLite, Oracle, MS SQL Server, etc.
- It follows ANSI/ISO standards, ensuring portability across different database platforms.
- SQL statements include commands like SELECT, INSERT, UPDATE, DELETE, CREATE TABLE, ALTER TABLE, etc.
- SQL can be used to create, modify, and delete databases, tables, and indexes, as well as perform data manipulation and retrieval operations.

ANSI SQL

- Interoperability and portability of SQL-based applications across different database platforms.
- Code written for one RDBMS should easily be ported to another ANSI compliant RDBS.

WHAT IS CONSISTENCY IN SQL?

Consistent state implies that database is accurate, valid, and meets all defined rules and constraints.

1. **Entity Integrity:** Each row in a table is uniquely identifiable by a primary key
2. **Domain Integrity:** Data in a database conforms to the specified data types and value ranges.
3. **Referential Integrity:** Referential integrity maintains the relationships between tables by ensuring that foreign key values always reference existing primary key values in another table. It prevents orphaned or dangling references.
4. **Semantic Integrity:** Semantic integrity enforces the correctness of the logical connections between different data elements in the database. It ensures that the meaning and interpretation of data remain consistent across different parts of the database.

WHAT IS AN RDBMS?

The software used to store, manage, query, and retrieve data stored in a RDB. The RDBMS provides an interface between users and applications and the database, as well as administrative functions for managing data storage, access, and performance.

Examples: MySQL, PostgreSQL, Oracle Database, Microsoft SQL Server

A relational database (RDB) is a way of structuring information in tables, rows, and columns. An RDB has the ability to establish links—or relationships—between information by joining tables, which makes it easy to understand and gain insights about the relationship between various data points.

- Developed by E.F. Codd from IBM in the 1970s

Analogy:

Database = Collection of spreadsheets

Each spreadsheet = Table

Columns = Attributes

Rows = Records or Tuples

Attributes (columns) specify a data type, and each record (or row) contains the value of that specific data type.

All tables in RDB has an attribute called **primary key**, which uniquely identifies each row.

And each row can be used to create a relationship between different tables using a **foreign key**—a reference to a primary key of another existing table.

CustomerID is the primary key in the Customer table.

But CustomerID is the foreign key in the Orders table.

WHAT IS A SCHEMA?

Ans. Logical container or a namespace which contains database objects such as tables, views, indexes, and constraints.

- Helps in Organizing related objects within a database.
- Namespace: `schema_name.table_name`
- Access control at the Schema level

A database can contain multiple schemas and each schema contains multiple objects.

But in MySQL and also in PostgreSQL Schema is a synonym for Database.

Table Structure

```
DESCRIBE BigBasket_Products;
show columns from BigBasket_Products;

SELECT *
FROM INFORMATION_SCHEMA.COLUMNS
WHERE table_name = 'bigbasket_products';
```

```
SELECT *  
FROM INFORMATION_SCHEMA.COLUMNS  
WHERE table_name = 'bigbasket_products';
```

COLUMNS 1 ×

Enter a SQL expression to filter results (use Ctrl+Space)

	asc COLUMN_NAME	123 ORDINAL_POSITION	asc COLUMN_DEFAULT	asc IS_NULLABLE	asc DATA_TYPE	123 CH/
1	index	1 [NULL]	YES	int		
2	product	2 [NULL]	YES	varchar		
3	category	3 [NULL]	YES	varchar		
4	sub_category	4 [NULL]	YES	varchar		
5	brand	5 [NULL]	YES	varchar		
6	sale_price	6 [NULL]	YES	int		
7	market_price	7 [NULL]	YES	int		
8	type	8 [NULL]	YES	varchar		
9	rating	9 [NULL]	YES	double		
10	description	10 [NULL]	YES	text		