

## 02 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

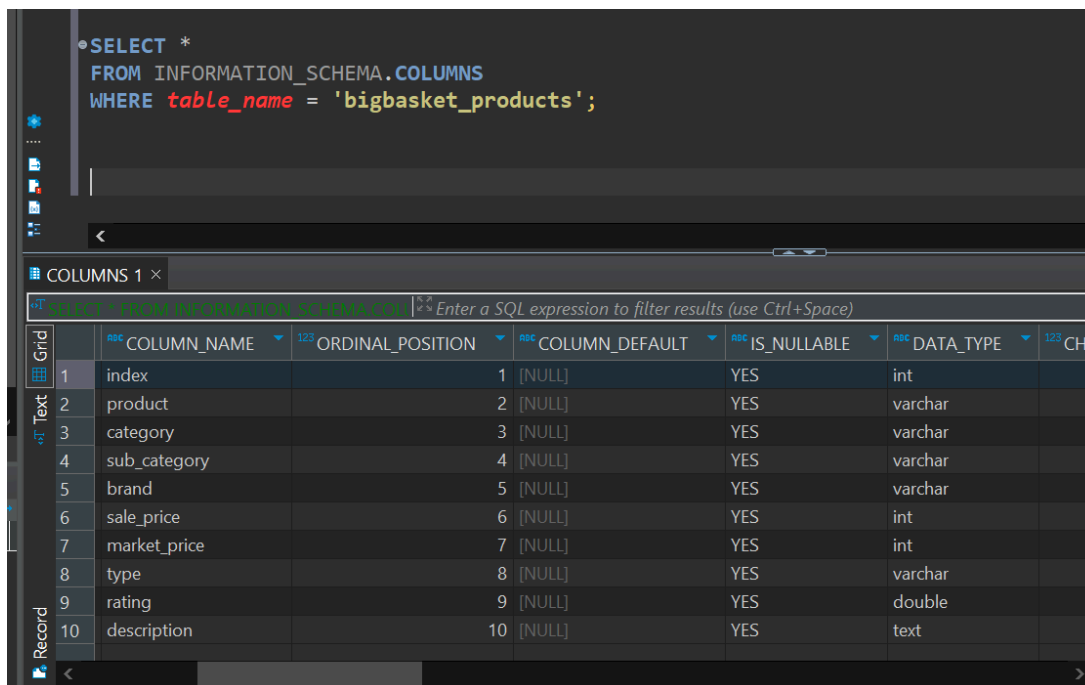
A database can contain multiple schemas and each schema contains multiple objects.

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';
```



The screenshot shows a SQL IDE interface. The top editor contains the following SQL query:

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

Below the editor, a results pane titled "COLUMNS 1 x" displays the output of the query. The results are shown in a table with the following columns: COLUMN\_NAME, ORDINAL\_POSITION, COLUMN\_DEFAULT, IS\_NULLABLE, DATA\_TYPE, and CHARACTER\_MAXIMUM\_LENGTH. The table contains 10 rows of data.

	COLUMN_NAME	ORDINAL_POSITION	COLUMN_DEFAULT	IS_NULLABLE	DATA_TYPE	CHARACTER_MAXIMUM_LENGTH
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	