WELCOME, TO SQL COURSE

BASIC STEP BY STEP ADVANCE

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Complete SQL With Notes

1.Introduction to SQL-What Is SQL & Database

2.Data Types, Primary-Foreign Keys & Constraints

a.Install postgresqland pgadmin4

3.Create Table In SQL & Create Database

4.INSERT UPDATE, DELETE & ALTER Table

5.SELECT Statement & WHERE Clause with Example

6.How To Import Excel File (CSV) to SQL

7.Functions in SQL & String Function

8.Aggregate Functions –Types & Syntax

9.Group By and Having Clause

10.Time Stamp and Extract Function, Date Time Function

11.SQL JOINS –Types & Syntax

12.SELF JOIN, UNION & UNION ALL

13. Subquery

14.Window Function –Types & Syntax

15.Case Statement/Expression with examples

16.CTE-Common Table Expression with examples

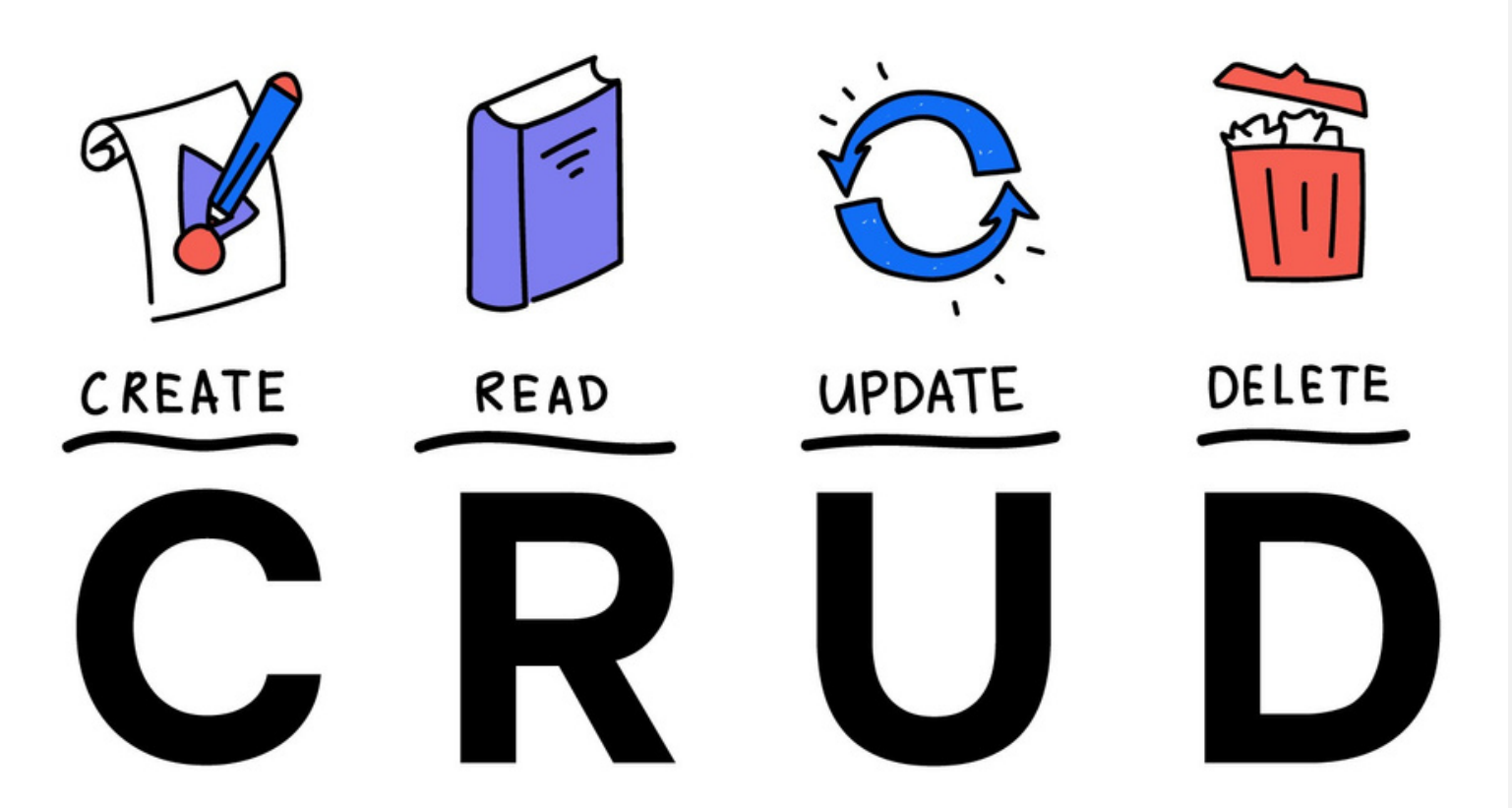
Introduction to SQL

- What is SQL
- It’s applications
- SQL v/s NoSQL
- Types of SQL Commands
- What is Database
- Excel v/s Database in SQL

What is SQL?

SQL (Structured Query Language) is a programming language used to interact with database

SQL Application



CRUD is an acronym for CREATE, READ(SELECT), UPDATE, and DELETE statements in SQL

SQL v/s NoSQL

Relational Database	Non-Relational Database
SQL database	NoSQL database
Data stored in tables	Data stored are either key-value pairs, document-based, graph databases or wide-column stores
These databases have fixed or static or predefined schema	They have dynamic schema
Low performance with huge volumes of data Eg: PostgreSQL, MySQL, MS SQL Server	Easily work with huge volumes of data Eg: MongoDB, Cassandra, Hbase

SQL Commands

There are mainly 3 types of SQL commands:

- **DDL**(Data Definition Language): create, alter, and drop
- **DML**(Data Manipulation Language): select, insert, update and delete
- **DCL**(Data Control Language): grant and revoke permission to users

What is Database?

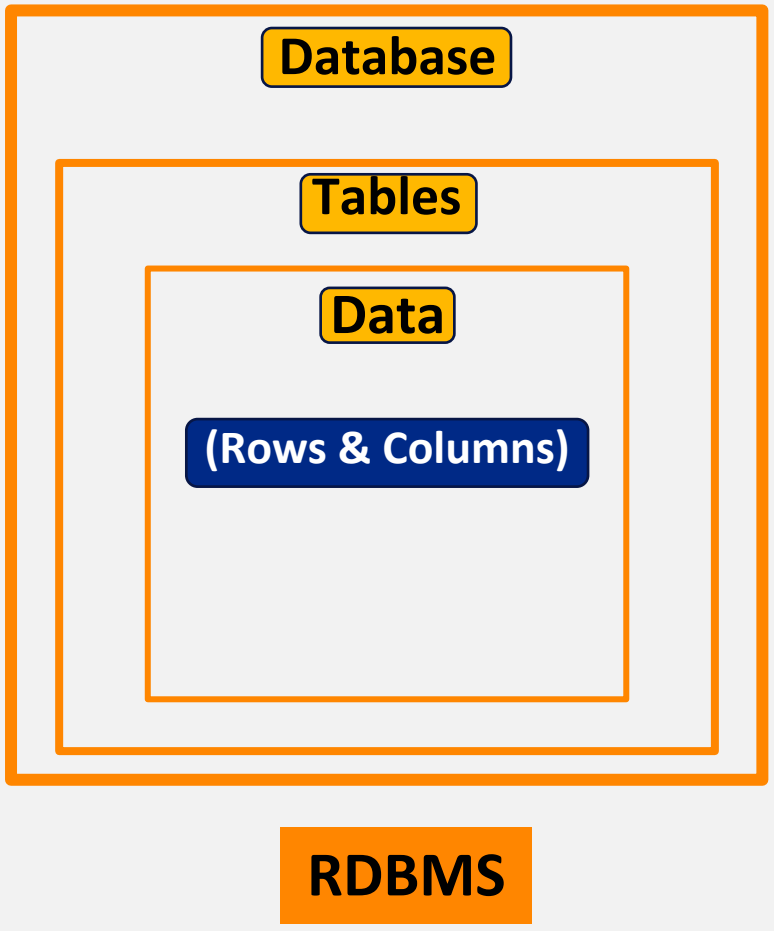
Database is a system that allow users to store and organise data

Excel v/s Database

Excel	Database
Easy to use-untrained person can work	Trained person can work
Data stored less data	Stores large amount of data
Good for one time analysis, quick charts	Can automate tasks
No data integrity due to manual operation	High data integrity
Low search/filter capabilities	High search/filter capabilities

SQL Databases

SQL Structure



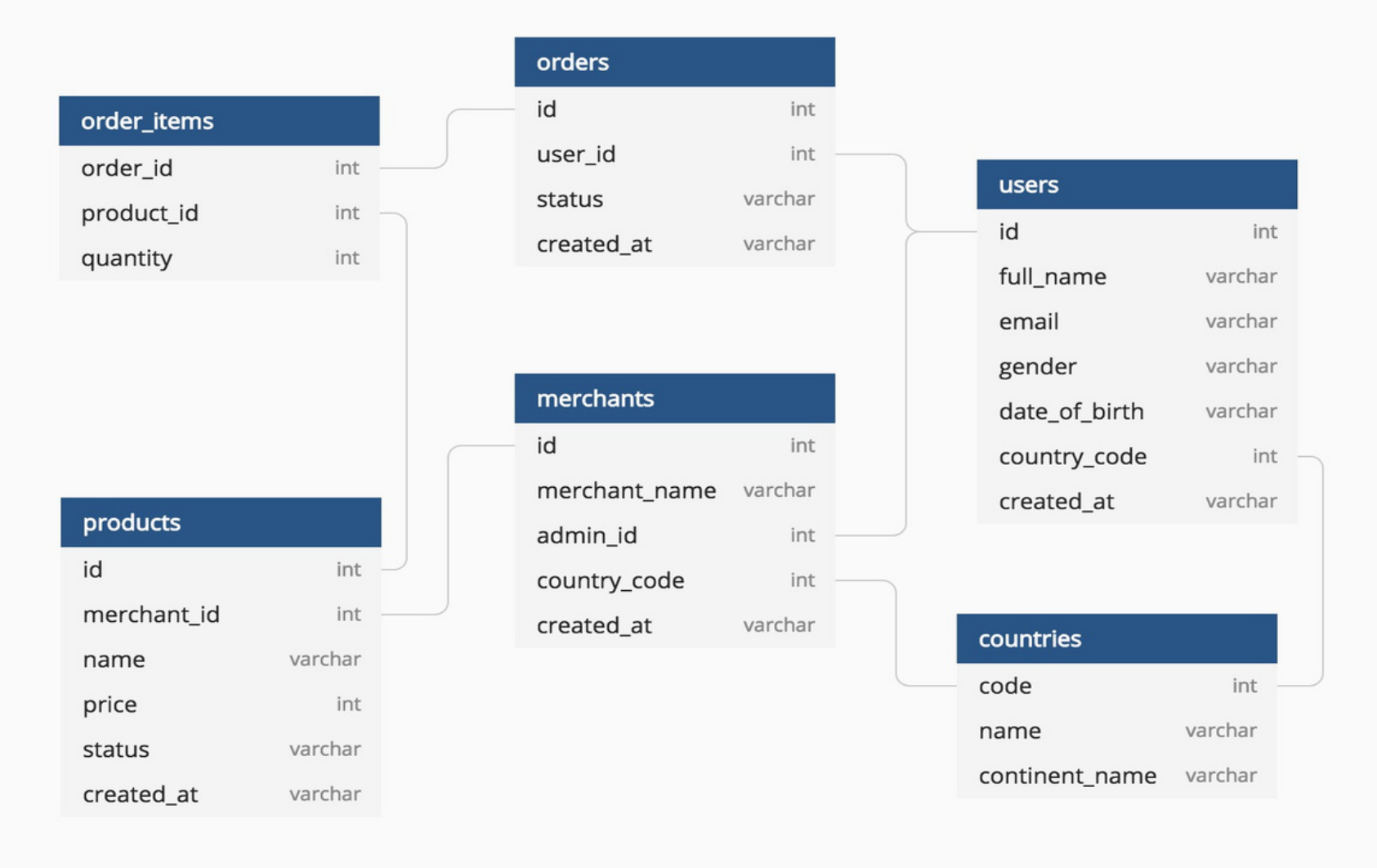
Example

Columns

Rows

```
mysql> SELECT* FROM employee;
+--------+----------+--------------------+---------+---------+
| emp_id | emp_name | emp_dept           | emp_age | emp_sex |
+--------+----------+--------------------+---------+---------+
| E00001 | JHONNY   | BACKEND DEVELOPER  |      26 | male    |
| E00002 | DARSHI   | NULL               |      27 | male    |
| E00003 | JASMINE  | NULL               |      37 | female  |
| E00004 | LILLY    | NULL               |      47 | female  |
| E00005 | RONALD   | UI DEVELOPER       |      26 | male    |
+--------+----------+--------------------+---------+---------+
5 rows in set (0.01 sec)
```

Database Diagram



Example

Creating Database & Tables

- Data types
- Primary & Foreign keys
- Constraints
- SQL Commands
  - CREATE
  - INSERT
  - UPDATE
  - BACKUP
  - DELETE
  - ALTER
  - DROP, TRUNCATE

Data Types

- Data type of a column defines what value the column can store in table
- Defined while creating tables in database
- Data types mainly classified into three categories + most used
  - String: char, varchar, etc
  - Numeric: int, float, bool, etc
  - Date and time: date, datetime, etc

Data Types

Commonly Used data types in SQL:

- **int:** used for the integer value
- **float:**used to specify a decimal point number
- **bool:**used to specify Boolean values true and false
- **char:**fixed length string that can contain numbers, letters, and special characters
- **varchar:**variable length string that can contain numbers, letters, and special characters
- **date:**date format YYYY-MM-DD
- **datetime:**date & time combination, format is YYYY-MM-DD hh:mm:ss

Primary and Foreign Keys:

Primary key (PK):

- A Primary key is a unique column we set in a table to easily identify and locate data in queries
- A table can have only one primary key, which should be unique and NOT NULL

Foreign keys (FK):

- A Foreign key is a column used to link two or more tables together
- A table can have any number of foreign keys, can contain duplicate and NULL values

Constraints

- Constraints are used to specify rules for data in a table
- This ensures the accuracy and reliability of the data in the table
- Constraints can be specified when the table is created with the CREATE TABLE statement, or
- after the table is created with the ALTER TABLE statement
- Syntax

```
CREATE TABLE table_name(
  column1 datatype constraint,
  column2 datatype constraint,
  column3 datatype constraint,
....
);
```

Constraints

Commonly used constraints in SQL:

- NOT NULL -Ensures that a column cannot have a NULL value
- UNIQUE -Ensures that all values in a column are different
- PRIMARY KEY -A combination of a NOT NULL and UNIQUE
- FOREIGN KEY -Prevents actions that would destroy links between tables (used to link multiple tables together)
- CHECK -Ensures that the values in a column satisfies a specific condition
- DEFAULT -Sets a default value for a column if no value is specified
- CREATE INDEX -Used to create and retrieve data from the database very quickly

Creating Database & Tables

SQL Tutorial

Create Table

The CREATE TABLE statement is used to create a new table in a database • Syntax

```
CREATE TABLE table_name
(
    column_name1 datatypeconstraint,
    column_name2 datatypeconstraint,
    column_name3 datatypeconstraint,
);
```

- **Example**

```
CREATE TABLE customer
(
CustIDint8 PRIMARY KEY,
    CustNamevarchar(50) NOT NULL,
Age int NOT NULL,
City char(50),
Salary numeric
);
```

Insert, Update, Delete Values in Table

+

Alter, Drop & Truncate Table

SQL Tutorial

Insert Values In Table

The INSERT INTO statement is used to insert new records in a table • Syntax

```
INSERT INTO TABLE_NAME
(column1, column2, column3,...columnN)
VALUES
(value1, value2, value3,...valueN);
```

- **Example**

```
INSERT INTO customer
(CustID, CustName, Age, City, Salary)
VALUES
(1, 'Sam', 26, 'Delhi', 9000),
(2, 'Ram', 19, 'Bangalore', 11000),
(3, 'Pam', 31, 'Mumbai', 6000),
(4, 'Jam', 42, 'Pune', 10000);
```

Update Values In Table

The UPDATE command is used to update existing rows in a table • Syntax

```
UPDATE TABLE_NAME
SET “Column_name1” = ‘value1’, “Column_name2” = ‘value2’ WHERE “ID” = ‘value’
```

- **Example**

```
UPDATE  customer
SET CustName= 'Xam’, Age= 32
WHERE CustID= 4;
```

ALTER Table

The ALTER TABLE statement is used to add, delete, or modify columns in an existing table

- **ALTER TABLE -ADD Column Syntax**

```
ALTER TABLE table_name
ADD COLUMN column_name;
```

- **ALTER TABLE -DROP COLUMN Syntax**

```
ALTER TABLE table_name
DROP COLUMN column_name;
```

- **ALTER TABLE -ALTER/MODIFY COLUMN Syntax**

```
ALTER TABLE table_name
ALTER COLUMN column_namedatatype;
```

Delete Values In Table

The DELETE statement is used to delete existing records in a table • Syntax

DELETE FROM table_nameWHERE condition;

- **Example**

DELETE FROM customer WHERE CustID= 3;

Drop & Truncate Table

The DROP TABLE command deletes a table in the database • Syntax

```
DROP TABLE table_name;
```

The TRUNCATE TABLE command deletes the data inside a table, but not the table itself

- **Syntax**

```
TRUNCATE TABLE table_name;
```