What is Database?

An organized collection of data. A method to manipulate and access the data.

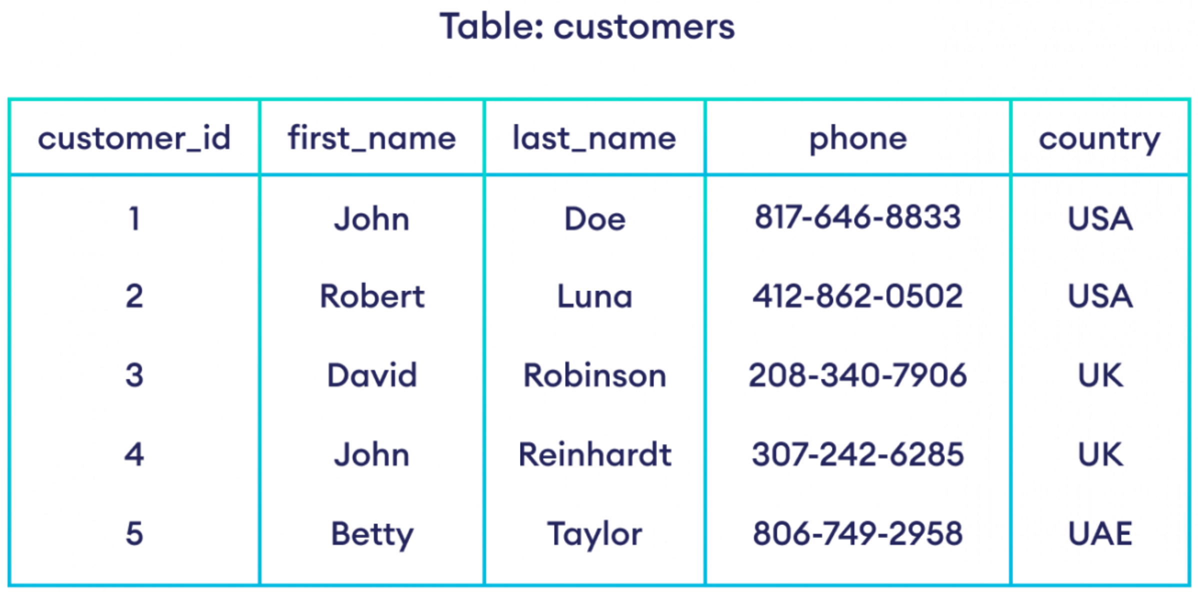


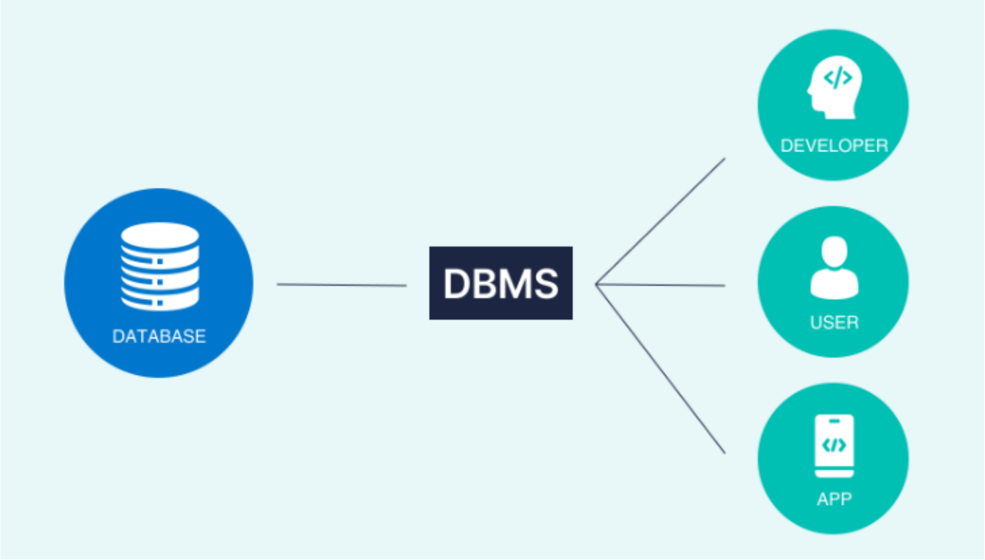
Table: customers

customer_id	first_name	last_name	phone	country
1	John	Doe	817-646-8833	USA
2	Robert	Luna	412-862-0502	USA
3	David	Robinson	208-340-7906	UK
4	John	Reinhardt	307-242-6285	UK
5	Betty	Taylor	806-749-2958	UAE

What is DBMS(Database Management System)?

Database Management Systems (DBMS) are software systems used to store, retrieve, and run queries on data. A DBMS serves as an interface between an end-user and a database, allowing users to create, read, update, and delete data in the database.

Difference between Database and DBMS(Database Management System)



No.	Category	Database	DBMS
1.	**Definition**	A database is a collection of connected information about people, locations, or things.	A database management system (DBMS) is a collection of programs that allow you to create, manage, and operate a database.
2.	**Storage**	Besides computers, databases can even be maintained in physical ledgers, books, or papers.	In a database management system (DBMS), all the records are maintained only on a computer.
3.	**Data Retrieval**	The retrieval of information from the databases can be done manually, through queries, or by using programs (C, C++, Java, etc.).	We can retrieve the data from the database management system through queries written in SQL.
4.	**Speed**	As databases can be handled manually or via computers, when SQL is not used to retrieve information, it can be very slow.	As a computer system is involved in a database management system, the retrieval of information is very quick.
5.	**Access**	The databases are not designed for a large number of people who can access data at the same time, rather it is designed for a very small number of people (preferably few people) who access data at different times.	The database management system is designed for a large number of people who can access the data at the same time.
6.	**Data**	Data is stored in databases.	A database management system (DBMS) manages and manipulates data.
7.	**Data Manipulation**	In the case of the databases, very less information can be modified at a time.	In the database management system (DBMS), a lot of information can be changed at one time (as it can have many users using it at the same time).
8.	**Backup and Recovery**	The databases do not ensure that the data will be available after failure arises.	The database management system (DBMS) ensures that the data will always be available even after system failures.

What is RDBMS(Relational Database Management System)?

It is basically a program that allows us to create, delete, and update a relational database. A Relational Database is a database system that stores and retrieves data in a tabular format organized in the form of rows and columns. It is a smaller subset of DBMS which was designed by E.F Codd in the 1970s. The major DBMSs like SQL, My-SQL, and ORACLE are all based on the principles of relational DBMS.

Difference between SQL and MYSQL

SQL is Structured Query Language which is used to interact with our database.

DBMS which uses SQL to interact with database

Listing and creating databases

```
SHOW DATABASES;
```

Creaing a new database

```
CREATE DATABASE database_name;
Ex- CREATE DATABASE mario_db;
```

For clearing all commands – system cls;

Working with a database

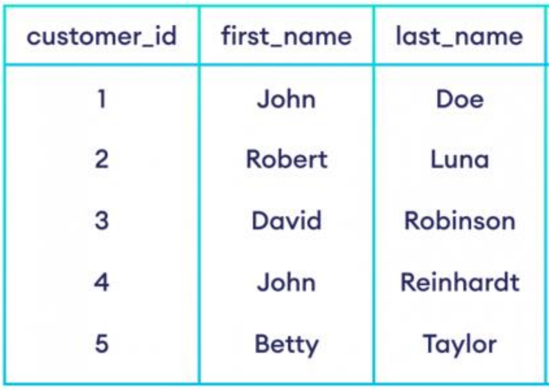
```
USE database_name;
Ex- USE mario_db;
SELECT DATABASE();
```

Deleting a Database

```
DROP DATABASE database_name;
Ex- DROP DATABASE mario_db;
```

Tables

A table is a collection of related data held in a table format within a database.



customer_id	first_name	last_name
1	John	Doe
2	Robert	Luna
3	David	Robinson
4	John	Reinhardt
5	Betty	Taylor

Creating a new table

```
CREATE TABLE employee (
id INT,
name VARCHAR(100),
ph_no INT
);
```

Show details of tables

```
DESC table_name;
Ex- DESC employee;
```

Inserting data into table

```
INSERT INTO employee(id, name, ph_no) VALUES (1, “Mario”, 0123456789);
```

Inserting multiple data into table

```
INSERT INTO employee(id, name, ph_no) VALUES (1, “Mario”, 0123456789), (2, “Luigi”,
1345274568), (3, “Shaun”, 1455274548), (4, “Peach”, 1645274268);
```

Displaying data from table

```
SELECT * FROM table_name;
Ex- SELECT * FROM employee;
```

Display a column

```
SELECT column_name FROM table_name;
Ex- SELECT name FROM employee;
```

Print data based on a given condition

```
SELECT * FROM employee WHERE id=1;
```

Update data in table

```
UPDATE employee SET ph_no=547854 WHERE
name=“mario”;
```

Deleting data from table

```
DELETE FROM employee WHERE name=”Peach”
```

Deleting a table

```
DROP TABLE table_name;
```

What is NOT NULL?

By default, a column can hold NULL values. The NOT NULL constraint enforces a column to NOT accept NULL values.

```
INSERT INTO employee(id) VALUES (4);
```

If we run this command then we can see that null values will be inserted.

```
INSERT INTO employee VALUES (NULL, NULL, NULL);
```

And we can insert null values also.

Now this query will ensure that columns will not accept the null values.

```
CREATE TABLE employee (
id INT NOT NULL,
name VARCHAR(50) NOT NULL,
ph_no INT NOT NULL
);
```

Altering a table

```
ALTER TABLE employee MODIFY id int NOT NULL;
```

Setting up default values

```
CREATE TABLE employee (
id INT NOT NULL,
name VARCHAR(50) NOT NULL,
acc_type VARCHAR(50) NOT NULL DEFAULT ‘savings’
);
```

What is primary key?

The PRIMARY KEY constraint uniquely identifies each record in a table. Primary keys must contain UNIQUE values, and cannot contain NULL values. A table can have only ONE primary key, and in the table, this primary key can consist of single or multiple columns (fields).

```
CREATE TABLE employee (
id INT NOT NULL PRIMARY KEY,
name VARCHAR(50) NOT NULL,
acc_type VARCHAR(50) NOT NULL DEFAULT ‘savings’
);
```

Auto increment

```
CREATE TABLE employee (
id INT NOT NULL PRIMARY KEY AUTO_INCREMENT,
name VARCHAR(50) NOT NULL,
acc_type VARCHAR(50) NOT NULL DEFAULT ‘savings’
);
```

Aliases

SQL aliases are used to give a table, or a column in a table, a temporary name. Aliases are often used to make column names more readable. An alias only exists for the duration of that query. An alias is created with the AS keyword.

```
SELECT name AS ‘emp_name’ FROM employee;
SELECT name AS ‘emp_name’, id AS ‘emp_id’ FROM employee;
```