CheckPoint26: Introduction to Databases

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What is a DATABASE ?

A database is an organized collection of data, so that it can be easily accessed, managed and updated, generally stored and accessed electronically from a computer system.

Where databases are more complex they are often developed using formal design and modeling techniques.

Types of DATABASEs :

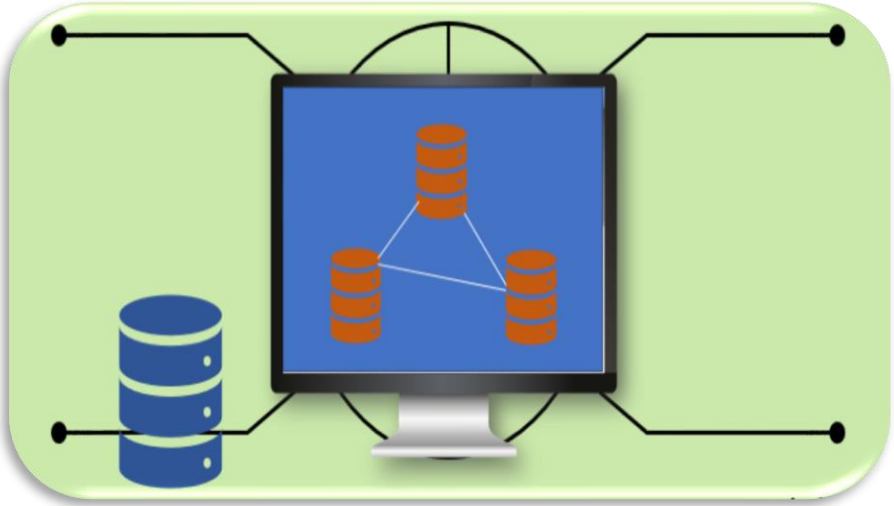
Depending upon the usage requirements, there are following types of databases available in the market ::

- Centralized database.
- Distributed database.
- Personal database.
- End-user database.
- Commercial database.
- NoSQL database.
- Operational database.
- ***Relational database.***
- Cloud database.
- Object-oriented database.
- Graph database.

➔ In this presentation we gone study the ***Relational database.***

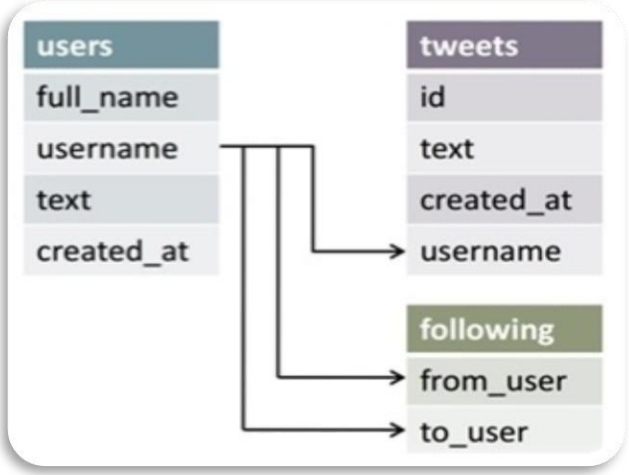
What is *Relational DATABASE ?*

A **relational database** is a type of **database**. It uses a structure that allows us to identify and access data in **relation** to another piece of data in the **database**. Often, data in a relational database is organized into tables.



What is *Relational DATABASE ?*

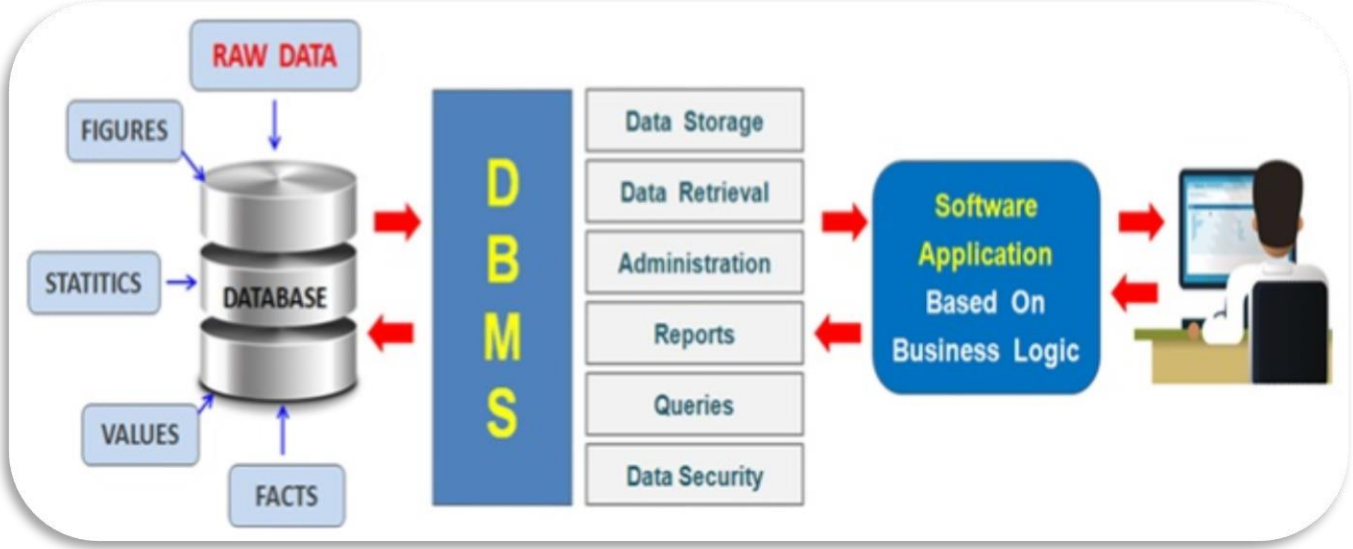
There are various simple operations that can be applied over the table which makes these databases easier to extend, join two databases with a common relation and modify all existing applications



A software system used to maintain relational databases is a **Relational Database Management System (RDBMS).**

What is a Relational Database Management System (RDBMS) ?

A **relational database management system (RDBMS)** is a **program** that allows you to **create**, **update**, and **administer** a **relational database**. Most relational database management systems use the **SQL** language to access the database.



RDBMS : How it works ?

- Data is represented in term of tuples (rows) in RDBMS.
- Relational database is most commonly used database. It contains numbers of tables and each table has its own primary *Key*.
- Due to a collection of organized set of tables, data can be accessed easily in RDBMS.

What is SQL ?

- SQL (Structured Query Language) is a programming language used to communicate with data stored in a relational database management system. SQL syntax is similar to the English language, which makes it relatively easy to write, read, and interpret.

- Many RDBMSs use SQL (and variations of SQL) to access the data in tables. For example, SQLite is a relational database management system. SQLite contains a minimal set of SQL commands (which are the same across all RDBMSs). Other RDBMSs may use other variants.

- (SQL is often pronounced in one of two ways. You can pronounce it by speaking each letter individually like “S-Q-L”, or pronounce it using the word “sequel”.)

RDBMSes :

The 3 most popular RDBMSes are:

MySQL :

- MySQL is the most popular open source SQL database. It is typically used for web application development, and often accessed using PHP.

- ✓ The main advantages of MySQL are that it is easy to use, inexpensive, reliable and has a large community of developers who can help answer questions.

- × Some of the disadvantages are that it has been known to suffer from poor performance when scaling, open source development has lagged since Oracle has taken control of MySQL, and it does not include some advanced features that developers may be used to.

PostgreSQL :

- PostgreSQL is an open source SQL database that is not controlled by any corporation. It is typically used for web application development.

- ✓ PostgreSQL shares many of the same advantages of MySQL. It is easy to use, inexpensive, reliable and has a large community of developers. It also provides some additional features such as foreign key support without requiring complex configuration.

- × The main disadvantage of PostgreSQL is that it can be slower in performance than other databases such as MySQL. It is also slightly less popular than MySQL.

Microsoft SQL SERVER :

- ➢ Microsoft owns SQL Server. Like Oracle DB, the code is close sourced.
- ✓ Large enterprise applications mostly use SQL Server.
- × Microsoft offers a free entry-level version called Express but can become very expensive as you scale your application.

Difference between MySQL, PostgreSQL and SQL Server :

MySQL	PostgreSQL	SQL Server
Is a free and open-source RDBMS.	Provides support to different functions of SQL.	SQL server is mainly used for e-commerce.
MySQL is developed by Oracle.	Is a free and open-source RDBMS.	Is developed by Microsoft.
Available only in English.	Views can be updated but not automatically.	Views can be updatable even if 2 table views are updated
Supports many platforms.	Does not provide computed columns.	Provide computed columns
Data file can be manipulated while running.	Replication is in the form of reports and is supposed to be least polished of the bunch.	Can replicate all sorts of data.
Does not support midway query execution cancellation.	Here there is no need to create a dull first.	Support stored procedures and stored functions
Blocks the database while taking the backup.	Support Dynamic actions	Does not support Dynamic actions
Needs less amount of operational storage space.	Case insensitive by default and it is difficult to make it insensitive.	Case insensitive by default.

Difference between MySQL, PostgreSQL and SQL Server :

	SQL Server	MySQL	PostgreSQL
SELECT ...	Select [col1], [col2]	SELECT col1, col2	SELECT col1, col2
Data from tables is case sensitive?	Yes WHERE name = 'John' Or WHERE name = 'john' are not the same	No WHERE name = 'John' Or WHERE name = 'john' are the same	Yes WHERE name = 'John' Or WHERE name = 'john' are not the same
Using quotation marks	name = 'John' only	name = 'John' or name = "John"	name = 'John' only
Aliases for columns and tables	SELECT AVG(col1)=avg1	SELECT AVG(col1) AS avg1	SELECT AVG(col1) AS avg1
Working with dates	GETDATE() DATEPART()	CURDATE() CURTIME() EXTRACT()	CURRENT_DATE() CURRENT_TIME() EXTRACT()
Window functions i.e., OVER(), PARTITION BY()	Yes	Yes	Yes

THANK YOU
FOR
YOUR ATTENTION