**Database Concepts**

## **What is Data?**

In simple words, data can be facts related to any object in consideration. For example, your name, age, height, weight, etc. are some data related to you. A picture, image, file, pdf, etc. can also be considered data.

## **What is Database?**

A database is a systematic collection of data. They support electronic storage and manipulation of data. Databases make data management easy.

Let us discuss a database example: An online telephone directory uses a database to store data of people, phone numbers, and other contact details. Your electricity service provider uses a database to manage billing, client-related issues, handle fault data, etc.

Let us also consider Facebook. It needs to store, manipulate, and present data related to members, their friends, member activities, messages, advertisements, and a lot more. We can provide a countless number of examples for the usage of databases.

## **Types of Databases**

Here are some popular types of databases.

### **Distributed databases:**

A distributed database is a type of database that has contributions from the common database and information captured by local computers. In this type of database system, the data is not in one place and is distributed at various organizations.

### **Relational databases:**

This type of database defines database relationships in the form of tables. It is also called Relational DBMS, which is the most popular DBMS type in the market. Database example of the RDBMS system include MySQL, Oracle, and Microsoft SQL Server database.

### **Object-oriented databases:**

This type of computers database supports the storage of all data types. The data is stored in the form of objects. The objects to be held in the database have attributes and methods that define what to do with the data. PostgreSQL is an example of an object-oriented relational DBMS.

### **Centralized database:**

It is a centralized location, and users from different backgrounds can access this data. This type of computers databases store application procedures that help users access the data even from a remote location.

### **Open-source databases:**

This kind of database stored information related to operations. It is mainly used in the field of marketing, employee relations, customer service, of databases.

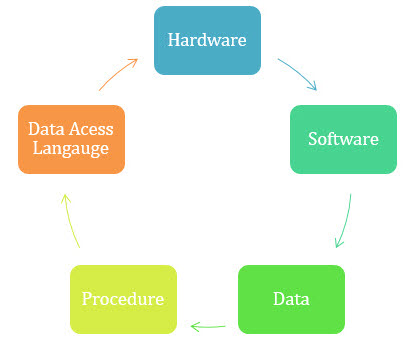
### **Cloud databases:**

A cloud database is a database which is optimized or built for such a virtualized environment. There are so many advantages of a cloud database, some of which can pay for storage capacity and bandwidth. It also offers scalability on-demand, along with high availability.

### **Data warehouses:**

Data Warehouse is to facilitate a single version of truth for a company for decision making and forecasting. A Data warehouse is an information system that contains historical and commutative data from single or multiple sources. Data Warehouse concept simplifies the reporting and analysis process of the organization.

## **Database Components**

[](https://www.guru99.com/images/2/database-components.jpg)

There are five main components of a database:

### **Hardware:**

The hardware consists of physical, electronic devices like computers, I/O devices, storage devices, etc. This offers the interface between computers and real-world systems.

### **Software:**

This is a set of programs used to manage and control the overall database. This includes the database software itself, the Operating System, the network software used to share the data among users, and the application programs for accessing data in the database.

### **Data:**

Data is a raw and unorganized fact that is required to be processed to make it meaningful. Data can be simple at the same time unorganized unless it is organized. Generally, data comprises facts, observations, perceptions, numbers, characters, symbols, images, etc.

### **Procedure:**

Procedure are a set of instructions and rules that help you to use the DBMS. It is designing and running the database using documented methods, which allows you to guide the users who operate and manage it.

### **Database Access Language:**

Database Access language is used to access the data to and from the database, enter new data, update already existing data, or retrieve required data from DBMS. The user writes some specific commands in a database access language and submits these to the database.

## **What is a Database Management System (DBMS)?**

****Database Management System (DBMS)**** is a collection of programs that enable its users to access databases, manipulate data, report, and represent data. It also helps to control access to the database. [Database Management Systems](https://www.guru99.com/what-is-dbms.html) are not a new concept and, as such, had been first implemented in the 1960s.

Charles Bachman's Integrated Data Store (IDS) is said to be the first DBMS in history. With time database, technologies evolved a lot, while usage and expected functionalities of databases increased immensely.

## **Advantages of DBMS**

* DBMS offers a variety of techniques to store & retrieve data.
* DBMS serves as an efficient handler to balance the needs of multiple applications using the same data.
* Application programmers never exposed to details of data representation and storage.
* A DBMS uses various powerful functions to store and retrieve data efficiently.
* Offers Data Integrity and Security.
* The DBMS implies integrity constraints to get a high level of protection against prohibited access to data.
* A DBMS schedules concurrent access to the data in such a manner that only one user can access the same data at a time.
* Reduced Application Development Time.

## **Disadvantage of DBMS**

DBMS may offer plenty of advantages but, it has certain flaws-

* Cost of Hardware and Software of a DBMS is quite high which increases the budget of your organization.
* Most database management systems are often complex systems, so the training for users to use the DBMS is required.
* In some organizations, all data is integrated into a single database which can be damaged because of electric failure or database is corrupted on the storage media.
* Use of the same program at a time by many users sometimes lead to the loss of some data.
* DBMS can't perform sophisticated calculations.

## **What is SQL?**

SQL is the standard language for dealing with Relational Databases. SQL can be used to insert, search, update, and delete database records. SQL can do lots of other operations, including optimizing and maintenance of databases.

## **SQL Full Form**

SQL stands for Structured Query language, pronounced as "S-Q-L" or sometimes as "See-Quel"... Relational databases like MySQL Database, Oracle, MS SQL Server, Sybase, etc. use ANSI SQL.

## **How to Use SQL**

SQL Code Example:

SELECT \* FROM Members WHERE Age > 30

SQL syntaxes used in different databases are almost similar, though few RDBMS use a few different commands and even proprietary SQL syntaxes.

## **What is SQL used for?**

Here are important reasons for using SQL

* It helps users to access data in the RDBMS system.
* It helps you to describe the data.
* It allows you to define the data in a database and manipulate that specific data.
* With the help of SQL, you can create and drop databases and tables.
* SQL offers you to use the function in a database, create a view, and stored procedure.
* You can set permissions on tables, procedures, and views.

## **Types of SQL Statements**

Here are five types of widely used SQL queries.

* Data Definition Language (DDL)
* Data Manipulation Language (DML)
* Data Control Language (DCL)
* Transaction Control Language (TCL)
* Data Query Language (DQL)

## **List of SQL Commands**

Here's a list of some of the most commonly used SQL commands:

* CREATE - defines the database structure schema
* INSERT - inserts data into the row of a table
* UPDATE - updates data in a database
* DELETE - removes one or more rows from a table
* SELECT - selects the attribute based on the condition described by the WHERE clause

## **SQL Process**

When you want to execute an SQL command for any DBMS system, you need to find the best method to carry out your request, and SQL engine determines how to interpret that specific task.

Important components included in this SQL process are:

* SQL Query Engine
* Optimization Engines
* Query Dispatcher
* Classic Query Engine

## **What is a database in SQL?**

A [database in SQL Server](https://www.guru99.com/introduction-to-database-sql.html) that is made up of a collection of tables that stores a detailed set of structured data. It is a table that contains a collection of rows, referred to as records or tuples, and columns that are also referred to as attributes.

Each column in the table is designed to store a specific type of information, for example, names, dates, dollar amounts, and numbers.