Learn SQL in 1 Day

By Krishna Rungta

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Chapter 1: What is Database?
What is SQL?

Before we learn about database , let's understand -

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 a Database?

Database is a systematic collection of data. Databases support storage and manipulation of data. Databases make data management easy.
Let's discuss few examples.

An online telephone directory would definitely use database to store data pertaining to people, phone numbers, other contact details, etc.

Your electricity service provider is obviously using a database to manage billing , client related issues, to handle fault data, etc.

Let's also consider the facebook. It needs to store, manipulate and present data related to members, their friends, member activities, messages, advertisements and lot more.

We can provide countless number of examples for usage of databases .

What is a Database Management System (DBMS)?

Database Management System (DBMS) is a collection of programs which enables its users to access database, manipulate data, reporting / representation of data .

It also helps to control access to the database.

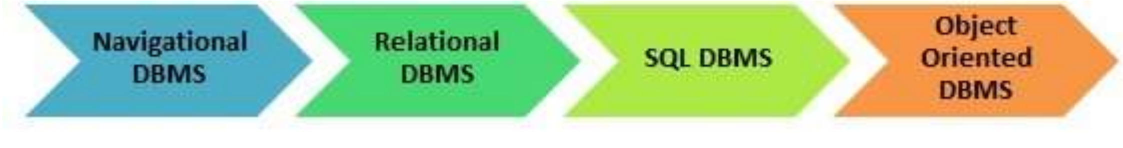
Database Management Systems are not a new concept and as such had been first implemented in 1960s.

Charles Bachmen'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 have been increased immensely.

Types of DBMS

Let's see how the DBMS family got evolved with the time. Following diagram shows the evolution of DBMS categories.



There are 4 major types of DBMS. Let's look into them in detail.

- **Hierarchical** - this type of DBMS employs the "parent-child" relationship of storing data. This type of DBMS is rarely used nowadays. Its structure is like a tree with nodes representing records and branches representing fields. The windows registry used in Windows XP is an example of a hierarchical database.
  Configuration settings are stored as tree structures with nodes.
- **Network DBMS** - this type of DBMS supports many-to many relations. This usually results in complex database structures. RDM Server is an example of a database management system that implements the network model.
- **Relational DBMS** - this type of DBMS defines database relationships in form of tables, also known as relations. Unlike network DBMS, RDBMS does not support many to many relationships.Relational DBMS usually have pre-defined data types that they can support. This is the most popular DBMS type in the market. Examples of relational database management systems include MySQL, Oracle, and Microsoft SQL Server database.
- **Object Oriented Relation DBMS** - this type supports storage of new data types. The data to be stored is in form of objects. The objects to be stored in the database have attributes (i.e. gender, ager) and methods that define what to do with the data.
  PostgreSQL is an example of an object oriented relational DBMS.

What is SQL?

Structured Query language (SQL) **pronounced as "S-Q-L" or sometimes as "See-Quel"**is actually the standard language for dealing with Relational Databases.

SQL programming can be effectively used to insert, search, update, delete database records.

That doesn't mean SQL cannot do things beyond that.

In fact it can do lot of things including, but not limited to, optimizing and maintenance of databases.

Relational databases like MySQL Database, Oracle, Ms SQL server, Sybase, etc uses SQL !

How to use sql syntaxes?

SQL syntaxes used in these databases are almost similar, except the fact that some are using few different syntaxes and even proprietary SQL syntaxes.

SQL Example

```
SELECT * FROM Members WHERE Age > 30
```

What is NoSQL ?

NoSQL is an upcoming category of Database Management Systems. Its main characteristic is its non-adherence to Relational Database Concepts. NOSQL means "Not only SQL".

Concept of NoSQL databases grew with internet giants such as Google, Facebook, Amazon etc who deal with gigantic volumes of data.

When you use relational database for massive volumes of data , the system starts getting slow in terms of response time.

To overcome this , we could of course "scale up" our systems by upgrading our existing hardware.

The alternative to the above problem would be to distribute our database load on multiple hosts as the load increases.

This is known as "scaling out".

NOSQL database are **non-relational databases** that scale out better than relational databases and are designed with web applications in mind.

They do not use SQL to query the data and do not follow strict schemas like relational models.With NoSQL, ACID (Atomicity, Consistency, Isolation, Durability) features are not guaranteed always

Why it makes sense to learn SQL after NOSQL ?

With the advantages of NOSQL databases outlined above that scale out better than relational models, you might be thinking **why one would still want to learn about SQL database?**

Well, **NOSQL databases** are sort of highly specialized systems and have their special usage and limitations. NOSQL suit more for those who handles huge volumes of data. The vast majority, use relational databases and associated tools.

Relational databases have the following advantages over NOSQL databases;

- SQL(relational) databases have a mature data storage and management model . This is crucial for enterprise users.
- SQL databases support the notion of views which allow users to only see data that they are authorized to view. The data that they are not authorized to see is kept hidden from them.
- SQL databases support stored procedure sql which allow database developers to implement part of the business logic into the database.
- SQL databases have better security models compared to NoSQL databases.

The world has not deviated from use of relational databases. There is **growing** a demand for professionals who can handle relational databases. Thus learning databases and SQL still holds merit.

Summary

- DBMS stands for Database Management System.
- We have four major types of DBMSs namely Hierarchical, Network, Relational, Object Oriented
- The most widely used DBMS is the relational model that saves data in table formats. It uses SQL as the standard query language SQL language
- is used to Sql query a database
- The database approach has many advantages when it comes to storing data compared to the traditional flat file based systems