Database:

•) In computing, a database is an organized collection of data stored and accessed electronically. Small databases can be stored on a file system, while large databases are hosted on computer clusters or cloud storage.

•) 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.

What is a databases used for?

•) Computer databases typically store aggregations of data records or files that contain information, such as sales transactions, customer data, financials and product information. Databases are used for storing, maintaining and accessing any sort of data. They collect information on people, places or things.

Types of Database systems:

1) Hierarchical database systems,
2) Network database systems,
3) Object-oriented database systems.

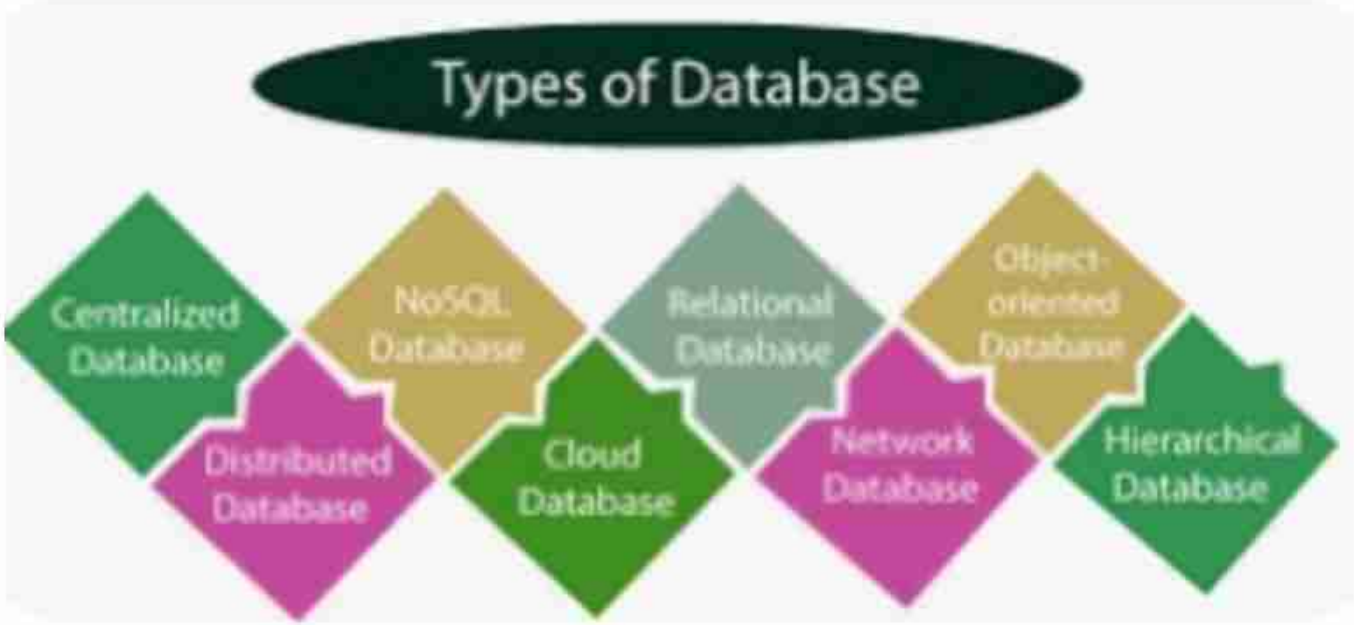
4) Relational databases,
5) No sql databases.

Categories of Databases:

•) Databases are widely divided into two major types or categories, namely, Relational or Sequence Databases and Non-relational or Non-sequence databases or No SQL databases. An organization may use them individually or combined, depending on the nature of data and functionality required

Examples:

•) Some examples of popular database software or DBMSs include MySQL, Microsoft Access, Microsoft SQL Server, FileMaker Pro, Oracle Database, and dBASE.



Evolvution of database:

•) Databases were first created in the 1960s. These early databases were network models where each record is related to many primary and secondary records. Hierarchical databases were also among the early models. They have tree schemas with a root directory of records linked to several subdirectories.

•) Relational databases were developed in the 1970s. Object-oriented databases came next in the 1980s. Today, we use Structured Query Language (SQL), NoSQL and cloud databases.

Components of Database:

•) While the different types of databases vary in schema, data structure and data types most suited to them, they are all comprised of the same five basic components.

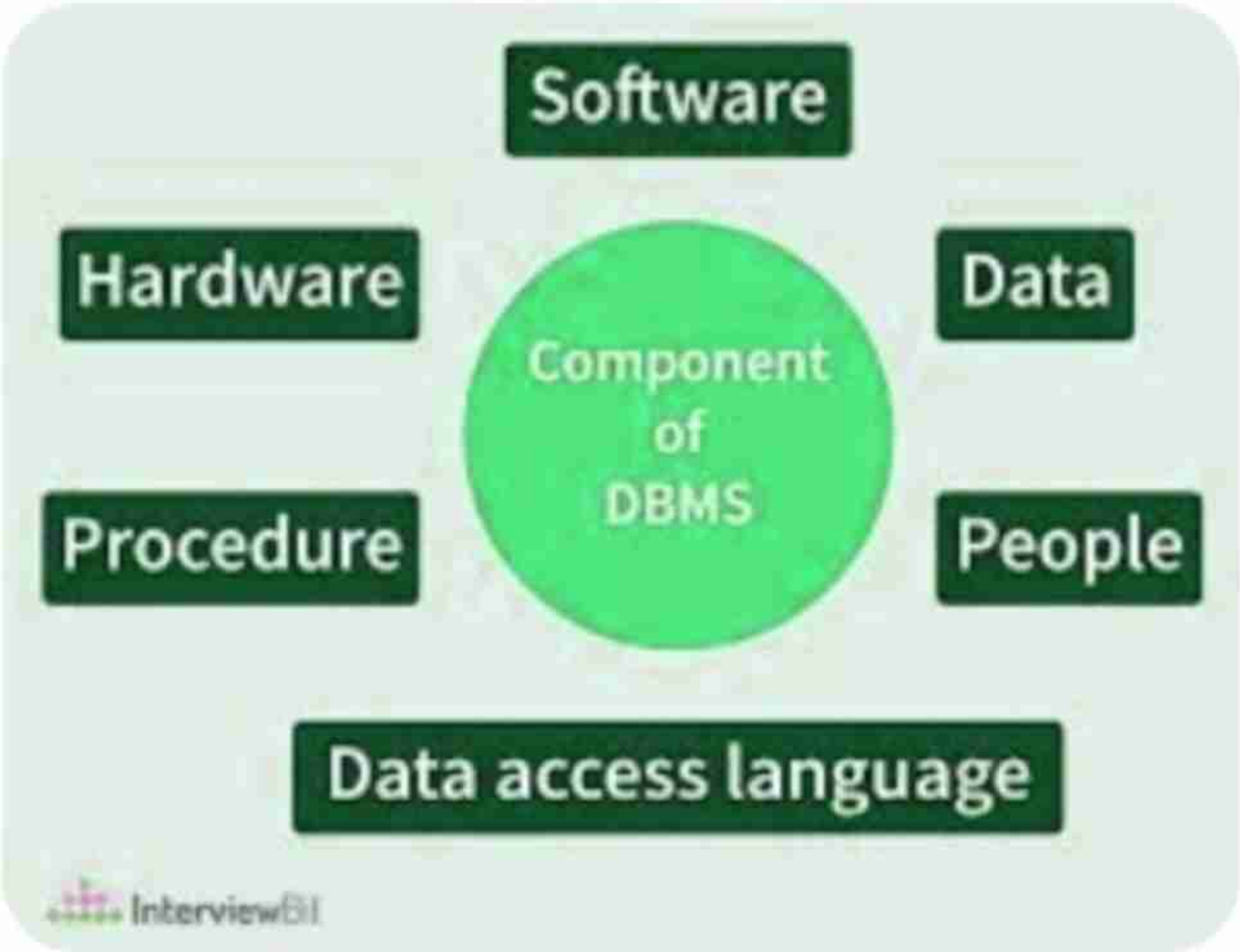
1) Hardware: This is the physical device that database software runs on. Database hardware includes computers, servers and hard drives.

2) Software: Database software or application gives users control of the database. Database management system (DBMS) software is used to manage and control databases.

3) Data: This is the raw information that the database stores. Database administrators organize the data to make it more meaningful.

4) Data access language: This is the programming language that controls the database. The programming language and the DBMS must work together. One of the most common database languages is SQL.

5) Procedures: These rules determine how the database works and how it handles the data.


Software
Hardware
Data
Component of DBMS
Procedure
People
Data access language
InterviewBit

Challenges in database:

•) Setting up, operating and maintaining a database has some common challenges, such as the following:

•) Data security is required because data is a valuable business asset. Protecting data stores requires skilled cybersecurity staff, which can be costly.

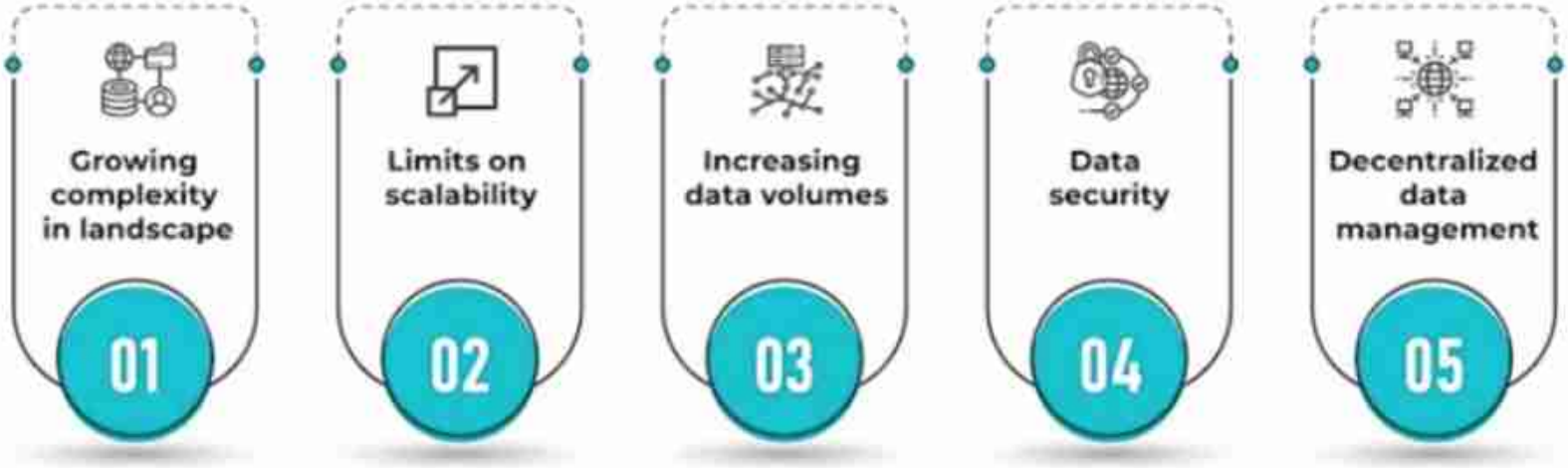
•) Data integrity ensures data is trustworthy. It is not always easy to achieve data integrity because it means restricting access to databases to only those qualified to handle it.

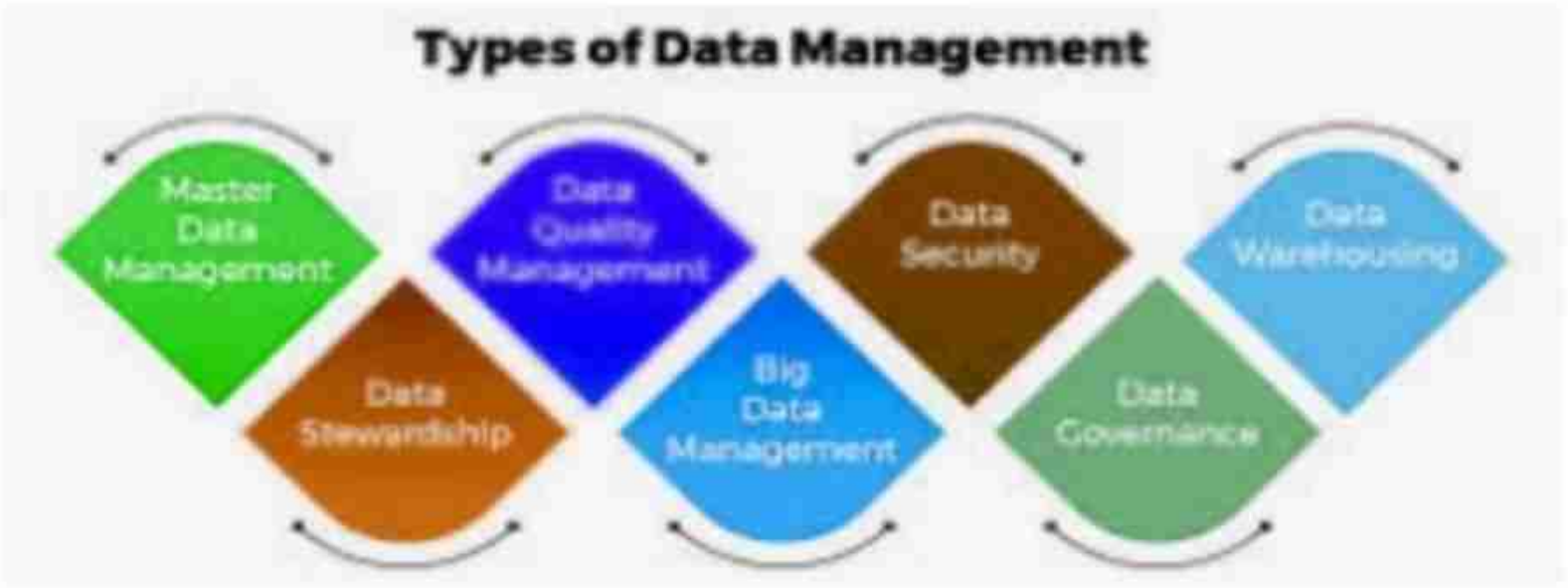
•) Database performance requires regular database updates and maintenance. Without the proper support, database functionality can decline as the technology supporting the database changes or as the data it contains changes.

•) Database integration can also be difficult. It can involve integrating data sources from varying types of databases and structures into a single database or into data lakes and data warehouses.
DBMS diagram

•) A database administrator (DBA) is the information technician responsible for directing and performing all activities related to maintaining a successful database environment. A DBA makes sure an organization's databases and related applications operate functionally and efficiently.

5 Challenges of Database Management





Difference between database and a spreadsheet:

•) Databases and spreadsheets (such as Microsoft Excel) are both convenient ways to store information. The primary differences between the two are:

•) How the data is stored and manipulated
Who can access the data
How much data can be stored.

•) Spreadsheets were originally designed for one user, and their characteristics reflect that. They're great for a single user or small number of users who don't need to do a lot of incredibly complicated data manipulation. Databases, on the other hand, are designed to hold much larger collections of organized information—massive amounts, sometimes.

•) Databases allow multiple users at the same time to quickly and securely access and query the data using highly complex logic and language.

Future databases and Autonomous databases:

•) The first autonomous database was announced in late 2017, and multiple independent industry analysts quickly recognized the technology and its potential impact on computing.

•) A Wikibon 2021 report (PDF) praised autonomous database technology, saying, "Oracle has by far the best Tier-1 Cloud Database Platform...Wikibon believes Oracle has the strongest Cloud Database Platform with Autonomous Database."

•) KuppingerCole's 2021 Leadership Compass (PDF) said, "The Oracle Autonomous Database, which completely automates provisioning, management, tuning, and upgrade processes of database instances without any downtime, not just substantially increases security and compliance of sensitive data stored in Oracle Databases but makes a compelling argument for moving this data to the Oracle Cloud." Because Oracle Autonomous Database is built on the highly available and scalable architecture of Oracle Exadata, it's possible to easily scale the database deployment as needs grow.