

Database Purpose

by Sophia



WHAT'S COVERED

In this lesson, you will learn that databases are a core component of business, science, e-commerce, and cloud computing. Databases are everywhere in our world today. This lesson explores a few of the terms and definitions related to understanding databases, in two parts. Specifically, this lesson will cover:

1. [Databases Are Everywhere](#)
2. [Data, Metadata, Information, and Knowledge](#)

1. Databases Are Everywhere

Organizations employ databases to efficiently and effectively manage vast amounts of data. A **database** is a structured and organized collection of data that is stored electronically. For instance, databases utilize business decision support systems (DSS) to process extensive data and gain insights into product and service trends. This same concept applies when overseeing inventory for a store or analyzing statistics for fantasy football players.

⇒ **EXAMPLE** Amazon.com is a prime example of this approach. They utilize their sales data to make informed decisions about the products they should offer directly. Additionally, by leveraging third-party sales data, Amazon can uncover new products and ideas they might not have discovered otherwise.



BIG IDEA

The database provides a structured and centralized method for storing and organizing large amounts of data. Information can be managed and retrieved efficiently using databases, as they store a wide range of data types, including text, numbers, images, and multimedia. Querying and searching the database can retrieve specific data quickly and efficiently. One common method for analyzing and contextualizing data is to use **Structured Query Language (SQL)**, a programming language used for displaying, sorting, filtering, and summarizing data in a database. Collectively, all those activities are known as querying. Querying a database using SQL is one of a database administrator's key responsibilities. Later in this course you will learn how to use SQL and practice it using a sample database.

In order to maintain data integrity, databases enforce constraints and rules that prevent inconsistent or invalid data from entering the database. The anomalies prevented can include data duplications, losses, or conflicts.

Collaboration and data sharing are possible through databases since they allow multiple users to collaborate and share data. Multiple users can work on the database and update it simultaneously since they provide concurrent access to data. This enhances productivity in organizations, encourages teamwork, and reduces data redundancy.

Databases provide various features and mechanisms to enforce data security and protect sensitive information. Encryption, access control mechanisms, and auditing capabilities help ensure that only authorized individuals can view or modify data. Data loss and system failure are also protected by backups and recovery mechanisms provided by databases.

In large organizations with many data sources, a database system can serve as a centralized repository that enables the organization to ensure that all relevant data is available from one information platform. It can also enforce data consistency and integrity across the enterprise.

Software developers often need to write programming code that can get data from a database, perform actions on it, and then write it back to the database. Because that is such a common need across diverse programming projects, developers often rely on **application programming interfaces (APIs)**, which are sets of rules, protocols, and tools that allow different applications to communicate with each other.



Think about your everyday experience and how often you interact with companies that use databases, like banks, the grocery store, the local pet store, Amazon, and schools, as well as social media sites like Instagram and TikTok. Also, consider how often you personally consume and produce data by uploading content, shipping, or depositing money from your paycheck.



KEY CONCEPT

Data management is a discipline that requires focus on the creation, storage, and retrieval of data. There's a lot of planning involved to ensure that data and information is accurate and usable. Data management is a discipline that requires focus on the creation, storage, and retrieval of data. There's a big focus on data management in most organizations and companies because ensuring that data is handled correctly is critically important to operations. As a database administrator, you will need to know how to manage data and ensure that the data is suitable for its intended use.

Database management systems are collections of programs that help manage database structures and control access to the data in the database. Some databases use a **graphical user interface (GUI)**, which is a type of user interface through which users interact with electronic devices via visual indicator representations to make managing them easier. PostgreSQL managers can use pgAdmin to help manage and run their databases.



TERMS TO KNOW

Database

A computer structure that holds a collection of related data.

Structured Query Language (SQL)

A specialized programming language used for managing and manipulating relational databases.

Application Programming Interface (API)

A set of rules, protocols, and tools that allow different software applications to communicate with each other.

Graphical User Interface (GUI)

A type of user interface through which users interact with electronic devices via visual indicator representations.

2. Data, Metadata, Information, and Knowledge

Data refers to raw, unprocessed facts and figures, typically organized in a structured format within a database. Data on its own lacks context and meaning. It represents the most basic level of information.

A database organizes data using **metadata**, which is data about data. Examples of metadata include the tables, the field names, and characteristics within each table, and the relationships between tables.

Information is data that has been processed and given context, making it more meaningful and useful. SQL commands such as ORDER BY or SELECT FROM help database administrators contextualize data to create information.

Knowledge is a higher-level abstraction that goes beyond information. It represents the understanding, insights, and experience derived from information and data. Knowledge may involve interpreting the meaning of information, recognizing patterns, and making strategic decisions based on the information available.



TERMS TO KNOW

Data

Raw, unprocessed facts and figures, typically organized in a structured format within a database.

Metadata

Data about data, which describes characteristics or relationships of the data.

Information

Data in a context that gives it meaning.

Knowledge

Information or data that has been organized, stored, and made accessible in a structured manner.



SUMMARY

In this lesson, you learned that **databases are everywhere** and exist throughout our modern world, used by various companies and organizations. **Data, metadata, information, and knowledge** are important terms to know when it comes to databases. You learned that data comprises the raw facts stored in a database. Information arises when that raw data is given context that adds meaning.

Knowledge consists of understanding, insights, and predictions made by thinking critically about the available information.

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TERMS TO KNOW

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A set of rules, protocols, and tools that allow different software applications to communicate with each other.

Database

A structured and organized collection of data that is stored electronically.

Graphical User Interface (GUI)

A type of user interface through which users interact with electronic devices via visual indicator representations.

Information

Data in a context that gives it meaning.

Knowledge

Information or data that has been organized, stored, and made accessible in a structured manner.

Metadata

Data about data, which describes characteristics or relationships of the data.

Structured Query Language (SQL)

A specialized programming language used for managing and manipulating relational databases.