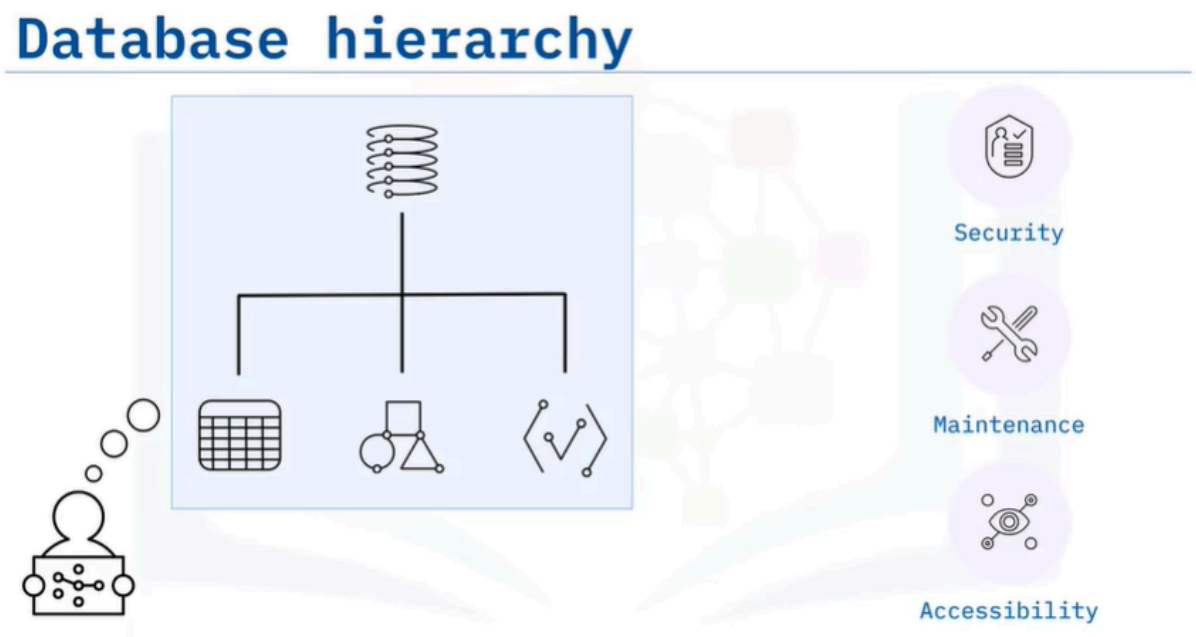
Database Objects

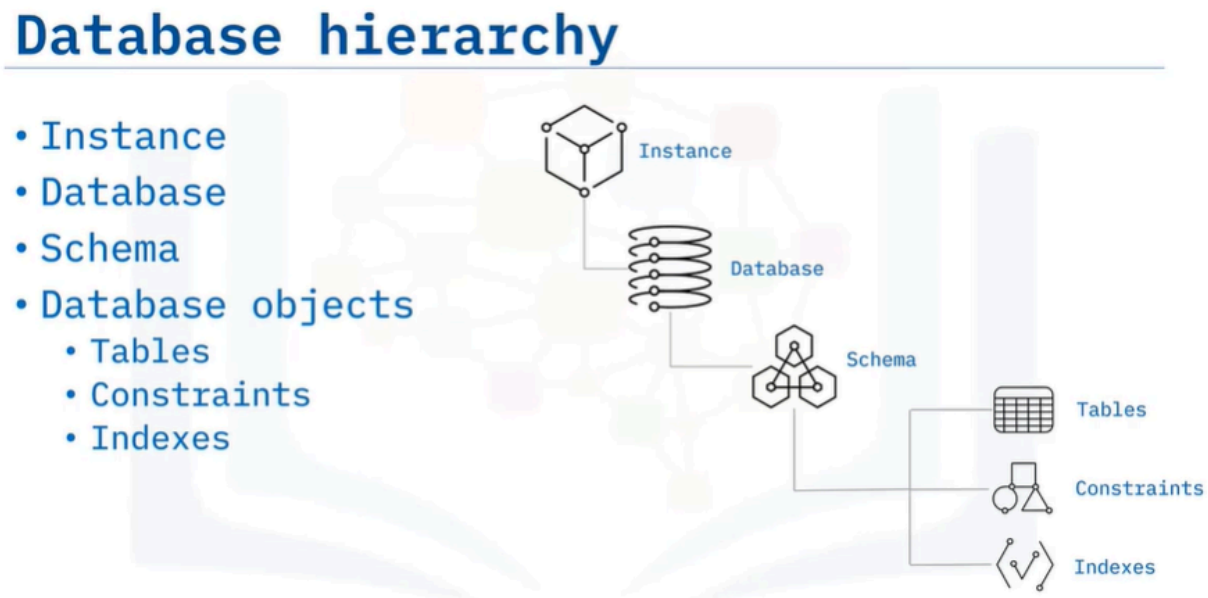
Sure! Let's talk about the concept of **database objects** in a relational database.

In simple terms, database objects are like the building blocks of a database. Imagine a database as a large library. Just like a library has different sections (like fiction, non-fiction, and reference), a database has various objects that help organize and manage data. These objects include tables (which store the actual data), constraints (rules that ensure data quality), indexes (which help find data quickly), and more. Each of these objects plays a specific role in keeping the database organized and efficient.

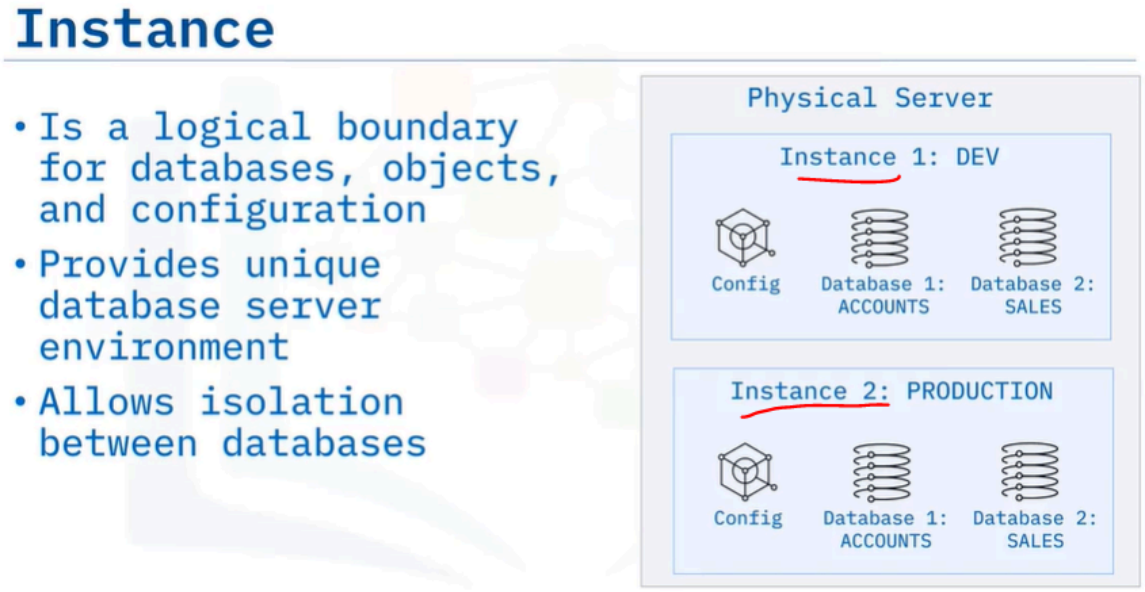
To illustrate, think of a table as a bookshelf filled with books. Each book represents a piece of data, and the shelves help keep everything in order. Constraints are like library rules that say, "You can't have two copies of the same book," ensuring that each book (or piece of data) is unique. Indexes are like a library catalog that helps you quickly find a book without searching every shelf.



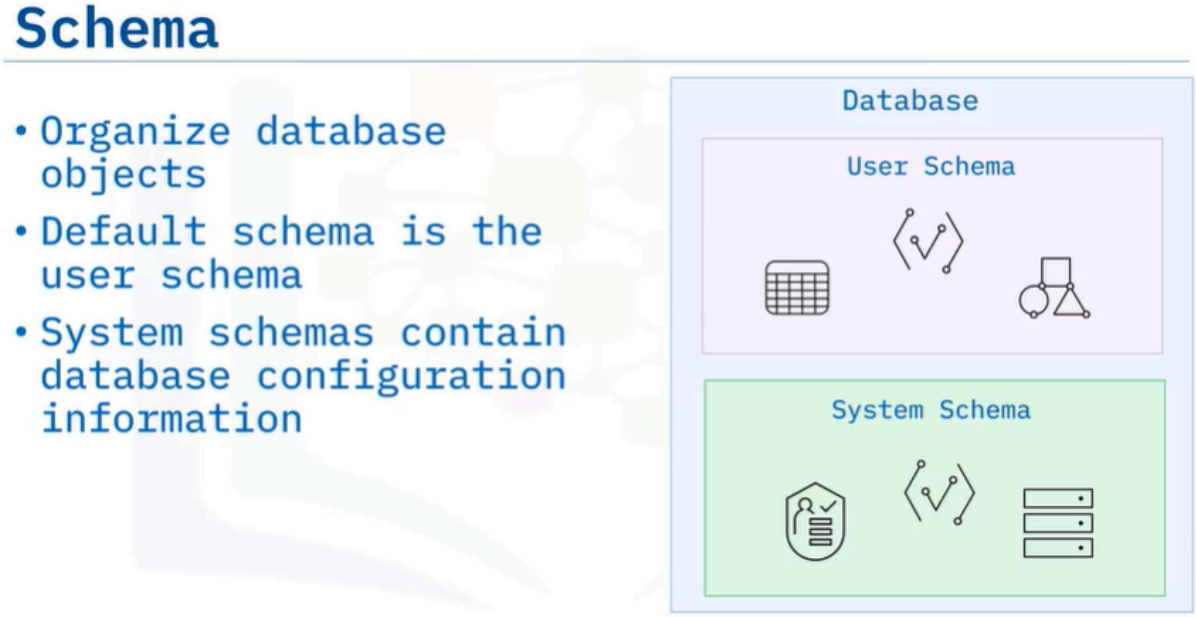
- Relational Database Management Systems (RDBMSes) contain many objects that database engineers and database administrators must organize. Storing tables, constraints, indexes, and other database objects in a hierarchical structure allows DBAs to manage security, maintenance, and accessibility.



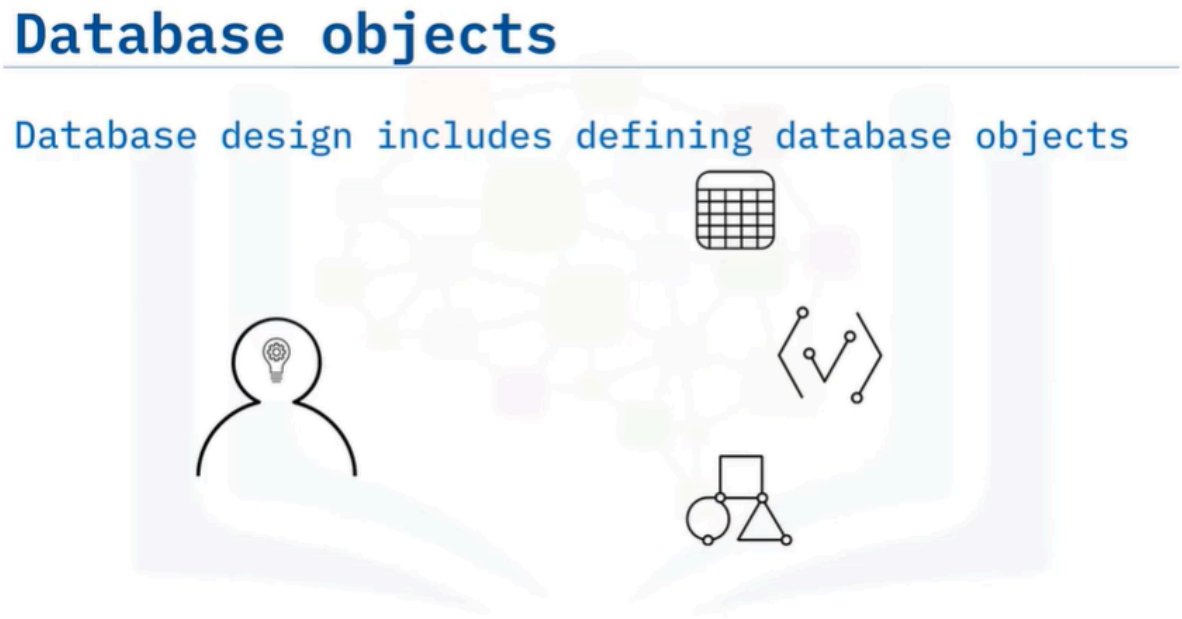
- This example hierarchy gives you an overview of how RDBMSes are structured, although slight variations may occur between products. Most RDBMSes begin with an instance, a single way of organizing the database and everything it contains. Many RDBMSes permit more than one database within a single instance. You will generally find at least one schema at some level in the hierarchy. A schema is a logical grouping of objects within a database. Schemas define how database objects are named and prevent ambiguous references. Some RDBMSes consider the schema a parent object of a database, and others consider it a database object. Within a schema are the database objects, including tables, constraints, and indexes.

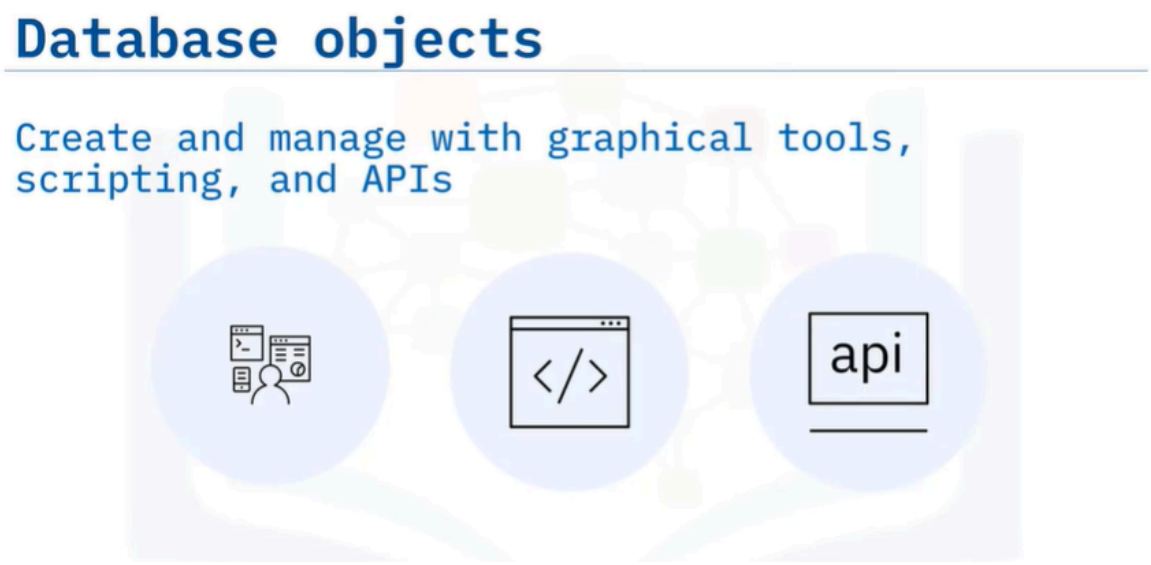


- An instance is a logical boundary for a database or set of databases where you organize database objects and set configuration parameters. Every database within an instance is assigned a unique name, has its own set of system catalog tables (which keep track of the objects within the database) and has its own configuration files. You can create more than one instance on the same physical server, providing a unique database server environment for each instance. The databases and other objects within one instance are isolated from those in any other instance. You can use multiple instances when you want to use one instance for a development environment and another instance for a production environment, restrict access to sensitive information, or control high-level administrative access. Not all RDBMSes use the concept of instances, often managing database configuration information in a special database instead. In Cloud-based RDBMSes, the term instance means a specific running copy of a service.

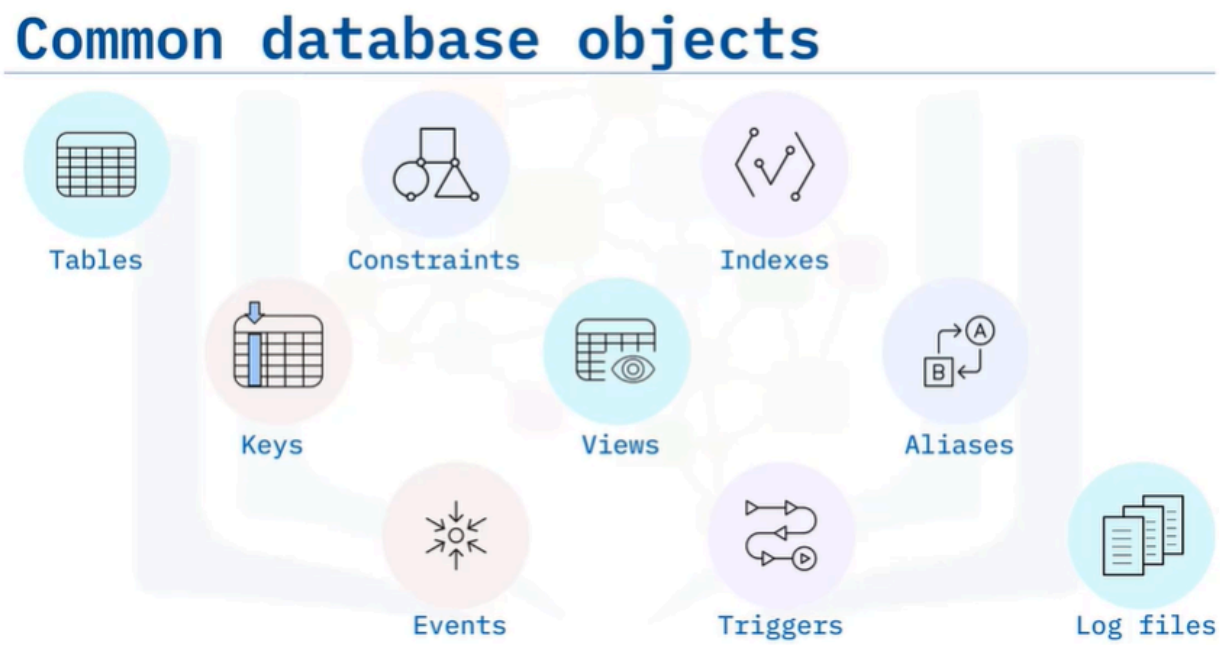


- A schema is a specialized database object that provides a way to group other database objects logically. A schema can contain tables, indexes, constraints, and other objects. When you create a database object, you can assign it to a schema. In most RDBMSes, the default schema is the user schema for the currently logged-on user. Many RDBMSes use a specialized schema to hold configuration information and metadata about a particular database. For example, tables in a system schema can store lists of database users and their access permissions, information about the indexes on tables, details of any database partitions that exist, and user-defined data types.





- Database objects are the items that exist within the database. The process of database design includes defining database objects and their relationships with each other. You can create and manage database objects through graphical database management tools, scripting, or accessing the database through an API. If you use SQL to create or manage the object, you will use Data Definition Language statements like CREATE or ALTER.



- In most RDBMSes, you can create objects such as:
  - Tables – Logical structures consisting of rows and columns which store data.
  - Constraints – Within any business, data is often subject to certain restrictions or rules. For example, an employee number must be unique. Constraints provide a way to enforce such rules.
  - Indexes – An index is a set of pointers used to improve performance and ensure the uniqueness of the data.
  - Keys – A key uniquely identifies a row in a table. Keys enable DBAs to define the relationships between tables.
  - Views – A view provides a different way of representing the data in one or more tables. A view is not an actual table and requires no permanent storage.
  - Aliases – An alias is an alternative name for an object such as a table. DBAs use aliases to provide shorter, simpler names to reference objects.
  - Events – An event is a Data Manipulation Language (DML) or Data Definition Language (DDL) action on a database object that can initiate a

trigger.

- Triggers – A trigger defines a set of actions performed in response to an insert, update, or delete on a specified table.
- Log files – Log files store information about transactions in a database.