Common terms used in DBMS:

Instance: Databases change over time as information is inserted and deleted. The collection of information **stored in the database at a particular moment is called an instance** of the database.

Schema: The *overall design of the database* is called the **database schema**. Schemas are changed rarely, if at all.

Schemas as per Abstraction-levels

Physical schema: It describes the database design at the physical level. The physical schema is hidden beneath the logical schema, and *can usually be changed easily* without affecting application programs.

Logical schema: It describes the database design at the logical level. This is important as it affects the application programs developed by programmers. Application programs are said to exhibit physical data independence if they do not depend on the physical schema, and thus need not be rewritten if the physical schema changes.

View level Schema/Subschemas: It describe different views of the database.

Data Models:

- Data model is a collection of conceptual tools for describing data, data relationships, data semantics, and consistency constraints.
- A data model provides a way to describe the design of a database at the physical, logical, and view levels.

The data models can be classified into **four different categories:**

Relational Model:

- The relational model uses **a collection of tables** to represent both data and the relationships among those data.
- **Each table has multiple columns**, and each column has a unique name. Tables are also known as **relations**.
- The *relational model is an example of a record-based* model. Record-based models are so named because the database is structured in fixed-format records of several types. Each table contains records of a particular type. Each record type defines a fixed number of fields, or attributes.
- The columns of the table correspond to the attributes of the record type.

Entity-Relationship Model:

- The entity-relationship (E-R) data model uses **a collection of basic objects, called entities**, and relationships among these objects.
- An entity is a "thing" or "object" in the real world that is distinguishable from other objects.

Object-Based Data Model:

- Object-oriented programming (especially in Java, C++, or C#) has become the dominant software-development methodology.
- This led to the development of an object-oriented data model that can be seen as extending the E-R model with notions of encapsulation, methods (functions), and object identity.
- The object-relational data model combines features of the object-oriented data model and relational data model.

Semi-structured Data Model:

- The semi-structured data model permits the specification of data where individual data items of the same type may have different sets of attributes. The Extensible Markup Language (XML) is widely used to represent semi-structured data.

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