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Instances and Schemas

→ Collection of Information stored in the DB at a particular moment is called an instance.
→ And the overall design of the DB is called schema.
→ Schema doesn't change frequently but data may change frequently
→ We have 3 types of schemas: Physical, logical, several view schemas.
→ Programmers build apps by the help of logical schemas.
→ physical schema change should not effect logical schema. That property is Physical data independence.

Data Models

→ It provides a way to describe the design of a DB at logical level.
→ Data model is a collection of conceptual tools for describing data, data relationships, data semantics & consistency constraints.

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ex:- ER model, Relational model, object-oriented model.

Database languages

① Data definition language (DDL)
It specifies the database schema.

② Data manipulation language (DML)
To express database queries and updates.

→ DDL

⊕ Tasks that DDL can do

→ CREATE
→ ALTER
→ DROP
→ TRUNCATE
→ COMMENT
→ RENAME

→ DML

⊕ Tasks that DML can do

→ SELECT
→ INSERT
→ UPDATE
→ DELETE
→ MERGE

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→ CALL
→ EXPLAIN PLAN
→ LOCK TABLE

③ Data control language (DCL)
Used to control privilleges.

⊕ Tasks that DCL can do
→ Grant permission
→ Revoke permission
→ System - creating a session, table,

④ Transaction Control Language (TCL)
Used to run the changes made by DML statements.

⊕ Tasks that TCL can do
→ COMMIT
→ SAVEPOINT
→ ROLLBACK
→ SET TRANSACTION

★ API is provided to send DML/DDL statements to DB and retrieve the results.

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DBMS Application Architecture

a. T1 Architecture
→ Client, server and DB all present on the same machine.

b. T2 Architecture
→ App is partitioned into 2 parts.
→ API standards like ODBC & JDBC are used to interact between client and server.

c. T3 Architecture
→ App is partitioned into 3 logical components
→ Client machine acts as a front-end and doesn't make any DB calls.
→ Client machine communicates with App server and App server communicates with DB system
→ Well suited for WWW applications
→ These are scalable, have data integrity and security.