INTRODUCTION OF DATABASE

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APPLICATION

a) BANKING: For customer ,informaion,account,and loans, and transaction.
b) Airline: For reservation and schedule information. Airline were among the first to use database in a geographically distributed manner terminals situated around the world accessed the central database system through phone lines and other data network.
c) Universities: For students information, course registration, and grades.
d) Credits card transaction: For purchases on credits cards and generation of monthly statements.
e) Sales: For customer, product, and purchase information.
f) Human resources: For information about employees, salaries, payroll taxes and benefits, and for generation of paychecks.

FILE SYSTEM

a) Data redundancy and inconsistency
b) Difficulty in accessing data
c) Data isolation
d) Integrity problems
e) Atomicity problems
f) Concurrent-access anomalies
g) Security problems

VIEW OF DATA

1. DATA ABSTRACTION

- Physical Level: The lowest level of abstraction describes how the data are actually stored.
- Logical Level: The next –higher level of abstraction describes what data are actually stored in the database, and what relationship exist among those data.
- View Level: The highest level of abstraction describes only part of the entire database.
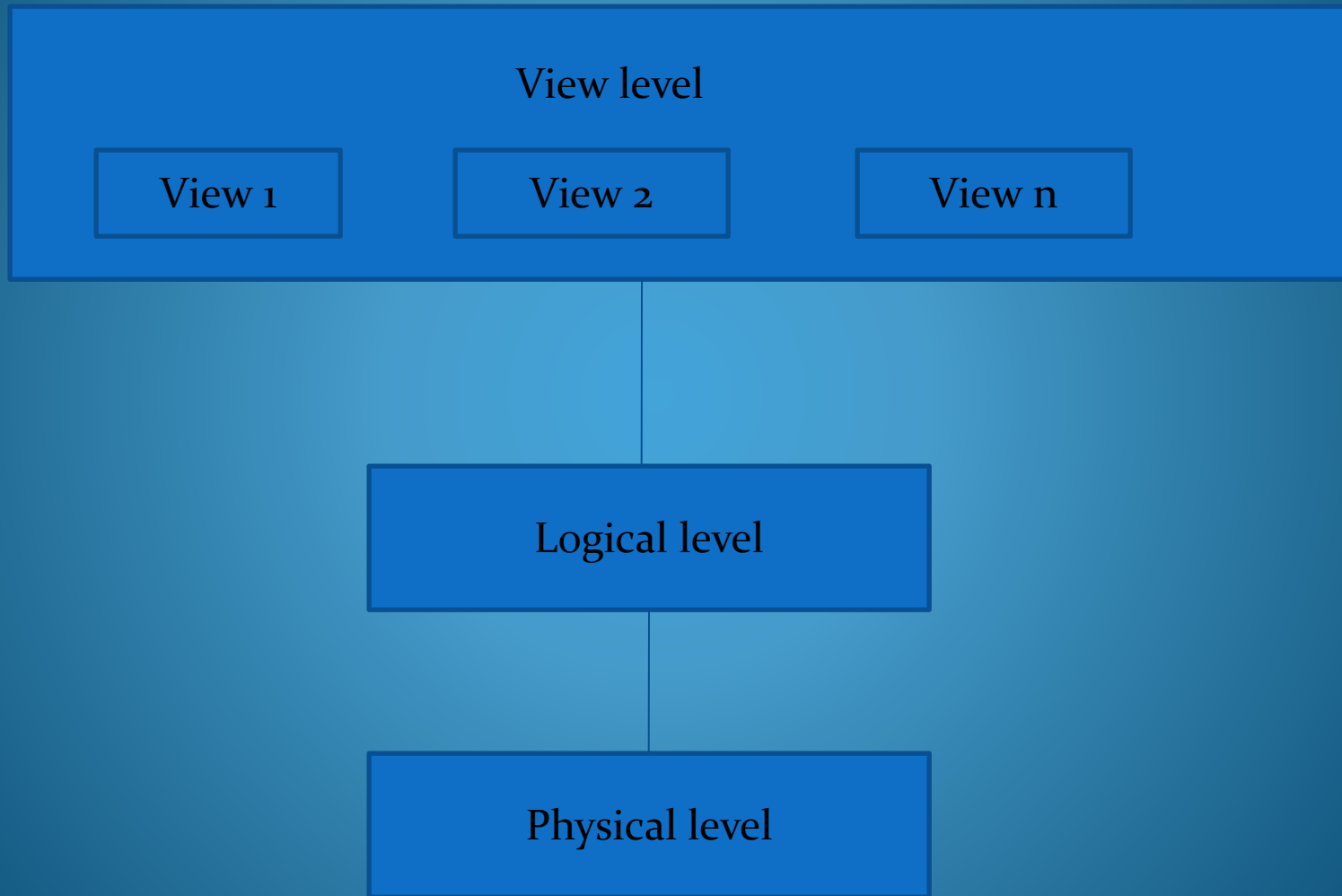
(The three levels of data abstraction)

INSTANCES AND SCHEMAS: The collection of information stored in the database at a particular moment is called an **instance** of the database. The overall design of the database is called the database **schema.**

QUERY PROCESSOR

The query processor components includes:
- DDL interpreter: Which interprets DDL statements and records the definitions in the data dictionary.
- DML: Compiler which translates DML statements in a query language into an evaluation plan consisting of low-Level instructions that the evaluation engine understands.
- Query evaluation engine: Which executes low-level instruction generates by the DML compiler.

Database Users and Administrators

- Database users and user interfaces
  - ➢ Naive Users
  - ➢ Application Programmers
  - ➢ Sophisticated Users
  - ➢ Online analytical processing(ONLP)
  - ➢ Specialized Users

- Database Administrator
  - ➢ Schema definition
  - ➢ Storage structure and access-method definition
  - ➢ Schema and physical-organization modification
  - ➢ Granting of authorization for data access
  - ➢ Routine maintenance

DATA LANGUAGES

The database provides a **data definition Language** to specify the database schema and a **data Manipulation language** to express database queries and updates.

- DATA-DEFINITION LANGUAGE

- DATA-MANIPULATION

DATA-DEFINITION LANGUAGE(DDL): We specify a database schema by a set of definition expressed by a special language called a Data-Definition Language. For instance, the following statement in the SQL language defines the account table:

e.g.   create table account(account-number
                    char (10),balance integer)
        Execution of the above DDL statement create the account table. In addition, it updates a special set of tables called the DATA DICTIONARY   or DATA DIRECTORY

DATA-MANIPULATION LANGUAGE: Data manipulation is:

- The retrieval of information stored in the database.
- The insertion of new information into the database.
- The deletion of information from the database.
- The modification of information stored in the database.

A data-manipulation language(DML) is a language that enables users to access or manipulate data as organized by the appropriate data model. There are basically two types :

• Procedural DMLs

• Declarative DMLs
The query in the SQL language finds the name of the customer whose customer-id is 1999:

e.g.   Select customer.customer-name
from customer
where customer.customer-id=1999

TRANSACTION MANAGEMENT

A transaction is a collection of operations that performs a single logical function in a database application. Each transaction is a unit of both atomicity and consistency . Thus, we require that transaction do not violate any database-consistency constraints. That is, if the database was consistent when a transaction started, the database   must be consistent when the transaction successfully terminates.

STORAGE MANAGER

A storage is a program module that provides the interface between the low-level data stored in the database and the application program and queries submitted to the system. The storage manager . The storage manager is responsible for the interaction with the file manager . The row data are stored on the disk using the file system, which is usually provided by a conventional operating system. The storage manager translates the various DML statements into low-level file-system commands. Thus, the storage manager is responsible for storing, retrieving and updating in the database.