DATABASE MANAGEMENT SYSTEM

Database System Concepts and Architecture

- **Data Model**: It is a collection concepts that can be used to describe the *structure* of a database, and provides the necessary means to achieve this abstraction.
- **Data Abstraction:** It refers to suppression of details of data organization and storage and the highlighting the essential features for an improved understanding of data.

Categories of data models

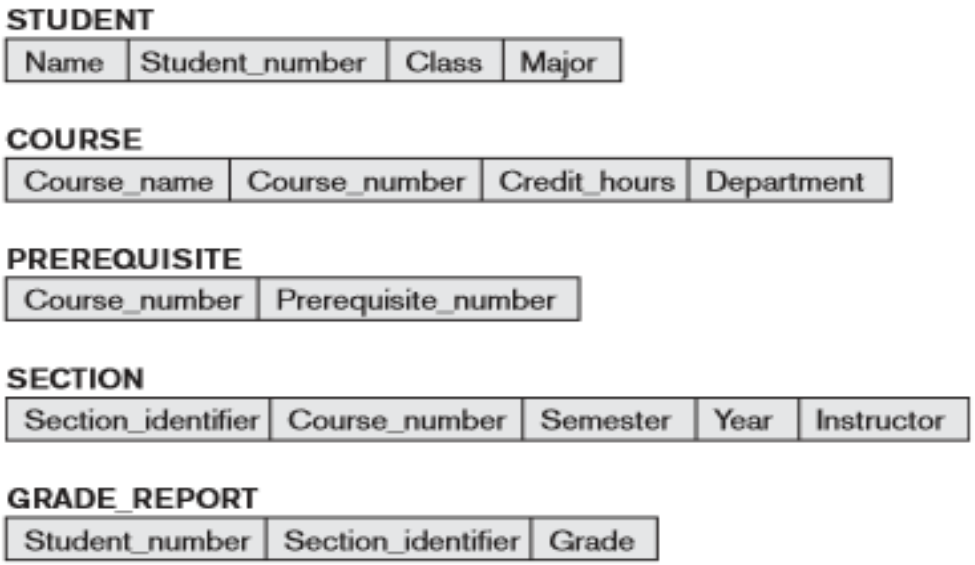
- **Conceptual** (**high-level**, **semantic**) **data models**: Provide concepts that are close to the way many users *perceive* data. (e.g. ER/EER Data Model)
- **Physical** (**low-level**, **internal**) **data models**: Provide concepts that describe details of how data is stored in the computer.
- **Implementation** (**representational**) **data models**: Provide concepts that fall between the above two, balancing user views with some computer storage details.(e.g. Relational Data Model)

Which is the best Data Model amongst these three?

What is schema?

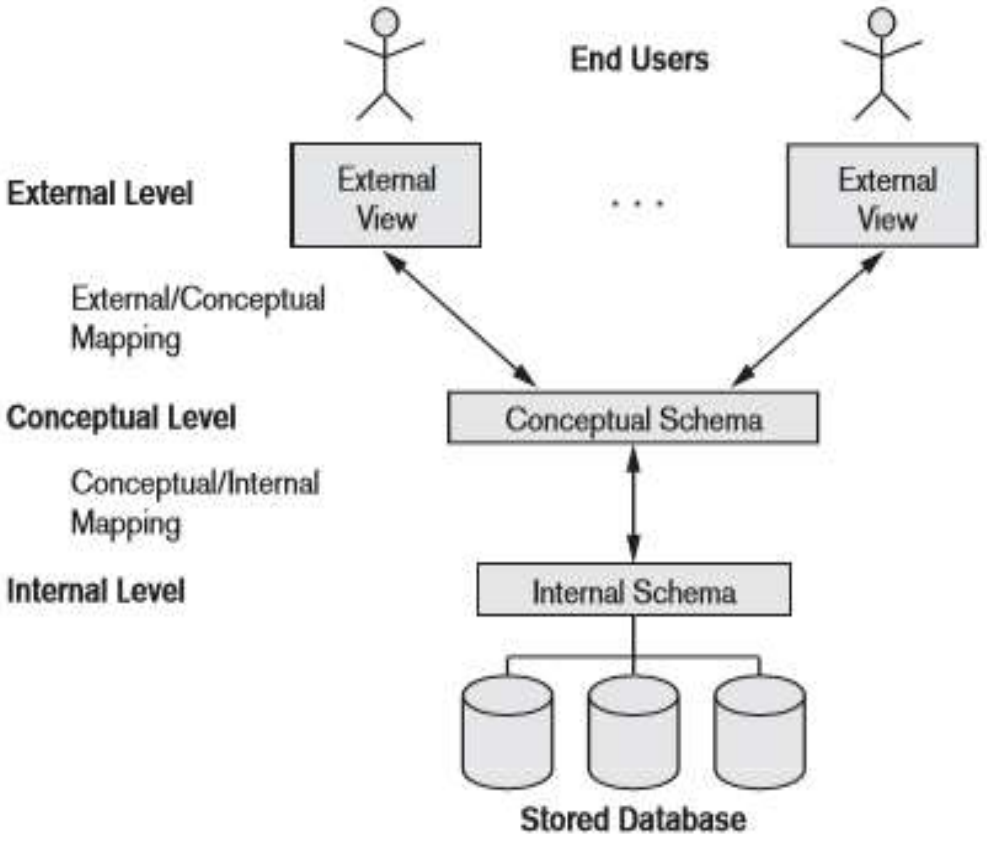
- **Database Schema**: The *description* of a database, specified during database design.
- **Schema Diagram**: A diagrammatic display of a database schema.

Figure 2.1
Schema diagram for the database in Figure 1.2.



Three-Schema Architecture

Figure 2.2
The three-schema architecture.



Three-Schema Architecture

- Defines DBMS schemas at *three levels*:
  - **Internal/Physical level** is used to describe physical storage structures and access paths.
  - **Conceptual/ logical level** is used to describe the structure and constraints for the *whole* database for a community of users.
  - **External level** is used to describe the various user views. Usually uses the same data model as the conceptual level.

Data Independence

It can be defined as the capacity to change the schema at one level of a database system without having to change the schema at the next higher level.

Data Independence

- **Logical Data Independence**: The capacity to change the conceptual schema without having to change the external schemas and their application programs.
- **Physical Data Independence**: The capacity to change the internal schema without having to change the conceptual schema.

DBMS Languages

- **Data Definition Language** (**DDL**): Used by the DBA and database designers to specify the *conceptual schema* of a database. In many DBMSs, the DDL is also used to define internal and external schemas (views). In some DBMSs, separate **storage definition language** (**SDL**) and **view definition language** (**VDL**) are used to define internal and external schemas.

DBMS Languages

- **Data Manipulation Language (DML)**: Used to specify database retrievals and updates.
  - DML commands (**data sublanguage**) can be *embedded* in a general-purpose programming language (**host language**), such as COBOL, C or an Assembly Language.
  - Alternatively, *stand-alone* DML commands can be applied directly (**query language**).


Thankyou