DATABASE ESSENTIALS

Lecture 2

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DATABASE TERMINOLOGIES

- **Field**
  - ✓Is the smallest unit of the data that has meaning to users.
  - ✓It is also called data item or data element.
  - ✓Example: name, address, and age.
  - ✓A field is represented in the database by a value.
  - ✓Each field has a fixed data type.
- **Record**
  - ✓Is a collection of related fields and each field have some value.

DATABASE TERMINOLOGIES…

- **File**
  - ✓Is a collection of related records.
- **Form**
  - ✓Is a structured document with specific areas for viewing or entering data in a database one record at a time.
- **Query**
  - ✓Is a request for a particular data in a database.

DATABASE TERMINOLOGIES…

- **Primary key**
  - ✓Is a field in a table whose value uniquely identifies each record in the table.

- **Foreign key**
  - ✓Is a primary key of another table which is used to connect two tables in a database.
  - ✓A table can have several foreign keys from each table that it is related to.

DATABASE TERMINOLOGIES…

- **Report**
  - ✓a formatted collection of information organized to provide printed data on a specific subject
- **Table**
  - ✓Is an arrangement of related information stored in columns and rows.
- **Relationship**
  - ✓Is the direct or indirect association between tables in a database.

DATABASE TERMINOLOGIES…

student_id	name	age
1	Akon	17
2	Bkon	18
3	Ckon	17
4	Dkon	18

subject_id	name	teacher
1	Java	Mr. J
2	C++	Miss C
3	C#	Mr. C Hash
4	Php	Mr. P H P

student_id	subject_id	marks
1	1	98
1	2	78
2	1	76
3	2	88

DATABASE TERMINOLOGIES…

- **Data type**
  - ✓ Is the kind of data a field can contain.
  - ✓ Examples
    i. a string
    ii. an integer
    iii. a date

DATABASE PROPERTIES

- Any database have the following properties:-
  - data sharing
  - data integration
  - data integrity
  - data security
  - data independence

- Data sharing
  - ✓ A database is normally expected to be accessible by more than one person, sometimes at the same time.
  - ✓ a formatted collection of information organized to provide printed data on a specific subject

DATABASE PROPERTIES…

- Data integration
  - ✓ Data integration is the process of combining data from multiple source systems to create unified sets
  - ✓ A database should be a collection of data with no redundant data.
  - ✓ The aim of a database system is to store one logical item of data in one place only.

- Data integrity
  - ✓ The database should accurately reflect the purpose or organization that it is attempting to model.

DATABASE PROPERTIES…

- Data security
  - ✓Users should be restricted to access some parts of the database only.
- Data independence
  - ✓This involves buffering data from the processes that use such data.
  - ✓A change to some part of the underlying database should not change the application programs using the affected data.
  - ✓Also the change in application program should not affect the database.

DBMS – THREE LEVEL ARCHITECTURE

- Three level architecture is a framework for describing database concepts and specifying the structure of database system.

- The DBMS three level architecture is also known as the three levels of data abstraction.

- The levels in this architecture are:-
  - **internal level**
  - **conceptual level**
  - **external level**

DBMS – THREE LEVEL ARCHITECTURE…

Internal level

- This level describes the actual physical storage of data or how the data are actually stored in memory.
- This is the low level representation of entire database.
- The internal view is described by internal schema.
- Also called the physical level.

DBMS – THREE LEVEL ARCHITECTURE…

Conceptual level

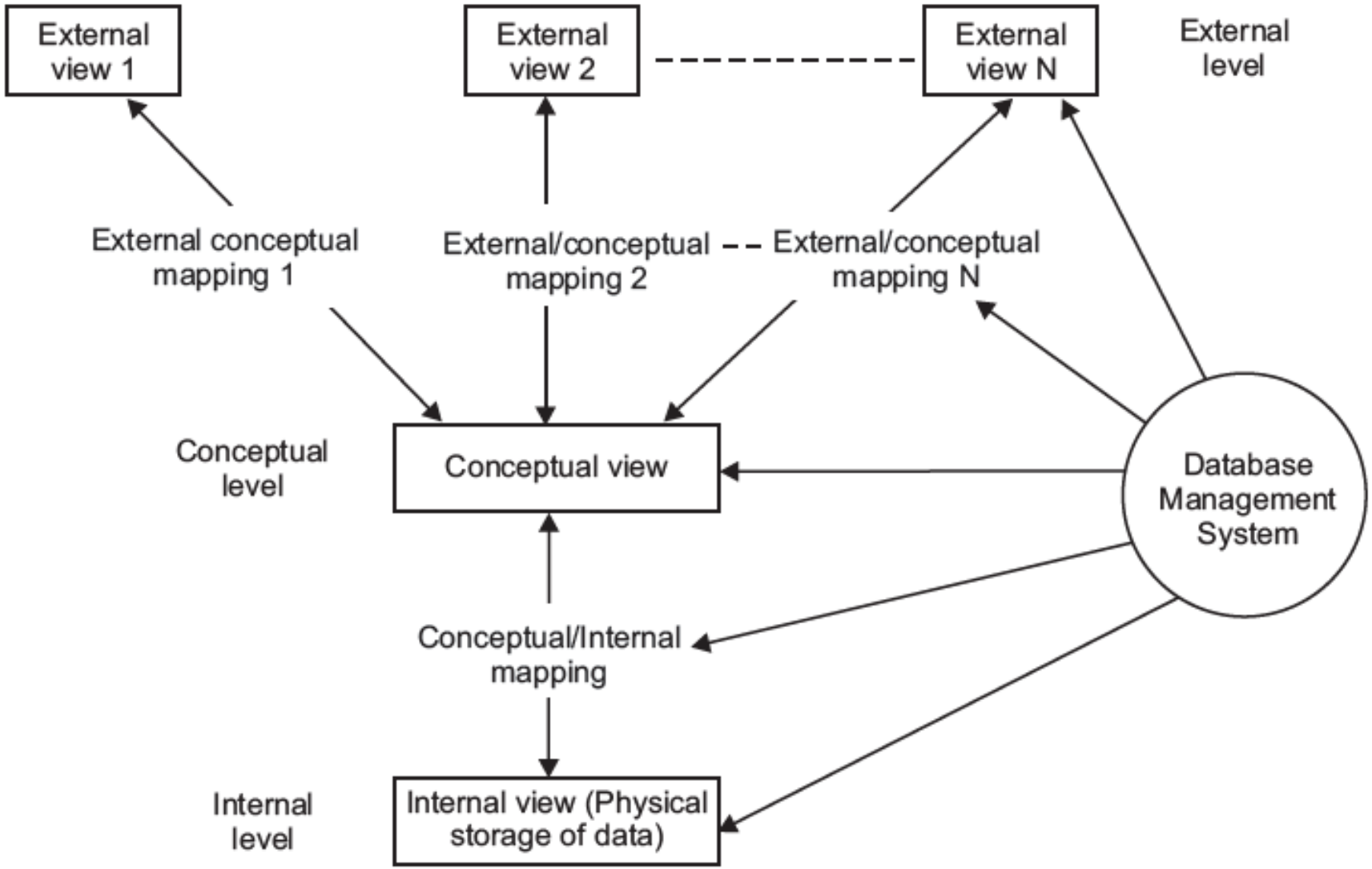
- This level describes *what* data are stored in the database, and what relationships exist among those data.
- This level describes the entire logical structure of a whole database.
- Also known as logical level.
- This level is relational, data visible at this level will be relational tables.

DBMS – THREE LEVEL ARCHITECTURE…

External level

- This level describes the actual view of data seen by individual users.
- The external schema is defined by the DBA for every user.
- A user can access only that part of database for which he is authorized by DBA.
- Also known as the view level.

DBMS – THREE LEVEL ARCHITECTURE…



DBMS – THREE LEVEL ARCHITECTURE…

Mappings in Three Level Architecture

- Mappings is the process of transforming requests and results between the three levels.

- Types of mappings:
  - Conceptual/Internal mapping
  - External/Conceptual mapping

DBMS – THREE LEVEL ARCHITECTURE…

Conceptual/Internal mapping

- Defines the correspondence or operations between the conceptual view and the physical view.
- It specifies how the data is retrieved from physical storage and shown at conceptual level and vice-versa.

External/Conceptual mapping

- Defines the correspondence between the conceptual view and the external view.
- It specifies how the data is retrieved from conceptual level and shown at external level.

DBMS – THREE LEVEL ARCHITECTURE…

- The **physical data independence** is achieved through conceptual/internal mapping.

- The **logical data independence** is achieved through external/conceptual mapping.

DBMS – THREE LEVEL ARCHITECTURE…

Advantages of three level architecture

i. Each user is able to access the same data but have a different customized view of the data.
ii. The changes to physical storage organization does not affect the internal structure of the database. *e.g.,* moving the database to a new storage device.
iii. To use the database, the user is no need to be concerned about the physical data storage details.
iv. The conceptual structure of the database can be changed by the DBA without affecting any user.
v. The database storage structure can be changed by the DBA without affecting the user's view.

The way to get started is to quit talking and begin doing.

– Walt Disney