Foundation University

Rawalpindi Campus

Introduction to Database Systems – CSC - 221

A Presentation by

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RECAP

- MY NAME IS……
- I REMEMBER……

Objective of Today's Lecture

The Database Architecture

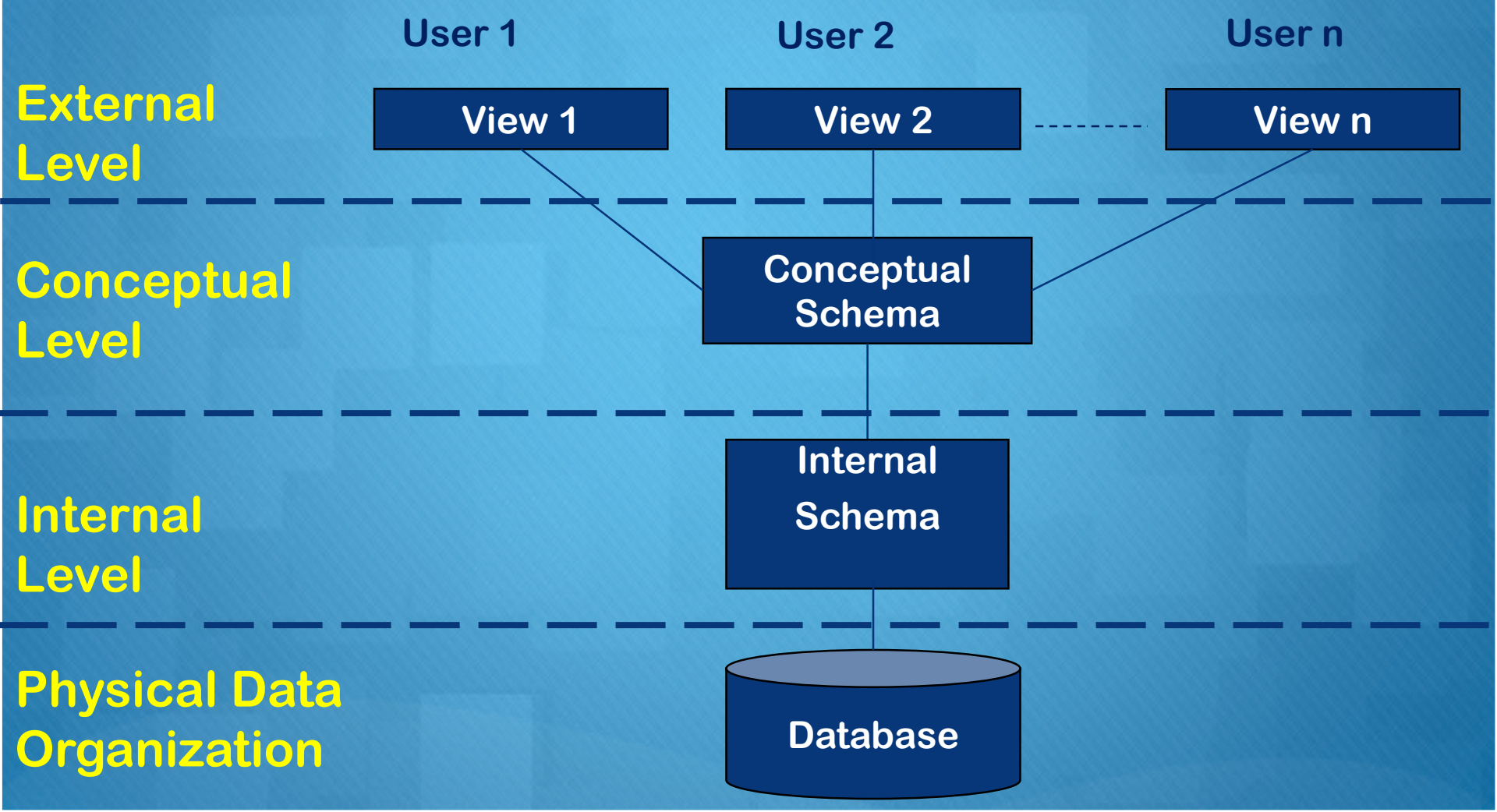
Database Architecture Standardization

- Database standard proposed by ANSI SPARC (American National Standards Institute, Standards Planning And Requirements Committee) in 1975.
- Used worldwide and is the only most popular agreed upon standard for database systems.
- Proposed – The Three Level Schema architecture

Three Level Architecture

- Three levels at which data can be described
- To separate the physical representation of data from the users' views of data
- Allows access the data in different formats at the external level, stored in a specific format at the internal level

The Three-Level Architecture



External View (Level / Schema)

The way users think about data

External View (Level / Schema)

- Each user has a view of the database limited to the appropriate portion of the user's *perspective of reality.*
- Users may have *different* views of the same data e.g. date, time etc.
- Virtual/calculated data: that is not actually stored in the database but is created when needed e.g. age, statistical data etc.

External View (Level / Schema)

- DBMS uses external views to create user interface for different users which is both the ***facility and barrier***
- User's external view is created after considering data access, reports, and the transactions needs.
- External schema evolves as user needs are modified over time

External View (Level / Schema)

Mike

Natalia

Employee Data

First Name: Morris
Last Name: David
Date of Birth:
15-February-1991

Workers

Name: M. David
Age: 25y,10d
Dept: Sales

External Layer

Lower Layers

Conceptual or Logical View

- This level contains the logical structure of the entire database as seen by the *DBA*.
- A complete view of the data of an organization that is why it is also known as the *community view* of the database.
- The conceptual view shows all the entities existing in the organization, attribute or characteristics associated with those entities and the relationships which exist among the entities of the organization.

Conceptual or Logical View

- All entities, their attributes, and their relationships; the constraints on the data semantic information about the data and security and integrity information.

- The conceptual level supports each external view, in that any data available to a user must be contained in, or derivable from, the conceptual level. However, this level must not contain any storage-dependent details.

Conceptual or Logical View

- For instance, the description of an entity should contain only data types of attributes (for example, integer, real, character) and their length (such as the maximum number of digits or characters), but not any storage considerations, such as the number of bytes occupied.
- *Relatively constant:* designed with the present as well as future needs of an organization.

Employee Data

First Name: Morris
Last Name: Anton
Date of Birth:
15-February-1991

Mike

Natalia

Workers

Name: M. Anton
Age: 25y,10d
Dept: Sales

External Layer

Logical Record Interface

Conceptual Layer

Name	DoB	Deps	DepId
Morris Anton	15/02/91	5	D001
Maria Michael	29/02/92	0	D005

Internal View (Level / Schema)

- The physical representation of the database on the computer. This level describes *how* the data is stored in the database.
- Places the data in such a format that, it is only readable by the DBMS, to achieve optimal runtime performance and storage space utilization.

Internal View (Level / Schema)

- It covers the data structures and file organizations used to store data on storage devices.
- It interfaces with the operating system access methods (file management techniques for storing and retrieving data records) to place the data on the storage devices, build the indexes, retrieve the data, and so on.

Internal View (Level / Schema)

- Storage space allocation for data and indexes
- Record descriptions for storage (with stored sizes for data items)
- Record placement
- Data compression and data encryption techniques

Physical Level

- Generally same as Internal but there lays thin line which actually separated the internal view f rom the physical view
- Actual representation of data on the storage device
- In the binary format
- OS responsibility

First Name: Morris
Last Name: Anton
Date of Birth:
12 Sep, 1970

Mike

Natalia

Name: M. Anton
Age: 25y,10d
Dept: Sales

Name	DoB	Deps	DepId
Morris Anton	15/02/91	5	D001
Maria Michaeil	29/02/92	0	D005

BH | RH | Morris Anton 120970 5 D001 | RH | Maria Michael…

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CHHUTTI

AND THAT IS FAREWELL TO DAY SIX ☺