

# Database Creation and Management

Schema, Mapping, Instances, Data Independence, Data Abstraction

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# Outline

- Mappings
- Schemas
- Instances
- Data Independence
- Data Abstraction

# Mappings

- Mapping is the process of transforming request response between various database levels of architecture.
- In other words, the process of transforming requests and results between levels are called mappings.
- These mappings may be time consuming, so some DBMS do not separate the three levels completely.
- Mapping is not good for small database, because it takes more time.

# Schemas

- The description of a database is called the database schema.
- This will be defined during the design phase and it is not expected to change frequently.
- It does not include;
  - the data type of each data item,
  - the relationships among the various files, and
  - Many types of constraints.

# Cont...

## STUDENT

Name	StudentNumber	Class	Major
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## COURSE

CourseName	CourseNumber	CreditHours	Department
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## PREREQUISITE

CourseNumber	PrerequisiteNumber
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## SECTION

SectionIdentifier	CourseNumber	Semester	Year	Instructor
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## GRADE\_REPORT

StudentNumber	SectionIdentifier	Grade
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## Schema Diagram for the Database

# INSTANCES

- The actual data of a database or the current contents of the database is known as the instances.
- It may change frequently.

# Cont...

At 5:00PM, EMPLOYEE and DEPARTMENT tables

EMPLOYEE				DEPARTMENT	
EMP_ID	EMP_NAME	ADDRESS	DEPT_ID	DEPT_ID	DEPT_NAME
100	Joseph	Clinton Town	10	10	Accounting
101	Rose	Fraser Town	20	20	Quality
102	Mathew	Lakeside Village	10	30	Design
103	Stewart	Troy	30		

At 5:01 PM, EMPLOYEE and DEPARTMENT tables  
– New records is added to EMPLOYEE table

EMPLOYEE				DEPARTMENT	
EMP_ID	EMP_NAME	ADDRESS	DEPT_ID	DEPT_ID	DEPT_NAME
100	Joseph	Clinton Town	10	10	Accounting
101	Rose	Fraser Town	20	20	Quality
102	Mathew	Lakeside Village	10	30	Design
103	Stewart	Troy	30		
104	William	Holland	30		

At 5:02 PM, EMPLOYEE and DEPARTMENT tables  
– EMP\_ID 102 has been deleted from EMPLOYEE table

EMPLOYEE				DEPARTMENT	
EMP_ID	EMP_NAME	ADDRESS	DEPT_ID	DEPT_ID	DEPT_NAME
100	Joseph	Clinton Town	10	10	Accounting
101	Rose	Fraser Town	20	20	Quality
<del>102</del>	<del>Mathew</del>	<del>Lakeside Village</del>	<del>10</del>	30	Design
103	Stewart	Troy	30		
104	William	Holland	30		

## Example of Instance

# DATA INDEPENDENCE

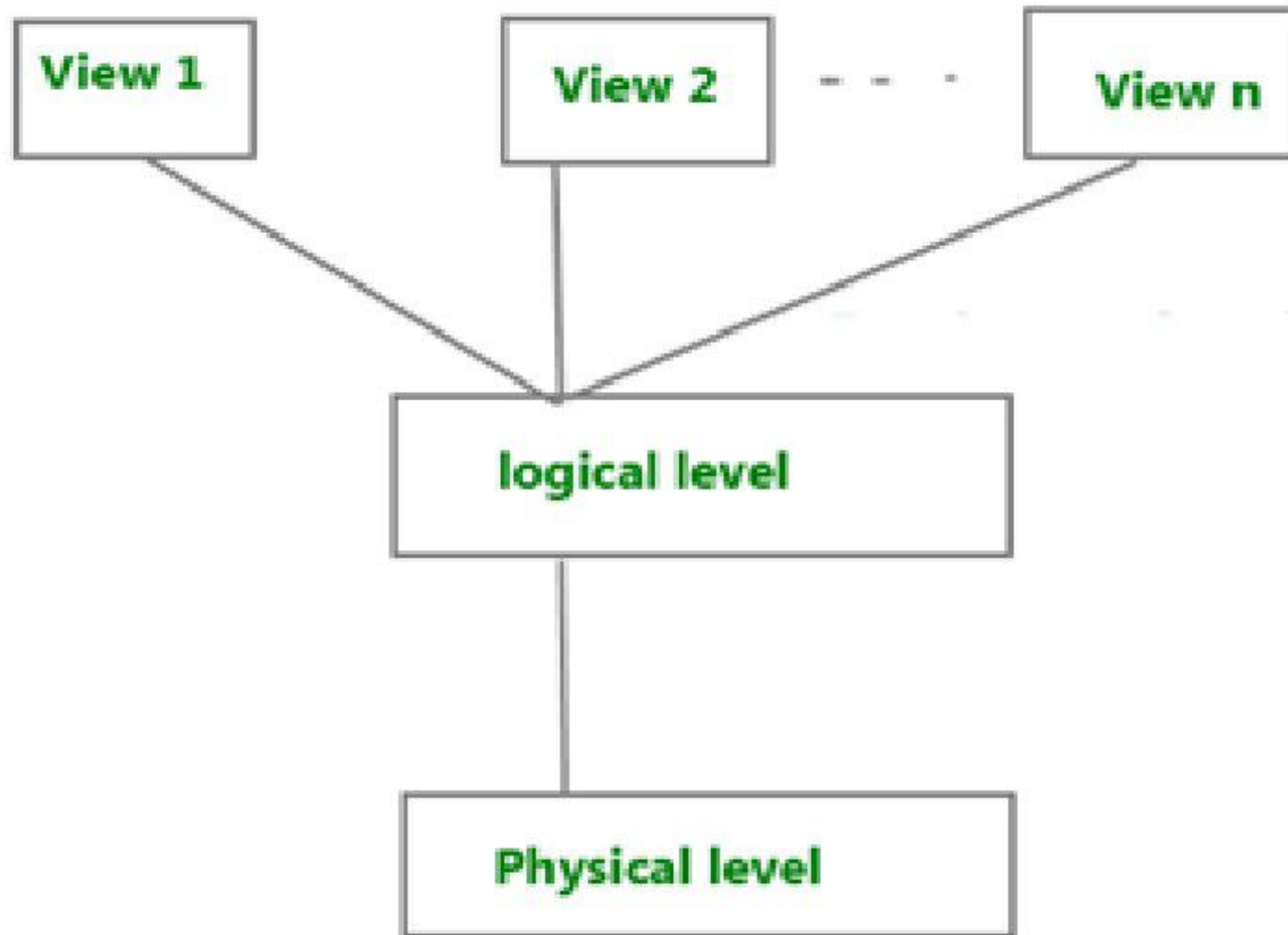
- The data independence defined as the capacity to change the schema at one level of a DB system without having to change the schema at the next higher level.
  - Logical data independence
  - Physical data independence



# DATA ABSTRACTION

- Database systems are made-up of complex data structures.
- To ease the user interaction with database, the developers hide internal irrelevant details from users. This process of hiding irrelevant details from user is called **data abstraction**.
- There are 3 levels of data abstraction:
  - External/View level
  - Logical/ Conceptual level
  - Physical level

# Cont...



## Three Levels of Data Abstraction