Assessment Report

Only for Course Teacher						
		Needs Improvement	Developing	Sufficient	Above Average	Total Mark
Allocate mark & Percentage		**25%**	**50%**	**75%**	**100%**	**10**
Problem Understanding	02					
Analysis	03					
Implementation	03					
Report Writing	02					
				Total obtained mark		
Comments						

Semester: Spring 2025

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Batch: 41H   **Section: H**

Course Code: SE 223   **Course Name: Database Systems**

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Submission Date: 09/04/2025

Assignment Title: Data Abstraction and Levels of Abstraction in Database
Management Systems

1. Introduction

Database Management Systems (DBMS) are essential tools used to efficiently manage data. One
of the core concepts that enables DBMS to handle data effectively is **data abstraction**. Data
abstraction is the process of hiding the complexity of the data and presenting it in a simplified
form to the users. This concept ensures that users interact with the data without needing to
understand the intricate details of how it is stored or maintained.

2. What is Data Abstraction?

Data abstraction refers to the process of hiding the internal details of the database from the users
and showing only the necessary parts of the data. It helps in separating the **logical view** of the
data from the **physical storage** of the data.

The main objective of data abstraction is to simplify user interaction with the system and
enhance database security by restricting access to sensitive or unnecessary details.

3. Levels of Data Abstraction

There are **three levels of data abstraction** in DBMS:

a. Physical Level (Lowest Level)

- Describes how data is actually stored on storage devices like hard drives.

- Focuses on the **storage structure** of the database.

- Deals with complex data structures such as indexes, blocks, and data compression.

- Not visible to end-users.

Example: Data stored in binary files using B+ Trees or Hash Indexing.

b. Logical Level (Intermediate Level)

- Describes **what data is stored** in the database and the relationships among those data.

- Deals with the **structure of the entire database** (schemas, tables, relationships).

- Provides a logical view of the database to the developers or database administrators.

Example: A table named Students with attributes like StudentID, Name, Department, and Marks.

c. View Level (Highest Level)

- The **user interaction level**.

- Describes only a **part of the entire database** that a particular user is interested in.

- Allows multiple users to have different views of the same database.

Example: A teacher may see only StudentID and Marks, while the admin may access full student records.

4. Importance of Data Abstraction in DBMS

- **Improves Security:** Sensitive data can be hidden at the view level.

- **Simplifies Access:** Users do not need to understand the storage details.

- **Data Independence:** Changes in physical storage do not affect application programs.

- **Easier Maintenance:** Developers can focus on high-level design without worrying about low-level data handling.

5. Conclusion

Data abstraction plays a vital role in managing complex database systems efficiently. By dividing the database architecture into three levels—physical, logical, and view—it ensures data security, better data handling, and ease of use for users and developers alike. Understanding this concept is essential for anyone involved in designing or managing databases.