DATABASE

CONCEPTS

WHAT IS DATABASE AND DATABASE SYSTEM?

INTRODUCTION

- **Database** is collection of interrelated data and **database system** is basically a computer based record keeping system.

- It contains the information about one particular enterprise.

- It maintains any information that may be necessary to the decision making process involved in the management of that organisation.

WHY DATABASE?

A typical file processing system suffers from some major limitations like,

- Data Redundancy
- Data Inconsistency
- Un-sharable Data
- Un-standardized Data
- Insecure Data
- Incorrect Data

On the other hand, a database system overcomes all these limitations and ensures continues efficiency.

ADVANTAGES OF DATABASE

The advantages provided by a database system are :

1. Reduced redundancy

2. Controlled data inconsistency

3. Shared Data

4. Standardized Data

5. Secured Data

6. Integrated Data

ADVANTAGES OF DATABASE

1. Reduced redundancy:

Database redundancy means duplication of data. Non-database systems maintain separate copy of data for each application.

For example:

In college, student records are maintained and hostel also maintains the student records for those students who live in hostel. Though the records of hosteller students are already being maintained by the college, the hostel keeps separate copy of it. But this duplication of data leads to incorrect data.

ADVANTAGES OF DATABASE

2. Controlled Data Inconsistency:

When the redundancy is not controlled, there may be occasions on which two entries about the same data do not agree(that is one of them stores updated information and the other does not.) at such times, database is said to be inconsistence.

By controlling redundancy, the inconsistency is also controlled. The database ensures any change is made to either of the two entries is automatically made to the other. This process is known as **propagating update.**

ADVANTAGES OF DATABASE

3. Shared Data

Sharing of data mean that individual piece of data in the database may be shared among several different users, in the sense that each of those users may have access to the same piece of data and each of them may use it for different purposes.

ADVANTAGES OF DATABASE

4. Standardized Data

The database management systems can ensure that all the data (that is stored centrally) follow the applicable standards. There may be certain standards laid by the company or organization using the database.

Similarly, there may be national and or international standards. Standardizing stored data formats is particularly desirable as an aid to data interchange or migration between systems.

ADVANTAGES OF DATABASE

5. Secured Data

A database management system ensures data security and privacy by ensuring that the only means of access is through proper channel and also by carrying out authorization checks whenever access to sensitive data is attempted.

Data Security: Data security refers to protection of data against accidental or intentional disclosure to unauthorized persons, or unauthorized modification or destructions.

Privacy of Data: it refers to the rights of individuals and organizations to determine for themselves when, how and what extent information about them is to be transmitted to others

ADVANTAGES OF DATABASE

6. Integrated Data

- Data integration is the process of **combining data from different sources into a single, unified view**.

- The database management system designs certain integrity checks to ensure that data values confirm to some specified rules. *For example date cant be like 25/25/12; it is invalid date.*

DATABASE ABSTRACTION/ DATABASE LEVELS/ DATABASE CATEGORIES

Data abstraction simplifies database design. The major purpose of a database system is to provide users with an **abstract view** of the system. The system hides certain details of how data is stored and created and maintained Complexity should be hidden from database users.

Three Levels of Abstractions are,

1.Physical Level (Internal Level) 2.Conceptual Level
3.External Level (View Level)

THREE LEVELS OF ABSTRACTION
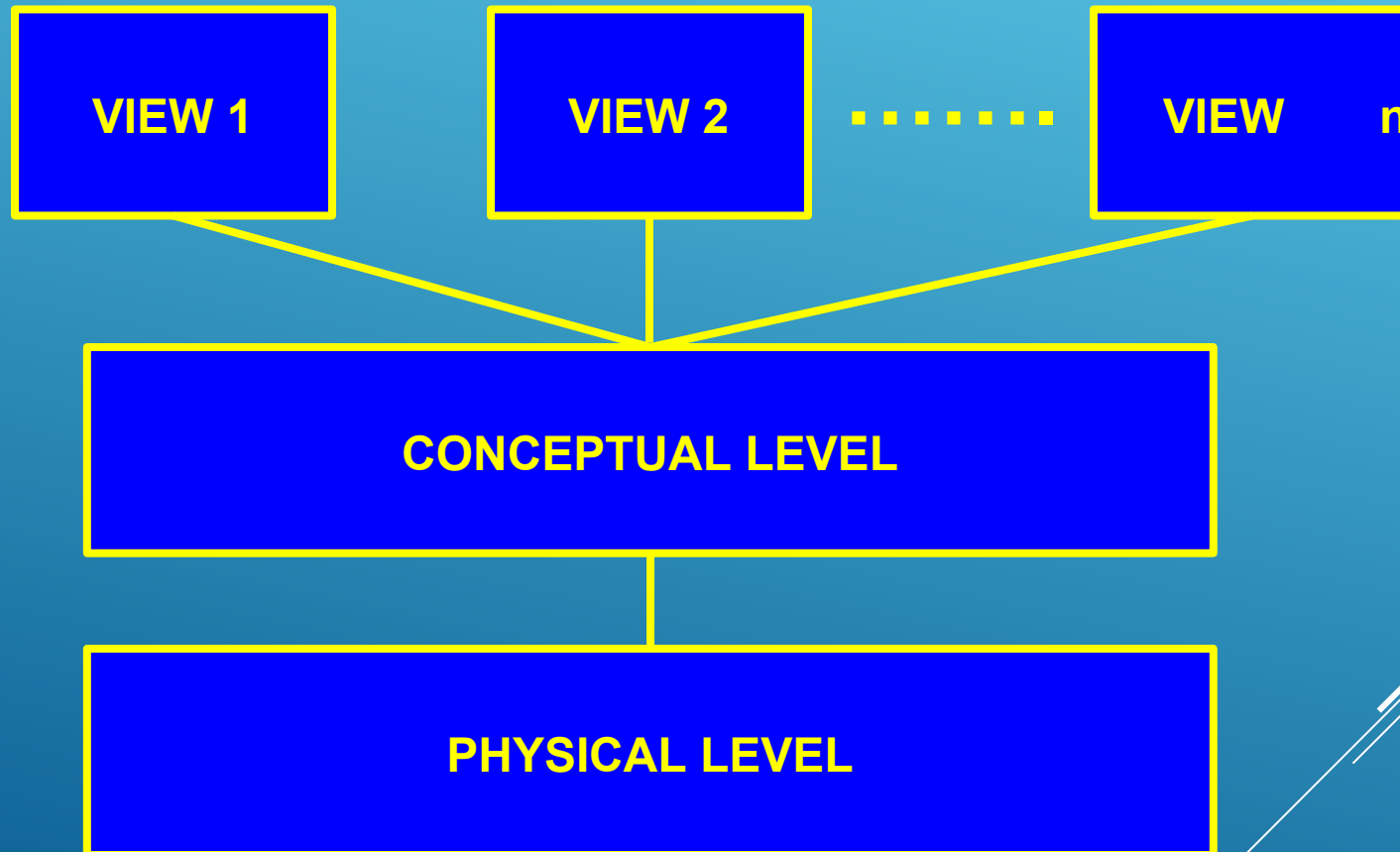
1. PHYSICAL LEVEL (INTERNAL OR LOW LEVEL)
It defines how data is stored. It is very complex and used by developers. & it deals with,

- How the data are stored.

- E.g. index, B-tree, hashing.

- Interface between OS and record structure.

- Lowest level of abstraction.

2. CONCEPTUAL LEVEL

It defines data in terms of a data model. It tells what data is stored and described in small numbers. This level is usually used by **DBA** (Database administrator) & it deals with,
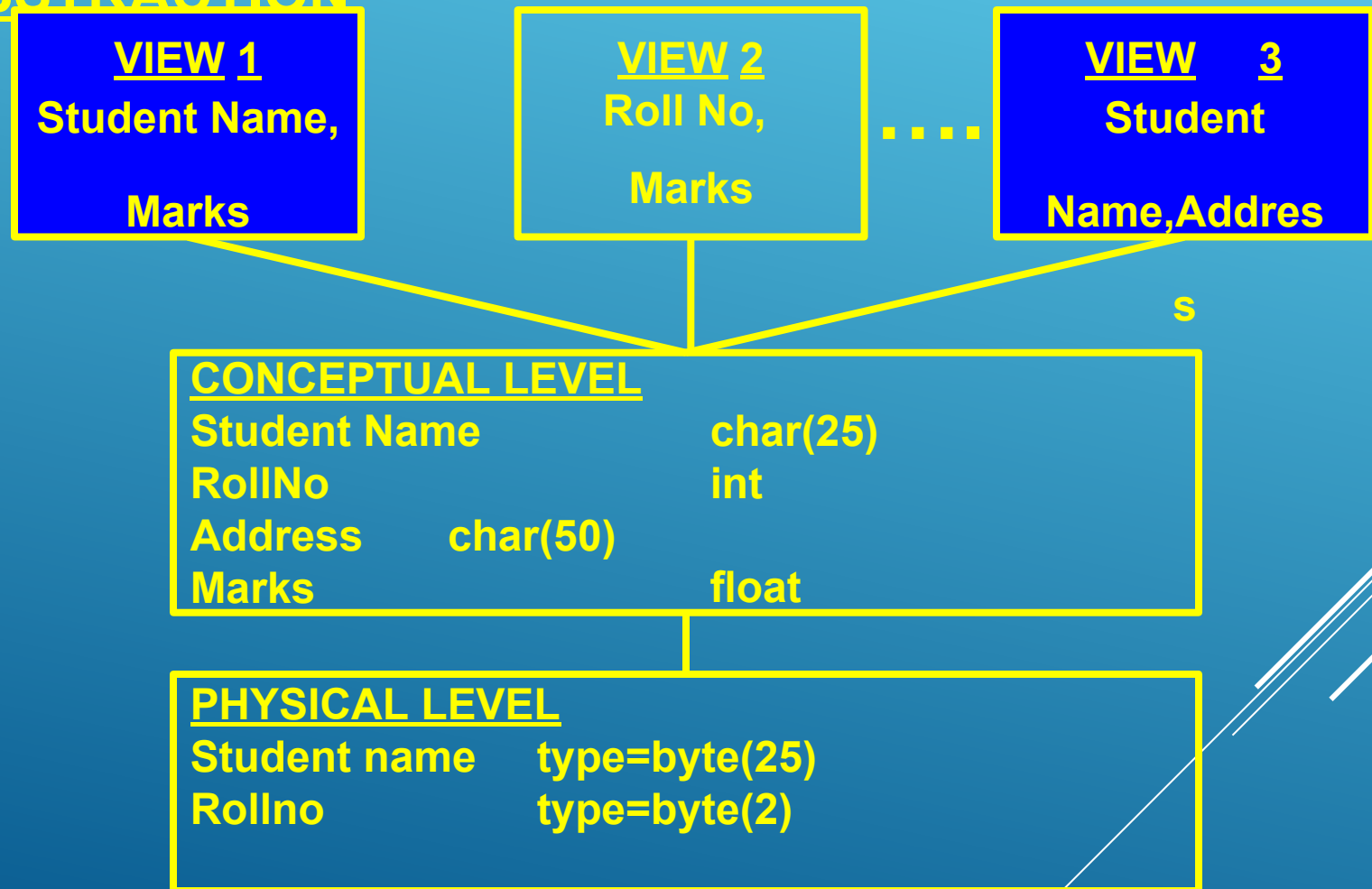
- Next highest level of abstraction.

- Describes *what* data are stored.

- Describes the relationships among data.

- Database administrator level.

3. <u>EXTERNAL LEVEL OR VIEW LEVEL</u>

It defines a number of simplified domain-specific views. It describes only part of databases. This level is used by users.

☐ Highest level.

☐ Describes *part* of the database for a particular group

of users.

☐ Can be many different views of a database.

☐ E.g. In a School get a view of Student details, but not

EXAMPLE OF THREE LEVELS OF ABSTRACTION

VIEW 1
Student Name,

Marks

VIEW 2
Roll No,

Marks

. . . .

VIEW 3
Student

Name,Addres
s

CONCEPTUAL LEVEL
Student Name	char(25)
RollNo	int
Address char(50)	
Marks	float

PHYSICAL LEVEL
Student name	type=byte(25)
Rollno	type=byte(2)

VIVA
1. WHAT IS DATABASE AND DATABASE SYSTEM?
2. LIST DOWN ABSTRACTION LEVELS OF DATABASE?
3. ADVANTAGES OF DATABASES