UNIT-3
RELATIONAL DATABASE MANAGEMENT SYSTEM

Data:
Basic/raw facts about something which is not organized, for example details of some students which is not organized.

Data Item:
Each piece of information about an entity, such as name of a person or address, age or name of a product or the price is a Data Item.

Database:
A well organised collection of data that ensures safety, security and integrity of data.

DataBase Management System(DBMS)
Comprehensive software that provides the essential services to create, manage and maintain the databases. In short a DBMS provides the means to store the data in the database, to edit or delete the data stored, to search and analyze the data in the database. They also provide various safety and security mechanisms that ensures that in any case stored data will be safe and accessible.

Relational DataBase Management System(RDBMS) :
A Database Management System that conforms at-least half of the 12 rules defined by Dr. E.F. Codd (1970) in his research document. In a relational data model, the data is organized into tables (i.e. Rows and Columns). These tables are called Relations. A row in a table represents a relationship among a set of values. Since table is a collection of relationships it is generally referred to using the mathematical term Relation.

Database Systems:
Systems comprising of Databases and Database Management Systems are simply referred as database systems.

Advantages of Data Base System:
1) Reduce data redundancy (duplication of data)
2) Control data inconsistency to a large extent
3) Database facilitate sharing of data
4) Enforce standards
5) Centralized databases can ensure data security

Examples of Common Database Management Systems:
MySQL ,INGRES, POSTGRES, ORACLE, DB2.

Levels of Database Implementation:

1. **Internal Level (Physical Level) :**
   It describes how the data are actually stored on the storage media.
2. **Conceptual Level :**
   It describes what data are actually stored in the database. It also describes the relationships existing among data.
3. **External Level (View Level) :**
   It is closest to the users and is concerned with the way in which the data are viewed by individual users
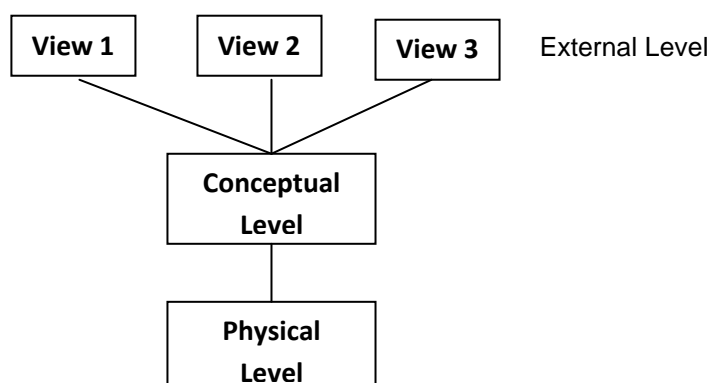
Data Independence: The ability to modify a scheme definition in one level without affecting a scheme definition in the next higher level.

Two Level of Data Independence:

1. **Physical Data Independence:** It refers to the ability to modify the scheme followed at the physical level without affecting the scheme followed at the conceptual level.
2. **Logical data Independence** It refers to the ability to modify the scheme followed at the conceptual level without affecting the scheme followed at the External level.

Data Model:

A way by which data structures and their relationships are analyzed.

Different Data Models :

1. Relational data model
2. Network data model
3. Hierarchical data model

Relational data model:

In this model data is organized into tabular structures called relations. A database may contain

many relations providing a better classification of data based on its nature and use. Multiple

relations are then linked/ associated together on some common key data values (foreign key).

Network Data Model :

In this model data is represented by collections of records and relationships among data are represented by links. A record is collection of fields i.e. attributes, each of which contents only one data value.

Hierarchical data model :

In this model records are organized as trees, data is represented by collection of records connected to one another through links.

Basics of Relational Model
Relation :

A tabular structure containing data. To be a relation is must satisfy following four conditions:
- Atomicity : At every row-column intersection (Cell) there must be an atomic value i.e. a value that can not be further subdivided.
- No duplicity: No two rows of relation will be identical i.e. in any two rows value in at least one column must be different.
- Ordering of rows is immaterial.
- Ordering of columns is immaterial.

Tuple :

A row in a relation is called a tuple

Attribute :

A column in a relation is called an attribute

Domain :

Domain of an attribute refers to the set of all the possible values for that attribute.

Degree :

Number of attributes in a relation is the degree of that relation

Cardinality :

Number of tuples in a relation is the cardinality of that relation.

Candidate Key:

A set of one or more minimal attributes used to uniquely identify a tuple in the relation

and which can act as Primary Key. A relation can have multiple candidate keys

Primary Key:

A candidate key that is primarily chosen for unique identification of tuples in a Relation.

Any subset of Primary key should not be Primary key.

Alternate Key:
Candidate keys that not chosen as primary key are the alternate keys.

Example:
In A LIBRARY Table
Candidate keys can be Accession no, Book no,
Primary key: If we select Book no as **primary key** for our purpose then
Alternate Key will be Accession No.

Views : A view is a virtual table whose contents are taking from other tables depending upon a condition.

Table: Student

Roll No.	Name	Marks
101	Anu	85
102	Riya	70
103	Ankit	78

Definition of the VIEW :   **CREATE VIEW toppers AS**

SELECT * FROM Student

WHERE Marks > 75 ;

Here name of the view is toppers

Base table is students

toppers(A virtual table based on Student table)

Roll No.	Name	Marks
101	Anu	85
103	Ankit	78