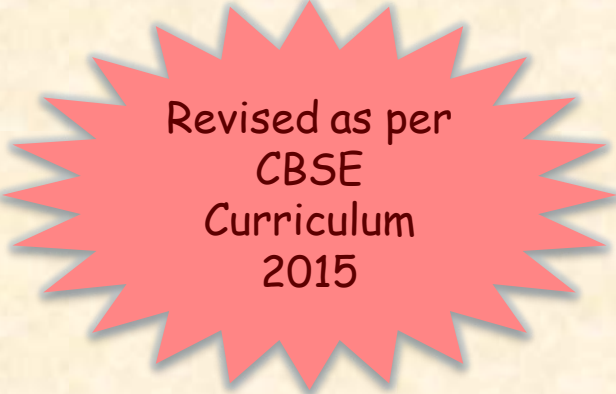


Chapter 8:

Introduction to Database Management System(DBMS)

Informatics Practices

Class XI (CBSE Board)



Revised as per
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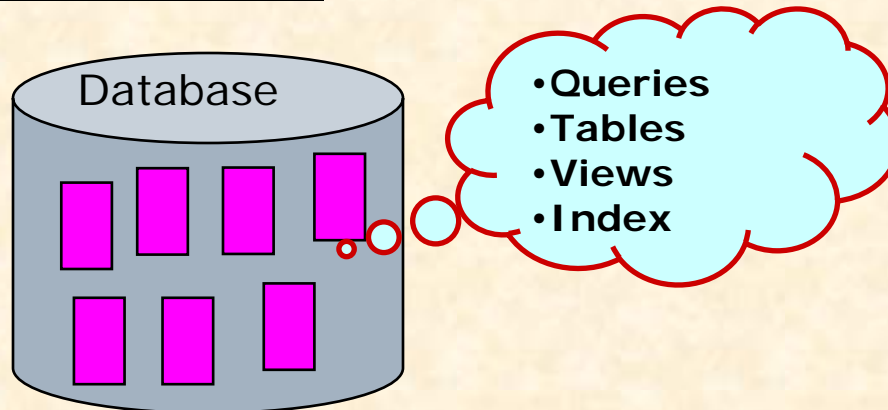
Objective

In this presentation you will learn about the fundamental concepts of Database and Database Management Systems.

- ❑ Concept of Database
 - ❑ Advantages of Database
 - ❑ Concept of Data Model
 - ❑ Basics of Relational Data Model
 - ❑ Concept of Keys
 - ❑ Types of key - Primary Key, Candidate Key and Alternate key
-

What is the Database?

- ❑ Data is raw facts and figures which does not convey any meaning or idea because it is not organized.
- ❑ A database is a well organized collection of inter-related that ensures safety, security and integrity of data. It works like a container which contains the various object like Tables, Queries, Reports etc. in organized way.
- ❑ Most of the databases stores data in the form of Relations (also called Tables). Such Database are known as Relational Database.



What is the Database Management System (DBMS)?

- ❑ A DBMS refers to a software that is responsible for storing, maintaining and utilizing database in an efficient way.
 - ❑ A Database along with DBMS software is called Database System.
 - ❑ Example of DBMS software are **Oracle**, **MS SQL Server**, **MS Access**, **Paradox**, **DB2** and **MySQL** etc.
 - ❑ MySQL is open source and freeware DBMS.
-

Why Database System is used? (Advantages)

❑ Databases reduces **Redundancy**

It removes duplication of data because data are kept at one place and all the application refers to the centrally maintained database.

❑ Database controls **Inconsistency**

When two copies of the same data do not agree to each other, then it is called Inconsistency. By controlling redundancy, the inconsistency is also controlled.

❑ Database facilitate **Sharing of Data**

Data stored in the database can be shared among several users.

❑ Database ensures **Security**

Data are protected against accidental or intentional disclosure to unauthorized person or unauthorized modification.

❑ Database maintains **Integrity**

It enforces certain integrity rules to insure the validity or correctness of data. For ex. A date can't be like 25/25/2000.

Data Model- Way of data organisation

Data model is a model or presentation which shows **How data is organized ?** or stored in the database. A data is modeled by one of the following given-

❑ **Relational Data Model**

In this model data is organized into **Relations** or **Tables** (i.e. Rows and Columns). A row in a table represents a relationship of data to each other and also called a **Tuple** or **Record**. A column is called **Attribute** or **Field**.

❑ **Network Data Model**

In this model, data is represented by collection of records and relationship among data is shown by **Links**.

❑ **Hierarchical Data Model**

In this model, Records are organized as **Trees**. Records at top level is called Root record and this may contains multiple directly linked children records.

❑ **Object Oriented Data Model**

In this model, records are represented as a objects. The collection of similar types of object is called class.

Representation of Data Models

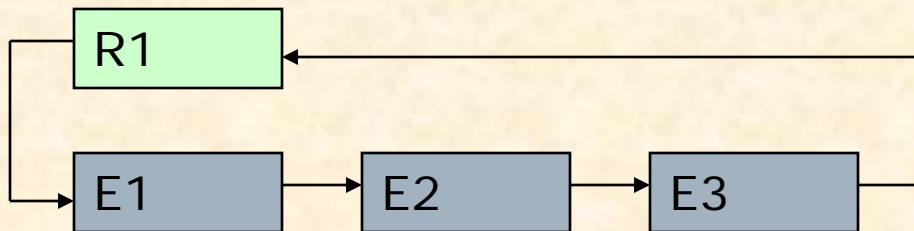
Attribute (Field)

Table (Relation)

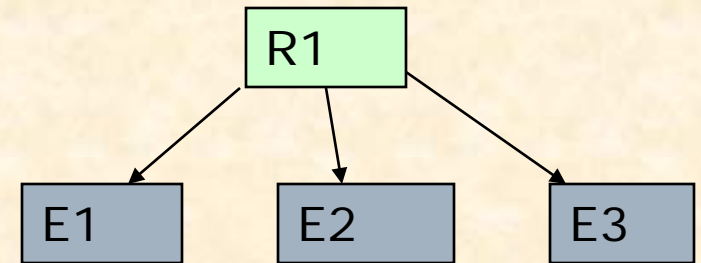
Name	Address	DOB	City	Phone
Amar	2/3 Chowk	01.04.1990	Kanpur	12345
Kailash	22 Katra	23.10.1992	Lucknow	67890

Entity (Record)

Relational Model



Network Model



Hierarchical Model

Representation of Records and Relationship in various Data Model

Basics of the Relational Data Model

Relational Databases stores data or information in tables. A table or Relation is a two dimensional representation of data using rows and columns.

Relational Model was developed by E.F.Codd of the IBM and used widely in the most of the DBMS. The following key-terms are used in the Relational Model-

□ **Relation (Table)**

A Relation or Table is Matrix like structure arranged in Rows and Columns. It has the following properties-

- ❖ **Atomicity** : Each column assigned a unique name and must have atomic (indivisible) 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.
- ❖ All items in a column are homogeneous i.e. same data type.
- ❖ Ordering of rows and column is immaterial.

□ **Domain :**

It is collection of values from which the value is derived for a column.

- **Tuple / Entity / Record** - Rows of a table is called Tuple or Record.
 - **Attribute/ Field**- Column of a table is called Attribute or Field.
 - **Degree** - Number of columns (attributes) in a table.
 - **Cardinality** - Number of rows (Records) in a table.
-

Concept of Keys

As discussed earlier, In a Relation each record must be unique i.e. no two identical records are allowed in the Database.

A **key attribute identifies the record** and must have unique value.

□ Primary Key

A primary key is a column in a table that is unique for each record. Every table in a database should have a column or a group of columns designated as the primary key. The value this key holds should be unique for each record in the table.

Some common examples of Primary key are:

Admission Number in student table of School,

Accession Number of a Book in the Book table,

Employee ID of an employee in the Employee Table,

Item Code of an item in the Stock table etc.

A set of one or more attribute (column) that can identify a record uniquely in the relation is called Primary Key.

Concept of Keys

□ Candidate Key

Some time a table may have more than one column that uniquely identifies a record in a table. All such columns are called Candidate Keys because they all are having candidature to work as key.

A Candidate key also uniquely identifies a record. A Primary Key is one of the candidate keys. A table may have more than one candidate keys but definitely has one and only one primary key.

□ Alternate Key

All candidate keys that not chosen as primary key are called alternate keys. A Candidate Key that is not a Primary key is called Alternate key.

□ Foreign Key

A non-key attribute whose values are derived from the primary key of some other table is called Foreign key. Foreign Key is used to implement Referential Integrity in the Database. It establishes relationship among two tables.

Concept of Keys- Example

Consider the following Student Table. The RollNo and Admission_no both may be used to uniquely identify each record in the Table, so both are candidate keys.

So, Candidate Keys are - RollNo and Admission_no

Primary Key - Admission_No and

Alternate Key – RollNo or vice-versa.

Admission_No	RollNo	Name	Class	Marks
2301	1	Seema Chauhan	11	23
1501	2	Ajay Kumar	11	15
1678	3	Vansh Pratap	11	20
7003	4	Manohar Lal	11	15