Termwise syllabus 2021-22

Chapter 10
Database Concepts

Informatics Practices

Class XI (As per CBSE Board)

DATABASE CONCEPTS

A **database** is a collection of **DATA/INFORMATION that is organized so that it can be easily accessed, managed and updated.**

In **Database** **,Data is organized into rows, columns and tables, and it is indexed to make it easier to find relevant information. It works like a container which contains the various object like Tables, Queries, Reports etc. in organized way.**

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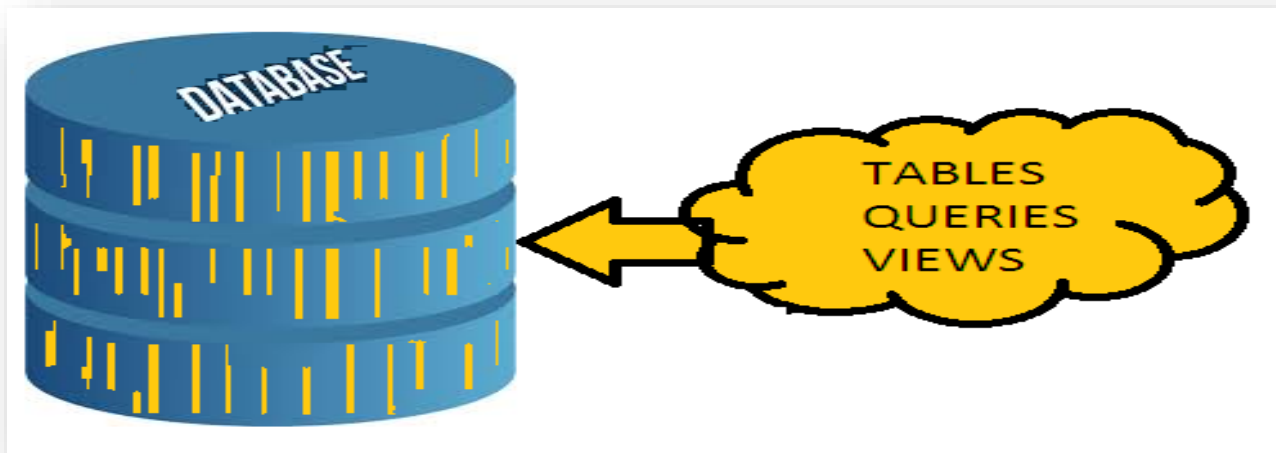
DATABASE CONCEPTS

WHY DO WE NEED DATABASE

- **To manage large chunks of data**: if size of data increases into thousands of records, it will simply create a problem to manage.Database can manage large amount of data.

- **Accuracy**: Through validation rule in database ,data accuracy can be maintained.

- **Ease of updating data**: With the database, we can flexibly update the data according to our convenience. Moreover, multiple people can also edit data at same time.

- **Security of data**: With databases we have security groups and privileges to restrict access.

- **Data integrity**: In databases, we can be assured of accuracy and consistency of data due to the built in integrity checks and access controls.

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**.

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DATABASE CONCEPTS

Advantages of Database System

⬛ **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 31/31/2000.

Data Model- Way of data representation

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.
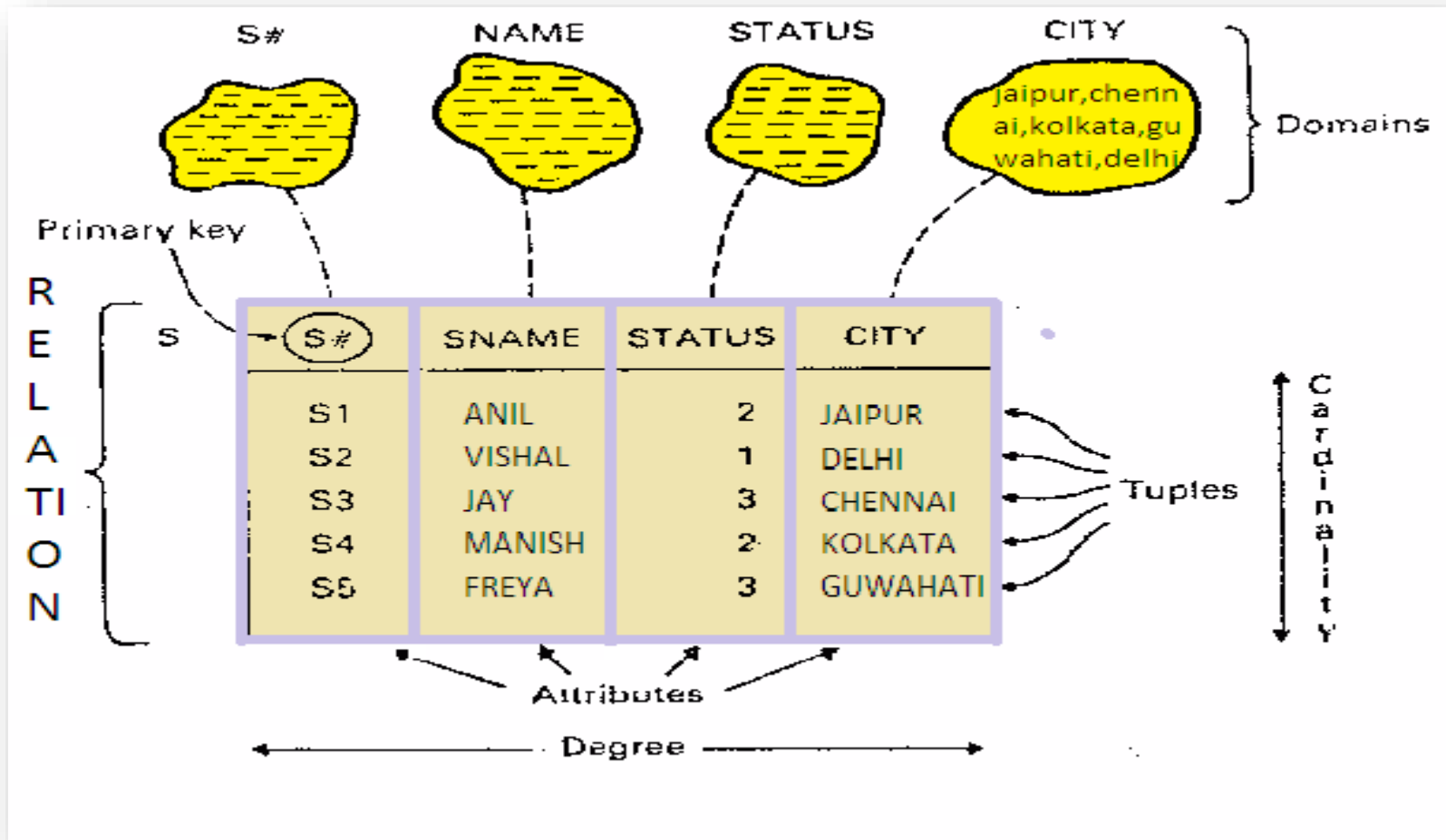
DATABASE CONCEPTS

RELATIONAL DATABASE

A **relational database** is a collective set of multiple data sets organized by tables, records and columns. Relational database establish a well-defined relationship between database tables. Tables communicate and share information, which facilitates data searcheability, organization and reporting.

A **Relational database** use Structured Query Language (SQL), which is a standard user application that provides an easy programming interface for database interaction.

RELATIONAL DATABASE TERMS

RELATIONAL DATABASE TERMS

❖ **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.**

KEYS IN A DATABASE

Key plays an important role in relational database; it is used for identifying unique rows from table & establishes relationship among tables on need.

Types of keys in DBMS

Primary Key – A primary is a column or set of columns in a table that uniquely identifies tuples (rows) in that table.

Candidate Key –It is an attribute or a set of attributes or keys participating for Primary Key, to uniquely identify each record in that table.

Alternate Key – Out of all candidate keys, only one gets selected as primary key, remaining keys are known as alternate or secondary keys.

Foreign Key – Foreign keys are the columns of a table that points to the primary key of another table. They act as a cross-reference between tables.

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KEYS IN A DATABASE