Chapter 12 :

Informatics Practices

Class XI (As per CBSE Board)

New Syllabus 2019-20

Relational Database Concepts

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.
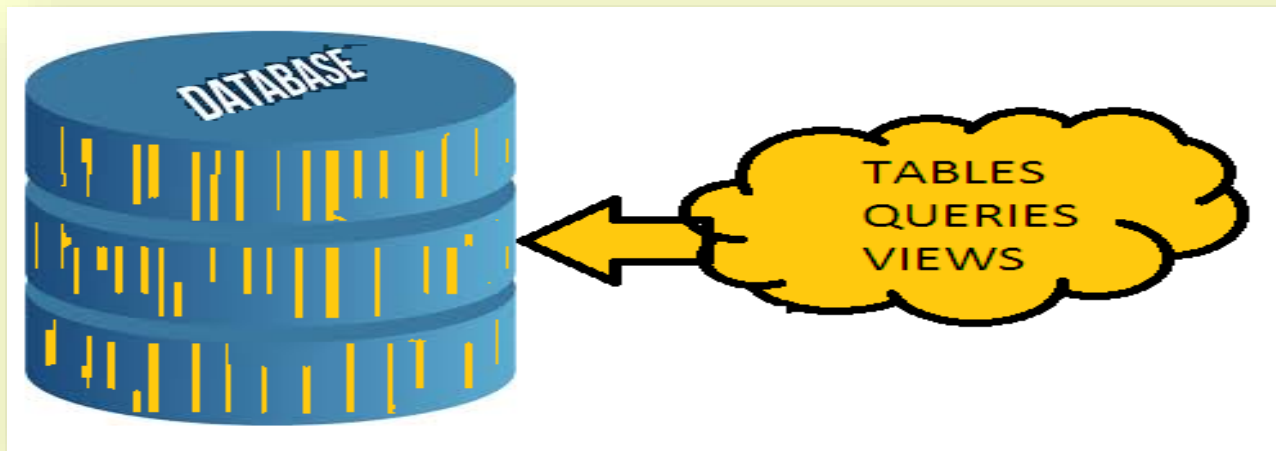
WHY DO WE NEED DATABASE

❑ **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.

DBMS

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**.

DBMS

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.

DBMS

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.

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
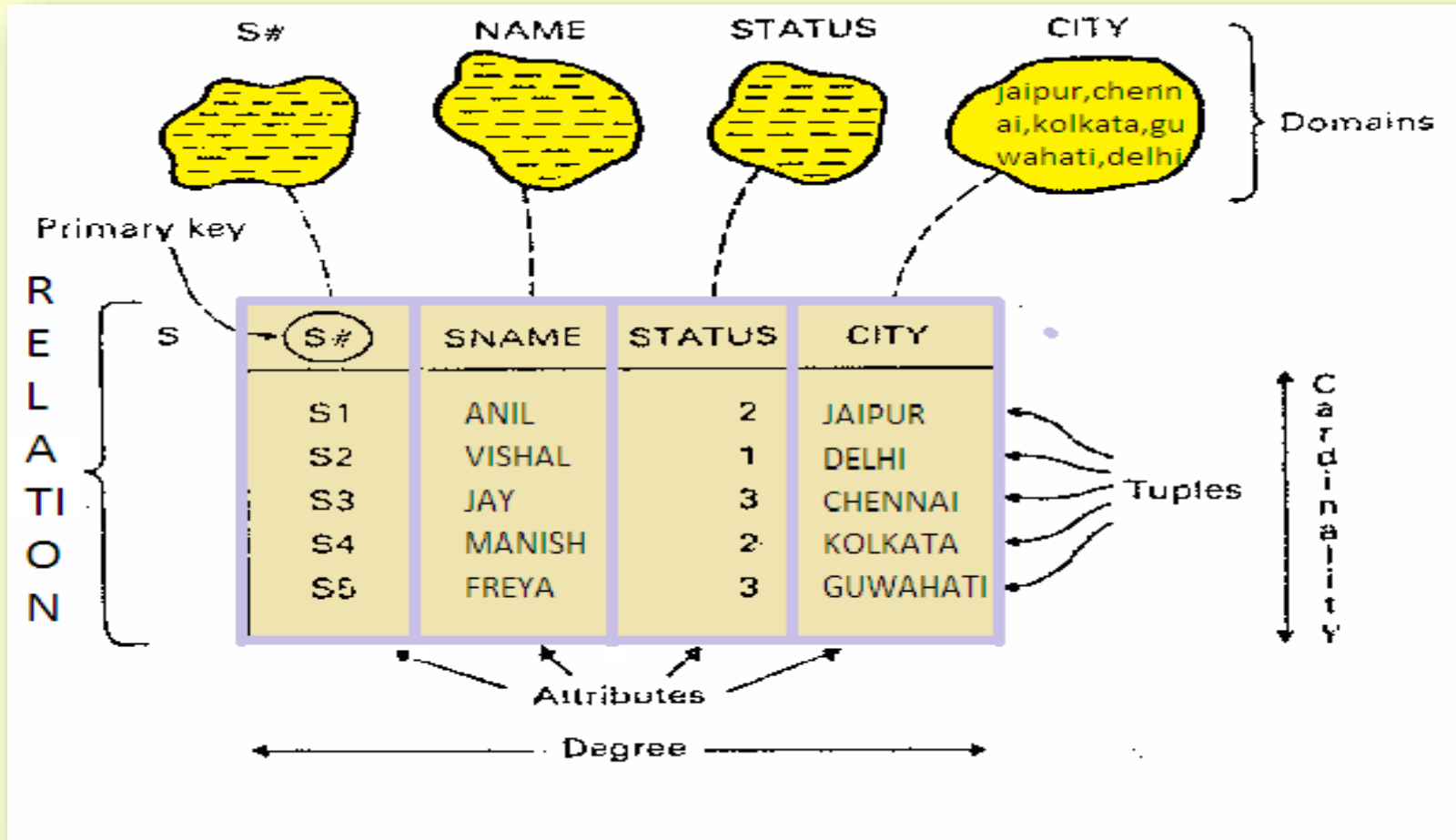
RELATIONAL DATABASE TERMS

❖ **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.

KEYS IN A DATABASE