

Chapter 10  
Database  
Concepts

Computer Science

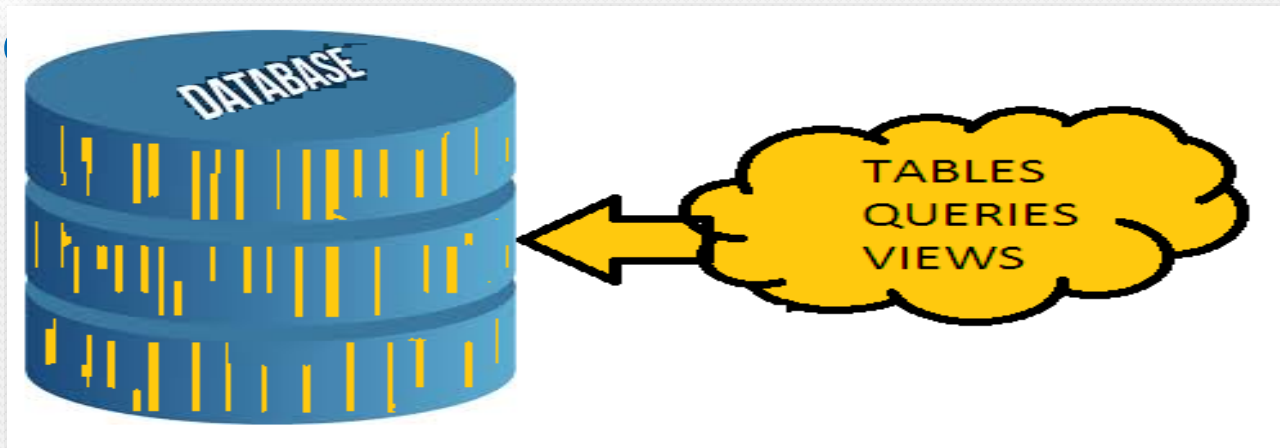
Class XII ( As per  
CBSE Board)

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# 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



## 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.

# 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.



# DATABASE CONCEPTS

## 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

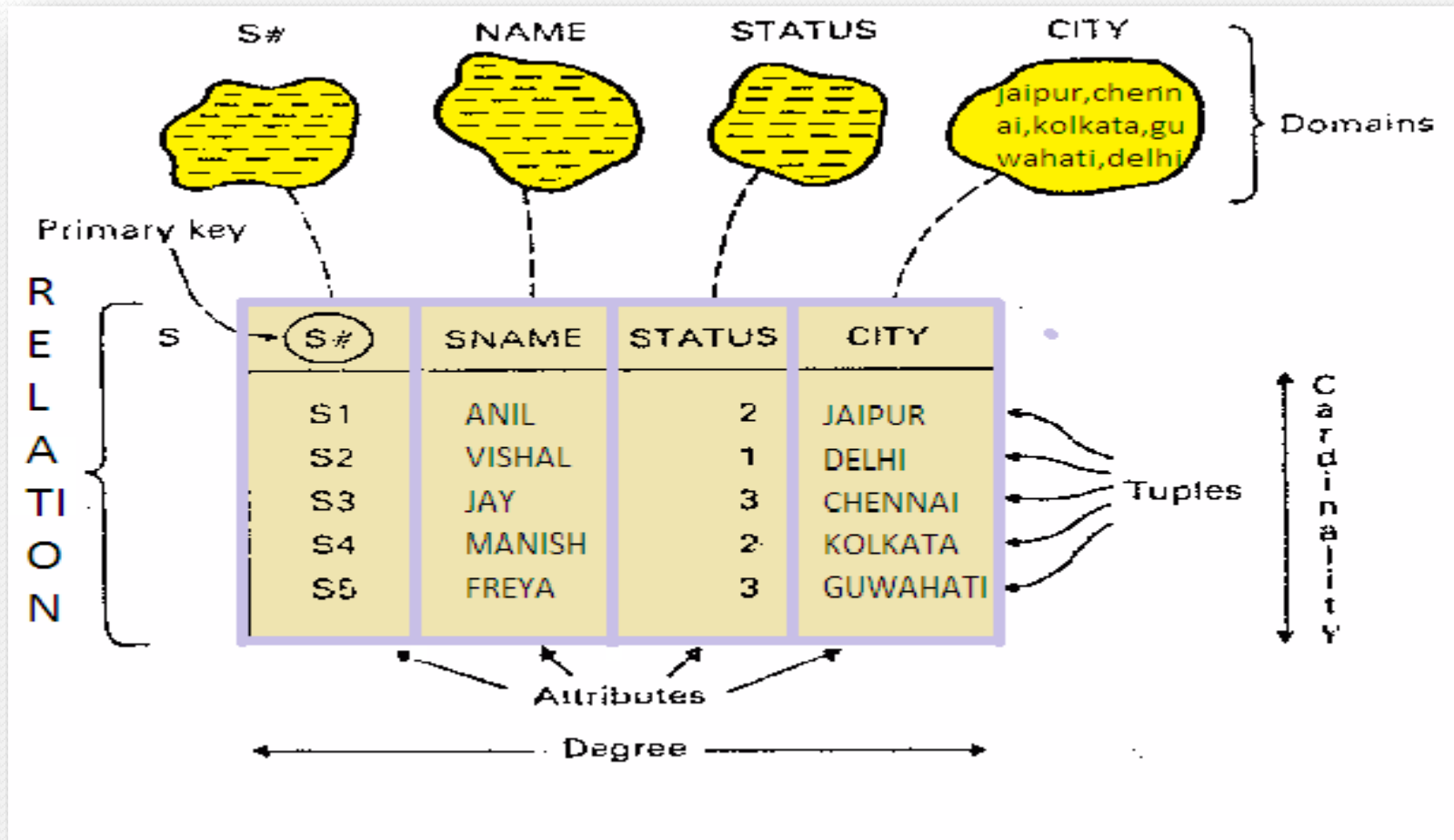
## RELATIONAL DATABASE

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 searchability, 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.

# DATABASE CONCEPTS

## RELATIONAL DATABASE TERMS





# DATABASE CONCEPTS

## 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 duplication**: 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.

# DATABASE CONCEPTS

## 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.

# DATABASE CONCEPTS

## KEYS IN A DATABASE

