# DATABASE CONCEPTS

# Database
# or
# DBMS ( Database Mangement system)

- It is a collection of multiple tables.
  - OR
- collection of logically related data.
  - OR
- It is computerized record keeping information system.

❖ Examples of DBMS software are

❖ Dbase, Foxpro, Oracle, MS SQL Server, MS Access, Paradox, DB2, FileMaker and MySQL etc.

# DATABASE

is a collection of organized DATA/INFORMATION

Data is organized into rows, columns i.e. in the tables form

It works like a container which contains the various object like Tables, Queries, Reports

# Different types of Databases

- RDBMS-(Relational Database management system). e.g. MS Access, MySQL, Microsoft SQL Server, IBM DB2
- ORDBMS-Object Relational Database management system. e.g. Oracle

# WHY DO WE NEED DATABASE?
# OR
# ADVANTAGES OF DATABASE

- reduces Redundancy (duplication)
- facilitate Sharing of Data
- Provides Security
- maintains Integrity ( rules /condition)

# RELATIONAL DATABASE

It is a collective set of multiple data sets organized by tables, records and columns

It establishes a well-defined relationship between database tables

It uses Structured Query Language (SQL),

**SQL- is a standard user application that provides an easy programming interface for database interaction.**

# RELATIONAL DATABASE TERMS

**Relation**

**Domain**

**Tuple/Record**

**Attribute/field/column**

**Degree**

**Cardinality**

**Relation** - Relation is a collection of rows and columns . It is also called Table.

**Relation : Student**

| Rollno | Admno | Name | Stream | Phone |
|---|---|---|---|---|
| 1 | 12/345 | Teena | Science | 234567879 |
| 2 | 14/564 | Sheena | Commerce | 344553322 |
| 3 | 10/345 | Heena | Science | 23455632 |
| 4 | 11/456 | Meena | Science | 345522356 |
| 5 | 13/432 | Leena | Humanities | 456720980 |
| 6 | 3/567 | Reena | Commerce | 456322578 |

## Attribute/field/column

A column in a relation is called an attribute. It is also termed as field or column.

**Relation : Student**

| Rollno | Admno | Name | Stream | Phone |
|---|---|---|---|---|
| 1 | 12/345 | Teena | Science | 234567879 |
| 2 | 14/564 | Sheena | Commerce | 344553322 |
| 3 | 10/345 | Heena | Science | 23455632 |
| 4 | 11/456 | Meena | Science | 345522356 |
| 5 | 13/432 | Leena | Humanities | 456720980 |
| 6 | 3/567 | Reena | Commerce | 456322578 |

# Degree

No of columns/attributes in a relation

**Degree is 5**

| Relation : Student | | | | |
|---|---|---|---|---|
| Rollno | Admno | Name | Stream | Phone |
| 1 | 12/345 | Teena | Science | 234567879 |
| 2 | 14/564 | Sheena | Commerce | 344553322 |
| 3 | 10/345 | Heena | Science | 23455632 |
| 4 | 11/456 | Meena | Science | 345522356 |
| 5 | 13/432 | Leena | Humanities | 45672098o |
| 6 | 3/567 | Reena | Commerce | 456322578 |

# Tuple/Record

- A row in a relation is called a tuple.

OR

– Collection of fields in a relation

**Relation : Student**

| Rollno | Admno | Name | Stream | Phone |
|---|---|---|---|---|
| 1 | 12/345 | Teena | Science | 234567879 |
| 2 | 14/564 | Sheena | Commerce | 344553322 |
| 3 | 10/345 | Heena | Science | 23455632 |
| 4 | 11/456 | Meena | Science | 345522356 |
| 5 | 13/432 | Leena | Humanities | 456720980 |
| 6 | 3/567 | Reena | Commerce | 456322578 |

# Cardinality

- No of rows/record/tuples in a relation

Cardinality is 6

**Relation : Student**

| Rollno | Admno | Name | Stream | Phone |
|---|---|---|---|---|
| 1 | 12/345 | Teena | Science | 234567879 |
| 2 | 14/564 | Sheena | Commerce | 344553322 |
| 3 | 10/345 | Heena | Science | 23455632 |
| 4 | 11/456 | Meena | Science | 345522356 |
| 5 | 13/432 | Leena | Humanities | 456720980 |
| 6 | 3/567 | Reena | Commerce | 456322578 |

# Domain

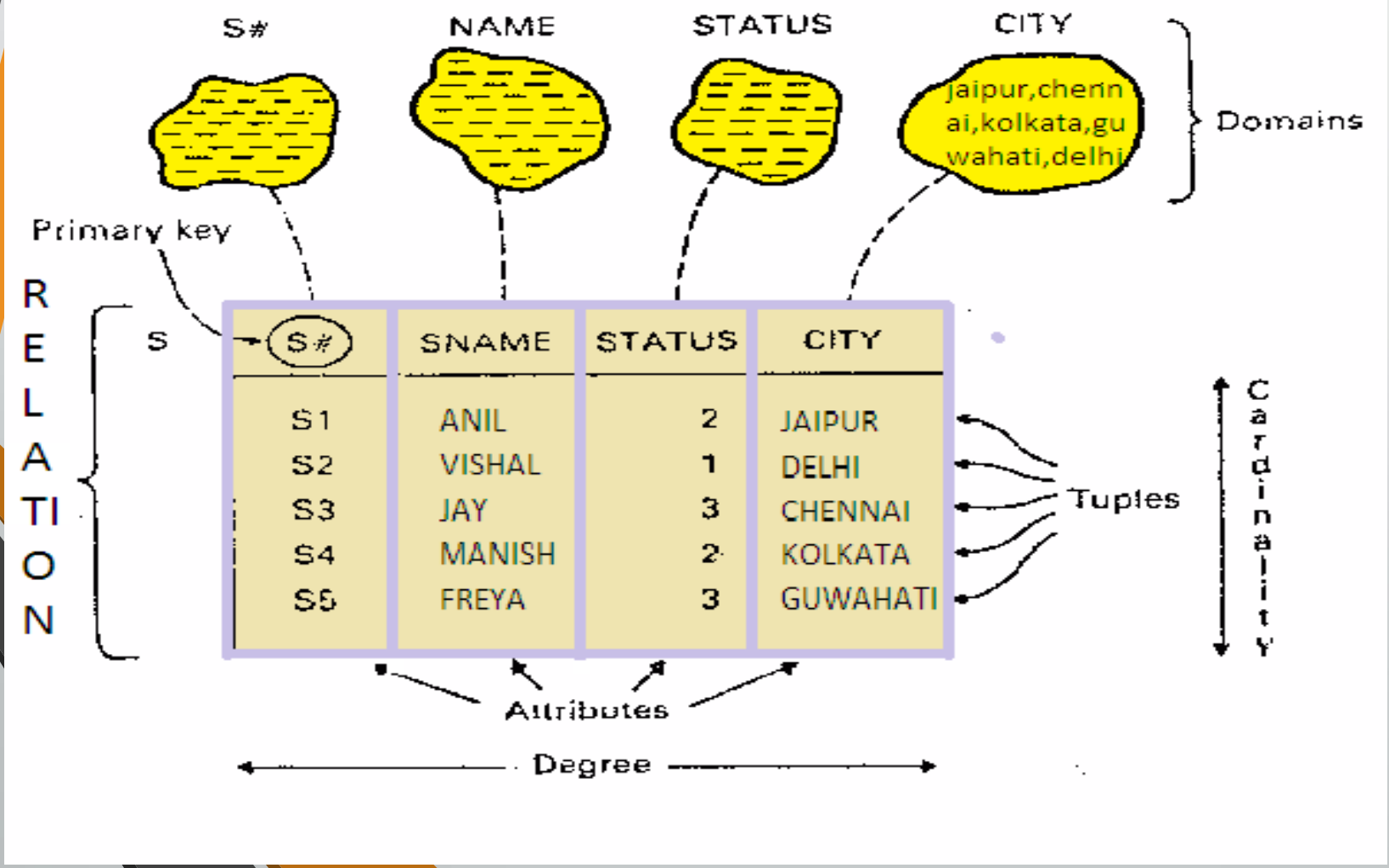
It is pool of values from which the value is derived for a column.

**Relation : Student**

| Rollno | Admno | Name | Stream | Phone |
|---|---|---|---|---|
| 1 | 12/345 | Teena | Science | 234567879 |
| 2 | 14/564 | Sheena | Commerce | 344553322 |
| 3 | 10/345 | Heena | Science | 23455632 |
| 4 | 11/456 | Meena | Science | 345522356 |
| 5 | 13/432 | Leena | Humanities | 456720980 |
| 6 | 3/567 | Reena | Commerce | 456322578 |

Science
Commerce
Humanities

# RELATIONAL DATABASE TERMS



# KEYS IN A DATABASE

**it is used for  identifying unique rows from table & establishes relationship among tables on need.**

# KEYS IN A DATABASE

Candidate Key

Primary Key

Alternate Key-

Foreign Key

## Candidate Key -

1. It is any column or set of columns that can uniquely identify a row in a tabe.
2. **A table can have multiple candidate keys**

Rollno & admno both are candidate keys

**Relation : Student**

| Rollno | Admno | Name | Stream | Phone |
|---|---|---|---|---|
| 1 | 12/345 | Teena | Science | 234567879 |
| 2 | 14/564 | Sheena | Commerce | 344553322 |
| 3 | 10/345 | Heena | Science | 23455632 |
| 4 | 11/456 | Meena | Science | 345522356 |
| 5 | 13/432 | Leena | Humanities | 456720980 |
| 6 | 3/567 | Reena | Commerce | 456322578 |

# Primary Key

1. **Primary key is a candidate key that is selected to be the main identifier for the table. It also uniquely identifies the records/tuples in a relation.**

2. **This key can never be duplicated and NULL.**

3. **A table can have only one primary key**

**Relation : Student**

| Rollno | Admno | Name | Stream | Phone |
|---|---|---|---|---|
| 1 | 12/345 | Teena | Science | 234567879 |
| 2 | 14/564 | Sheena | Commerce | 344553322 |
| 3 | 10/345 | Heena | Science | 23455632 |
| 4 | 11/456 | Meena | Science | 345522356 |
| 5 | 13/432 | Leena | Humanities | 456720980 |
| 6 | 3/567 | Reena | Commerce | 456322578 |

Rollno can be primary key

## Difference Between Candidate key & Primary Key

1. Both candidate key and primary keys guarantee uniqueness of records.
2. **A primary key is chosen from the available candidate keys**
3. **A table can have multiple candidate keys but only one primary key.**

## Alternate Key-

1. Alternate keys are candidate keys that are not chosen as the primary key.

**2. A table can have multiple alternate keys**

admno can be alternate key

**Relation : Student**

| Rollno | Admno | Name | Stream | Phone |
|---|---|---|---|---|
| 1 | 12/345 | Teena | Science | 234567879 |
| 2 | 14/564 | Sheena | Commerce | 344553322 |
| 3 | 10/345 | Heena | Science | 23455632 |
| 4 | 11/456 | Meena | Science | 345522356 |
| 5 | 13/432 | Leena | Humanities | 456720980 |
| 6 | 3/567 | Reena | Commerce | 456322578 |

**In Brief:**

**Candidate Keys: are those columns that uniquely identifies records in a table**

**Primary key- is the chosen candidate key for uniquely identifying rows**

**Alternate keys- are the remaining candidate keys that are not the primary key**

## Foreign Key-

Foreign Key is a key that is defined as a primary key in some other relation.

**Relation : Student**

| Rollno | Admno | Name | Stream | Phone | Tno |
|---|---|---|---|---|---|
| 1 | 12/345 | Teena | Science | 234567879 | T1 |
| 2 | 14/564 | Sheena | Commerce | 344553322 | T1 |
| 3 | 10/345 | Heena | Science | 23455632 | T2 |
| 4 | 11/456 | Meena | Science | 345522356 | T2 |
| 5 | 13/432 | Leena | Humanities | 456720980 | T3 |
| 6 | 3/567 | Reena | Commerce | 456322578 | T2 |

**Relation : Test**

| Tno | Tname | dateofexam |
|---|---|---|
| T1 | UT1 | 2/4/2020 |
| T2 | HY | 3/9/2020 |
| T3 | UT2 | 5/11/2020 |
| T4 | Annual | 9/1/2021 |

FOREIGN KEY

Observe the following table and answer the question

**TABLE: VISITOR**

| VisitorID | VisitorName | ContactNumber |
|---|---|---|
| V001 | ANAND | 9898989898 |
| V002 | AMIT | 9797979797 |
| V003 | SHYAM | 9696969696 |
| V004 | MOHAN | 9595959595 |

1. **Write the name of most appropriate columns which can be considered as Candidate keys?**
2. **Out of selected candidate keys, which one will be the best to choose as Primary Key?**
3. **What is the degree and cardinality of the table?**

Modern Public School is maintaining fees records of students. The database administrator Aman decided that-

- Name of the database -School
- Name of the table – Fees

The attributes of Fees are as follows:

- Rollno - numeric
- Name – character of size 20
- Class - character of size 20
- Fees – Numeric
- Qtr – Numeric

(i) Identify the attribute best suitable to be declared as a primary key

(ii) Write the degree of the table.

(iii) Define attribute and cardinality.

**Write SQL Commands for the following queries based on the relations PRODUCT and CLIENT given below.**

- **Table: Product**

| P_ID | ProductName | Manufacturer | Price | ExpiryDate |
|---|---|---|---|---|
| TP01 | Talcum Powder | LAK | 40 | 2011-06-26 |
| FW05 | Face Wash | ABC | 45 | 2010-12-01 |
| BS01 | Bath Soap | ABC | 55 | 2010-09-10 |
| SH06 | Shampoo | XYZ | 120 | 2012-04-09 |
| FW12 | Face Wash | XYZ | 95 | 2010-08-15 |

- **Table: Client**

| C_ID | ClientName | City | P_ID |
|---|---|---|---|
| 1 | Cosmetic Shop | Delhi | FW05 |
| 6 | Total Health | Mumbai | BS01 |
| 12 | Live Life | Delhi | SH06 |
| 15 | Pretty One | Delhi | FW05 |

**(i) Identify the attribute best suitable to be declared as a primary key from the product table**

**(ii) Identify the foreign key and primary key from the table client**

**(ii) Write the degree and cardinality of the table product.**