SNS COLLEGE OF TECHNOLOGY

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Department of MCA

DBMS - Relational Model

Course Name : 23CAT603 - DATA BASE MANAGEMENT SYSTEM

Class : I Year / I Semester

Unit II – Relational Model

Relational Model

- **History of Relational Model**
- **Terminologies**

History of Relational model

- The relational Model was proposed by **E.F. Codd to model (in 1970)**
- Uses concept of mathematical relation
- First commercial implementations of the relational model oracle DBMS, (SQL/DS) Sytem (IBM)

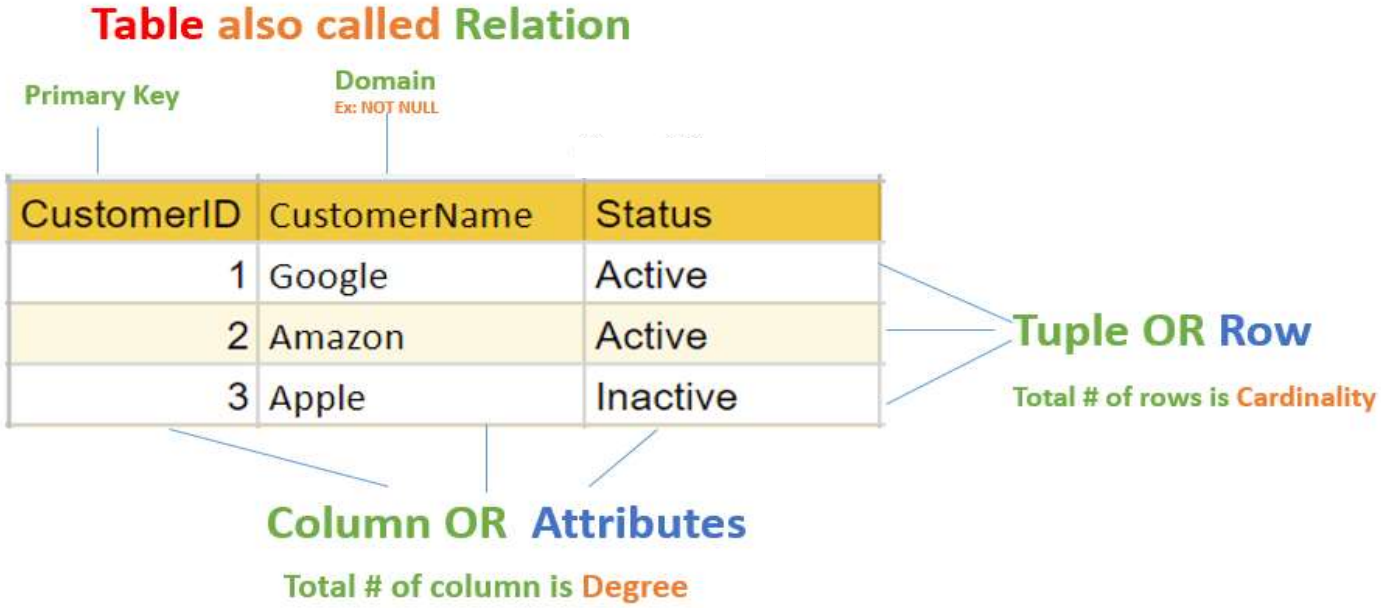
- Some popular Relational Database management systems are:

- **DB2 and Informix Dynamic Server** – IBM
- **Oracle and RDB** – Oracle
- **SQL Server and Access** – Microsoft

- Standard for commercial RDBMS ---> SQL Query Language

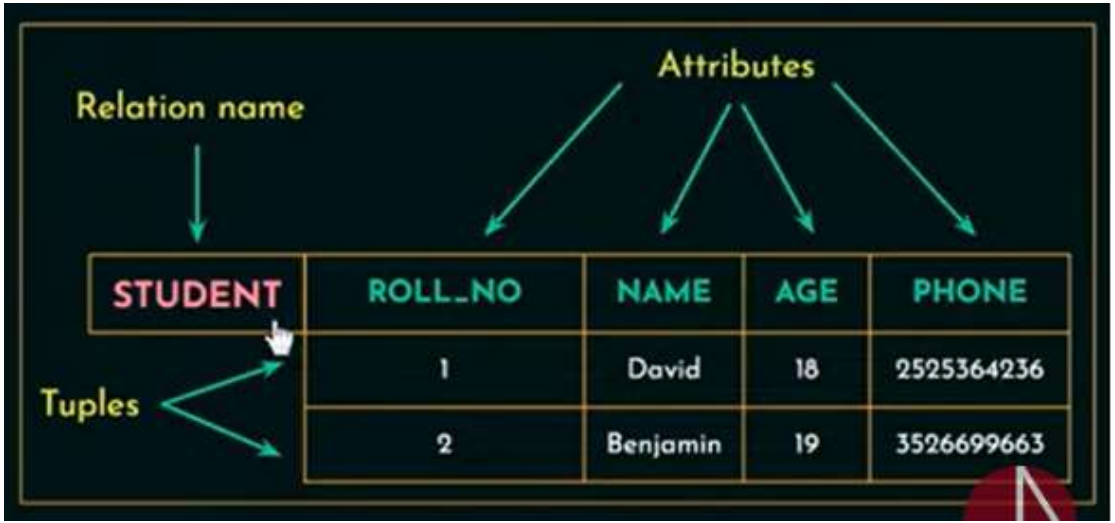
Relational Model

- Relational model can represent as a table with columns and rows. Each **row** is known as a **tuple**. Each table of the **column** has a name or **attribute.**



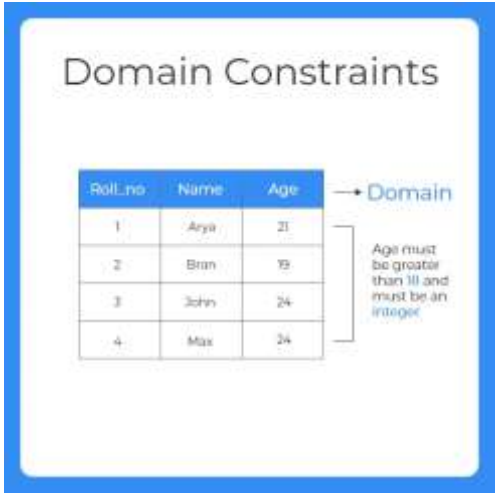
Relational Model

- Relational Model represents data as a collection of tables.
- A table is also called a relation.
- Each Row ---> Tuple
- Column Headers ---> Attributes



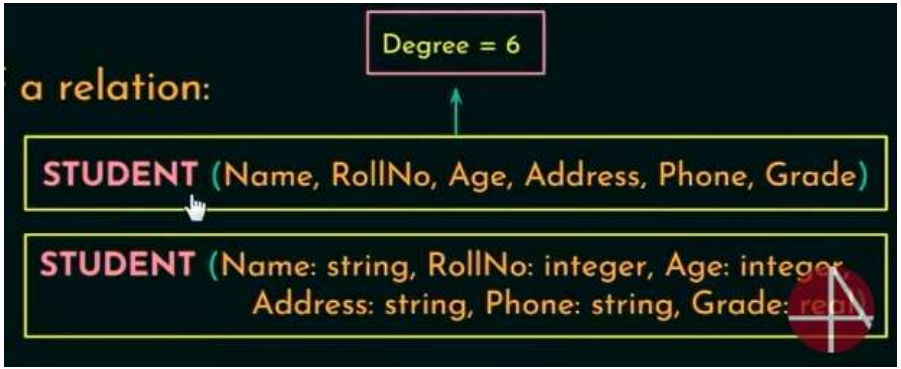
Relational Model

- **Domain**
- A set of atomic values allowed for an attribute.
- **Ex 1. Name :** String of characters that represent name of person
- **Ex 2. Employess_ages :** Possible ages of employees of a company (Values between 20 and 70 years old)



Relational Model

- **Relation Schema:**
  - Describes a relation
  - Made up of a relation name R and a list of attributes A1, A2, A3, ... An.
- **Degree (or arity) of a relation:**
  - Number of attributes in a relation shema



Relational Model

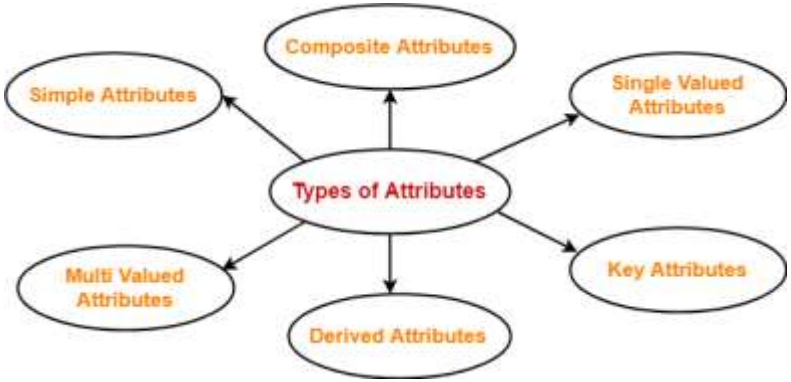
- **Cardinality:**
  - Total number of tuples present in a relation.
- **Relational Database Schema:**
  - Is a set of realtion schemas and a set of integrity constraints.
- **Relation state or (Relation Instance)**
  - Set of Tuples at a given time.

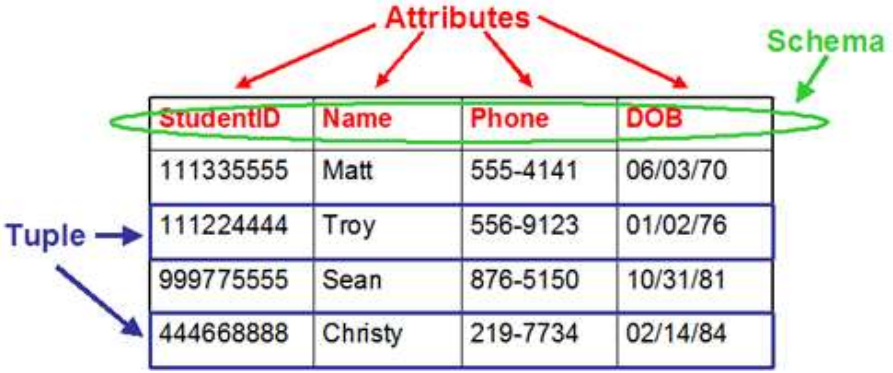
Relational Model

1. Attribute
2. Tables
3. Tuple
4. Relation Schema
5. Degree
6. Cardinality
7. Column
8. Relation instance
9. Relation key
10. Attribute domain

Relational Model

Attribute: It contains the name of a column in a particular table. Each attribute Ai must have a domain, dom(Ai)

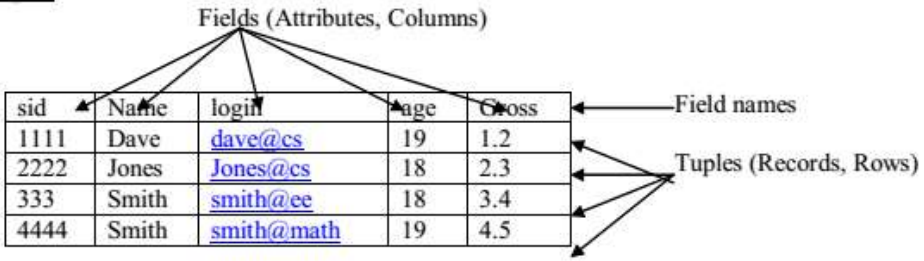




Relational Model

Relational instance: In the relational database system, the relational instance is represented by a finite set of tuples. Relation instances do not have duplicate tuples.

Example:



sid	Name	login	age	Gross
1111	Dave	dave@cs	19	1.2
2222	Jones	Jones@cs	18	2.3
333	Smith	smith@ee	18	3.4
4444	Smith	smith@math	19	4.5

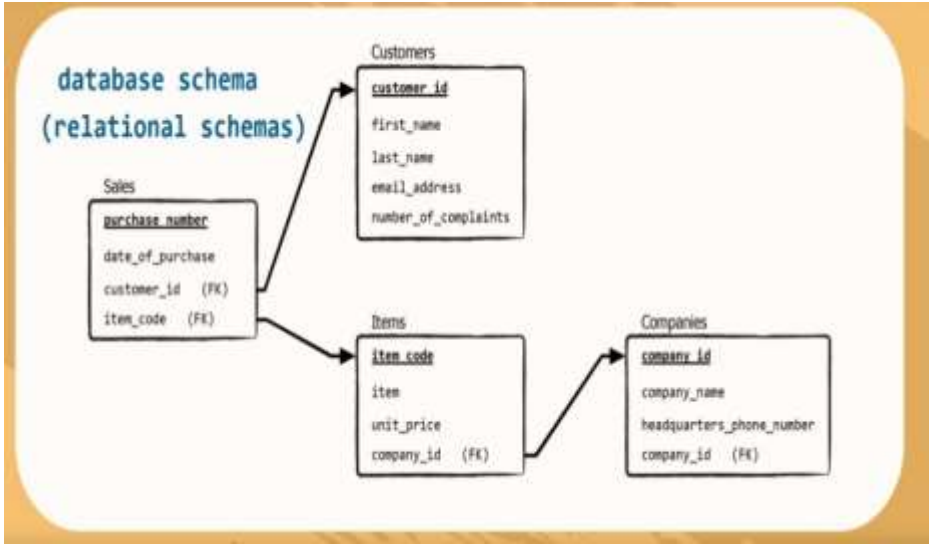
Example Instance of Students Relation

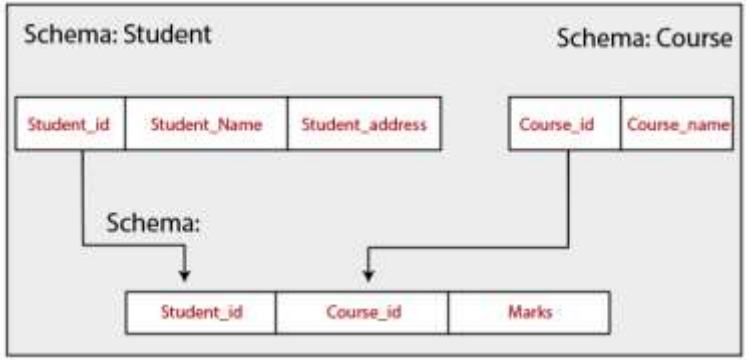
sid	name	login	age	gpa
53666	Jones	jones@cs	18	3.4
53688	Smith	smith@eecs	18	3.2
53650	Smith	smith@math	19	3.8

- Cardinality = 3, arity = 5 , all rows distinct
- Do all values in each column of a relation instance have to be distinct?

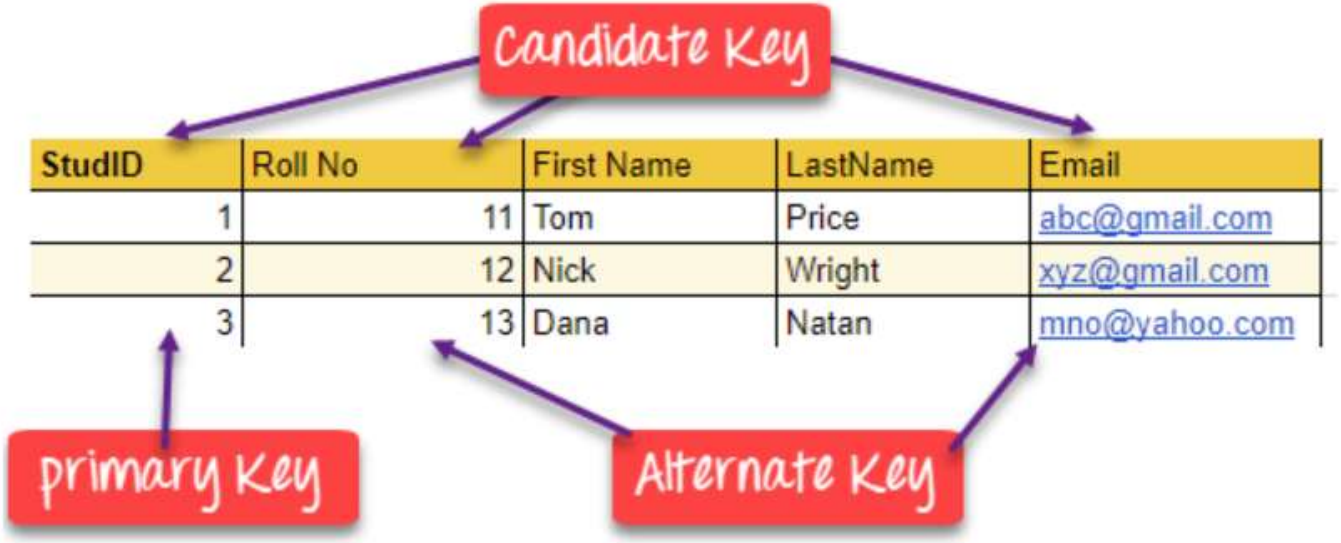
Relational Model

Relational schema: A relational schema contains the name of the relation and name of all columns or attributes.





Relational key: In the relational key, each row has one or more attributes. It can identify the row in the relation uniquely.



Relational Model

- **Attribute:** Each column in a Table. Attributes are the properties which define a relation. e.g., Student_Rollno, NAME,etc.
- **Tables** – In the Relational model the, relations are saved in the table format. It is stored along with its entities. A table has two properties rows and columns. Rows represent records and columns represent attributes.
- **Tuple** – It is nothing but a single row of a table, which contains a single record.
- **Relation Schema:** A relation schema represents the name of the relation with its attributes.
- **Degree:** The total number of attributes which in the relation is called the degree of the relation.
- **Cardinality:** Total number of rows present in the Table.
- **Column:** The column represents the set of values for a specific attribute.
- **Relation instance** – Relation instance is a finite set of tuples in the RDBMS system. Relation instances never have duplicate tuples.
- **Relation key** – Every row has one, two or multiple attributes, which is called relation key.
- **Attribute domain** – Every attribute has some pre-defined value and scope which is known as attribute domain

References

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