

(Relational Model)

3 Relational Model :-

Relational Model represents how data is stored in Relational databases.

- o A relational database stores data in the form of tables.
- o The Relational Model is considered one of the most popular developments in the database because it can be used for representing most of the real world objects and the relationships between them.

(Sample Relation Model)

- o Consider a relation STUDENT with attributes Stu_No, S_Name, Address, Birthdate, Sex.

	Stu_No	S_Name	Address	Birthdate	Sex	Domain (F, M)
Primary key	121	Anita	41, Kandy Av	15-07-1981	F	
Rows, Records or Tuple	122	Atul	58, Lax Rd	23-06-1980	M	
	125	Ram	22, Basant Av.	19-09-1982	F	
	131	Sham	120, St. Av	27-08-1978	M	

Annotations:
- Degree (No. of columns) is indicated by a double-headed arrow below the table.
- Data values are indicated by a double-headed arrow below the table.
- Cardinality is indicated by a vertical double-headed arrow on the right side of the table.

* Relational Model Terminology :-

Relation	Table
Tuple	Row, Record
Attribute	Column, field
Domain	Set of legal values
Cardinality	Number of Rows
Degree	Number of Columns
Primary key	Unique Identifier
Foreign key	Identifier used to reference another table.

- o Relation :- In Relational Database, everything stored in a Relation also known as Tables.
- o Tuple :- A Tuple also known as a Row or Record which represents a collection of information about a single row of the table.
- o Attribute :- An attribute also known as field or column represents the characteristics of an item.
- o Domain :- A domain is a set of values from which the actual values are taken.

for example, In the STUDENT table, the domain of SEX attribute is set of data values (M(male), F(female)).

- CARDINALITY:- The total number or rows or tuples in a table are referred as Cardinality of the table.
- DEGREE:- The total Number of columns or attributes of a table is known as Degree of the table.
- KEYS:- A key is an attribute or collection of attributes that may uniquely identify any particular Tuple (row) with a relation (table).

The different types of keys are:-

- ★ Primary key
- ★ Foreign key
- ★ Candidate key
- ★ Super key
- ★ Alternate key
- ★ Composite key
- ★ Artificial key

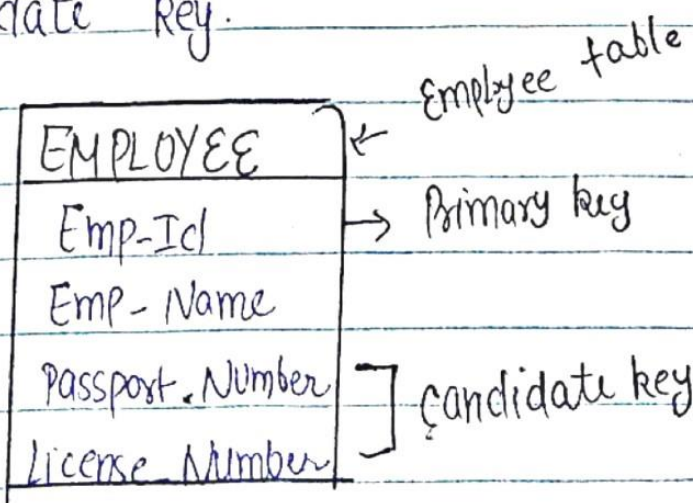
(i) Primary key :- It is set of one or more attributes having unique values within the relation and thus able to uniquely identify that tuple.

Example.

Student Table		
SID	S-NAME	COURSE
1	ABC	BCA
2	ABC0	BCA
3	XYZ	MCA
4	PQR	MBA
5	WXYZ	B.A.

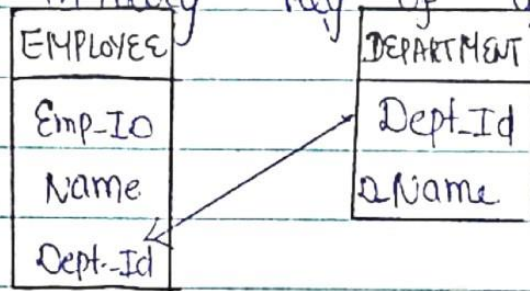
SID → Primary key

(ii) Candidate key :- Except for the Primary key, the remaining attributes are considered a candidate key.



3. Super key :- A Super key is a super set of a candidate key.

4. Foreign key :- Foreign keys are the column of the table used to point to the primary key of another table.



5. Alternate key :- The candidate key other than the primary key is called an alternate key.

6. Composite key :- Whenever a primary key consists of more than one attribute, it is known as candidate key.

7. Artificial key :- Its aim to uniquely identify each record is called Artificial key.

→ Artificial key are usually created when, the primary key is complex and large.

* Operations of Relational Model :-

(i) Insert :- The Insert operation is used to Insert a new record into the table.

→ The Insert operation gives values of the attribute for a new tuple which should be inserted into a relation.

Customer-Id	Customer-Name	Status
1	Amazon	Active
2	Apple	Inactive

Insert →

Customer-ID	Customer-Name	Status
1	Amazon	Active
2	Apple	Inactive
3	Alibaba	Active

(ii) Update :- The updation operation is used to update the data values of a record in the table.

→ Example - CustomerName = 'Apple' is updated from Inactive to Active

Customer-Id	Customer-Name	Status
1	Google	Active
2	Amazon	Active
3	Apple	Inactive

Update →

Customer-ID	Customer-Name	Status
1	Google	Active
2	Amazon	Active
3	Apple	Active

(iii) Delete :- The delete operation is used to delete a record from the table.

→ **Example** :- CustomerName = "Apple" is deleted from the table.

CustomerID	Customer Name	Status
1	Google	Active
2	Amazon	Active
3	Apple	Active
4	Alibaba	Active

CustomerID	Customer Name	Status
1	Google	Active
2	Amazon	Active
4	Alibaba	Active

4 **Select** :- Select allows you to choose a specific range of data.

→ **Example** In the below - give example, CustomerName = "Amazon" is selected.

CustomerID	Customer Name	Status
1	Google	Active
2	Amazon	Active
4	Alibaba	Active

CustomerID	Customer Name	Status
2	Amazon	Active

* Advantages of Relational Model :-

- A Relational model in DBMS is simpler than the hierarchical and Network Model.
- It is very easy and simple to design and implement at the logical level.
- Relational database is only concerned with data and not with the structures, which improves Performance.
- The Relational database provide flexibility that allows changes to database structure.
- They're strictly defined and well-organized, so data doesn't get duplicated.

* Disadvantages of Relational Model :-

- The Model uses tables having rows and columns which consumes a lot of Physical Memory.
- It have limited ability to deal with binary large objects.
- Not suitable for huge databases.