

Introduction to Relational Model

The Relational model represents how data is stored and managed in relational databases.

RollNo	Name	PhoneNo	Branch
1	Ramesh	93- - - 91	CSE
2	Suresh	94- - - 98	CSM
3	Satish	98- - - 91	CSD

Key terms in the Relational Schema Model:

- ① **Attribute:** Attributes are the properties that define an entity. Attributes are also known as field (or) column names. These Attribute values are atomic ie; values can't divide further.
- ② **Tuple:** A Tuple represents a row in a relation. Each tuple containing a set of attribute values that describes a particular entity. Tuple is also known as row value (or) record.
- ③ **Relational Instance:** The set of tuples of a relation at a particular instance of time is called relation instance. It can change whenever there is an insertion, deletion (or) updation in the database.
- ④ **Null values:** The values which is not known (or) unavailable is called null value.

Eg: Ramesh . CSE - -

⑤ Cardinality: The number of tuples in a relation is known as cardinality.

Eg: student relations has cardinality '3'.

⑥ Degree: The number of attributes in a relation is known as the degree of the relation.

Eg: student relation has degree '4'.

⑦ Relation Schema: It describes relations. It is made up relations and attributes of relation.

Eg: student (Roll, name, phone-no, Branch)

⑧ Relation DBMS: set of relation schemas and set of Integrity Constraints (types of keys)

Integrity Constraints: A set of rules which defines the constraints on the data.

⑨ Relational Instance: At a given time no. of tuples present in it.

Types of keys in the Relational Model:-

① primary key

② Candidate key

③ Foreign key

④ Super key

⑤ Composite key

Key: Keys plays an important role in the relational database. It is used to uniquely identify any record (or) row from the table. Keys are also used to establish and identify relationships between the tables.

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① Primary key:- By using primary key we can easily identify any record. All the ^{values} for the attribute need to be unique and null values are not accepted.

Student table:- 

name	rollno	Dept
Sai	1	CSE
Shiva	2	CSD
Ram	3	CSE

Create table Student (name varchar(20), rollno int(5) primary key, Dept varchar(5));

Insert into Student values ("Sai", 1, "CSE"), ("Shiva", 2, "CSD"), ("Ram", 3, "CSE");

② Foreign key:- Foreign keys are the attribute values of the table used to point to primary key of another table. This foreign key is used to establish a relation between 2 tables. In foreign key null values are not accepted and duplicates are also allowed.

Create table department (name, varchar(20), DIA int primarykey);

Insert into department value ("CSE", 1), ("CSD", 2), ("CSM", 3);

create table Student (Sname varchar(20), rollno int Primary key, DeptId int, foreign key (DeptId) references department (DId));

Department		Student		
Dname	Did	Sname	rollno	Did
CSE	1	Sai	A1	1
CSD	2	Shiva	A2	2
CSM	3	Ram	A3	3
		Surekha	A4	1

insert into Student ("Sai", "A1", 1), ("Shiva", "A2", 2),
 ("Ram", "A3", 3), ("Surekha", "A4", 1);

③ Super key:- It is a set of columns that can uniquely identify a record is known as super key.

It supports null values.

Allows null values and no duplicates
and no allowed.

name	rollno	address	mobile no
sai	1	Hyderabad	9345678910
Shiva	2	Delhi	9234567890
Ram	3	Delhi	null

super key :> { name, rollno, mobile no }

{ name, address }

{ name, rollno, address }.

④ Candidate key :- minimal super key is known as candidate key.

{ name { rollno } { mobile no }

⑤ Alternate key :- from the candidate key one of the column is considered as primary key and the remaining keys are considered as alternate keys

⑥ Composite key :- primary key consists of more than one column.

Integrity constraints over relations.

In DBMS there is a certain set of rules which are used to maintain the quality and consistency of data in the database. Every time there is an insertion or deletion & it is the responsibility of these integrity constraints to maintain the integrity of data.

Types of Integrity Constraints

- Domain Constraints
- Entity Integrity Constraint
- Referential Integrity Constraint
- Key Constraints.

① Domain Constraints:-

Each table contains set of columns and each column allows same type of data based on its data types and the column values does not accept any other data type values.

Domain constraints includes the factors like.

data-type, constraints like not null, unique, primary key, foreign key, check, default.

name	rollno	age	section
Sai	1	17	A
Shiva	2	18	A
Ram	3	19	A
Sham	4	19	B

create table student(name varchar(20) not null,
rollno number(5) unique
age number(5) check
age < 20,
section varchar(5) default "A");

insert into student values("Sai", 1, 17),
("Shiva", 2, 18),
("Ram", 3, 19),
("Sham", 4, 19, "B");

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② Entity Integrity Constraints:

In Entity Integrity Constraints states that primary key cannot be null values because primary keys is used to determine individual rows in a relation. If primary key contains null values then we cannot able to identify those rows.

stdid	std name	Branch
1	Shiva	CSE
2	Ram	CSD
null	Slam	CSM

- ① uniqueness
- ② not null

Null values cannot be accepted in the stdid column.

③ Foreign Referential Constraints:

It ensures the relationships between

tables remains consistent.

The foreign key in one table must match a value in the referenced primary key of another table

- (i) be null value.

atdid	name	Department	Section
1	Ramesh	CSE	A
2	Aneesh	CSD	B
3	Vikas	CSM	A.
4	Sam	CSE	B.

stdid	Marks
1	420
2	430
3	440
4	410

stdid 4 is not present because it is not present in table 2.

④ Key Constraints :-

- Key constraints ensure that certain columns uniquely identify each row.
- (a) Combinations of columns in a table uniquely identify each row.

is primary key constraint; It states that the primary key attributes are required to be unique and not null.

Std-id	Name	Age
1	sai	22
2	shiva	23
3	Sham	21

(3)

② unique key Constraints:

The unique key constraints in DBMS ensures that all values in a specified column are unique. Values are also accepted by but for only one row. adding another null value in the row may result an error.

	std-id	Email-id
1		aniket@gmail.com
2		sharavati@gmail.com
3		null

③ foreign key Constraints:

foreign keys are the columns of the table that points to the primary key of another table. Here duplicate values and null values are accepted. If the key values in the data from the main table is deleted than an error will be shown in the referenced table.

Querying Relational Data in DBMS:-

- ① select
- ② from
- ③ where
- ④ group by.
- ⑤ having
- ⑥ order by
- ⑦ join.