

Relational Model

- It is one of the important data model
- It was developed by EF codd
- In relational model , data is organized in the form of table which includes rows and columns is called relational model

Regno	Name	Address	Combination
101	Natraj	Bellary	Pmcs
102	Harish	Bellary	pmcs
103	Adarsha	BELLARY	CBZ
104	Santhosh	Bidar	cbz

Each row in a table is called Tuple or record.

Each column in a table is called attribute or field.

Table is also called Relation

Relational model constraints

There are two types of relational model constraints

1.domain constraints

2.key constraints

Domain constraints

The value of each attribute A must be atomic from the dom(A).

Eg: employee name accepts or holds characters not numbers.

Regno holds numbers not characters.

Key constraints.

Types of constraints

1.primary key

2.candidate key

3.super key

4.foreign key

Relational database schema

- Entity integrity
- Referential integrity

Entity integrity

Entity integrity means primary key value cannot be null because primary key is used to uniquely identify records in a table.

Referential integrity

It is used to maintain consistency between two relations.

That is tuple in one relation must reference to the tuple in another relation.

Employee table

id	Name	Address	Dno
101	Arun	Bellary	1
102	Ashok	Bellary	2
103	Alok	Bellary	1

Department table

Dno	Dname	dloc
1	Cs	Bellary
2	Botany	bellary

If the dept no is not in the department table then it displays referential integrity violated because in the employee table we have dept no and in department table we have dept name.

Relational Algebra

Relational algebra is a set of operations that takes one or more table or relation as input and produces single table as output or result.

Relational algebra is inspiration for data base languages.

SQL Is especially built on relational algebra.

We can perform many operations on relational algebra

- Select
- Project
- Union
- Intersection
- Difference
- Cartesian

Select operation

Select operation is used to obtain few tuples from the relation.

It is denoted by σ

Syntax: σ condition(relation name)

Ex: σ salary>10000(employee)

σ salary>10000 and address="ballari"(employee)

Projection:

It is used to obtain the columns from the table.

Which is denoted by π .

Syntax:

π column1,column2(relation)

Ex:

π regno,name(employee)

Set operations

There are four set operations

- Union
- Intersection
- Difference
- Cartesian

Union operation(U)

R table

id	Name	salary
101	Arun	10000
102	Ashok	20000
103	Alok	30000
104	Pallavi	40000
105	Harsha	45000

S table

id	Name	salary
101	Arun	10000
102	Ashok	20000
103	Alok	30000
106	Sowmya	45000
107	Rekha	50000

Assume that R and S are the tables.

Result of $R \cup S$ includes all the tuples from r or s or from both and duplicate tuples are not displayed in the result.

id	Name	salary
101	Arun	10000
102	Ashok	20000
103	Alok	30000
104	Pallavi	40000
105	Harsha	45000
106	Sowmya	45000
107	Rekha	50000

Intersection Operation($\cap$)

The result of $R \cap S$ is common tuples in both the relations

id	Name	salary
101	Arun	10000
102	Ashok	20000
103	Alok	30000

Difference Operation(-)

The result of $R - S$ which include all the tuples appeared in R but not in S.

id	Name	salary
104	Pallavi	40000
105	Harsha	45000

Cartesian($*$)

It is used to combine two relations.

The result of $R * S$ is the number of tuples in R * number of tuples in S.

Id	Name	D_no
101	A	1
102	B	2
103	C	3

D_NAME	D_LOC
CS	BALLARI
BOTANY	BALLARI

THE RESULT OF R*S IS

Id	Name	D_no	D_NAME	D_LOC
101	A	1	CS	BALLARI
101	A	1	BOTANY	BALLARI
102	B	2	CS	BALLARI
102	B	2	BOTANY	BALLARI
103	C	3	CS	BALLARI
103	C	3	BOTANY	BALLARI

Join operation

Join operation is used to join two relations.

Cartesian is also used to join two relation but the difference is Cartesian we have not mentioned the condition in join operation we have mentioned the equality condition.

There are two types of join operation.

1. equi join or inner join
2. outer join

Equi join:

It is a type of join operation.

It is also called inner join.

The result of equi join is matched data between two tables as per the equality condition mention in query.

Syntax:

Select tablename1.column1,tablename1.column2,tablename2.column1,tablename2.column2
from tablename1,tablename2 where tablename1.column name=tablename2.columnname;

Employee table

id	Name	Address	Dno
101	Arun	Bellary	1
102	Ashok	Bellary	2
103	Alok	Bellary	1

Department table

Dno	Dname	dloc
1	Cs	Bellary
2	Botany	bellary

Select employee.id, employee.name,department.d_no,department.d_name from
employee,department where employee.d_no=department.d_no;

id	Name	Dno	D_name
101	Arun	1	cs
102	Ashok	2	botany
103	Alok	1	cs

Outer join

Outer join is a type of join operation.

The result of outer join is based on matched data and unmatched data.

There are three types of outer join

- Left outer join
- Right outer join
- Full outer join.

Left outer join

it is a type of outer join in which result is based on matched data from two tables and remaining rows from the left table and null for the right table column.

Syntax:

Select tablename1.column1,tablename1.column2,,tablename2.column1,tablename2.column2
....n from tablename1 left outer join tablename2 where tablename1.column
name=tablename2.columnname;

Left table (class)

Right table(classA)

Id	name
1	A
2	B
3	C
4	D
5	E
8	F

Id	Address
1	bidar
2	bidar
9	bellary
10	bangalore
11	hubli

Ex: select class.id,class.name,classA.id,classA.address from class left outer join
classA where class.id=classA.id;

Id	name	id	address
1	A	1	bidar
2	B	2	bellary
3	C	-	-
4	D	-	-
5	E	-	-
8	F	-	-

Right outer join

it is a type of outer join in which result is based on matched data from two tables
and remaining rows from the right table and null for the left table column.

Select tablename1.column1,tablename1.column2,,tablename2.column1,tablename2.column2
....n from tablename1 right outer join tablename2 where tablename1.column
name=tablename2.columnname;

Ex: select class.id,class.name,classA.id,classA.address from class right outer join
classA where class.id=classA.id;

Id	name	id	address
1	A	1	bidar
2	B	2	bellary
-	-	9	bellary
-	-	10	bangalore
-	-	11	hubli

Full outer join

it is a type of outer join in which result is based on matched data from two tables and remaining rows from the right table and left table.

Select tablename1.column1,tablename1.column2,,tablename2.column1,tablename2.column2n from tablename1 full outer join tablename2 where tablename1.column name=tablename2.columnname;

Ex: select class.id,class.name,classA.id,classA.address from class full outer join classA where class.id=classA.id;

Id	name	id	address
1	A	1	bidar
2	B	2	bellary
3	C	-	-
4	D	-	-
5	E	-	-
8	F	-	-
-	-	9	bellary
-	-	10	bangalore
-	-	11	hubli

Satish