Foreign Key

Foreign key maintains referential integrity

Referenced table (Parent table)

Insertion – No violation

Deletion – May cause violation
on delete cascade

Updation – May cause violation
on update cascade

Foreign Key

Foreign key maintains referential integrity

Referencing table (Child table)

Insertion – May cause violation

Deletion – No violation

Updation – May cause violation

Foreign Key

ON DELETE CASCADE

- Is used to automatically remove the matching records from the child table when we delete the rows from the parent table.

- It is a kind of referential action related to the foreign key.

Foreign Key

ON DELETE CASCADE

```
CREATE TABLE Employee (
 emp_id int(10) NOT NULL,
 name varchar(40) NOT NULL,
 birthdate date NOT NULL,
 gender varchar(10) NOT NULL,
 hire_date date NOT NULL,
 PRIMARY KEY (emp_id)
);
```

Foreign Key

ON DELETE CASCADE

```
CREATE TABLE Payment (
 payment_id int(10) PRIMARY KEY NOT NULL,
 emp_id int(10) NOT NULL,
 amount float NOT NULL,
 payment_date date NOT NULL,
 FOREIGN KEY (emp_id) REFERENCES Employee (emp_id)
ON DELETE CASCADE
);
```

Foreign Key

ON DELETE CASCADE

```
CREATE TABLE Payment (
 payment_id int(10) PRIMARY KEY NOT NULL,
 emp_id int(10) NOT NULL,
 amount float NOT NULL,
 payment_date date NOT NULL,
 FOREIGN KEY (emp_id) REFERENCES Employee (emp_id)
ON DELETE CASCADE
);
```

Foreign Key

ON DELETE CASCADE

```
CREATE TABLE Payment (
 payment_id int(10) PRIMARY KEY NOT NULL,
 emp_id int(10) NOT NULL,
 amount float NOT NULL,
 payment_date date NOT NULL,
 FOREIGN KEY (emp_id) REFERENCES Employee (emp_id)
ON DELETE CASCADE
);
```

Join

A join is an SQL operation performed to establish a connection between two or more database tables based on matching columns, thereby creating a relationship between the tables.

Types :

- Cross(cartesian) Join
- Natural Join
- Equi Join
- Self Join
- Conditional Join
- Outer Join
  - ✓ Left outer join
  - ✓ Right outer join
  - ✓ Full Join

Join

Employee Table

Eno	Ename	Address
1	Ram	Delhi
2	Ramu	Mumbai
3	Raju	Bangalore
4	Raj	Chennai

Dept Table

DeptNo	Dname	Eno
D1	HR	1
D2	IT	2
D3	Market	3

Join

Employee Table

Eno	Ename	Address
1	Ram	Delhi
2	Ramu	Mumbai
3	Raju	Bangalore
4	Raj	Chennai

Dept Table

DeptNo	Dname	Eno
D1	HR	1
D2	IT	2
D3	Market	3

Join is possible only if common attribute is existing between both tables.

Join is cross product + condition (select statement)

Natural Join

Employee Table

Eno	Ename	Address
1	Ram	Delhi
2	Ramu	Mumbai
3	Raju	Bangalore
4	Raj	Chennai

Dept Table

DeptNo	Dname	Eno
D1	HR	1
D2	IT	2
D3	Market	3

Find the employee who is working in a department

Cross product is one row of table A is multiplied with all row of the other table B. Cross product is AXB = 12 rows

Select ename from emp,dept where emp.eno = dept.eno

Eno	Ename	DeptNo	Eno
1	Ram	D1	1
1	Ram	D2	2
1	Ram	D3	3
2	Ramu	D1	1
2	Ramu	D2	2
2	Ramu	D3	3
3	Raju	D1	1
3	Raju	D2	2
3	Raju	D3	3
4	Raju	D1	1
4	Raju	D2	2
4	Raju	D3	3

Natural Join : is used when common attribute values are equal.

Equi Join

Equi Join is used when any attribute values are equal.

Employee Table

Eno	Ename	Address
1	Ram	Delhi
2	Ramu	Mumbai
3	Raju	Bangalore
4	Raj	Chennai

Dept Table

DeptNo	Location	Eno
D1	Delhi	1
D2	Pune	2
D3	Bihar	4

Find the empname who worked in a department having location same as their address.

Select ename from emp, dept where emp.eno = dept.eno and emp.address = dept.location

Equi Join

Employee Table

Eno	Ename	Address
1	Ram	Delhi
2	Ramu	Mumbai
3	Raju	Bangalore
4	Raj	Chennai

Dept Table

DeptNo	Location	Eno
D1	Delhi	1
D2	Pune	2
D3	Bihar	4

Select ename from emp, dept where emp.eno = dept.eno and emp.address = dept.location

Cross Product

Name Address Deptno Location Eno.

Eno	~~Address~~	~~Deptno~~	~~Location~~	~~Eno~~	
1	Ram	Delhi	D1	Delhi	1
1	Ram	Delhi	D2	Pune	2
1	Ram	Delhi	D3	Bihar	4
2	Ramu	Mumbai	D1	Delhi	1
2	Ramu	Mumbai	D2	Pune	2
2	Ramu	Mumbai	D3	Bihar	4
3	Raju	Bangalore	D1	Delhi	1
3	Raju	Bangalore	D2	Pune	2
3	Raju	Bangalore	D3	Bihar	4
4	Raj	Chennai	D1	Delhi	1
4	Raj	Chennai	D2	Pune	2
4	Raj	Chennai	D3	Bihar	4

Self Join

- A self join is a join in which a table is joined with itself
- To join a table itself means that each row of the table is combined with itself and with every other row of the table.
- The self join can be viewed as a join of two copies of the same table. The table is not actually copied, but SQL performs the command as though it were.

```
SELECT column_name(s)
FROM table1 T1, table1 T2
WHERE condition;
```

T1 and T2 are different table aliases for the same table.

Self Join

Study Table

sid	cid	since
S1	C1	2016
S2	C2	2017
S1	C2	2017

Find studentid who is enrolled in atleast two courses.

Select T1.sid from study as T1, study as T2 where T1.sid = T2.sid and T1.cid <> T2.cid

Self Join

Study Table

sid	cid	since
S1	C1	2016
S2	C2	2017
S1	C2	2017

Cross Product

T1		T2	
S1	C1	S1	C1
S1	C1	S2	C2
S1	C1	S1	C2
S2	C2	S1	C1
S2	C2	S2	C2
S2	C2	S1	C2
S1	C2	S1	C1
S1	C2	S2	C2
S1	C2	S1	C2

Find studentid who is enrolled in atleast two courses.

Select T1.sid from study as T1, study as T2 where T1.sid = T2.sid and T1.cid <> T2.cid

SQL queries and subqueries

Emp

Eid	Ename	dept	salary
1	Ram	HR	10000 X
2	Anu	MRKT	20000 X
3	Raju	HR	40000 X
4	Vani	IT	50000 ✓

Vani

① maximum salary earned by an employee — 50000

Select max(sal) from employee.

② display name of emp earning max salary → Vani

Select ename from emp where salary = (Select max(sal) from emp) → 50,000 → Inner query.
→ outer query