Batch: A3 **Roll No.: 16010121045**

Experiment / assignment / tutorial No. 5

Title: Queries based on Joins, and Views

Objective: To be able to use SQL JOIN clause to extract data from 2 (or more) tables, we need a relationship between certain columns in these tables.

Expected Outcome of Experiment:
CO 3 : Use SQL for Relational database creation, maintenance and query processing
CO 4 : Applying normalization to design database

Books/ Journals/ Websites referred:

1. Dr. P.S. Deshpande, SQL and PL/SQL for Oracle 10g.Black book, Dreamtech Press
2. www.db-book.com
3. Korth, Slberchatz, Sudarshan : "Database Systems Concept", 5th Edition , McGraw Hill
4. Elmasri and Navathe,"Fundamentals of database Systems", 4th Edition,PEARSON Education.

Resources used: Postgresql

Theory

Join is a combination of a Cartesian product followed by a selection process. A Join operation pairs two tuples from different relations, if and only if a given join condition is satisfied. Or JOINS are used to retrieve data from multiple tables. A JOIN is performed whenever two or more tables are joined in a SQL statement.
There are different types of Joins:

- The CROSS JOIN
- The INNER JOIN
- The LEFT OUTER JOIN

- The RIGHT OUTER JOIN
- The FULL OUTER JOIN

A **CROSS JOIN** matches every row of the first table with every row of the second table. If the input tables have x and y columns, respectively, the resulting table will have x+y columns. Because CROSS JOINs have the potential to generate extremely large tables, care must be taken to use them only when appropriate.
Ex. SELECT EMP_ID, NAME, DEPT FROM COMPANY CROSS JOIN DEPARTMENT;

A **INNER JOIN** creates a new result table by combining column values of two tables (table1 and table2) based upon the join-predicate. The query compares each row of table1 with each row of table2 to find all pairs of rows, which satisfy the join-predicate. When the join-predicate is satisfied, column values for each matched pair of rows of table1 and table2 are combined into a result row.

Ex. SELECT EMP_ID, NAME, DEPT FROM COMPANY INNER JOIN DEPARTMENT ON COMPANY.ID = DEPARTMENT.EMP_ID;

The **OUTER JOIN** is an extension of the INNER JOIN. SQL standard defines three types of OUTER JOINs: LEFT, RIGHT, and FULL and PostgreSQL supports all of these.

In case of **LEFT OUTER JOIN**, an inner join is performed first. Then, for each row in table T1 that does not satisfy the join condition with any row in table T2, a joined row is added with null values in columns of T2. Thus, the joined table always has at least one row for each row in T1.

Ex. SELECT EMP_ID, NAME, DEPT FROM COMPANY LEFT OUTER JOIN DEPARTMENT ON COMPANY.ID = DEPARTMENT.EMP_ID;

The RIGHT OUTER JOIN
First, an inner join is performed. Then, for each row in table T2 that does not satisfy the join condition with any row in table T1, a joined row is added with null values in columns of T1. This is the converse of a left join; the result table will always have a row for each row in T2.
Ex. SELECT EMP_ID, NAME, DEPT FROM COMPANY RIGHT OUTER JOIN DEPARTMENT ON COMPANY.ID = DEPARTMENT.EMP_ID;

The **FULL OUTER JOIN**

First, an inner join is performed. Then, for each row in table T1 that does not satisfy the join condition with any row in table T2, a joined row is added with null values in columns of T2. In addition, for each row of T2 that does not satisfy the join condition with any row in T1, a joined row with null values in the columns of T1 is added.
SELECT EMP_ID, NAME, DEPT FROM COMPANY FULL OUTER JOIN DEPARTMENT ON COMPANY.ID = DEPARTMENT.EMP_ID;

Views are pseudo-tables. That is, they are not real tables; nevertheless appear as ordinary tables to SELECT. A view can represent a subset of a real table, selecting certain columns or certain rows from an ordinary table. A view can even represent joined tables. Because views are assigned separate permissions, you can use them to restrict table access so that the users see only specific rows or columns of a table.

A view can contain all rows of a table or selected rows from one or more tables. A view can be created from one or many tables, which depends on the written PostgreSQL query to create a view.
Views, which are kind of virtual tables, allow users to do the following −

- Structure data in a way that users or classes of users find natural or intuitive.
- Restrict access to the data such that a user can only see limited data instead of complete table.
- Summarize data from various tables, which can be used to generate reports.

Since views are not ordinary tables, you may not be able to execute a DELETE, INSERT, or UPDATE statement on a view. However, you can create a RULE to correct this problem of using DELETE, INSERT or UPDATE on a view.

Syntax

CREATE [TEMP | TEMPORARY] VIEW view_name AS

SELECT column1, column2.....

FROM table_name

WHERE [condition];

Ex

CREATE VIEW COMPANY_VIEW AS

SELECT ID, NAME, AGE

FROM COMPANY;

Dropping Views

Syntax: DROP VIEW view_name;

Implementation Screenshots (Problem Statement, Query and Screenshots of Results):

Cross Join:

Query:

Query Editor | Query History

```
1  SELECT deliverytype, modetrans, umail FROM delivery CROSS JOIN customer;
```

Output:

Data Output | Explain | Messages | Notifications

	deliverytype character varying (20)	modetrans character varying (30)	umail character varying (30)
1	express	air	cust2@mail.com
2	normal	road	cust2@mail.com
3	express	air	cust3@mail.com
4	normal	road	cust3@mail.com
5	express	air	cust4@mail.com
6	normal	road	cust4@mail.com
7	express	air	cust5@mail.com
8	normal	road	cust5@mail.com
9	express	air	cust1@mail.com
10	normal	road	cust1@mail.com

Inner joint:

Query:

Query Editor | Query History

```
1  SELECT sname,saddress,upassword FROM sender INNER JOIN customer
2          ON sender.uid = customer.uid;
```

Output:

Data Output | Explain | Messages | Notifications

	sname character varying (20)	saddress character varying (100)	upassword character varying (10)
1	riya	ad2	abc124
2	desai	ad3	abc125
3	beet	ad4	abc126
4	pargat	ad5	abc127
5	meet	ad1	abc123

Left Outer Join:

Query:

```
SELECT uid,sname,umail,deliverytype,cid FROM sender LEFT OUTER JOIN delivery
   ON sender.uid = delivery.cid;
```

Output;

Data Output | Explain | Messages | Notifications

	uid integer	sname character varying (20)	umail character varying	deliverytype character varying (20)	cid integer
1	1	meet	meet@mail.com	express	1
2	2	riya	riya@mail.com	normal	2
3	5	pargat	pargat@mail.com	[null]	[null]
4	4	beet	beet@mail.com	[null]	[null]
5	3	desai	desai@mail.com	[null]	[null]

Right Outer Join:

Query :

Query Editor | Query History

```
1  SELECT deliverytype, umail, upassword FROM delivery RIGHT OUTER JOIN customer
2     ON delivery.cid = customer.uid;
```

Output:

Data Output | Explain | Messages | Notifications

	deliverytype character varying (20)	umail character varying (30)	upassword character varying (10)
1	express	cust1@mail.com	abc123
2	normal	cust2@mail.com	abc124
3	[null]	cust5@mail.com	abc127
4	[null]	cust4@mail.com	abc126
5	[null]	cust3@mail.com	abc125

Views:

Code:

```
CREATE VIEW adminn_view AS SELECT aid, amail FROM adminn;
CREATE VIEW billingsys_view AS SELECT bno, tamount FROM billingsys;
CREATE VIEW delivery_view AS SELECT cid, ordrplaceddate, ordrdelivereddate FROM delivery;
DROP VIEW adminn_view;
```

Output:

Data Output | Explain | Messages | Notifications

	aid integer	amail character varying (20)
1	1	meet@mail.com
2	1	meet@mail.com
3	2	riya@mail.com

Data Output | Explain | Messages | Notifications

	bno integer	tamount integer
1	987	2000

Data Output | Explain | Messages | Notifications

	cid integer	ordrplaceddate integer	ordrdelivereddate integer
1	1	27	31
2	2	28	31

Conclusion:

Through this experiment we learnt about SQL Join, Views and applied the same on our chosen problem statement.

Post Lab Questions:

1. **What is a view?**

   a) A view is a special stored procedure executed when certain event occurs
   b) A view is a virtual table which results of executing a pre-compiled query
   c) A view is a database diagram
   d) None of the Mentioned

2. **What type of join is needed when you wish to include rows that do not have matching values?**

   A. Equi-join
   B. Natural join
   C. Outer join
   D. All of the mentioned

3. **Write SQL query including join operator to get following output:**

   Input Tables:

The **class** table,

ID	NAME
1	abhi
2	adam
3	alex
4	anu
5	ashish

and the **class_info** table,

ID	Address
1	DELHI
2	MUMBAI
3	CHENNAI
7	NOIDA
8	PANIPAT

   Output Table:

ID	NAME	ID	Address
1	abhi	1	DELHI
2	adam	2	MUMBAI
3	alex	3	CHENNAI
4	anu	null	null
5	ashish	null	null
null	null	7	NOIDA
null	null	8	PANIPAT