PRACTICAL NO. 5

OBJECTIVE (AIM) OF THE EXPERIMENT

Querying the Database based on Set, Arithmetic(and Logical operator.(AND,OR,BETWEEN,NOT,LIKE, Addition,Multiplication,Subtraction,Division)

PROCEDURE

a) Procedure for doing the experiment:

Step no.	Details of the step
1	**Set Operators:** The Set operator combines the result of 2 queries into a single result. The following are the operators: • Union • Union all • Intersect • Minus
2	**The rules to which the set operators are strictly adhere to :** The queries which are related by the set operators should have a same number of column and column definition. Such query should not contain a type of long. Labels under which the result is displayed are those from the first select statement.

b) SQL commands:

Union: Returns all distinct rows selected by both the queries
Syntax:
Query1 Union Query2;

Union all: Returns all rows selected by either query including the duplicates.
Syntax:
Query1 Union all Query2;

Intersect: Returns rows selected that are common to both queries.
Syntax:
Query1 Intersect Query2;

Minus: Returns all distinct rows selected by the first query and are not by the second
Syntax:
Query1 minus Query2;

EXCEPT

EXCEPT clause in SQL Server is working as like MINUS operation in Oracle. EXCEPT query returns all rows which are in the first query but those are not returned in the second query.

c) Queries:

UNION:

Q1: Display all the dept numbers available with the dept and emp tables avoiding duplicates.

Solution:

1. Use select from clause.
2. Use union select clause to get the result.

Ans:

SQL> select deptno from emp union select deptno from dept;

DEPTNO

1
2
12
30
40

1. Get the names of employees who are married or earn over 30,000.

```
SQL> SELECT EMP_NAME FROM EMP WHERE MARITAL_STATUS = 'M'
  UNION
  SELECT EMP_NAME FROM EMP WHERE SALARY > 30000;

EMP_NAME
------------------------
Brown
Green
Jarvis
Jones
```

2. Get the names of departments with budgets in excess of 140,000 or that are managed by employee E8.

```
SQL> SELECT DEPT_NAME FROM DEPT WHERE BUDGET > 140000
   UNION
  SELECT DEPT_NAME FROM DEPT WHERE MANAGER_NO = 'E8';

DEPT_NAME
--------------
Accounts
Sales
Transport
```

3. Find the Project Numbers of projects which have a deadline before 01-Jan-2008 or have employee E3 working on them.

```
SQL> SELECT PROJ_NO FROM PROJ WHERE DEADLINE < '01-JAN-2008'
   UNION
  SELECT PROJ_NO FROM ALLOC WHERE EMP_NO = 'E3';

PR
--
```

```
P2
```

4. List the Employee Numbers of employees who either manage the Sales Department or work on project P4.

```
SQL> SELECT MANAGER_NO FROM DEPT WHERE DEPT_NAME = 'Sales'
  UNION
  SELECT EMP_NO FROM ALLOC WHERE PROJ_NO = 'P4';

MA
--
E4
E5
E6
E9
```

5. Get the names of employees with their salaries and of departments with their budgets.

```
SQL> SELECT EMP_NAME, SALARY FROM EMP
   UNION
  SELECT DEPT_NAME, BUDGET FROM DEPT;

EMP_NAME        SALARY
-------------------- --------------------
Accounts         95000
Brown            38500
Evans            11000
Fletcher         12000
Green            38500
Jarvis           21000
Jones            12000
Production      100000
Roberts          20000
Sales           250000
Transport       150000
11 rows selected.
```

Q6: **Display all the dept numbers available with the dept and emp tables.**
Solution:
1. Use select from clause. 2. Use union all in select clause to get the result.
Ans:
SQL> select deptno from emp union all select deptno from dept;

DEPTNO

1
2
2
1
12
1
2
30
40
9 rows selected.

INTERSECT:

1. Get the names of employees who are married and earn more than £15,000.

```
SQL> SELECT EMP_NAME FROM EMP WHERE MARITAL_STATUS = 'M'
  INTERSECT
  SELECT EMP_NAME FROM EMP WHERE SALARY > 15000;
EMP_NAME
--------------
Jarvis
```

2. Get the names of departments not managed by employee E5 that have budgets of more than£96,000.

```
SQL> SELECT DEPT_NAME FROM DEPT WHERE MANAGER_NO <> 'E5'
  INTERSECT
  SELECT DEPT_NAME FROM DEPT WHERE BUDGET > 96000;

DEPT_NAME
--------------
Production
Transport
```

3. List the EmployeeNumbers of department managers who are paid less than £12,500.

```
SQL> SELECT MANAGER_NO FROM DEPT
  INTERSECT
 SELECT EMP_NO FROM EMP WHERE SALARY < 12500;

MA
--
E2
```

4. Get the Project Numbers of projects that started after 10-Jun-2005 and have employee E4 working on them.

```
SQL> SELECT PROJ_NO FROM PROJ WHERE START_DATE > '10-Jun-2005'
  INTERSECT
 SELECT PROJ_NO FROM ALLOC WHERE EMP_NO = 'E4';
PR
--
P4
```

5. Get the Employee Numbersof managers who are also working on projects.

```
SQL> SELECT MANAGER_NO FROM DEPT
   INTERSECT
  SELECT EMP_NO FROM ALLOC;

MA
--
E2
E5
```

MINUS:

1. Get the names of employees known to be single who do not earn more than £13,000.

```
SQL> SELECT EMP_NAME FROM EMP WHERE MARITAL_STATUS = 'S'
   MINUS
 SELECT EMP_NAME FROM EMP WHERE SALARY > 13000;

EMP_NAME
--------------
Evans
Fletcher
```

2. Get the salaries of every employee apart from those working for department D2.

```
SQL> SELECT SALARY FROM EMP
   MINUS
```

```
  SELECT SALARY FROM EMP WHERE DEPT_NO = 'D2';

SALARY
    -------------
     11000
     12000
     20000
     21000
```

3. Find the EmployeeNumbers of employees who do not manage a department.

```
SQL> SELECT EMP_NO FROM EMP
  MINUS
  SELECT MANAGER_NO FROM DEPT;

EM
-- E4
E6 E9
```

4. Get the Employee Numbers of those employees who are not working on any projects.

```
SQL> SELECT EMP_NO FROM EMP
  2     MINUS
  3  SELECT EMP_NO FROM ALLOC;

EM
-- E3
E8
```

5. Get the Employee Numbers of employees paid more than £15,000apart from those who manage departments with a budget of £100,000 or less

```
SQL> SELECT EMP_NO FROM EMP WHERE SALARY > 15000
  2     MINUS
  3  SELECT MANAGER_NO FROM DEPT WHERE BUDGET <= 100000; EM
-- E5
E6
```

Q6: **Display all the dept numbers available in emp and not in dept tables and vice versa.**

Solution:

1. Use select from clause.
2. Use minus in select clause to get the result. Ans:

SQL> select deptno from emp minus select deptno from dept;

DEPTNO

12

SQL> select deptno from dept minus select deptno from emp; DEPTNO

30
40

d) Result:

Thus the set operations using DML Commands was successfully performed and executed.

SQL Operators

The operators are symbols (and keywords) that are used to perform operations with values.

These operators are used with SQL clauses such as: `SELECT`, `WHERE`, `ON` etc.
The operators in SQL can be categorized as:

- Arithmetic operators
- Comparison operators
- Logical operators

SQL Arithmetic Operators

Arithmetic operators perform simple arithmetic operations such as addition, subtraction, multiplication etc.

Operator	Description
`+`	Addition
`-`	Subtraction
`*`	Multiplication
`/`	Divide
`%`	Modulo (Remainder)

Addition Operator

```
-- returns new column named total_amount which is
-- 100 added to the amount field
SELECT item, amount, amount+100 AS total_amount
FROM Orders;
```

Run Code

Subtraction Operator

```
-- returns new column named offer_price which is
-- 20 subtracted to the amount field
SELECT item, amount, amount-20 AS offer_price
FROM Orders;
```
Run Code

Multiplication Operator

```
-- returns new column named total_amount  which is
-- 4 multiplied to the amount field
SELECT item, amount, amount*4 AS total_amount
FROM Orders;
```
Run Code

Division Operator

```
-- returns new column named half_amount which is
-- divided by 2 to the amount field
SELECT item, amount, amount/2 AS half_amount
FROM Orders;
```
Run Code

Modulo (Remainder) Operator

```
-- returns 1 which is remainder
SELECT 10 % 3 AS result;
```
Run Code

Consider the following Tables:

EMPLOYEE(Emp_id, EMP_name,Job_name,Manager_id,Hire_date,Salary,Deptno)

DEPARTMENT(Deptno, Dname, MGRSSN)

PROJECT(Pname,Pno,Plocation,Deptno)

emp_id	emp_name	job_name	manager_id	hire_date	salary	E_Bonus	dep_no
68319	KAYLING	PRESIDENT		1991-11-18	6000.00	300.00	1001
66928	BLAZE	MANAGER	68319	1991-05-01	2750.00	200.00	3001
67832	CLARE	MANAGER	68319	1991-06-09	2550.00	200.00	1001
65646	JONAS	MANAGER	68319	1991-04-02	2957.00	200.00	2001
67858	SCARLET	ANALYST	65646	1997-04-19	3100.00	250.00	2001
69062	FRANK	ANALYST	65646	1991-12-03	3100.00	250.00	2001
63679	SANDRINE	CLERK	69062	1990-12-18	900.00	150.00	2001
64989	ADELYN	SALESMAN	66928	1991-02-20	1700.00	180.00	3001
65271	WADE	SALESMAN	66928	1991-02-22	1350.00	180.00	3001

```
  66564 | MADDEN   | SALESMAN  |      66928 | 1991-09-28 | 1350.00 |   180.00   3001
  68454 | TUCKER   | SALESMAN  |      66928 | 1991-09-08 | 1600.00 |   180.00   3001
  68736 | ADNRES   | CLERK     |      67858 | 1997-05-23 | 1200.00 |   150.00   2001
  69000 | JULIUS   | CLERK     |      66928 | 1991-12-03 | 1050.00 |   150.00   3001
  69324 | MARKER   | CLERK     |      67832 | 1992-01-23 | 1400.00 |   150.00   1001
```

Department Table

deptno	dname	Citylocation	dCountry
1001	Accounting	New York	United States of America,
2001	Research	Dallas	United States
3001	Sales	Chicago	United States of America
4001	Marketing	Los Angeles	United States

Project Table

Pno	Pname	PCitylocation	PCountry
111	P_1	New York	United States of America,
112	P_2	Dallas	United States
113	P_3	Chicago	United States of America
114	P_4	Denmark	northern Europe
115	P_5	Paris	France
116	P_6	Chicago	United States of America

Write a query for the following:-

Q1. Display all the Departments and Projects available.

Q2. Display the Locations of Departments and Projects.

Q3. Display the Project's Locations which are not the Department's Locations.

Q4. Display the Department's Locations which are also Project's Locations.

Q5. Display the cities of United States of America in which Projects are been designed and also display their respective Departments.

Q6. Display the Countries and cities for projects P_1 and P_2 & Departments Accounting and Marketing.

Q7. Display those Cities which are same for Projects and Departments.

Q8. Display Project numbers and Department numbers for which country is United States.

Q9. Find the names of the projects and Departments which have city as Chicago.

Q10.Display the details for projects and Departments which don't have country as Northern Europe.

Q11 Get details of the Employee with the largest Salary.

Q12. Display the Total Salary of Employees including Bonus.

Q13. Display the Salaries if it is increased by 3 times more than original Salaries of Employees who work as Analyst.

Q14. Display the Salaries of all Employees who are paying 10 % of their total salary for Social Cause.