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BATCH 2

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EXPERIMENT 7

Title: Use of Inbuilt functions and relational algebra operation

Objective: To understand the use of inbuilt function and relational algebra with sql query.

Write and execute the following queries using the Relational Algebra on the COMPANY database schema.

```
mysql> SELECT * FROM EMPLOYEE;
+----------+-------+---------+-----------+------------+-------------------------+------+----------+-----------+-----+
| Fname    | Minit | Lname   | Ssn       | Bdate      | Address                 | Sex  | Salary   | Super_ssn | Dno |
+----------+-------+---------+-----------+------------+-------------------------+------+----------+-----------+-----+
| John     | B     | Smith   | 123456789 | 1965-01-09 | 731 Fondren, Houston TX | M    | 30000.00 | 333445555 |   5 |
| Franklin | T     | Wong    | 333445555 | 1965-12-08 | 638 Voss, Houston TX    | M    | 40000.00 | 888665555 |   5 |
| Joyce    | A     | English | 453453453 | 1972-07-31 | 5631 Rice, Houston TX   | F    | 25000.00 | 333445555 |   5 |
| Ramesh   | K     | Narayan | 666884444 | 1962-09-15 | 975 Fire Oak, Humble TX | M    | 38000.00 | 333445555 |   5 |
| James    | E     | Borg    | 888665555 | 1937-11-10 | 450 Stone, Houston TX   | M    | 55000.00 | NULL      |   1 |
| Jennifer | S     | Wallace | 987654321 | 1941-06-20 | 291 Berry, Bellaire TX  | F    | 43000.00 | 888665555 |   4 |
| Ahmad    | V     | Jabbar  | 987987987 | 1969-03-29 | 980 Dallas, Houston TX  | M    | 25000.00 | 987654321 |   4 |
| Alicia   | J     | Zelaya  | 999887777 | 1968-01-19 | 3321 Castle, Spring TX  | F    | 25000.00 | 987654321 |   4 |
+----------+-------+---------+-----------+------------+-------------------------+------+----------+-----------+-----+
8 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM DEPARTMENT;
+----------------+---------+-----------+-----------------+
| Dname          | Dnumber | Mgr_ssn   | Mgr_start_date  |
+----------------+---------+-----------+-----------------+
| Headquarters   |       1 | 888665555 | 1981-06-19      |
| Administration |       4 | 987654321 | 1995-01-01      |
| Research       |       5 | 333445555 | 1988-05-22      |
+----------------+---------+-----------+-----------------+
3 rows in set (0.01 sec)
```

```
mysql> SELECT * FROM DEPT_LOCATIONS;
+---------+-----------+
| Dnumber | Dlocation |
+---------+-----------+
|       1 | Houston   |
|       4 | Stafford  |
|       5 | Bellaire  |
|       5 | Houston   |
|       5 | Sugarland |
+---------+-----------+
5 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM PROJECT;
+-----------------+---------+-----------+------+
| Pname           | Pnumber | Plocation | Dnum |
+-----------------+---------+-----------+------+
| ProductX        |       1 | Bellaire  |    5 |
| ProductY        |       2 | Sugarland |    5 |
| ProductZ        |       3 | Houston   |    5 |
| Computerization |      10 | Stafford  |    4 |
| Reorganization  |      20 | Houston   |    1 |
| Newbenefits     |      30 | Stafford  |    4 |
+-----------------+---------+-----------+------+
6 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM WORKS_ON;
+-----------+-----+-------+
| Essn      | Pno | Hours |
+-----------+-----+-------+
| 123456789 |   1 |  32.5 |
| 123456789 |   2 |   7.5 |
| 333445555 |   2 |  10.0 |
| 333445555 |   3 |  10.0 |
| 333445555 |  10 |  10.0 |
| 333445555 |  20 |  10.0 |
| 453453453 |   1 |  20.0 |
| 453453453 |   2 |  20.0 |
| 666884444 |   3 |  40.0 |
| 888665555 |  20 |   0.0 |
| 987654321 |  20 |  15.0 |
| 987654321 |  30 |  20.0 |
| 987987987 |  10 |  35.0 |
| 987987987 |  30 |   5.0 |
| 999887777 |  10 |  10.0 |
| 999887777 |  30 |  30.0 |
+-----------+-----+-------+
16 rows in set (0.00 sec)
```

1. Retrieve the names of all employees in department 5 who work more than 10 hours per week on the ‘ProductX’ project.

```
mysql> SELECT E.Fname, E.Lname
    -> FROM EMPLOYEE E
    -> JOIN WORKS_ON W ON E.Ssn = W.Essn
    -> JOIN PROJECT P ON W.Pno = P.Pnumber
    -> WHERE E.Dno = 5 AND W.Hours > 10 AND P.Pname = 'ProductX';
+-------+---------+
| Fname | Lname   |
+-------+---------+
| John  | Smith   |
| Joyce | English |
+-------+---------+
2 rows in set (0.03 sec)
```

2. List the names of all employees who have a dependent with the same first name as themselves.

```
mysql> SELECT E.Fname, E.Lname
    -> FROM EMPLOYEE E
    -> JOIN DEPENDENT D ON E.Ssn = D.Essn
    -> WHERE E.Fname = D.Dependent_name;
Empty set (0.00 sec)
```

3. Find the names of employees who are directly supervised by ‘Franklin Wong’.

```
mysql> SELECT E.Fname, E.Lname
    -> FROM EMPLOYEE E
    -> JOIN EMPLOYEE S ON E.Super_ssn = S.Ssn
    -> WHERE S.Fname = 'Franklin' AND S.Lname = 'Wong';
+--------+---------+
| Fname  | Lname   |
+--------+---------+
| John   | Smith   |
| Joyce  | English |
| Ramesh | Narayan |
+--------+---------+
3 rows in set (0.00 sec)
```

4. Retrieve the names of employees who work on every project.

```
mysql> SELECT E.Fname, E.Lname
    -> FROM EMPLOYEE E
    -> WHERE NOT EXISTS (
    ->     SELECT P.Pnumber
    ->     FROM PROJECT P
    ->     WHERE NOT EXISTS (
    ->         SELECT W.Essn
    ->         FROM WORKS_ON W
    ->         WHERE W.Pno = P.Pnumber AND W.Essn = E.Ssn
    ->     )
    -> );
Empty set (0.02 sec)
```

5. Retrieve the names of employees who do not work on any project.

```
mysql> SELECT E.Fname, E.Lname
    -> FROM EMPLOYEE E
    -> WHERE NOT EXISTS (
    ->     SELECT W.Essn
    ->     FROM WORKS_ON W
    ->     WHERE W.Essn = E.Ssn
    -> );
Empty set (0.00 sec)
```

6. Retrieve the names and addresses of all employees who work on at least one project located in Houston but whose department has no location in Houston.

```
mysql> SELECT DISTINCT E.Fname, E.Lname, E.Address
    -> FROM EMPLOYEE E
    -> JOIN WORKS_ON W ON E.Ssn = W.Essn
    -> JOIN PROJECT P ON W.Pno = P.Pnumber
    -> WHERE P.Plocation = 'Houston'
    -> AND E.Dno NOT IN (
    ->     SELECT D.Dnumber
    ->     FROM DEPT_LOCATIONS D
    ->     WHERE D.Dlocation = 'Houston'
    -> );
+----------+---------+-----------------------+
| Fname    | Lname   | Address               |
+----------+---------+-----------------------+
| Jennifer | Wallace | 291 Berry, Bellaire TX |
+----------+---------+-----------------------+
1 row in set (0.00 sec)
```

7. Retrieve the last names of all department managers who have no dependents.

```
mysql> SELECT E.Lname
    -> FROM EMPLOYEE E
    -> JOIN DEPARTMENT D ON E.Ssn = D.Mgr_ssn
    -> WHERE NOT EXISTS (
    ->     SELECT 1
    ->     FROM DEPENDENT Dep
    ->     WHERE Dep.Essn = E.Ssn
    -> );
+-------+
| Lname |
+-------+
| Borg  |
+-------+
1 row in set (0.02 sec)
```