Experiment 5

Aim: Perform string manipulation operations and aggregate functions with group by.. Having clause.

Hardware and Software Requirement: P-IV and above, Oracle

Theory:

1. ***Like Condition:***
   A LIKE condition specifies a test involving pattern matching.

   We describe patterns by using two special characters:

   • Percent (%): The % character matches any substring.

   • Underscore ( ): The character matches any character.

Syntax:

```
SELECT columns
FROM tables
WHERE column1 LIKE '%_';
```

Example:

List the customers whose name begin with the letters''

```
SELECT FName,LName
FROM cust
WHERE FName LIKE 'Ch%';
```

The % indicates that any number of character can follow the letter Ch.

```
select lower(name) || upper(name) from try;
select lower('RINA') from dual;
select upper(name) from try;
select * from try where name like '%mal%'
```

Logical operator:

1. ***OR operator:***

   The OR condition allows you to create an SQL statement where records are returned when any one of the conditions are met. It can be used in any valid SQL statement - select, insert, update, or delete.

Syntax:

```
SELECT columns
FROM tables
WHERE column1 = 'value1' or column2 = 'value2'
```

The OR condition requires that any of the conditions be must be met for the record to be included in the result set. In this case, column1 has to equal 'value1' OR column2 has to equal 'value2'.

Example:

```
SELECT *
FROM suppliers
WHERE city = 'New York'
or city = 'Newark';
```

This would return all suppliers that reside in either New York or Newark. Because the * is used in the select, all fields from the suppliers table would appear in the result set.

2. ***AND Operator:***

   The AND operator displays a record if both the first condition and the second condition is true.

Syntax:

```
SELECT columns
FROM tables
WHERE column1 = 'value1' and column2 = 'value2'
```

Example:

```
SELECT *
FROM  EMP
WHERE EmpTown = 'London' AND EmpAge > 30
```

3. ***NOT Operator:***

If you want to find rows that do not satisfy a condition, you can use the logical operator, NOT. NOT results in the reverse of a condition. That is, if a condition is satisfied, then the row is not returned.

Example:

If you want to find out the names of the students who do not play football, the query would be like:

```
SELECT first_name, last_name, games
FROM student_details
WHERE NOT games = 'Football' ;
```

- ***ORDER BY clause: Sorting of data in table***

The ORDER BY keyword is used to sort the result-set by a specified column.

The ORDER BY keyword sort the records in ascending order by default.

If you want to sort the records in a descending order, you can use the DESC keyword

Syntax:

```
SELECT "column_name"
FROM "table_name"
[WHERE "condition"]
ORDER BY "column_name" [ASC, DESC];
```

Aggregate functions

Aggregate functions return a single result row based on groups of rows, rather than on single rows.

avg: average value
min: minimum value
max: maximum value
sum: sum of values

count: number of values

Find the average account balance at the Perryridge branch

```
select avg (balance)
        from account
        where branch_name = 'Perryridge'
```

Find the number of tuples in the

```
select count (*)
        from customer
```

Find the number of depositors in the bank

```
select count (distinct customer_name)
        from depositor
```

Aggregate Functions – Group By

Find the number of depositors for each branch.

```
select branch_name, count (distinct
customer_name)
        from depositor, account
        where depositor.account_number = account.account_number
        group by branch_name
```

Find the names of all branches where the average account balance is more than 1,200.

```
select branch_name, avg (balance)
        from account
        group by branch_name
        having avg (balance) > 1200
```

predicates in the **having** clause are applied after the formation of groups whereas predicates in the **where** clause are applied before forming groups

select count(ename),dno from emp group by dno;

Conclusion: We have Successfully Performed string manipulation operations and aggregate functions with group by.. Having clause using SQL Command Line Client.

Code and Output:

MySQL 8.0 Command Line Client

```
mysql> SELECT * FROM employees WHERE last_name REGEXP '^al|si|an$' ORDER BY last_name;
+-------------+------------+-----------+-----------------------------+--------+------------+------------+
| employee_id | first_name | last_name | job_title                   | salary | reports_to | office_id |
+-------------+------------+-----------+-----------------------------+--------+------------+------------+
|       56274 | Keriann    | Alloisi   | VP Marketing                | 110150 |      37270 |          1 |
|       40448 | Mindy      | Crissil   | Staff Scientist             |  94860 |      37270 |          1 |
|       98374 | Estrellita | Daleman   | Staff Accountant IV         |  70187 |      37270 |          5 |
|       72913 | Kass       | Hefferan  | Computer Systems Analyst IV |  96401 |      37270 |          3 |
|       67370 | Elladine   | Rising    | Social Worker               |  96767 |      37270 |          2 |
+-------------+------------+-----------+-----------------------------+--------+------------+------------+
5 rows in set (0.00 sec)

mysql> SELECT * FROM employees where first_name LIKE '%ri%';
+-------------+------------+-----------+-----------------+--------+------------+------------+
| employee_id | first_name | last_name | job_title       | salary | reports_to | office_id |
+-------------+------------+-----------+-----------------+--------+------------+------------+
|       56274 | Keriann    | Alloisi   | VP Marketing    | 110150 |      37270 |          1 |
|       76196 | Mirilla    | Janowski  | Cost Accountant | 119241 |      37270 |          3 |
|       80679 | Mildrid    | Sokale    | Geologist II    |  67987 |      37270 |          4 |
+-------------+------------+-----------+-----------------+--------+------------+------------+
3 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM employees where first_name LIKE '%a%' and (salary >50000 and salary< 95000);
+-------------+------------+-----------+--------------------+--------+------------+-----------+
| employee_id | first_name | last_name | job_title          | salary | reports_to | office_id |
+-------------+------------+-----------+--------------------+--------+------------+-----------+
|       33391 | D'arcy     | Nortunen  | Account Executive  |  62871 |      37270 |         1 |
|       37270 | Yovonnda   | Magrannell| Executive Secretary|  63996 |       NULL |        10 |
|       84791 | Hazel      | Tarbert   | General Manager    |  93760 |      37270 |         4 |
|       98374 | Estrellita | Daleman   | Staff Accountant IV|  70187 |      37270 |         5 |
+-------------+------------+-----------+--------------------+--------+------------+-----------+
4 rows in set (0.00 sec)

mysql> SELECT * FROM employees e JOIN offices o ON e.office_id= o.office_id and (o.state = 'NY' or o.state='MH') ;
+-------------+------------+-----------+----------------------+--------+------------+-----------+-----------+-----------------+--------------+-------+
| employee_id | first_name | last_name | job_title            | salary | reports_to | office_id | office_id | address         | city         | state |
+-------------+------------+-----------+----------------------+--------+------------+-----------+-----------+-----------------+--------------+-------+
|       63196 | Alaster    | Scutchin  | Assistant Professor  |  32179 |      37270 |         2 |         2 | 5507 Becker Terrace | New York City | NY    |
|       67009 | North      | de Clerc  | VP Product Management| 114257 |      37270 |         2 |         2 | 5507 Becker Terrace | New York City | NY    |
|       67370 | Elladine   | Rising    | Social Worker        |  96767 |      37270 |         2 |         2 | 5507 Becker Terrace | New York City | NY    |
|       68249 | Nisse      | Voysey    | Financial Advisor    |  52832 |      37270 |         2 |         2 | 5507 Becker Terrace | New York City | NY    |
+-------------+------------+-----------+----------------------+--------+------------+-----------+-----------+-----------------+--------------+-------+
4 rows in set (0.01 sec)
```

MySQL 8.0 Command Line Client

```
mysql> SELECT * FROM employees e JOIN offices o ON  e.office_id= o.office_id and NOT (o.state = 'NY' or o.state='MH') ;
+-------------+------------+-----------+----------------------------+--------+------------+-----------+-----------+-----------------+--------------+-------+
| employee_id | first_name | last_name | job_title                  | salary | reports_to | office_id | office_id | address         | city         | state |
+-------------+------------+-----------+----------------------------+--------+------------+-----------+-----------+-----------------+--------------+-------+
|       33391 | D'arcy     | Nortunen  | Account Executive          |  62871 |      37270 |         1 |         1 | 03 Reinke Trail | Cincinnati   | OH    |
|       37851 | Sayer      | Matterson | Statistician III           |  98926 |      37270 |         1 |         1 | 03 Reinke Trail | Cincinnati   | OH    |
|       40448 | Mindy      | Crissil   | Staff Scientist            |  94860 |      37270 |         1 |         1 | 03 Reinke Trail | Cincinnati   | OH    |
|       56274 | Keriann    | Alloisi   | VP Marketing               | 110150 |      37270 |         1 |         1 | 03 Reinke Trail | Cincinnati   | OH    |
|       72540 | Guthrey    | Iacopetti | Office Assistant I         | 117690 |      37270 |         3 |         3 | 54 Northland Court | Richmond  | VA    |
|       72913 | Kass       | Hefferan  | Computer Systems Analyst IV|  96401 |      37270 |         3 |         3 | 54 Northland Court | Richmond  | VA    |
|       75900 | Virge      | Goodrum   | Information Systems Manager|  54578 |      37270 |         3 |         3 | 54 Northland Court | Richmond  | VA    |
|       76196 | Mirilla    | Janowski  | Cost Accountant            | 119241 |      37270 |         3 |         3 | 54 Northland Court | Richmond  | VA    |
|       80529 | Lynde      | Aronson   | Junior Executive           |  77182 |      37270 |         4 |         4 | 08 South Crossing | Cincinnati | OH    |
|       80679 | Mildrid    | Sokale    | Geologist II               |  67987 |      37270 |         4 |         4 | 08 South Crossing | Cincinnati | OH    |
|       84791 | Hazel      | Tarbert   | General Manager            |  93760 |      37270 |         4 |         4 | 08 South Crossing | Cincinnati | OH    |
|       95213 | Cole       | Kesterton | Pharmacist                 |  86119 |      37270 |         4 |         4 | 08 South Crossing | Cincinnati | OH    |
|       96513 | Theresa    | Binney    | Food Chemist               |  47354 |      37270 |         5 |         5 | 553 Maple Drive | Minneapolis  | MN    |
|       98374 | Estrellita | Daleman   | Staff Accountant IV        |  70187 |      37270 |         5 |         5 | 553 Maple Drive | Minneapolis  | MN    |
|      115357 | Ivy        | Fearey    | Structural Engineer        |  92710 |      37270 |         5 |         5 | 553 Maple Drive | Minneapolis  | MN    |
|       37270 | Yovonnda   | Magrannell| Executive Secretary        |  63996 |       NULL |        10 |        10 | 4 Bluestem Parkway | Savannah  | GA    |
+-------------+------------+-----------+----------------------------+--------+------------+-----------+-----------+-----------------+--------------+-------+
16 rows in set (0.00 sec)

mysql> SELECT upper(first_name) AS NAME FROM employees WHERE salary > (SELECT DISTINCT(AVG(salary)) FROM employees );
+----------+
| NAME     |
+----------+
| SAYER    |
| MINDY    |
| KERIANN  |
| NORTH    |
| ELLADINE |
| GUTHREY  |
| KASS     |
| MIRILLA  |
| HAZEL    |
| COLE     |
| IVY      |
+----------+
11 rows in set (0.00 sec)
```

```
mysql> SELECT LOWER(first_name) FROM employees WHERE first_name IN ('virge','kass');
+-------------------+
| LOWER(first_name) |
+-------------------+
| kass              |
| virge             |
+-------------------+
2 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM employees e JOIN offices o ON e.office_id= o.office_id GROUP BY o.city ;
+-------------+------------+-----------+--------------------+--------+------------+-----------+-----------+-------------------+--------------+-------+
| employee_id | first_name | last_name | job_title          | salary | reports_to | office_id | office_id | address           | city         | state |
+-------------+------------+-----------+--------------------+--------+------------+-----------+-----------+-------------------+--------------+-------+
|       33391 | D'arcy     | Nortunen  | Account Executive  |  62871 |      37270 |         1 |         1 | 03 Reinke Trail   | Cincinnati   | OH    |
|       37270 | Yovonnda   | Magrannell| Executive Secretary|  63996 |       NULL |        10 |        10 | 4 Bluestem Parkway| Savannah     | GA    |
|       63196 | Alaster    | Scutchin  | Assistant Professor|  32179 |      37270 |         2 |         2 | 5507 Becker Terrace| New York City| NY    |
|       72540 | Guthrey    | Iacopetti | Office Assistant I | 117690 |      37270 |         3 |         3 | 54 Northland Court| Richmond     | VA    |
|       96513 | Theresa    | Binney    | Food Chemist       |  47354 |      37270 |         5 |         5 | 553 Maple Drive   | Minneapolis  | MN    |
+-------------+------------+-----------+--------------------+--------+------------+-----------+-----------+-------------------+--------------+-------+
5 rows in set (0.00 sec)

mysql> SELECT * FROM employees e JOIN offices o ON e.office_id= o.office_id GROUP BY o.city having salary > avg(e.salary);
+-------------+------------+-----------+--------------------+--------+------------+-----------+-----------+-------------------+----------+-------+
| employee_id | first_name | last_name | job_title          | salary | reports_to | office_id | office_id | address           | city     | state |
+-------------+------------+-----------+--------------------+--------+------------+-----------+-----------+-------------------+----------+-------+
|       72540 | Guthrey    | Iacopetti | Office Assistant I | 117690 |      37270 |         3 |         3 | 54 Northland Court| Richmond | VA    |
+-------------+------------+-----------+--------------------+--------+------------+-----------+-----------+-------------------+----------+-------+
1 row in set (0.00 sec)
```

```
mysql> SELECT SUM(salary) AS sum_of_salary,MAX(salary) AS max_salary,MIN(salary) AS min_salary,AVG(salary) AS average_salary FROM employees;
+---------------+------------+------------+----------------+
| sum_of_salary | max_salary | min_salary | average_salary |
+---------------+------------+------------+----------------+
|       1650047 |     119241 |      32179 |     82502.3500 |
+---------------+------------+------------+----------------+
1 row in set (0.00 sec)
```