Aim: Demonstrate Data Fragmentation.

Objectives:

- To work with the syntax of Data Fragmentation.
- To understand the concepts of Data Fragmentation.

Tools Used:SQL Plus, Oracle 19c

Concepts: The process of dividing the database into smaller multiple parts or sub−tables is called fragmentation. The smaller parts or sub−tables are called fragments and are stored at different locations. Data fragmentation should be done in a way that the reconstruction of the original parent database from the fragments is possible.Database fragmentation is of three types: Horizontal fragmentation, Vertical fragmentation, and Mixed or Hybrid fragmentation.

1. **Horizontal Fragmentation:**It divides a table horizontally into a group of rows to create multiple fragments or subsets of a table.
2. **Vertical Fragmentation:**Vertical fragmentation refers to the process of decomposing a table vertically by attributes are columns.
3. **Hybrid or Mixed fragmentation:**The combination of vertical fragmentation of a table followed by further horizontal fragmentation of some fragments is called mixed or hybrid fragmentation.

1. Create Two users (User1<rollno> and User2<rollno>) using parent login

```
SQL> create user parent identified by pass;

User created.

SQL> grant all privileges to parent;

Grant succeeded.
```

```
SQL> connect parent;
Enter password:
Connected.
SQL> alter session set"_oracle_script"=true;

Session altered.

SQL> create user snehal1 identified by pass;

User created.

SQL> create user snehal2 identified by pass;

User created.

SQL> grant all privileges to snehal1;

Grant succeeded.

SQL> grant all privileges to snehal2;

Grant succeeded.
```

1. Create table employee with attributes empid, ename, address, salary, department inparent login.

Output:

```
SQL> create table employee8
  2  (empid number(5),
  3  ename varchar2(20),
  4  address varchar2(30),
  5  salary number(10),
  6  department varchar2(15));

Table created.
```

2. Create link to the previously created users from the parent login. Create table employee with attributes empid, ename, department with user1<rollno> login.

Output:

```
SQL> create database link link1 connect to snehal1 identified by pass using 'localhost/orcl';

Database link created.

SQL> create database link link2 connect to snehal2 identified by pass using 'localhost/orcl';

Database link created.
```

3. Create table employee with attributes empid, address and salary with user2<rollno>login.

Output:

```
SQL> connect snehal2
Enter password:
Connected.
```

```
SQL> create table emp(empid number(5),address varchar2(30), salary number(10));

Table created.
```

4. Create trigger for inserting records into fragmented table. Insert minimum 5 records in employee table created in parent.

Output:

```
SQL> connect parent
Enter password:
Connected.
SQL> create or replace trigger insert_value8
  2  after insert on employee8
  3  for each row
  4  begin
  5  execute immediate 'insert into emp@link1 values(:1,:2,:3)'
  6  using :new.empid, :new.ename, :new.department;
  7  execute immediate 'insert into emp@link2 values(:1,:2,:3)'
  8  using :new.empid, :new.address, :new.salary;
  9  end;
 10  /

Trigger created.
```

```
SQL> insert into employee8 values(101 ,'snehal', 'bhandup',100000,'IT');

1 row created.

SQL> insert into employee8 values(101 ,'swati', 'boisar',200000,'IT');

1 row created.

SQL> insert into employee8 values(101 ,'kalyani', 'virar',300000,'IT');

1 row created.

SQL> insert into employee8 values(101 ,'sanika', 'andheri',400000,'IT');

1 row created.

SQL> insert into employee8 values(101 ,'samruddhi', 'andheri',400000,'IT');

1 row created.
```

5. Display records from employee table of user1<rollno> and user2<rollno>.

Output:

```
SQL> connect parent
Enter password:
Connected.
SQL> connect snehal1
Enter password:
Connected.
SQL> select * from emp;

     EMPID ENAME                DEPARTMENT
---------- -------------------- ---------------
       101 snehal               IT
       101 swati                IT
       101 kalyani              IT
       101 sanika               IT
       101 samruddhi            IT

SQL> connect snehal2
Enter password:
Connected.
SQL> select * from emp;

     EMPID ADDRESS                             SALARY
---------- ------------------------------ ----------
       101 bhandup                            100000
       101 boisar                             200000
       101 virar                              300000
       101 andheri                            400000
       101 andheri                            400000
```

6. Display employees whose salary is more than 25000.

Output:

```
SQL> connect parent
Enter password:
Connected.
SQL> select * from employee8 where salary>25000;

     EMPID ENAME                ADDRESS                        SALARY
---------- -------------------- ------------------------------ ----------
DEPARTMENT
---------------
       101 snehal               bhandup                        100000
IT

       101 swati                boisar                         200000
IT

       101 kalyani              virar                          300000
IT


     EMPID ENAME                ADDRESS                        SALARY
---------- -------------------- ------------------------------ ----------
DEPARTMENT
---------------
       101 sanika               andheri                        400000
IT

       101 samruddhi            andheri                        400000
IT


SQL>
```

2. Create table movietab in parent login using attributes movie_title, Language, Length_in_min (LENGTH IN MINUTES), lead_actor, lead_actress.

Output :

```
SQL> create user snehal3 identified by pass;

User created.

SQL> grant all privileges to snehal3;

Grant succeeded.

SQL> connect snehal3;
Enter password:
Connected.
SQL> alter session set"_oracle_script"=true;

Session altered.
```

```
SQL> create user users1 identified by pass;

User created.

SQL> create user users2 identified by pass;

User created.

SQL> grant all privileges to users1;

Grant succeeded.

SQL> grant all privileges to users2;

Grant succeeded.

SQL> connect snehal3;
Enter password:
Connected.
SQL> create table movietable8(movie_title varchar2(20), language varchar2(20), duration_mins number,
  2  lead_actor varchar2(20), lead_actress varchar2(20));

Table created.
```

1. Create link to the users User1<rollno> & User2<rollno> from the parent login.

Output:

```
SQL> create database link link1 connect to users1 identified by pass using 'localhost/orcl';

Database link created.

SQL> create database link link2 connect to users2 identified by pass using 'localhost/orcl';

Database link created.
```

2. Create table movietab with same attributes in user1<rollno>.

Output:

```
SQL> connect users1;
Enter password:
Connected.
SQL> create table movietable8(movie_title varchar2(20), language varchar2(20), duration_mins number,
  2  lead_actor varchar2(20), lead_actress varchar2(20));

Table created.
```

3. Create table movietab with same attributes in user2<rollno>.

Output:

```
SQL> connect users2;
Enter password:
Connected.
SQL> create table movietable8(movie_title varchar2(20), language varchar2(20), duration_mins number,
  2  lead_actor varchar2(20), lead_actress varchar2(20));

Table created.
```

4. Create trigger in main user to insert data into fragmented table based on Length_in_min. (if Length_in_min are <60 then insert into movietab table of user1<rollno> otherwise in user2<rollno> movietab table)

Output:

```
SQL> create or replace trigger insert_val_frag8
  2  after insert on movietab8
  3  for each row
  4  begin
  5  if :new.duration_mins>60 then
  6  insert into movietab8@link2
  7  values(:new.movie_title,:new.language,:new.duration_mins,:new.lead_actor,:new.lead_actress);
  8  else
  9  insert into movietab8@link1
 10  values(:new.movie_title,:new.language,:new.duration_mins,:new.lead_actor,:new.lead_actress);
 11  end if;
 12  end;
 13  /

Trigger created.
```

```
SQL> insert into movietab8 values('barfi','hindi',65,'ranbir','priyanka');

1 row created.

SQL> insert into movietab8 values('Ludo','hindi',15,'aditya','aisha');

1 row created.

SQL> insert into movietab8 values('home alone','english',75,'boy','lady');

1 row created.

SQL> insert into movietab8 values('sairat','marathi',50,'aakash','rinku');

1 row created.
```

5. Display data from both the horizontal fragments.

Output:

```
SQL> connect user1;
Enter password:
Connected.
SQL> select * from movietab8;

MOVIE_TITLE          LANGUAGE             DURATION_MINS LEAD_ACTOR
-------------------- -------------------- ------------- --------------------
LEAD_ACTRESS
--------------------
Ludo                 hindi                           15 aditya
aisha

sairat               marathi                         50 aakash
rinku
```

```
SQL> connect user2;
Enter password:
Connected.
SQL> select * from movietab8;

MOVIE_TITLE          LANGUAGE             DURATION_MINS LEAD_ACTOR
-------------------- -------------------- ------------- --------------------
LEAD_ACTRESS
--------------------
barfi                hindi                           65 ranbir
priyanka

home alone           english                         75 boy
lady
```

Observation:

In this practical, I understand the concepts of data fragmentation and its various ways and their uses . By addressing fragmentation, we can enhance data organization, improve query performance, and ensure a more responsive and efficient database system.