**Fragmentation**

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. The restoration can be done using UNION or JOIN operations.

Database fragmentation is of three types: Horizontal fragmentation, Vertical fragmentation, and Mixed or Hybrid fragmentation.

**Horizontal Fragmentation**

It divides a table horizontally into a group of rows to create multiple fragments or subsets of a table. These fragments can then be assigned to different sites in the database. Reconstruction is done using UNION or JOIN operations. In relational algebra, it is represented as ?p(T) for any given table(T).

Example

In this example, we are going to see how the horizontal fragmentation looks in a table.

**Input :**

**STUDENT**

id name age salary

1 aman 21 20000

2 naman 22 25000

3 raman 23 35000

4 sonam 24 36000

Example

SELECT \* FROM student WHERE salary<35000;

SELECT \* FROM student WHERE salary>35000;

Output

id name age salary

1 aman 21 20000

2 naman 22 25000

id name age salary

4 soman 24 36000

There are three types of Horizontal fragmentation: Primary, Derived, and Complete Horizontal Fragmentation

**A: Primary Horizontal Fragmentation:**It is a process of segmenting a single table in a row?wise manner using a set of conditions.

Example

This example shows how the Select statement is used with a condition to provide output.

SELECT \* FROM student SALARY<30000;

Output

id name age salary

1 aman 21 20000

2 naman 22 25000

**B: Derived Horizontal Fragmentation:**Fragmentation that is being derived from primary relation.

Example

This example shows how the Select statement is used with the where clause to provide output.

SELECT \* FROM student WHERE age=21 AND salary<30000;

Output

id name age salary

1 aman 21 20000

**C: Complete horizontal fragmentation:**It derives a set of horizontal fragments to make the table have at least one partition.

**Vertical Fragmentation**

It divides a table vertically into a group of columns to create multiple fragments or subsets of a table. These fragments can then be assigned to different sites in the database. Reconstruction is done using full outer join operation.

Example

This example shows how the Select statement is used to do the fragmentation and to provide the output.

**Input Table :**

**STUDENT**

id name age salary

1 aman 21 20000

2 naman 22 25000

3 raman 23 35000

4 sonam 24 36000

Example

SELECT \* FROM name;#fragmentation 1

SELECT \* FROM id, age;#fragmentation 2

Output

name

aman

naman

raman

sonam

age

21

22

23

24

**Mixed or Hybrid Fragmentation**

It is done by performing both horizontal and vertical partitioning together. It is a group of rows and columns in relation.

Example

This example shows how the Select statement is used with the where clause to provide the output.

SELECT \* FROM name WHERE age=22;

Output

name age

naman 22