Experiment No. : 6

Title: Write a program to demonstrate set operations and joins.

Objectives:

1. To learn SQL set operations
2. To learn about inner join
3. To learn about left outer join
4. To learn about right outer join
5. To learn about full outer join

Key Concepts: set operations, Inner join, left outer join, right outer join, full outer join

Theory:

Set operations

SET operators are mainly used to combine the same type of data from two or more tables. Although more than one select statement will then be present, only one result set is returned.

Rules on Set Operations:

- The result sets of all queries must have the same number of columns.
- In every result set the data type of each column must match the data type of its corresponding column in the first result set.
- In order to sort the result, an ORDER BY clause should be part of the last statement.
- The records from the top query must match the positional ordering of the records from the bottom query.
- The column names or aliases must be found out by the first select statement.

Four Set Operators:

The four set operators union, union all, intersect and except allow us to serially combine two or more select statements.

Operator	Returns
UNION	Combine two or more result sets into a single set, without duplicates.
UNION ALL	Combine two or more result sets into a single set, including all duplicates.
INTERSECT	Takes the data from both result sets which are in common.
MINUS	Takes the data from first result set, but not the second (i.e. no matching to each other)

UNION

The SQL Union Operator is used to combine two tables using select statement when both tables have the same number of columns.Union works like Distinct.

```
SELECT Name,TotalMarks FROM students2000 UNION

SELECT Name,TotalMarks FROM students2005
```

UNION ALL

The SQL Union ALL Operator is used to combine two tables using select statement when both tables have the same number of columns. Union all DOES NOT do distinct.

```
SELECT Name,TotalMarks FROM students2000 UNION ALL

SELECT Name,TotalMarks FROM students2005
```

INTERSECT

INTERSECT returns any distinct values that are returned by both the query on the left and right sides of the INTERSECT operand.

```
SELECT Name,TotalMarks FROM students2000 INTERSECT

SELECT Name,TotalMarks FROM students2005
```

MINUS

MINUS query returns all rows which are in the first query but those are not returned in the second query.

```
SELECT Name,TotalMarks FROM students2000 MINUS
SELECT Name,TotalMarks FROM students2005
```

JOINS

Join is one of the fundamental units of relational database system. Generally Join is used to combine related data from many tables to produce result.

There are different types of joins available,

- Inner Join
- Left Outer Join
- Right Outer Join
- Full Outer Join
- Cross Join

Inner Join:

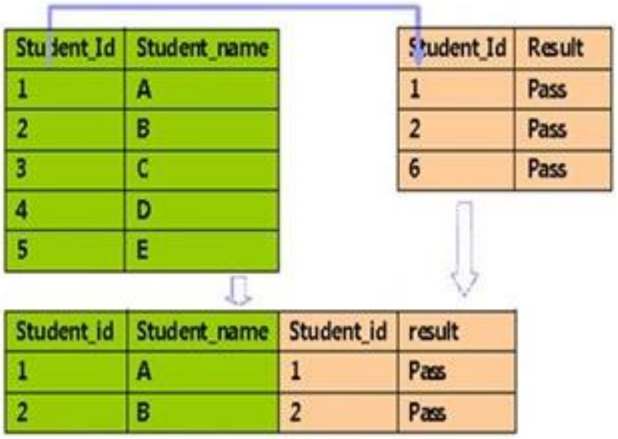
The default join is inner join. Inner join returns all matching records from the given datasets. The match is identified using predicates.

```
Select * from student INNER JOIN result ON  student.student_id = result.student_id
```

Outer Join

Outer join can be classified into Left outer join, Right outer join and Full outer join.

Student Table Result Table



Student_Id	Student_name
1	A
2	B
3	C
4	D
5	E

Student_Id	Result
1	Pass
2	Pass
6	Pass

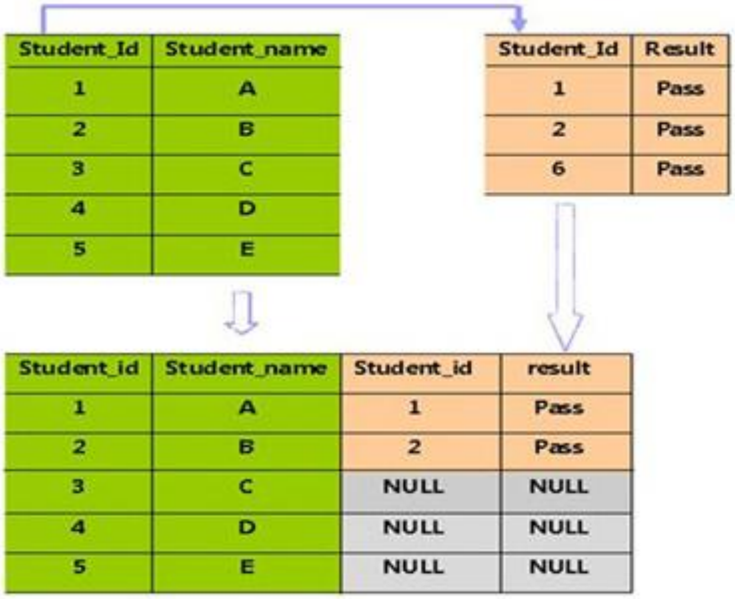
Student_id	Student_name	Student_id	result
1	A	1	Pass
2	B	2	Pass

Left outer join

Left outer join returns all records from left table, at the same time, it brings all matching rows from right table for the given predicate and NULL appears in right side when no matching row exists.

Left outer join can also be defined as "result set of inner join + missed records from left table with NULL in the right hand side"

Student Table Result Table



Student_Id	Student_name
1	A
2	B
3	C
4	D
5	E

Student_Id	Result
1	Pass
2	Pass
6	Pass

Student_id	Student_name	Student_id	result
1	A	1	Pass
2	B	2	Pass
3	C	NULL	NULL
4	D	NULL	NULL
5	E	NULL	NULL

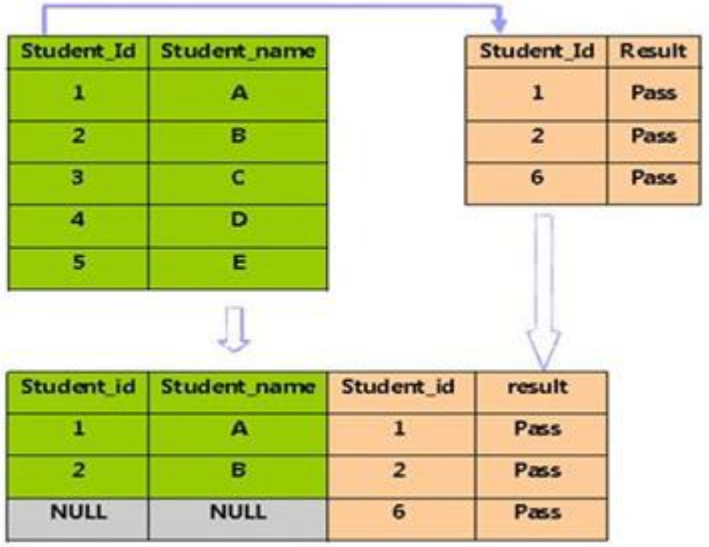
Select * from student LEFT OUTER JOIN result ON student.student_id = result.student_id

Right outer join

Right outer join returns all records from right table, at the same time, it brings all matching rows from left table for the given predicate, and NULL appears in left side when no matching row exists.

Right outer join can also defined as “result set of inner join + missed records from right table with NULL in the left hand side”

Student Table Result Table



Student_Id	Student_name
1	A
2	B
3	C
4	D
5	E

Student_Id	Result
1	Pass
2	Pass
6	Pass

Student_id	Student_name	Student_id	result
1	A	1	Pass
2	B	2	Pass
NULL	NULL	6	Pass

Select * from student RIGHT OUTER JOIN result ON student.student_id = result.student_id

Full outer join

A full outer join returns all rows in both the left and right tables. Any time a row has no match in the other table, such columns from the other table contain null values. When there is a match between the tables, the entire result set row contains data values from the base tables.

Select * from student FULL OUTER JOIN result ON student.student_id = result.student_id

Cross join

In Cross join every row of one table is matched with every row of another table. Cartesian join and cross join are same. If T1 and T2 are two sets then T1 X T2 return T1 * T2 rows.

SELECT * FROM EMP CROSS JOIN DEPT;

SELECT * FROM EMP, DEPT;

In first statement it is specified explicitly, Second one is implicit.

Algorithm:

1. Start
2. Create two tables by taking field information from user
3. Insert data into above created tables.
4. Write SQL query to demonstrate use of set operations- union, union all, minus, intersect
5. Write SQL query to retrieve data using inner join.
6. Write SQL query to retrieve data using left outer join.
7. Write SQL query to retrieve data using right outer join.
8. Write SQL query to retrieve data using full outer join.
9. Write SQL query to retrieve data using cross join.
10. Execute SQL queries through java program.
11. Stop.