PostgreSQL: Database Joins
Retrieving Data from Multiple Tables

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In Last Module

- **Basics of SELECT statement**

- **Updating data into a table**

- **Inserting data into a table**

- **Deleting data from a table**

In This Module

- **Retrieving data from more multiple tables**

- **Basics of Join**
    - Inner Join
    - Outer Join
        - Left Outer Join
        - Right Outer Join
        - Full Outer Join
    - Cross Join

Scenario Setup

- **Two Database Administrators**
- **Rahul – Sr. Database Administrator**
- **Mike – Jr. Database Administrator**

Rahul

Mike

Scenario Setup

- **Two Database Administrators and a Teacher**
- **Rahul – Sr. Database Administrator**
- **Mike – Jr. Database Administrator**
- **Troy – School Teacher**

Rahul

Mike

Troy

Scenario Setup

- **We have three tables –**
  - Students
  - Classes
  - StudentClass
- **The student can sign up maximum of three classes**
- **In summer student can opt out and can sign up for no classes**

Scenario 1

Task:

☐ Troy wants to retrieve all the students who have signed up for classes in the summer.

- **Rahul's hint to Mike:**

☐ Learn Inner Join

Inner Join

- **INNER join returns rows when there is at least one match in both the tables**

- **Avoid ambiguity by qualifying each column name with table name**

- **Join tables based on relationships as well ad-hoc**

- **Operators for Join**

  - =

  - >

  - <

  - <=
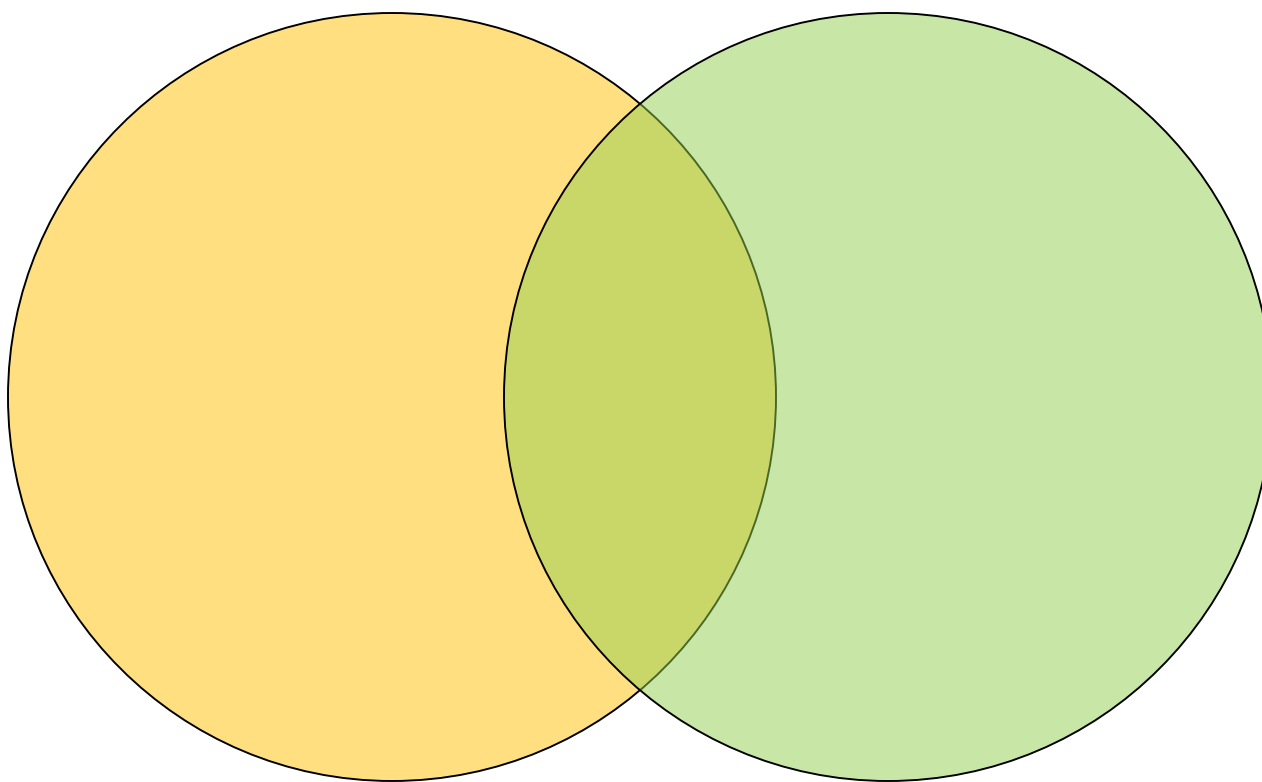
  - >=

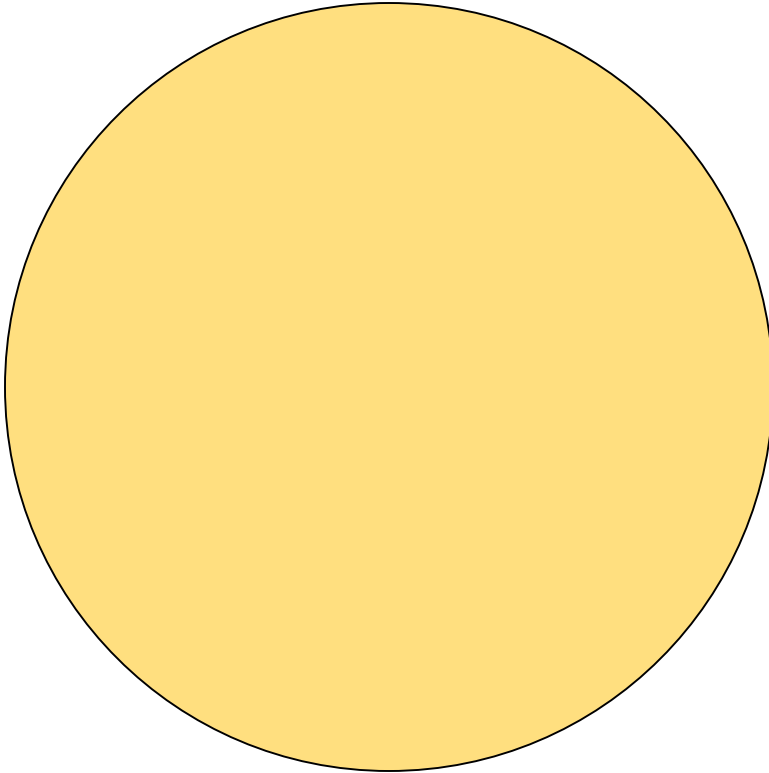# Inner Join

Table 1   Table 2
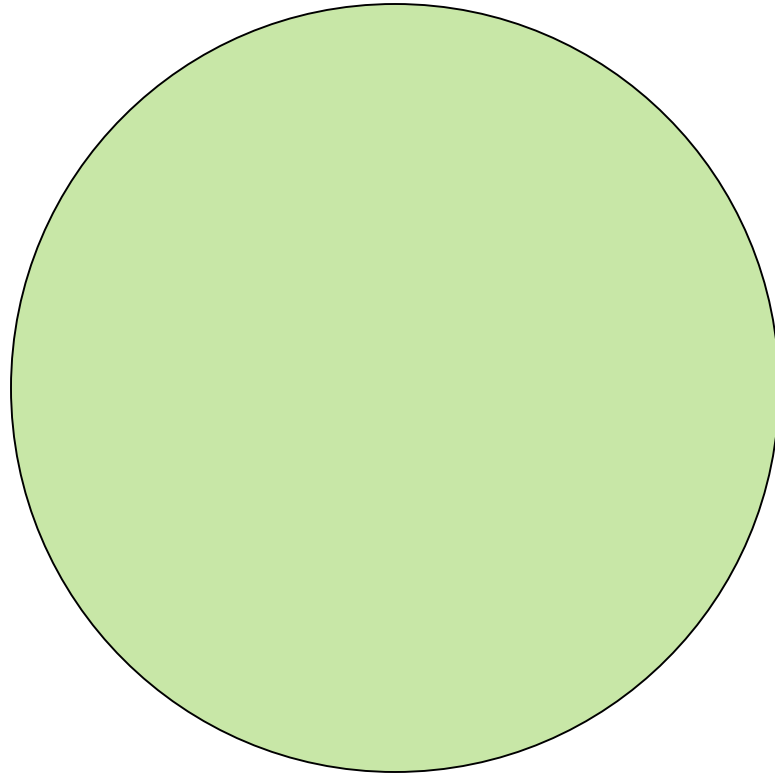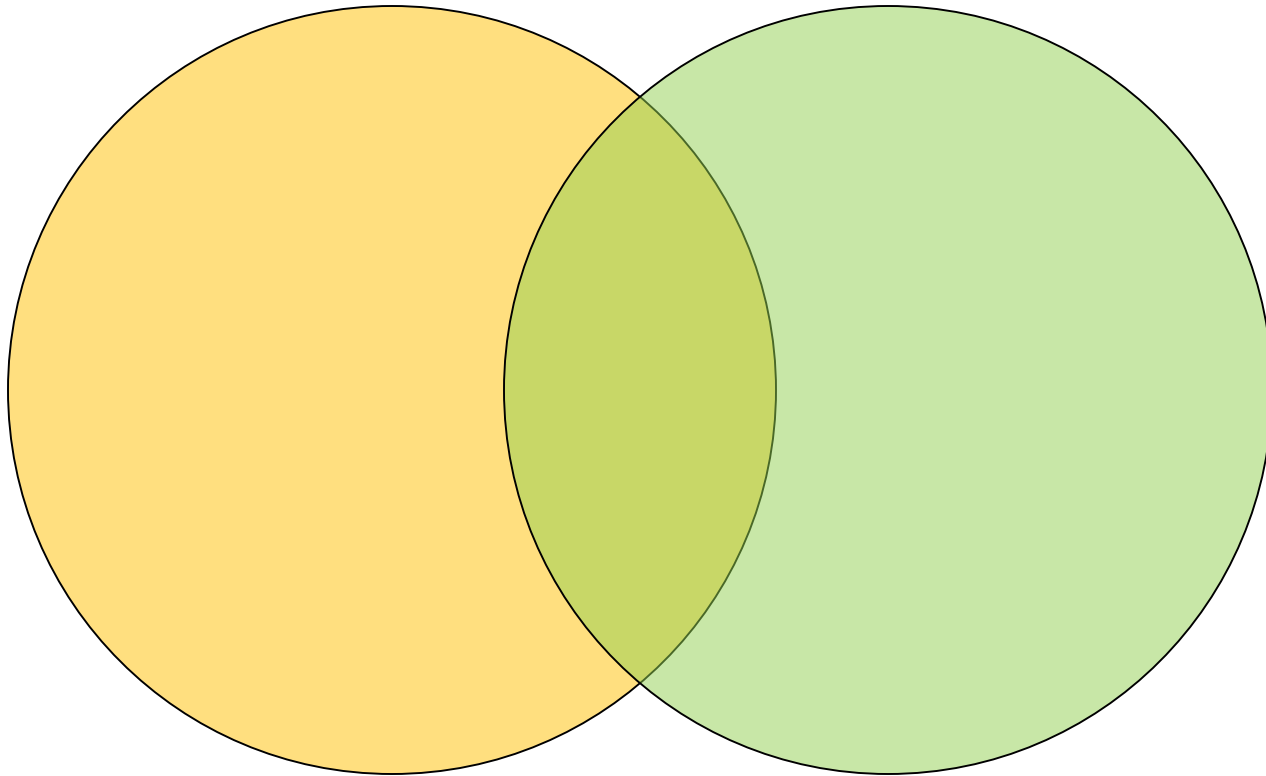
Inner Join

Table 1

Inner Join

Table 2

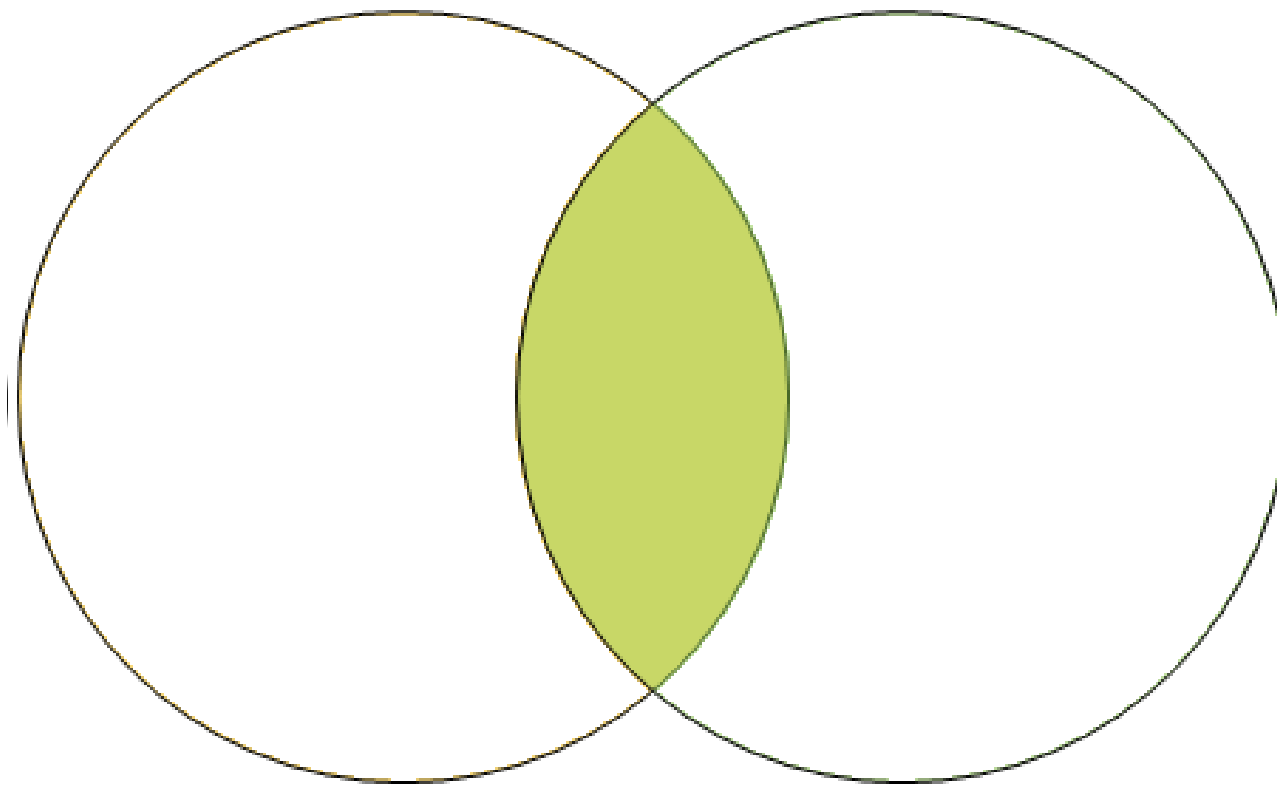# Inner Join

Table 1   Table 2

Inner Join

Table 1   Table 2

Scenario 1

Task:

□ Troy wants to retrieve all the students who have signed up for classes in the summer.

- **Rahul's hint to Mike:**

□ Learn Inner Join

Scenario 2

Task:

- ❑ Troy wants to retrieve all the students who have signed up for no classes in the summer.

- ■ **Rahul's hint to Mike:**

  - ❑ Learn Left Outer Join

Left Outer Join

- **LEFT OUTER join returns all the rows from the left table with the matching rows from the right table**

- **If there are no columns matching in the right table, it returns NULL values**
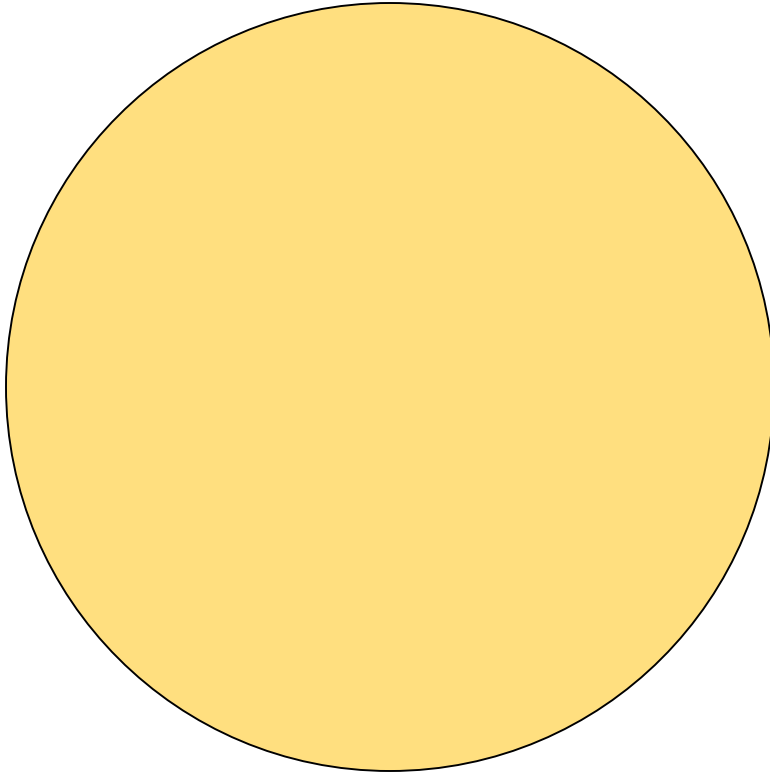
Left Outer Join

Left Outer Join

Table 1

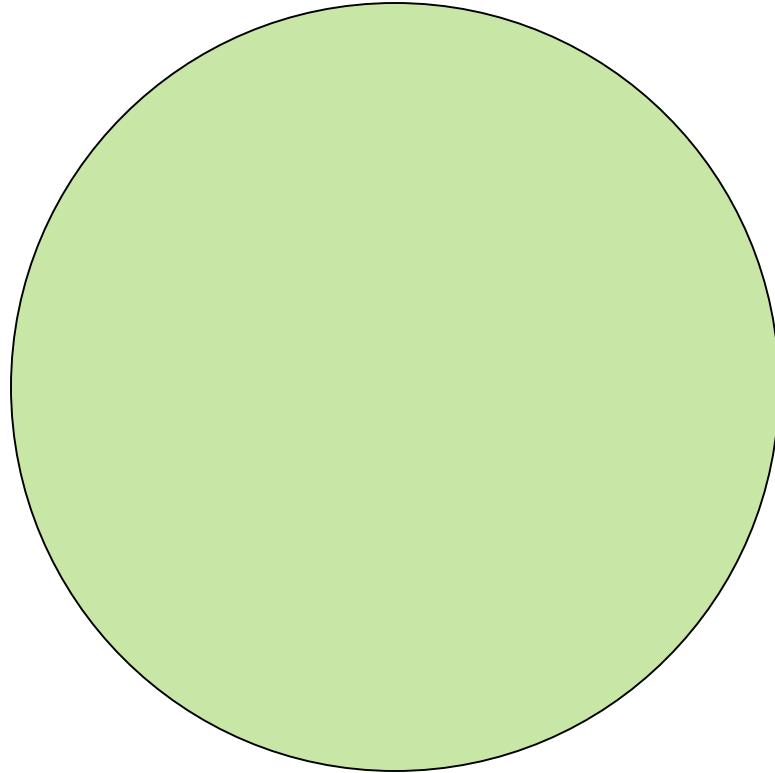# Left Outer Join

Table 2

Left Outer Join

Table 1   Table 2
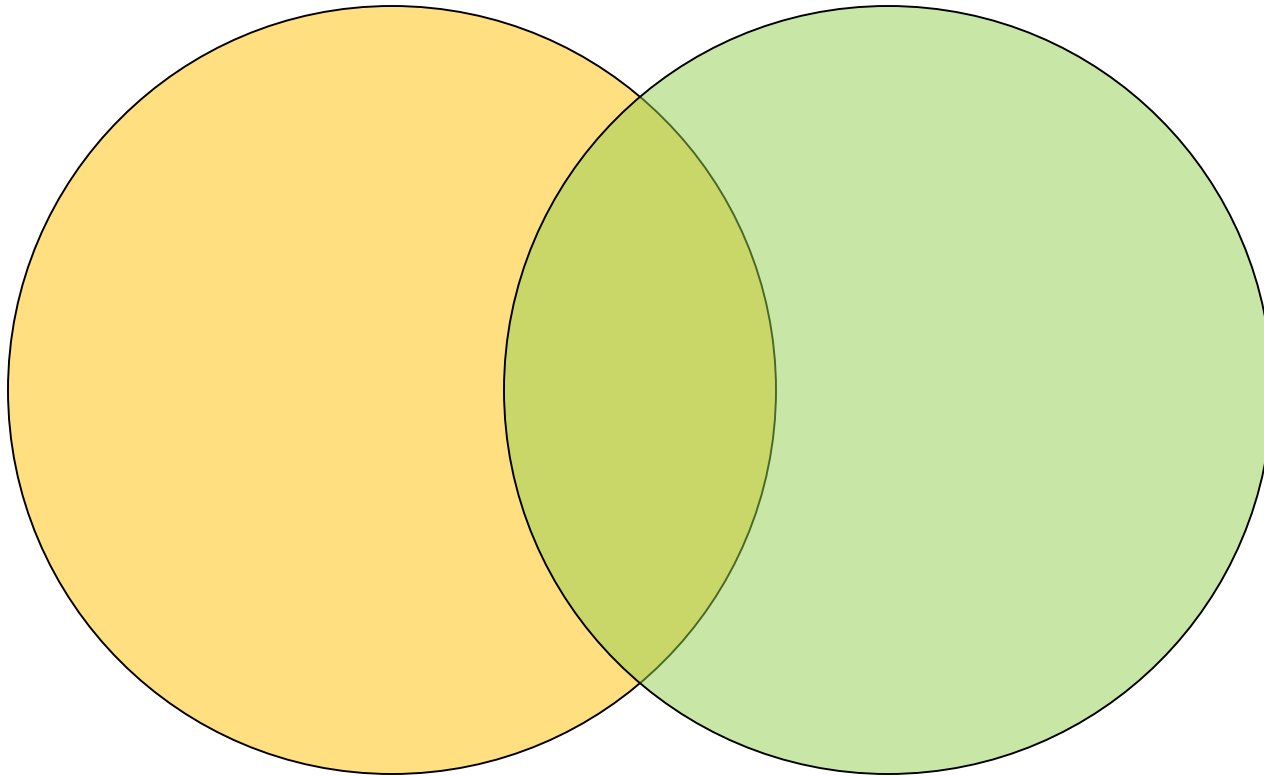
Left Outer Join

Table 1   Table 2

Scenario 2

Task:

◻ Troy wants to retrieve all the students who have signed up for no classes in the summer.

■ **Rahul's hint to Mike:**

◻ Learn Left Outer Join

Scenario 3

Task:

- Troy wants to retrieve all the classes not signed up by any student in the summer.

- **Rahul's hint to Mike:**

  - Learn Right Outer Join

Right Outer Join

- **RIGHT OUTER join returns all the rows from the right table with the matching rows from the left table**

- **If there are no columns matching in the left table, it returns NULL values**

Right Outer Join

Right Outer Join
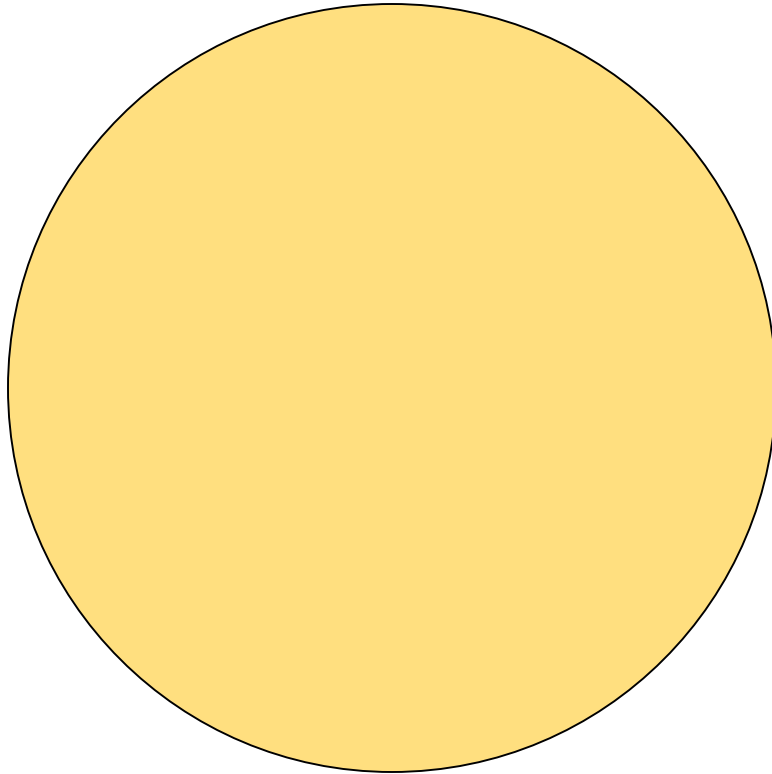
Table 1

Right Outer Join

Table 2

Right Outer Join
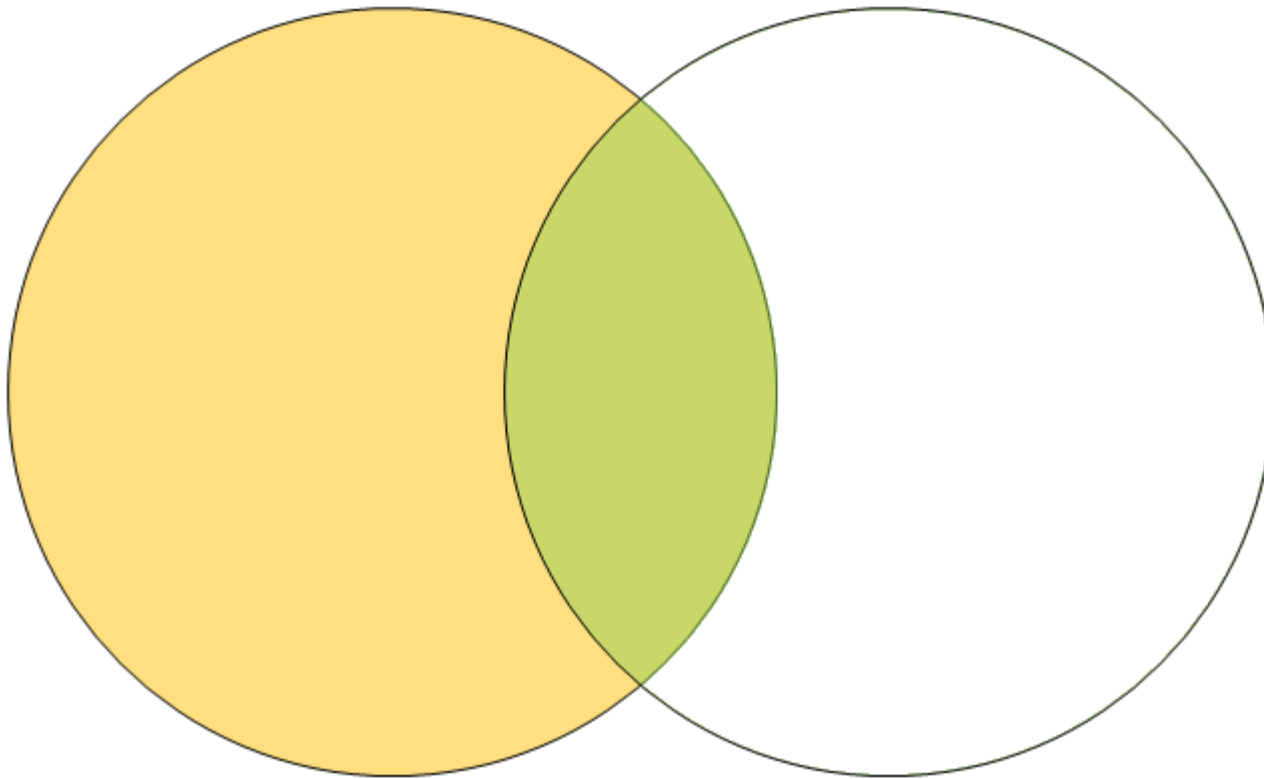

Table 1   Table 2
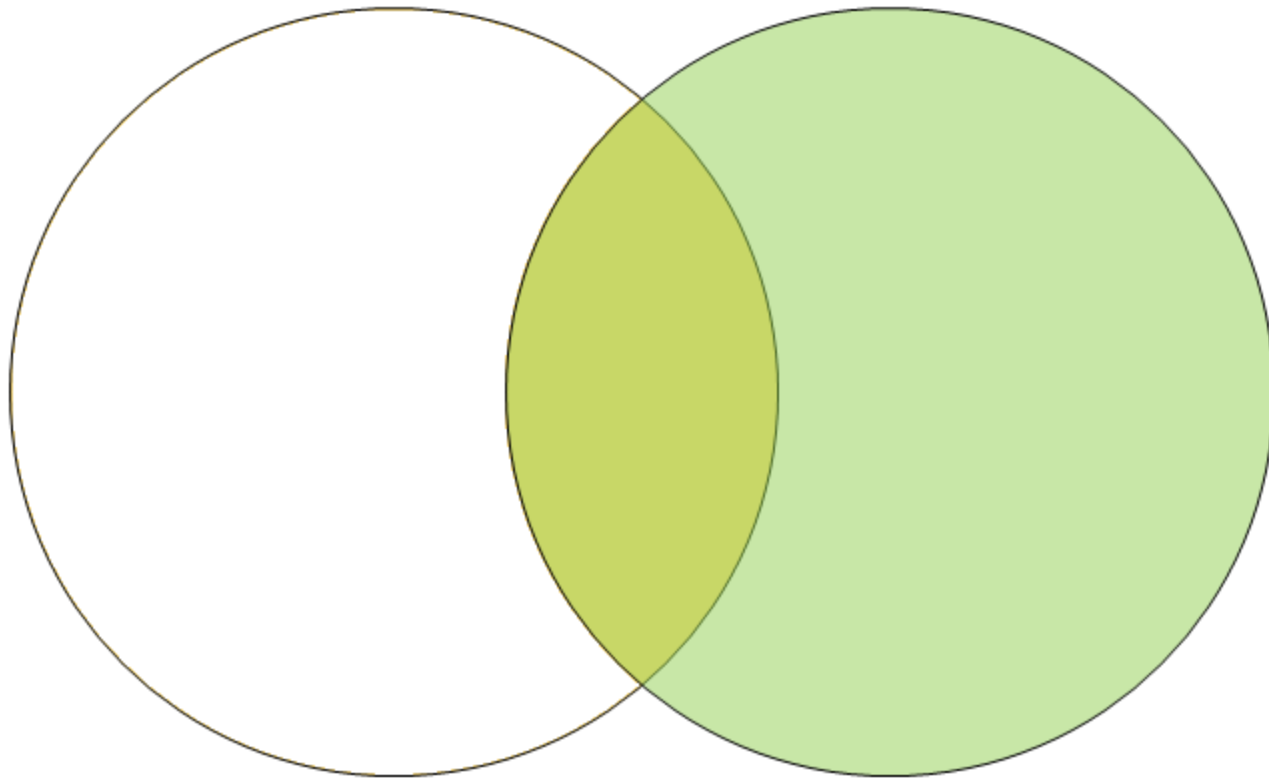
Right Outer Join

Table 1   Table 2

Scenario 3

Task:

- Troy wants to retrieve all the classes not signed up by any student in the summer.

- **Rahul's hint to Mike:**

  - Learn Right Outer Join

Scenario 4

Task:

☐ Troy wants to see how big the class can grow if all the students sign up for all the classes in the summer.

- **Rahul's hint to Mike:**

  ☐ Learn Cross Join

Cross Join

- **CROSS join is a Cartesian join that does not necessitate any condition to join**

- **The result set contains records that are multiples of the record number of both the tables**

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1

Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1

Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1

Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1

Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1

Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1   Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1   Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1   Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1   Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1   Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1   Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1   Table 2

Cross Join

ID	Value
1	First
2	Second
3	Third
4	Fourth
5	Fifth

ID	Value
1	First
2	Second
3	Third
6	Sixth
7	Seventh
8	Eighth

Table 1   Table 2

Cross Join

Table 1

Table 2

	ID	Value
1	1	First
2	2	Second
3	3	Third
4	4	Fourth
5	5	Fifth
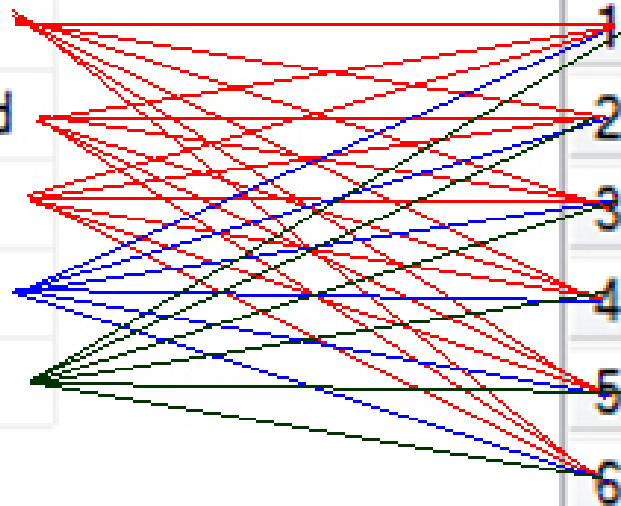
	ID	Value
1	1	First
2	2	Second
3	3	Third
4	6	Sixth
5	7	Seventh
6	8	Eighth

	ID	Value	ID	Value
1	1	First	1	First
2	1	First	2	Second
3	1	First	3	Third
4	1	First	6	Sixth
5	1	First	7	Seventh
6	1	First	8	Eighth
7	2	Second	1	First
8	2	Second	2	Second
9	2	Second	3	Third
10	2	Second	6	Sixth
11	2	Second	7	Seventh
12	2	Second	8	Eighth
13	3	Third	1	First

Scenario 4

Task:

□ Troy wants to see how big the class can grow if all the students sign up for all the classes in the summer.

- **Rahul's hint to Mike:**

□ Learn Cross Join

Scenario 5

Task:

□ Troy wants to see a list of enrolled students along with students who did not sign up for any classes as well as a classes not signed up by any students.

▪ **Rahul's hint to Mike:**

□ Learn Full Outer Join

Full Outer Join

- **FULL OUTER join combines left outer join and right outer join**

- **This join returns rows from either table when the conditions are met and returns a null value when there is no match**
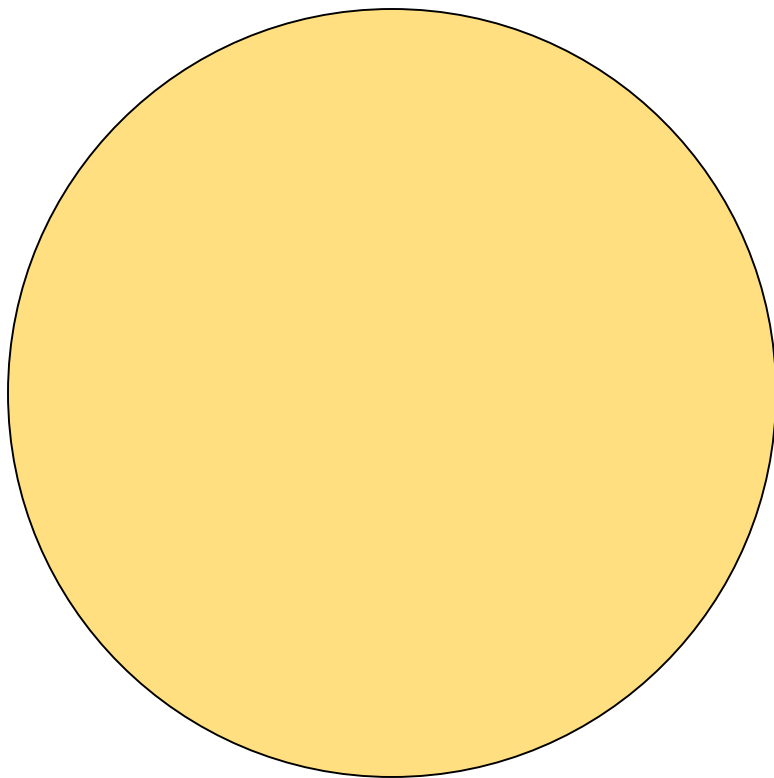
Full Outer Join

Full Outer Join

Table 1

Full Outer Join
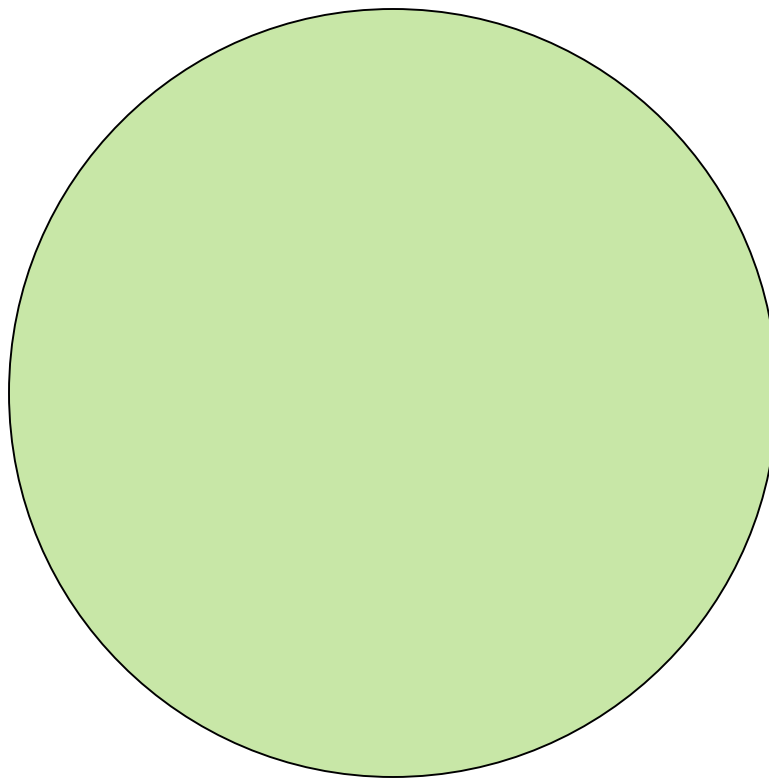
Table 2

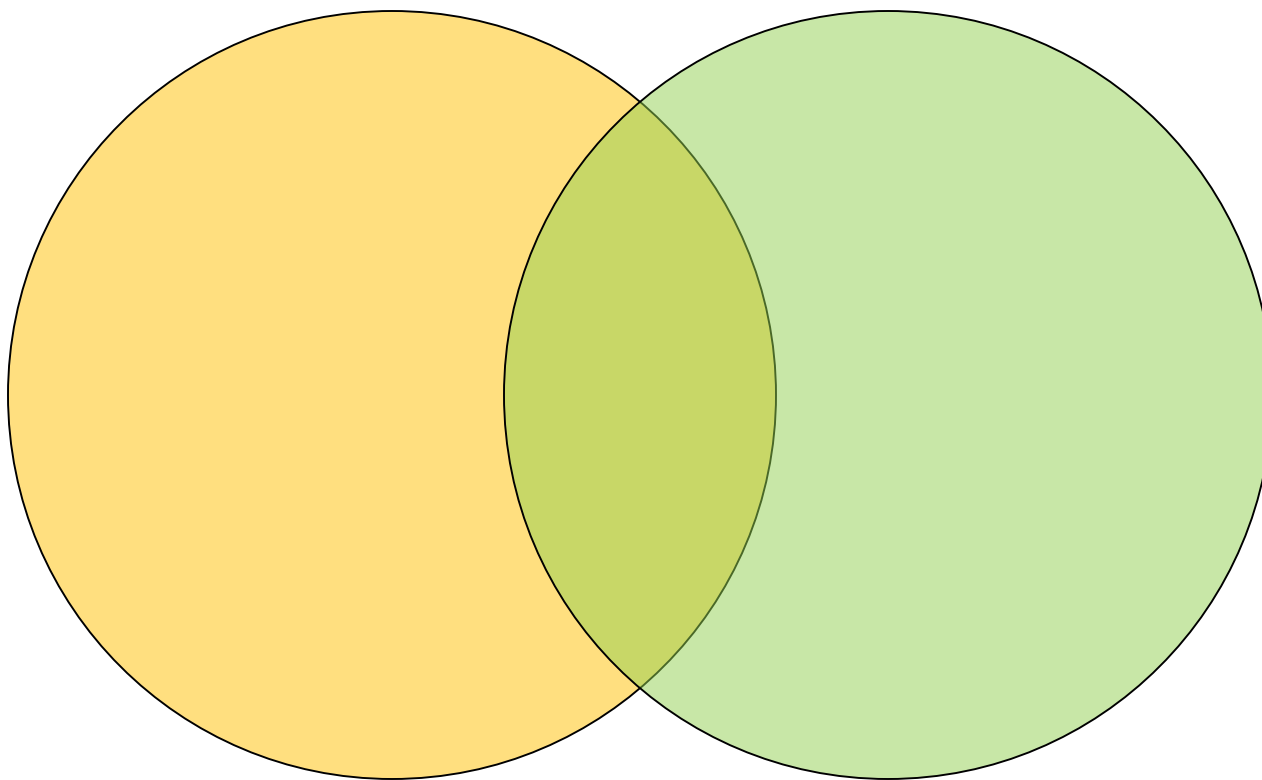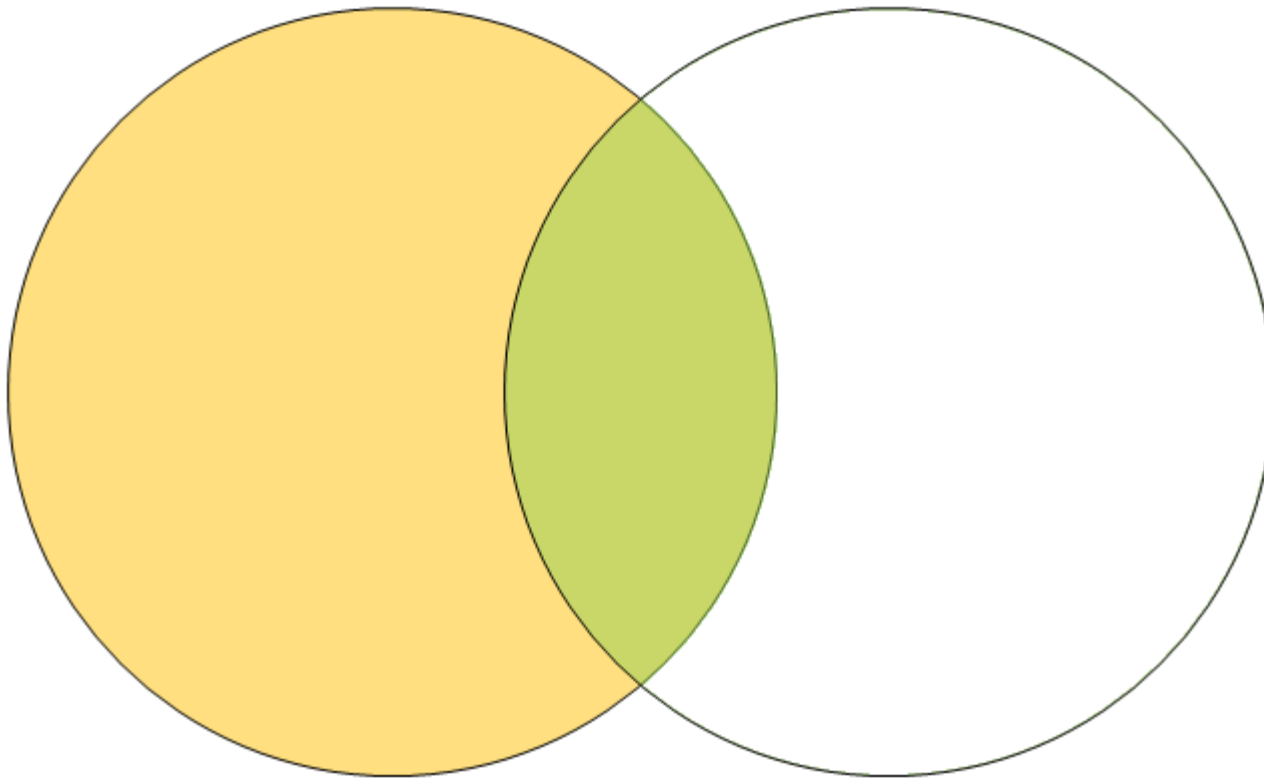# Full Outer Join

Table 1   Table 2

Left Outer Join

Table 1   Table 2
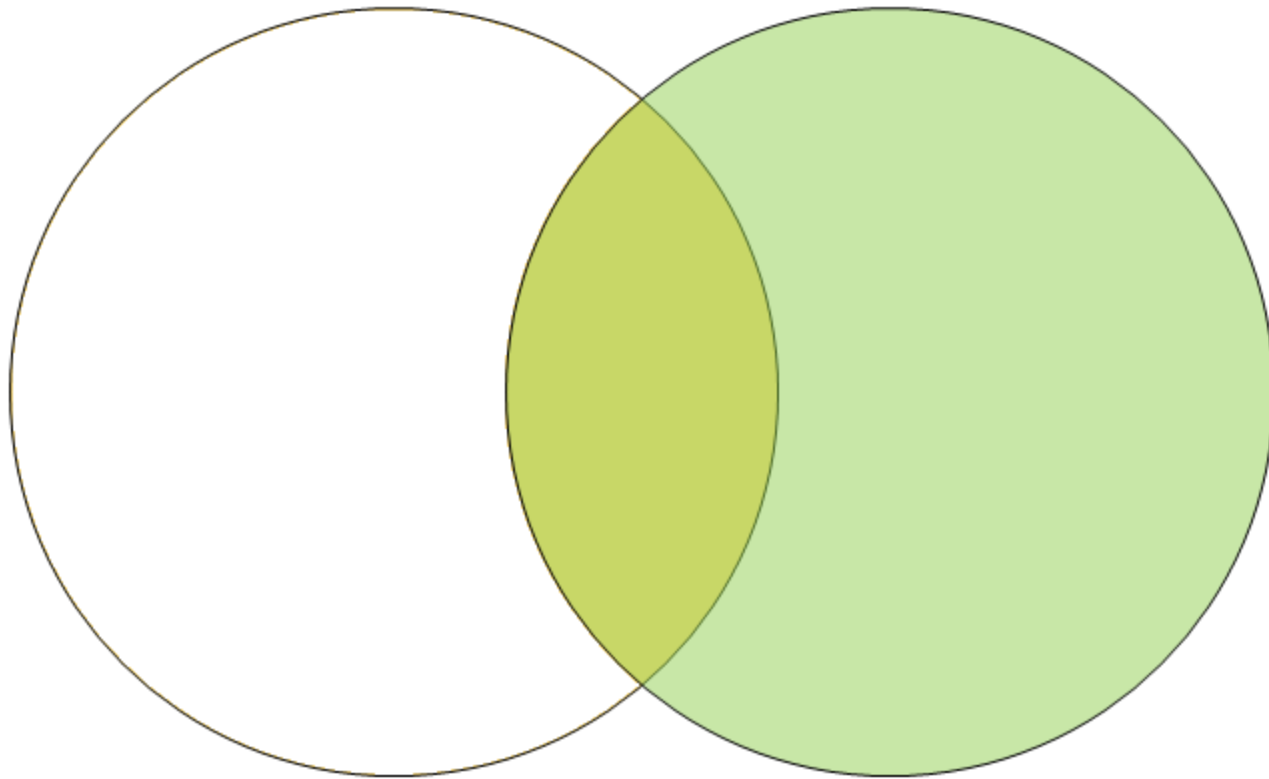
Right Outer Join

Table 1   Table 2

Full Outer Join
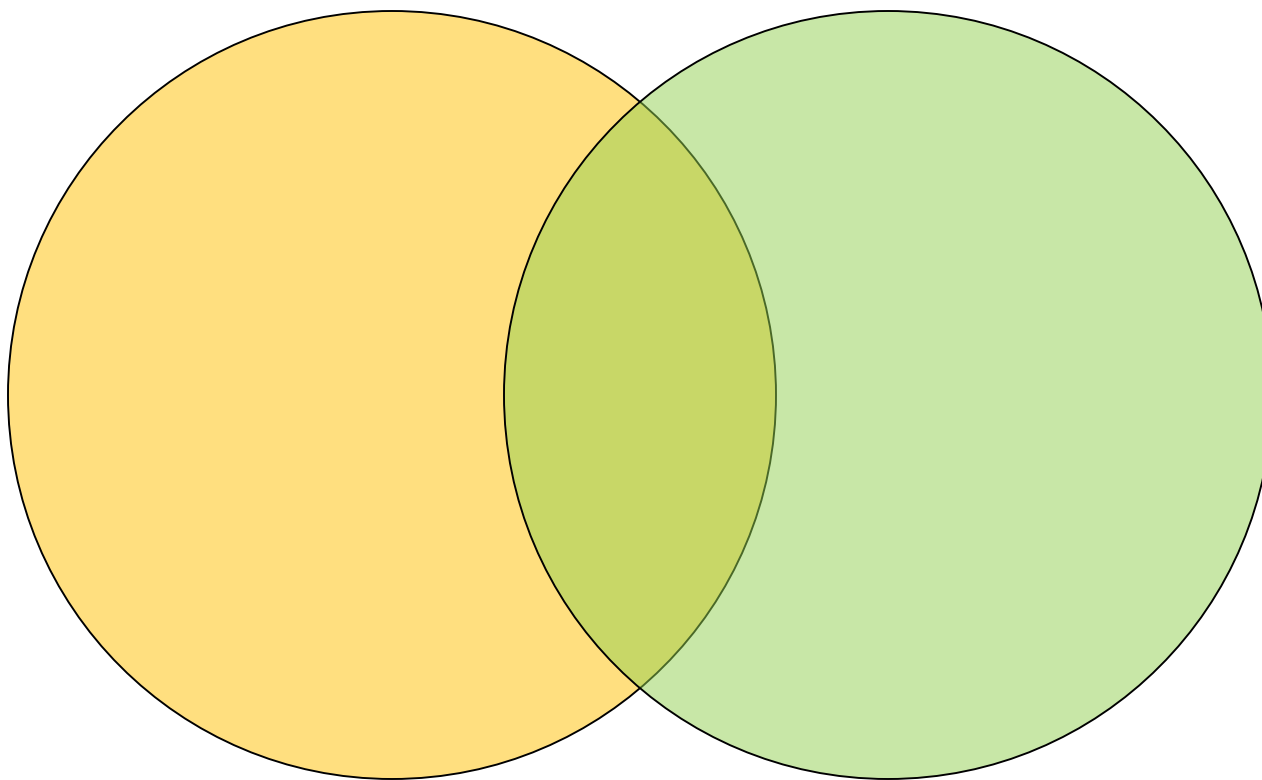

Table 1   Table 2

Scenario 5

Task:

 Troy wants to see a list of enrolled students along with students who did not sign up for any class as well as a class not signed up by any students.

■ Rahul's hint to Mike:

 Learn Full Outer Join

Summary

- **A SQL JOIN combines columns from two or more tables in a single result set**

- **Basics of Join**

  - Inner Join

  - Outer Join

    - Left Outer Join

    - Right Outer Join

    - Full Outer Join

  - Cross Join

- **Always alias your column with table to avoid ambiguity in the code**