# Using the Set Operators

Objectives

After completing this lesson, you should be able to do the following:

- Describe set operators
- Use a set operator to combine multiple queries into a single query
- Control the order of rows returned

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Set Operators

A **B**   **A** **B**

`UNION/UNION ALL`

A **B**

`INTERSECT`

A **B**

`MINUS`

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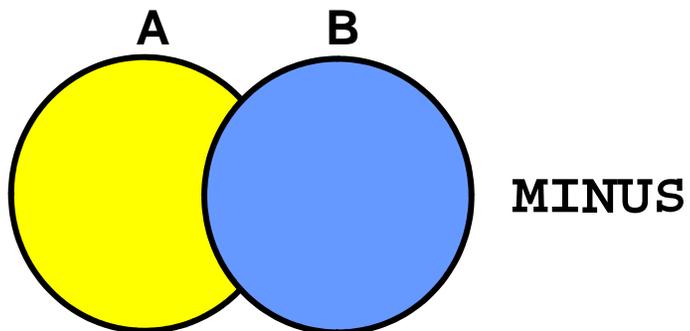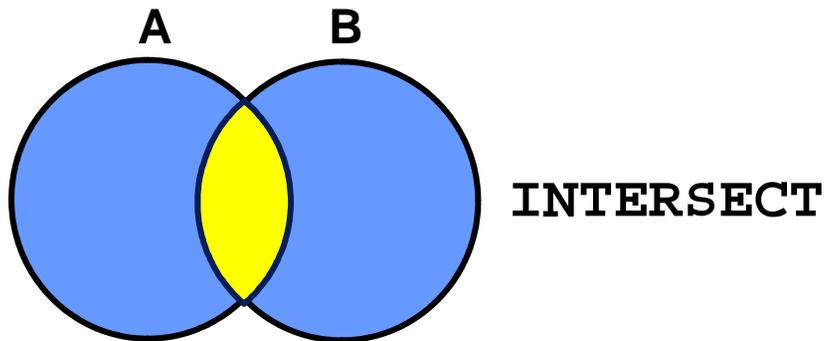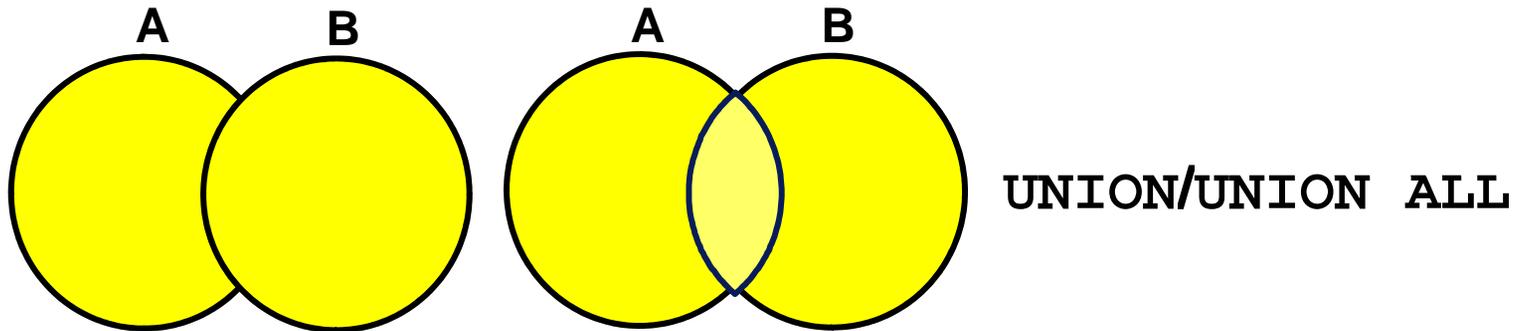
Tables Used in This Lesson

The tables used in this lesson are:

- **`EMPLOYEES`: Provides details regarding all current employees**

- **`JOB_HISTORY`: Records the details of the start date and end date of the former job, and the job identification number and department when an employee switches jobs**

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`UNION` Operator

A   B
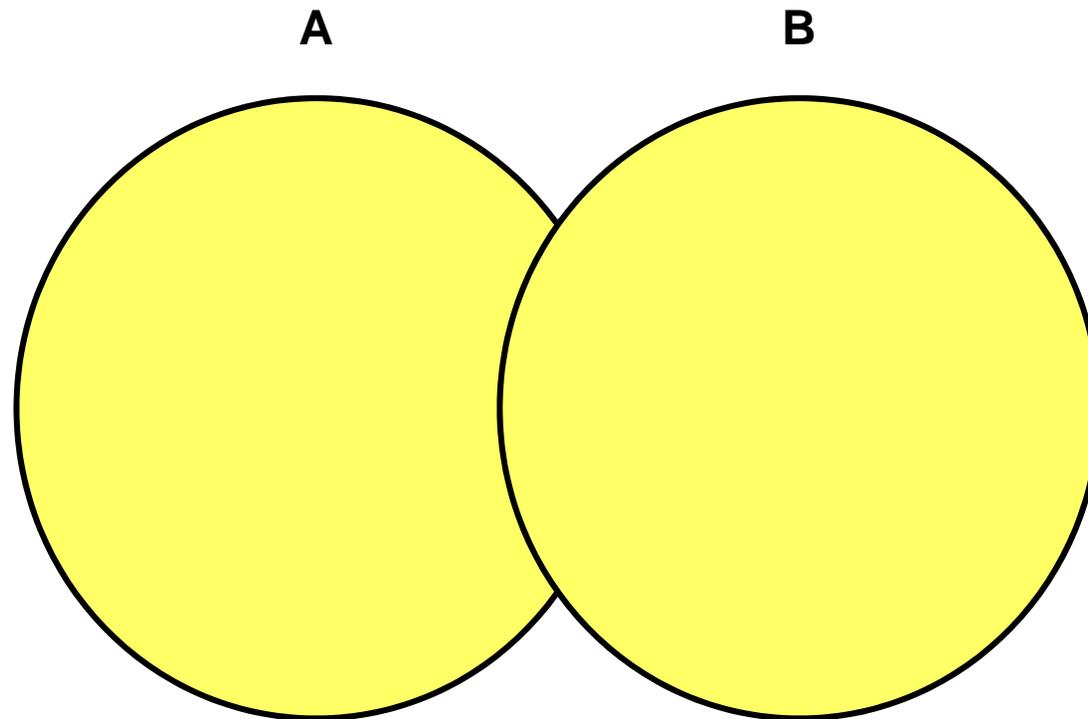
The `UNION` operator returns results from both queries after eliminating duplications.

Using the `UNION` Operator

Display the current and previous job details of all employees. Display each employee only once.

```
SELECT  employee_id, job_id
FROM    employees
UNION
SELECT  employee_id, job_id
FROM    job_history;
```

EMPLOYEE_ID	JOB_ID
100	AD_PRES
101	AC_ACCOUNT
...	
200	AC_ACCOUNT
200	AD_ASST
...	
205	AC_MGR
206	AC_ACCOUNT

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`UNION ALL` Operator

A   B
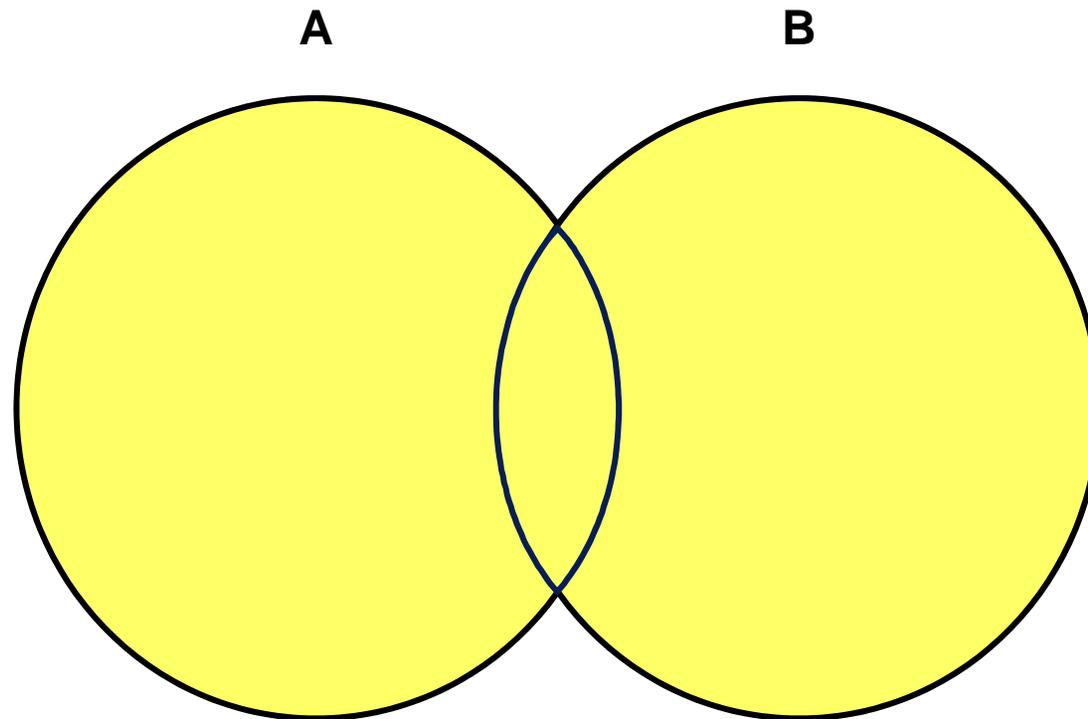
The `UNION ALL` operator returns results from both queries, including all duplications.

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Using the `UNION ALL` Operator

Display the current and previous departments of all employees.

```
SELECT employee_id, job_id, department_id
FROM    employees
UNION ALL
SELECT employee_id, job_id, department_id
FROM    job_history
ORDER BY  employee_id;
```

EMPLOYEE_ID	JOB_ID	DEPARTMENT_ID
100	AD_PRES	90
101	AD_VP	90

...

EMPLOYEE_ID	JOB_ID	DEPARTMENT_ID
200	AD_ASST	10
200	AD_ASST	90
200	AC_ACCOUNT	90

...

EMPLOYEE_ID	JOB_ID	DEPARTMENT_ID
205	AC_MGR	110
206	AC_ACCOUNT	110

30 rows selected.

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INTERSECT Operator
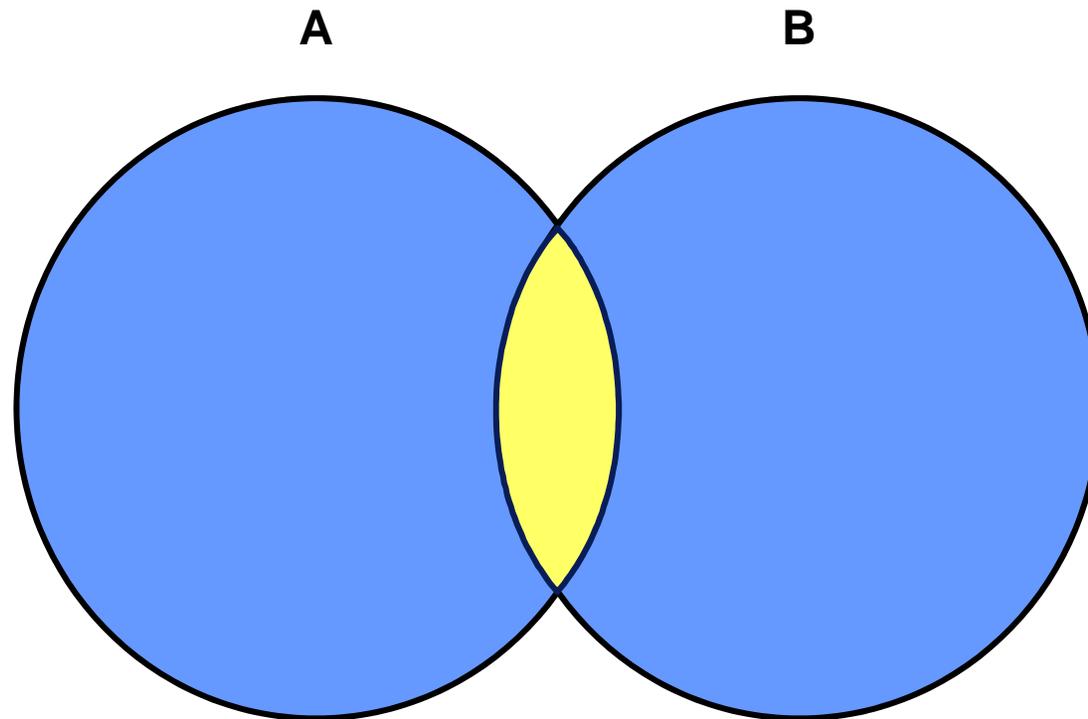
The INTERSECT operator returns rows that are common to both queries.

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Using the `INTERSECT` Operator

Display the employee IDs and job IDs of those employees who currently have a job title that is the same as their job title when they were initially hired (that is, they changed jobs but have now gone back to doing their original job).

```
SELECT  employee_id, job_id
FROM    employees
INTERSECT
SELECT  employee_id, job_id
FROM    job_history;
```

EMPLOYEE_ID	JOB_ID
176	SA_REP
200	AD_ASST

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`MINUS` Operator

A   B
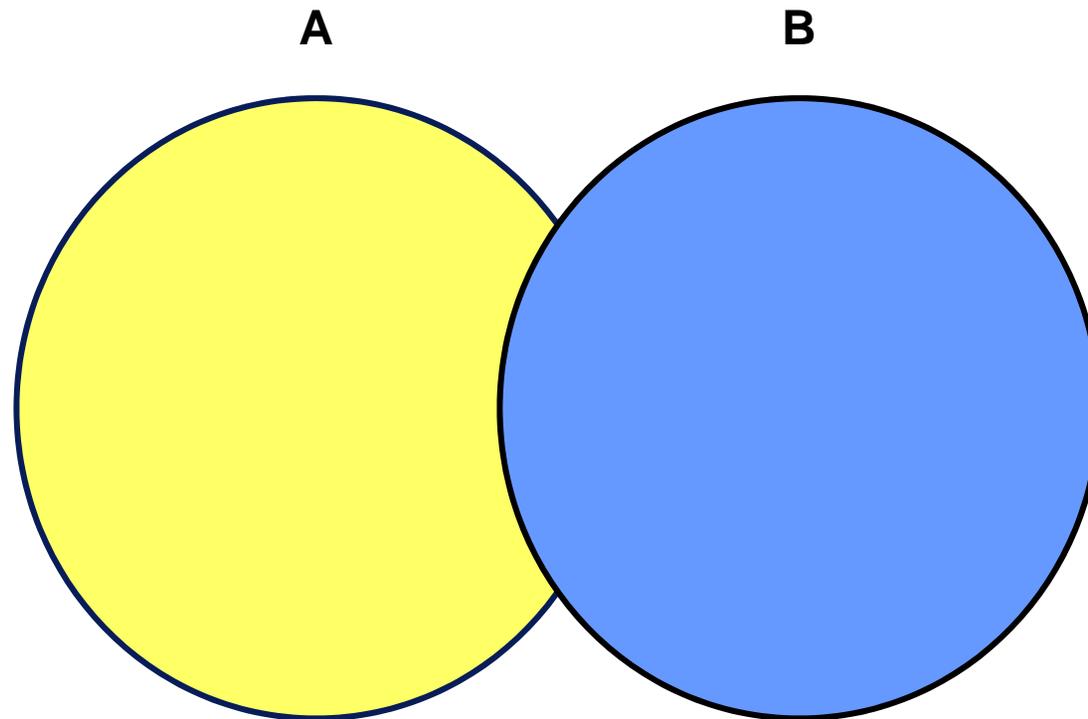
**The `MINUS` operator returns rows in the first query
that are not present in the second query.**

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`MINUS` Operator

Display the employee IDs of those employees who have not changed their jobs even once.

```
SELECT  employee_id
FROM    employees
MINUS
SELECT  employee_id
FROM    job history;
```

EMPLOYEE_ID
100
103
104
107

...

205
206

15 rows selected.

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Set Operator Guidelines

- **The expressions in the `SELECT` lists must match in number and data type.**

- **Parentheses can be used to alter the sequence of execution.**

- **The `ORDER BY` clause:**
  - **Can appear only at the very end of the statement**
  - **Will accept the column name, aliases from the first `SELECT` statement, or the positional notation**

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The Oracle Server and Set Operators

- **Duplicate rows are automatically eliminated except in UNION ALL.**

- **Column names from the first query appear in the result.**

- **The output is sorted in ascending order by default except in UNION ALL.**

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Matching the `SELECT` Statements

Using the `UNION` operator, display the department ID, location, and hire date for all employees.

```
SELECT  department_id, TO_NUMBER(null)
        location, hire_date
FROM    employees
UNION
SELECT  department_id, location_id,  TO_DATE(null)
FROM    departments;
```

DEPARTMENT_ID	LOCATION	HIRE_DATE
10	1700	
10		17-SEP-87
20	1800	
20		17-FEB-96
. . .		
110	1700	
110		07-JUN-94
190	1700	
		24-MAY-99

27 rows selected.

Matching the `SELECT` Statement: Example

Using the `UNION` operator, display the employee ID, job ID, and salary of all employees.

```
SELECT  employee_id, job_id,salary
FROM    employees
UNION
SELECT  employee_id, job_id,0
FROM    job_history;
```

EMPLOYEE_ID	JOB_ID	SALARY
100	AD_PRES	24000
101	AC_ACCOUNT	0
101	AC_MGR	0
...		
205	AC_MGR	12000
206	AC_ACCOUNT	8300

30 rows selected.

Controlling the Order of Rows

Produce an English sentence using two `UNION` operators.

```
COLUMN a_dummy NOPRINT
SELECT 'sing' AS "My dream", 3 a_dummy
FROM dual
UNION
SELECT 'I''d like to teach', 1 a_dummy
FROM dual
UNION
SELECT 'the world to', 2 a_dummy
FROM dual
ORDER BY a_dummy;
```

My dream
I'd like to teach
the world to
sing

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Summary

In this lesson, you should have learned how to:

- Use `UNION` to return all distinct rows
- Use `UNION ALL` to return all rows, including duplicates
- Use `INTERSECT` to return all rows that are shared by both queries
- Use `MINUS` to return all distinct rows that are selected by the first query but not by the second
- Use `ORDER BY` only at the very end of the statement

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Practice 7: Overview

In this practice, you use the set operators to create reports:

- **Using the `UNION` operator**
- **Using the `INTERSECTION` operator**
- **Using the `MINUS` operator**

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