

17 October 2025

## Data Analytics

### Exercise 1 : SQL Functions

Database : employee - db

Assume you have a table called employees with the following structure :

Employees						
id	first-name	last-name	department	salary	hire-date	city
1	John	Doe	IT	55000	2018-06-15	New York
2	Jane	Smith	HR	48000	2019-07-20	Chicago
3	Mike	Johnson	Finance	60000	2017-09-30	Los Angeles
4	Sarah	Brown	IT	53000	2021-03-25	New York
5	David	White	Marketing	52000	2016-04-10	San Francisco
6	Emily	Davis	IT	62000	2015-02-14	Chicago
7	Robert	Wilson	Finance	59000	2019-10-01	Houston
8	Jessica	Moore	HR	51000	2018-05-25	Los Angeles
9	Daniel	Clark	Marketing	55000	2022-06-01	Chicago
10	Laura	Hall	IT	50000	2020-05-10	San Francisco

### Questions

#### 1. SELECT Statement

Write a SQL query to retrieve all columns from the employees table.

SELECT \*

FROM employees;

#### Return / Output

Will be all data in the above table along with its all columns.

gives us unique values in one column  
returns specific values in a specific column

## 2. SELECT DISTINCT statement

Write a SQL query to find all the unique departments in the employees table.

SELECT DISTINCT department

~~SELECT department  
FROM employees;~~

SELECT DISTINCT department

~~FROM employees;~~

Return: employees

department
IT
HR
Finance
IT
Marketing
IT
Finance
HR
Marketing
IT

## 3. ORDER BY Statement

sorting statement  
ASC → DESC — biggest to smallest  
smallest to biggest

Write a SQL query to retrieve all employee's first and last names, order by salary in descending order.

```
SELECT first_name,  
       last_name,  
FROM   employees  
ORDER BY salary DESC;
```

Return:

Employees		
first_name	last_name	salary
Emily	Davis	62000
Mike	Johnson	60000
Robert	Wilson	59000
John	Doe	55000
Sarah	Brown	53000
Daniel	Clark	53000
David	White	52000
Jessica	Moore	51000
Laura	Hall	50000
Jane	Smith	48000

#### 4. LIMIT Statement

Write a SQL query to retrieve all employees' the top  $\frac{5}{\$}$  highest paid employees.

```
SELECT *  
FROM   employees  
ORDER BY salary DESC  
LIMIT 5;
```

Return:

### Employees

<u>id</u>	<u>first-name</u>	<u>last-name</u>	<u>department</u>	<u>salary</u>	<u>hire-date</u>	<u>city</u>
6	Emily	Davis	IT	62000	2015-02-14	Chicago
3	Mike	Johnson	Finance	60000	2017-09-30	Los Angeles
7	Robert	Wilson	Finance	59000	2019-01-01	Houston
1	John	Doe	IT	55000	2018-06-15	New York
4	Sarah	Brown	IT	53000	2021-03-25	New York

### 5. WHERE Statement

Write a SQL query to find employees who work in the IT department.

```
SELECT *
FROM employees
WHERE department = 'IT';
```

<u>id</u>	<u>first-name</u>	<u>last-name</u>	<u>department</u>	<u>salary</u>	<u>hire-date</u>	<u>city</u>
1	John	Doe	IT	55000	2018-06-15	New York
4	Sarah	Brown	IT	53000	2021-03-25	New York
6	Emily	Davis	IT	62000	2015-02-14	Chicago
10	Laura	Hall	IT	50000	2020-08-10	San Francisco

### 6. AND Statement

Write a SQL query to find employees who work in the Finance department AND have a salary greater than R58 000. (The database checks each row in the employees table)

- Only returns rows where BOTH conditions are true:

1. department = 'Finance'

2. salary > 58000

```
SELECT *
FROM employees
```

```
WHERE department = 'Finance' AND salary > 58000;
```

```
AND salary > 58000;
```

Return :

Employees

<u>id</u>	<u>first-name</u>	<u>last-name</u>	<u>department</u>	<u>salary</u>	<u>hire-date</u>	<u>city</u>
3	Mike	Johnson	Finance	60000	2017-09-30	Los Angeles
7	Robert	Wilson	Finance	54000	2019-10-01	Houston

### 7. OR Statement

Write a SQL query to find employees who work in the HR department OR the Marketing department.

SELECT \*

FROM employees

WHERE department = 'HR' OR department = 'Mark'

OR department = 'Marketing';

Return :

employees

<u>id</u>	<u>first-name</u>	<u>last-name</u>	<u>department</u>	<u>salary</u>	<u>hire-date</u>	<u>city</u>
2	Jane	HR Smith	HR	48000	2019-07-20	Chicago
5	David	White	Marketing	52000	2016-04-10	San Francisco
8	Jessica	Moore	HR	51000	2018-05-22	Los Angeles
9	Daniel	Clark	Marketing	53000	2022-06-01	Chicago

### 8. NOT Statement

Write a SQL query to find employees who are in HR, IT or Finance department. do not work in IT department.

SELECT \*

FROM employees

WHERE NOT department = 'IT';

We looking for all data of employees not working in IT.  
(exclusive to IT)

Return: employees

	id	first-name	last-name	department	salary	hire-date	city
2	John	Smith	HR	48000	2014-07-20	Chicago	
3	Mike	Johnson	Finance	60000	2017-04-30	Los Angeles	
5	David	White	Marketing	52000	2018-06-10	San Francisco	
7	Robert	Wilson	Finance	59000	2019-10-01	Houston	
8	Jessica	Moore	HR	51000	2018-05-22	Los Angeles	
9	Daniel	Clark	Marketing	53000	2022-06-01	Chicago	

### q. IN Statement (condition)

Write a SQL query to find employees who are in the HR, IT or Finance departments.

~~SELECT \*~~

~~FROM employees~~

~~WHERE department = 'HR'~~

~~OR department = 'IT'~~

~~OR department = 'Finance'~~

~~SELECT \*~~

~~FROM employees~~

~~WHERE department IN ('HR', 'IT', 'Finance');~~

Return: employees

	id	first-name	last-name	department	salary	hire-date	city
1	John	Doe	IT	55000	2018-06-05	New York	
2	Jane	Smith	HR	48000	2019-07-20	Chicago	
3	Mike	Johnson	Finance	60000	2017-09-30	Los Angeles	
4	Sarah	Brown	IT	53000	2021-03-25	New York	
5	Emily	Davis	IT	62000	2015-02-14	Chicago	
6	Robert	Wilson	Finance	59000	2019-10-01	Houston	
7	Jessica	Moore	HR	51000	2018-05-22	Los Angeles	

Key Differences		
Feature	AND Operator	IN Operator
Purpose	combines multiple conditions	check if value matches any in a list
Logic	All conditions must be true	ANY value in the list matches.
Alternative	Can chain multiple ANDs	Replace multiple OR conditions
Readability	Good for different conditions	Better for same column with multiple values

## 10. Combining Conditions

Write a SQL query to find employees who are in the IT department, have a salary greater than 50,000 and are located in New York.

```
SELECT *
FROM employees
WHERE department = 'IT'
      AND salary > 50000
      AND city = 'New York';
```

Return:

	id	first_name	last_name	department	salary	hire_date	city
1	John	Doe		IT	55000	2018-06-05	New York
4	Sarah	Brown		IT	53000	2021-03-25	New York

## 11. Combining WHERE, AND and ORDER BY

Write a SQL query to retrieve the first and last names of employees who work in the Finance or Marketing department, earn more than \$2000 and order the results by salary in descending order.

```
SELECT first_name,  
       last_name,  
FROM employees  
WHERE department = 'Finance'  
      OR department = 'Marketing'  
      AND salary > 52000  
ORDER BY salary DESC;
```

Return!

first-name	last-name	department	salary
Mike	Johnson	Finance	60000
Robert	Wilson	Finance	59000
Daniel	Clark	Marketing	53000

## 12. Combining SELECT DISTINCT, WHERE, and IN

Write a SQL query to ~~retrieve the first and last names of employees who work in~~ find all unique cities where employees work, excluding <sup>not</sup> those in the IT and HR departments.

```
SELECT + SELECT DISTINCT CITY city  
FROM employees FROM employees,  
WHERE WHERE department NOT IN  
      ('IT', 'HR');
```

Return 'employees'

department	city
Finance	Los Angeles
Marketing	San Francisco
Finance	Houston
Marketing	Chicago

13. Combing WHERE, NOT, AND, and ORDER BY

Write a SQL query to retrieve employees who are **NOT** in the **Finance department**, have a **salary** greater than **50 000**, and order the results by **hire\_date** in ascending order.

```
SELECT *  
FROM employees  
WHERE department NOT IN ('Finance')  
      AND salary > 50 000  
ORDER BY hire_date ASC;
```

Return :

id	first_name	last_name	department	salary	hire_date	city
6	John	David	Marketing	50 000		
1	John	Doe	IT	55 000	2018-06-15	New York
4	Sarah	Brown	IT	53 000	2021-03-25	New York
5	David	White	Marketing	52 000	2016-04-10	San Francisco
8	Jessica	Moore	HR	51 000	2019-10-01	Houston
9	Daniel	Clark	Marketing	530 000	2022-06-01	Chicago

id	first_name	last_name	department	salary	hire_date	city
5	David	White	Marketing	52 000	2016-04-10	San Francisco
1	John	Doe	IT	55 000	2018-06-15	New York
8	Jessica	Moore	HR	51 000	2019-10-01	Houston
4	Sarah	Brown	IT	53 000	2021-03-25	New York
9	Daniel	Clark	Marketing	530 000	2022-06-01	Chicago

DATA ARRANGED BY HIRE-DATE

#### 14. Combining WHERE, OR, IN and LIMIT

Write a SQL Q query to find the first 3 employees who work in either Chicago or Los Angeles and belong to the IT or Marketing department.

```
SELECT *  
FROM employees  
WHERE city = 'Chicago' OR  
      OR city = 'Los Angeles'  
WHERE AND department = 'IT'  
      OR department = 'Marketing'  
LIMIT 3;
```

OR

```
SELECT *  
FROM employees  
WHERE city IN('Chicago', 'Los Angeles')  
      AND department IN('IT', 'Marketing')  
LIMIT 3;
```

Return:

Employees

	id	first-name	last-name	department	salary	hire-date	city
26	Jane	Emily	Davis	# IT	62 000	2015-02-14	Chicago
9	Daniel	Clark		Marketing	53 000	2022-06-01	Chicago