

# Exercise 4: Joins, Union, Filtering and Aggregates.

## 1. SQL Joins

### 1. INNER JOIN

Select A.EmployeeID,

A. FirstName,

A. LastName,

A. Department,

A. Salary,

B. projectID,

B. ProjectName,

B. Budget,

B. Status

FROM employees AS A

INNER JOIN projects AS B

ON A.EmployeeID = B.EmployeeID;

~~EmployeeID FirstName LastName Department Salary ProjectID ProjectName Budget Status~~

EmployeeID	firstname	lastname	Department	Salary	ProjectID	Projectname	Budget	Status
1	John	Doe	IT	70000	101	AI Development	100000	Completed
1	John	Doe	IT	70000	103	Cybersecurity	75000	Pending
2	Alice	Smith	HR	60000	102	Employee Training	50000	Ongoing
3	Bob	Johnson	Finance	75000	104	Financial Audit	90000	Ongoing
5	Emma	Wilson	Sales	65000	105	Market Expansion	65000	Completed
6	Michael	Clark	Finance	80000	106	Risk Management	80000	Pending

2. SELECT A.employeeID,

firstname,

lastname,

department,

Salary,

projectID,

ProjectName,

Budget,

Status

FROM employees AS A

Left JOIN projects AS B

ON A.employeeID = B.employeeID;

EmployeeID	firstname	lastname	department	Salary	ProjectID	ProjectName	Budget	Status
1	John	Doe	IT	70000	101	AI Development	100000	Completed
2	John	Doe	IT	70000	103	Cybersecurity audit	75000	Pending
3	Alice	Smith	HR	60000	102	Employee training	50000	Ongoing
4	Bob	Johson	Finance	75000	104	Financial analysis	90000	Ongoing
5	David	Brown	IT	72000	NULL	NULL	NULL	NULL
6	Emma	Wilson	Sales	65000	105	Market expansion	65000	Completed
7	Michael	Clark	Finance	80000	106	Risk Management	80000	Pending

3. SELECT projectID, project  
 projectname,  
 budget,  
 status,  
 A. employeeID,  
 firstname,  
 lastname,  
 department,  
 salary

FROM Employees as A  
 Right JOIN Projects as B  
 ON A.employeeID = B.employeeID;

ProjectID	Projectname	Budget	Status	EmployeeID	firstname	lastname	Department	Salary
101	A1 Development	100 000	Completed	1	John	Doe	IT	7000
103	Cybersecurity Training	75 000	Pending	1	John	Doe	IT	7000
102	Employee Training	50 000	Ongoing	2	Alice	Smith	HR	60000
104	Financial Analysis	90 000	Ongoing	3	Bob	Johnson	Finance	75000
105	Market Expansion	65 000	Completed	5	Emma	Wilson	Sales	65000
106	Risk management	80 000	Pending	6	Michael	Clark	Finance	80000

-- SELECT A.employeeID,  
 firstname,  
 lastname,  
 department,  
 salary,  
 ProjectID,  
 Projectname,  
 budget,  
 Status

FROM employees AS A

FULL OUTER JOIN projects AS B

ON A.employeeID = B.employeeID;

EmployeeID	firstname	lastname	department	Salary	ProjectID	Projectname	Budget	Status
1	John	Doe	IT	70000	101	AI Development	100000	Completed
2	John	Doe	IT	70000	103	Cybersecurity audit	75000	Pending
3	Alice	Smith	HR	60000	102	Employee training	50000	Ongoing
4	Bob	Johnson	Finance	75000	104	Financial analysis	90000	Ongoing
5	David	Brown	IT	72000	NULL	NULL	NULL	NULL
6	Emma	Wilson	Sales	65000	105	Market expansion	65000	Completed
7	Michael	Clark	Finance	80000	106	Risk Management	80000	Pending

## 2. UNION & UNION ALL

5. SELECT distinct city as location

FROM employees  
UNION

SELECT distinct status as Location  
FROM projects;

Location
New York
Los Angeles
Toronto
London
Sydney
Completed
Ongoing
Pending

6. SELECT city AS Location

FROM employees  
UNION ALL

SELECT status AS Location  
FROM projects;

Location
New York
Los Angeles
Toronto
London
Sydney
New York
Completed
Ongoing
Pending
Ongoing
Completed
Pending

### 3. FILTERING STATEMENTS

7. SELECT EmployeeID, firstname, lastname, Department, salary  
FROM employees  
WHERE salary > 70 000

EmployeeID	firstname	lastname	Department	salary
3	Bob	Johso	Finance	75000
4	David	Brown	IT	72000
6	Michael	Clark	Finance	80000

8. SELECT EmployeeID, firstname, lastname, Department, salary  
FROM employees  
, WHERE department='IT' OR department='Finance' ;

EmployeeID	firstname	lastname	Department	Salary
1	John	Doe	IT	70000
3	Bob	Johnson	Finance	75000
4	David	Brown	IT	72000
6	Michael	Clark	Finance	80000

9. SELECT projectID, projectName, budget, status  
 FROM projects  
 WHERE status NOT IN ('Completed');

Project ID	Project name	Budget	Status
102	Employee training	50000	Ongoing
103	Cybersecurity Audit	75000	Pending
104	Financial Analysis	90000	Ongoing
106	Risk Management	80000	Pending

10. SELECT projectID, projectName, budget, status  
 FROM projects  
 WHERE budget > 70000 AND status NOT IN ('Completed');

Project ID	Project name	Budget	Status
103	Cybersecurity Audit	75000	Pending
104	Financial Analysis	90000	Ongoing
106	Risk Management	80000	Pending

11. SELECT A.employeeID, fname, lname, department, salary, city  
 FROM employees AS A  
 INNER JOIN projects AS B  
 ON A.employeeID = B.employeeID  
 WHERE city = 'New York' OR City = 'Toronto'  
 ORDER BY salary DESC;

EmployeeID	firstname	lastname	department	salary	City
6	Michael	Clark	finance	80000	New York
3	Bob	Jackson	finance	75000	Toronto
1	John	Doe	IT	70000	New York

12. SELECT employeeID, fname, lname, department, salary  
 FROM employees  
 ORDER BY salary DESC  
 LIMIT 3;

EmployeeID	firstname	lastname	department	salary
6	Michael	Clark	finance	80000
3	Bob	Jackson	finance	75000
4	David	Brown	IT	72000

#### 4. Aggregates functions with Group BY & HAVING

13. SELECT department,  
           sum(salary) as totalsalary  
       FROM employees  
       GROUP BY department  
       ORDER BY sum(salary) DESC;

Department	Total salary
Finance	155000
IT	142000
Sales	65000
HR	60000

14. SELECT city, avg(salary) AS AverageSalary  
       FROM employees  
       GROUP BY city  
       HAVING avg(salary) > 65000;

City	AverageSalary
New York	75000
Toronto	75000
London	72000

15. SELECT department, count(employeeID) as EmployeeCount  
       FROM employees  
       GROUP BY department  
       HAVING count(employeeID) > 1

Department	EmployeeCount
IT	2
Finance	2

16. SELECT Status , count (projectID) as projectcount  
 FROM projects  
 GROUP BY status  
 HAVING count (projectID) >= 2 ;

Status	Project Count
Completed	2
Ongoing	2
Pending	2

17. SELECT A.employeeID,  
 A.firstname,  
 A.lastname,  
 sum(B.budget) as totalprojectbudget  
 FROM employees AS A  
 JOIN Projects AS B  
 ON A.employeeID = B.employeeID  
 Group By A.employeeID,firstname, lastname  
 Having sum(budget) > 150 000 ;

EmployeeID	Firstname	Lastname	Totalprojectbudget
1	John	Doe	175 000