

SQL Practice Exercise: Joins, UNION, Filtering, and Aggregates

BrightLight Tutorials

Instructions:

1. Write answers on paper with a pen.
2. Draw tables of the final outcome.
3. In the SELECT statement, choose relevant columns to display, if not specified.
4. Scan the completed work into a PDF file and email it to:
rophiwa@brightlighttutorials.co.za
5. Submission Deadline: 25 March 2025, 00:00

Table 1: Employees

EmployeeID	FirstName	LastName	Department	Salary	City	Age
1	John	Doe	IT	70000	New York	35
2	Alice	Smith	HR	60000	Los Angeles	40
3	Bob	Johnson	Finance	75000	Toronto	45
4	David	Brown	IT	72000	London	30
5	Emma	Wilson	Sales	65000	Sydney	28
6	Michael	Clark	Finance	80000	New York	50

Table 2: Projects

ProjectID	EmployeeID	ProjectName	Budget	StartDate	Status
101	1	AI Development	100000	2024-01-10	Completed
102	2	Employee Training	50000	2024-02-15	Ongoing
103	1	Cybersecurity Audit	75000	2024-03-05	Pending
104	3	Financial Analysis	90000	2024-04-12	Ongoing
105	5	Market Expansion	65000	2024-05-20	Completed
106	6	Risk Management	80000	2024-06-10	Pending

Questions

1. SQL Joins

1. Retrieve all employees and their assigned projects using an **INNER JOIN**.
 - Return: EmployeeID, FirstName, LastName, Department, Salary, ProjectID, ProjectName, Budget, Status.
 2. Retrieve all employees and their assigned projects, including employees who have no projects using a **LEFT JOIN**.
 - Return: EmployeeID, FirstName, LastName, Department, Salary, ProjectID, ProjectName, Budget, Status.
 3. Retrieve all projects and their assigned employees, including projects that have no employees using a **RIGHT JOIN**.
 - Return: ProjectID, ProjectName, Budget, Status, EmployeeID, FirstName, LastName, Department, Salary.
 4. Retrieve all employees and projects, including those without a match in either table using a **FULL OUTER JOIN**.
 - Return: EmployeeID, FirstName, LastName, Department, Salary, ProjectID, ProjectName, Budget, Status.
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2. UNION & UNION ALL

5. Retrieve a list of all unique cities where employees are located and project statuses.
 - Return: Location (Rename the column to Location using an alias).
 6. Retrieve a list of all cities where employees are located and project statuses, allowing duplicates.
 - Return: Location (Rename the column to Location using an alias).
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3. Filtering Statements

7. Retrieve employees who earn **more than 70,000**.
 - Return: EmployeeID, FirstName, LastName, Department, Salary.
8. Retrieve employees working in either **IT or Finance** departments.
 - Return: EmployeeID, FirstName, LastName, Department, Salary.

9. Retrieve projects that are **not yet completed**.
 - Return: ProjectID, ProjectName, Budget, Status.
 10. Retrieve projects that have a **budget greater than 70,000** and are **not completed**.
 - Return: ProjectID, ProjectName, Budget, Status.
 11. Retrieve employees from **New York OR Toronto**, ordered by **salary in descending order**.
 - Return: EmployeeID, FirstName, LastName, Department, Salary, City.
 12. Retrieve the **top 3 highest-paid employees**.
 - Return: EmployeeID, FirstName, LastName, Department, Salary.
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4. Aggregate Functions with GROUP BY & HAVING

13. Find the **total salary per department**, sorted in descending order.
 - Return: Department, TotalSalary (Rename SUM(Salary) as TotalSalary).
14. Find the **average salary per city**, but only include cities where the average salary is greater than **65,000**.
 - Return: City, AverageSalary (Rename AVG(Salary) as AverageSalary).
15. Count the **number of employees per department**, including only departments with more than 1 employee.
 - Return: Department, EmployeeCount (Rename COUNT(EmployeeID) as EmployeeCount).
16. Retrieve the **number of projects per status**, but only include statuses with **at least 2 projects**.
 - Return: Status, ProjectCount (Rename COUNT(ProjectID) as ProjectCount).
17. Retrieve the **total project budget per employee**, but only for employees who are managing projects worth more than **150,000**.
 - Return: EmployeeID, FirstName, LastName, TotalProjectBudget (Rename SUM(Budget) as TotalProjectBudget).