

Case Study using SQL

Case Study: Employee and Department Management System

Background:

You are working as a data analyst for a company that is looking to optimize its HR and financial operations. The company has two main entities: employees and departments. You are provided with two tables:

1. **Department:** Contains information about the company's departments.
2. **Employee:** Contains details of all employees, including which department they belong to.

Table Structures:

- **Department**
 - **DepartmentID:** Unique identifier for each department.
 - **DepartmentName:** Name of the department.
 - **Location:** Location of the department.
 - **ManagerID:** The ID of the manager who heads the department.
- **Employee**
 - **EmployeeID:** Unique identifier for each employee.
 - **FirstName:** Employee's first name.
 - **LastName:** Employee's last name.
 - **Salary:** Employee's current salary.
 - **DepartmentID:** The ID of the department the employee belongs to.

Scenario 1: Departmental Salary Review

The HR department wants to know the total salary expenditure per department to plan next year's budget.

- **Task:** Write an SQL query to find the total salary paid to all employees in each department.

Expected Output:

- Department Name
- Total Salary

Scenario 2: High Salary Employees

Management wants to review the employees who are earning more than 70,000 per year and in which department they work.

- **Task:** Write an SQL query to retrieve the names of all employees who have a salary greater than 70,000 and also list their department names.

Expected Output:

- Employee First Name
- Employee Last Name
- Department Name

Scenario 3: New Department Setup

A new department named "Research and Development" is being created, located in "Boston", and managed by the employee with ManagerID = 110.

- **Task:** Write an SQL query to add this new department to the Department table.

Expected Output:

- Department added to the Department table with the correct values for DepartmentID, DepartmentName, Location, and ManagerID.

Scenario 4: Department Shift

An employee named "Emily Davis" is shifting from the "Engineering" department to the "Marketing" department.

- **Task:** Write an SQL query to update the DepartmentID for Emily Davis in the Employee table to reflect her new department.

Expected Output:

- Confirmation that Emily Davis' department has been updated in the Employee table.

Scenario 5: Employees Without Departments

The company suspects that some employees might not be properly assigned to a department, meaning they have a NULL value for DepartmentID.

- **Task:** Write an SQL query to find all employees whose DepartmentID is NULL.

Expected Output:

- Employee First Name
- Employee Last Name

Scenario 6: Department Closure

The company has decided to close down the "Sales" department. All employees currently working in the Sales department will need to be reassigned to other departments, and the department will need to be removed from the system.

- **Task 1:** Write an SQL query to delete the "Sales" department from the Department table.
- **Task 2:** Write an SQL query to set the DepartmentID of all employees currently in the Sales department to NULL before the department is deleted.

Expected Output:

- The Department table should no longer contain the Sales department, and the affected employees should have NULL as their DepartmentID.

Scenario 7: Highest Paid Employee

The finance team wants to know who the highest-paid employee is and which department they work in.

- **Task:** Write an SQL query to retrieve the name and salary of the highest-paid employee and the name of their department.

Expected Output:

- Employee First Name
- Employee Last Name
- Salary
- Department Name

Scenario 8: Average Salary in Engineering

The HR department wants to determine the average salary of employees in the "Engineering" department to assess if they are under or overpaying their engineers compared to industry standards.

- **Task:** Write an SQL query to calculate the average salary of employees in the Engineering department.

Expected Output:

- Average Salary of Engineering employees.

Scenario 9: List of Employees by Department

HR wants a report of all employees grouped by their departments.

- **Task:** Write an SQL query to list all employees, sorted by department. The result should include the department name and the employee's first and last names.

Expected Output:

- Department Name
- Employee First Name
- Employee Last Name

Scenario 10: Salary Increase for All Employees

Due to a new policy, all employees will receive a 5% salary increase.

- **Task:** Write an SQL query to update the salary of all employees by increasing their current salary by 5%.

Expected Output:

- All employee salaries in the Employee table should reflect the 5% increase.