

Assignment: SQL Tasks for Special Force Private Limited

Database Operations (MySQL)

Task 1: Create Tables

1. Create three tables: Employees, Departments, and Projects to track employees, departments,

and projects, respectively.

- Ensure each table has a Primary Key for uniquely identifying records.
- Set up Foreign Key constraints to link employees to departments and projects.
- Use appropriate constraints (e.g., NOT NULL, UNIQUE, etc.) to maintain data integrity.

Ans. create table Departments(departmentid int primary key,departmentname varchar(25) not null);

create table Employees(employeeid int primary key, firstname varchar(15) not null, lastname varchar(20) not null,email varchar(50) unique, hiredate date, salary float, departmentid int not null,foreign key(departmentid) references Departments(departmentid));

create table Projects(projectid int not null,projectname varchar(50),startdate date,enddate date,departmentid int not null,foreign key(departmentid) references Departments(departmentid));

Task 2: Insert Data (Given in excel sheet)

Once you have created the tables, insert the provided data into the respective tables. The data contains details about employees, departments, and projects. Queries to

```
mysql> select * from Employees;
```

employeeid	firstname	lastname	email	hiredate	salary	departmentid
101	Ravi	Sharma	ravi.sharma@specialforce.com	2017-05-15	55000	1
102	Neha	Kapoor	nehakapoor@specialforce.com	2019-03-23	48000	2
103	Jyoti	Verma	jyotiverma@specialforce.com	2020-11-02	60000	1
104	Anil	Patil	anil.patil@specialforce.com	2018-09-18	70000	3
105	Pooja	Singh	poojasingh@specialforce.com	2021-06-10	40000	4
106	Sanjay	Iyer	sanajy.iyer@specialforce.com	2018-01-22	75000	3
107	Jatin	Reddy	jatin.reddy@specialforce.com	2021-12-12	85000	2
108	Shreya	Mehta	shreya.mehta@specialforce.com	2022-04-19	30000	5
109	Rajesh	Gupta	rajesh.gupta@specialforce.com	2020-08-11	90000	1
110	Kavita	Nair	kavita.nair@specialforce.com	2021-02-07	50000	2

10 rows in set (0.01 sec)

```
mysql> select * from Departments;
+-----+-----+
| departmentid | departmentname |
+-----+-----+
| 1 | IT |
| 2 | HR |
| 3 | Sales |
| 4 | Finance |
| 5 | Marketing |
+-----+-----+
5 rows in set (0.00 sec)
```

```
mysql> select * from Projects;
+-----+-----+-----+-----+-----+
| projectid | projectname | startdate | enddate | departmentid |
+-----+-----+-----+-----+-----+
| 201 | Project_Phoenix | 2021-01-15 | 2022-07-30 | 1 |
| 202 | Client_Onboarding | 2020-06-20 | NULL | 3 |
| 203 | Financial_Overhaul | 2019-03-10 | 2021-12-15 | 4 |
| 204 | Marketing_Revamp | 2022-03-01 | NULL | 5 |
| 205 | Internal_System_Audio | 2023-02-15 | NULL | 2 |
+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)
```

Query 1: Write a query to retrieve the first name, last name, and department name of all employees. If an employee does not belong to any department, the department name should be NULL.

Ans. mysql> select firstname,lastname,departmentname from Employees,Departments where Employees.departmentid=Departments.departmentid;

```
+-----+-----+-----+
| firstname | lastname | departmentname |
+-----+-----+-----+
| Ravi | Sharma | IT |
| Jyoti | Verma | IT |
| Rajesh | Gupta | IT |
| Neha | Kapoor | HR |
| Jatin | Reddy | HR |
| Kavita | Nair | HR |
| Anil | Patil | Sales |
| Sanjay | Iyer | Sales |
| Pooja | Singh | Finance |
| Shreya | Mehta | Marketing |
+-----+-----+-----+
10 rows in set (0.01 sec)
```

Query 2: Write a query to find all employees in the IT department who earn more than ₹50,000.

Ans. select firstname,lastname from Employees e,Departments d where e.departmentid=d.departmentid and departmentname='IT' and e.salary>50000;

```
+-----+-----+
| firstname | lastname |
+-----+-----+
| Ravi | Sharma |
| Jyoti | Verma |
| Rajesh | Gupta |
+-----+-----+
3 rows in set (0.00 sec)
```

Query 3: Write a query to list the first name, last name, and email of all employees whose first name starts with 'J' and whose email contains specialforce.com

Ans. select firstname,lastname,email from Employees e where e.firstname like 'J%' and e.email like '%specialforce.com%';

```
+-----+-----+-----+
| firstname | lastname | email |
+-----+-----+-----+
| Jyoti     | Verma    | jyotiverma@specialforce.com |
| Jatin     | Reddy    | jatin.reddy@specialforce.com |
+-----+-----+-----+
2 rows in set (0.00 sec)
```

Query 4: Write a query to find all the distinct department names in the Departments table.

Ans. select distinct departmentname from Departments;

```
+-----+
| departmentname |
+-----+
| IT              |
| HR              |
| Sales           |
| Finance         |
| Marketing       |
+-----+
5 rows in set (0.01 sec)
```

Query 5: Write a query to calculate the total salary expenditure of each department.

Ans. select sum(salary) from Employees group by departmentid;

```
+-----+
| sum(salary) |
+-----+
| 205000      |
| 183000      |
| 145000      |
| 40000       |
| 30000       |
+-----+
5 rows in set (0.01 sec)
```

Query 6: Write a query to find the average salary of employees in the Finance department.

Ans. select avg(salary) from Employees e,Departments d where e.departmentid=d.departmentid and d.departmentname='finance';

```
+-----+
| avg(salary) |
+-----+
| 40000       |
+-----+
1 row in set (0.00 sec)
```

Query 7: Write a query to find the minimum and maximum salaries of employees in the Sales department.

Ans. select max(salary) max_sal,min(salary)min_sal from Employees e,Departments d where e.departmentid=d.departmentid and departmentname='sales';

```

+-----+-----+
| max_sal | min_sal |
+-----+-----+
|    75000 |    70000 |
+-----+-----+
1 row in set (0.00 sec)

```

Query 8: Write a query to count the number of employees in each department.

Ans. select departmentid,count(employeeid) from Employees group by departmentid;

```

+-----+-----+
| departmentid | count(employeeid) |
+-----+-----+
|          1 |          3 |
|          2 |          3 |
|          3 |          2 |
|          4 |          1 |
|          5 |          1 |
+-----+-----+
5 rows in set (0.00 sec)

```

Query 9: Write a query to find all employees who were hired between January 1, 2018, and December 31, 2020. Sort the result by hire date in ascending order.

Ans. select firstname,lastname from Employees where hiredate between '2018-01-01' and '2020-12-31' order by hiredate;

```

+-----+-----+
| firstname | lastname |
+-----+-----+
| Sanjay    | Iyer     |
| Anil      | Patil    |
| Neha      | Kapoor   |
| Rajesh    | Gupta    |
| Jyoti     | Verma    |
+-----+-----+
5 rows in set (0.00 sec)

```

Query 10: Write a query to list all employees who do not have an email address.

Ans. select firstname,lastname from Employees where email is null;

```

Empty set (0.00 sec)

```

Query 11: Write a query to find all employees who work in HR, Finance, or IT departments.

Ans. select firstname,lastname from Employees e,Departments d where e.departmentid=d.departmentid and departmentname in('hr','finance','it');

firstname	lastname
Ravi	Sharma
Jyoti	Verma
Rajesh	Gupta
Neha	Kapoor
Jatin	Reddy
Kavita	Nair
Pooja	Singh

7 rows in set (0.00 sec)

Query 12: Write a query to list the first name, last name, and salary of employees earning between ₹30,000 and ₹70,000. Sort the results by salary in descending order.

select firstname,lastname,salary from Employees where salary between '30000' and '70000' order by salary desc;

firstname	lastname	salary
Anil	Patil	70000
Jyoti	Verma	60000
Ravi	Sharma	55000
Kavita	Nair	50000
Neha	Kapoor	48000
Pooja	Singh	40000
Shreya	Mehta	30000

7 rows in set (0.00 sec)

Transaction Management Tasks:

Use transaction control statements to manage the salary updates as follows:

Task 1: Increase HR Salaries:

Write a query to increase the salaries of all employees in the HR department by 5%. Start a transaction before applying the changes.

Ans. start transaction;

update Employees set salary=(salary + salary * 0.05)where departmentid =(select departmentid from Departments where departmentname='hr');

```
mysql> select * from Employees;
```

employeeId	firstname	lastname	email	hiredate	salary	departmentid
101	Ravi	Sharma	ravi.sharma@specialforce.com	2017-05-15	55000	1
102	Neha	Kapoor	nehakapoor@specialforce.com	2019-03-23	72000	2
103	Jyoti	Verma	vyoti@specialforce.com	2020-11-02	60000	1
104	Anil	Patil	anil.patil@specialforce.com	2018-09-18	70000	3
105	Pooja	Singh	poojasingh@specialforce.com	2021-06-10	40000	4
106	Sanjay	Iyer	sanjay.iyer@specialforce.com	2018-01-22	75000	3
107	Jatin	Reddy	jatin.reddy@specialforce.com	2021-12-12	127500	2
108	Shreya	Mehta	shreya.mehta@specialforce.com	2022-04-19	30000	5
109	Rajesh	Gupta	rajesh.gupta@specialforce.com	2020-08-11	90000	1
110	Kavita	Nair	kavita.nair@specialforce.com	2021-02-07	75000	2

10 rows in set (0.00 sec)

Task 2: Savepoint Before Sales Increase:

Set a savepoint before increasing the salaries of employees in the Sales department by 3%.

Ans. savepoint s1;

update employees set salary = (salary + 0.03 * salary) where departmentid = (select departmentid from departments where departmentname = 'sales');

Task 3: Rollback Sales Salary Increase:

Rollback to the savepoint created before the Sales salary increase.

Ans. rollback to s1;

Task 4: Commit the Transaction:

After rolling back the Sales increase, commit the changes made to the HR department salaries.

Ans. rollback to s2;

commit to s1;

Query 13: Write a query to join the Employees and Departments tables to list employees and their department names. Make sure all employees are included, even if they don't belong to any department.

Ans. select concat(concat(firstname , ' '), lastname) as name , departmentname from employees e left join departments d on e.departmentid = d.departmentid ;

Query 14: Write a query to list employees who are working on projects that started after January 1, 2023.

select concat(concat(firstname , ' '), lastname) as name from employees e , projects p where e.departmentid = p.departmentid and p.startdate > '2023-01-01';

Query 15: Write a query to list all departments, even those without any employees assigned.

Ans. select distinct(departmentname) from departments d left join employees e on d.departmentid = e.departmentid;

Query 16: Write a query to find the employee with the highest salary in each department.

Ans. select concat(concat(firstname , ' '), lastname) as name from employees where salary in (select max(salary) from employees group by departmentid);

Query 17: Write a query to remove all data from the Employees table but keep the structure intact.

Ans. truncate employees;

Query 18: Write a query to drop the Projects table from the database.

Ans. drop table projects;

Query 19: SpecialForce Private Limited realized they need to store the phone numbers of employees. Write a query to add a new column phone_number (VARCHAR(15)) to the Employees table using the ALTER statement.

Ans. alter table employees add phonenumbers varchar(15) unique;

Query 20: The company also decided to track the budget for each project. Write a query to add a column budget (DECIMAL(10,2)) to the Projects table.

Ans. alter table projects2 add budget decimal(10,2) ;

Query 21: Write a query to find the 2nd largest salary from the Employees table using:

- A subquery.
- The LIMIT clause.

Ans. select max(salary) from employees where salary < (select max(salary) from employees) ;

select salary from employees order by salary desc limit 1,1;

Query 22: Write a query to find the 3rd largest salary from the Employees table using:

- A subquery.
- The LIMIT clause.

Ans. select max(salary) from employees where salary < (select max(salary) from employees where salary < (select max(salary) from employees)) ;

select salary from employees order by salary desc limit 2,1;

Query 23: Write a query to drop the Projects table.

Ans. drop table projects;

Query 24: Write a query to truncate the Employees table.

Ans. Truncate employees;

