

Experiment 1

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Subject Name: Technical Training

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1. **Aim:**

To design and implement a sample database system using DDL, DML, and DCL commands, including database creation, data manipulation, schema modification, and role-based access control to ensure data integrity and secure, read-only access for authorized users.

2. **Objective:**

To gain practical experience in implementing Data Definition Language (DDL), Data Manipulation Language (DML), and Data Control Language (DCL) operations in a real database environment. This will also include implementing role-based privileges to secure data.

3. **Implementation/Code:**

```
-- QUERY FROM postgres
-- DDL
-- DEPARTMENT TABLE CREATE
TABLE department( department_id
INT PRIMARY KEY,
department_name VARCHAR(20) NOT NULL UNIQUE, salary
FLOAT CHECK(salary>=0))
```

```
);  
  
-- EMPLOYEE TABLE  
CREATE TABLE employee(  
employee_id INT PRIMARY KEY, employee_name  
VARCHAR(20) NOT NULL,  
department_id INT NOT NULL REFERENCES department(department_id),  
employee_contact VARCHAR(20), join_date DATE NOT NULL, end_date  
DATE CHECK(end_date>=join_date)  
);  
  
ALTER TABLE employee ADD work_location VARCHAR(20);  
ALTER TABLE employee DROP work_location;  
ALTER TABLE employee ADD status VARCHAR(20) DEFAULT 'active';  
  
-- PROJECT TABLE CREATE  
TABLE project( project_id INT  
PRIMARY KEY,  
project_name VARCHAR(20) NOT NULL UNIQUE,  
department_id INT NOT NULL REFERENCES department(department_id),  
start_date DATE NOT NULL,  
end_date DATE CHECK(end_date>=start_date)  
);  
  
-- DML  
INSERT INTO department  
VALUES  
(101,'Manager',90000),  
(102,'HR',70000),  
(103,'EMPLOYEE',50000);
```



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```
UPDATE department SET salary=80000 WHERE department_id=101;
```

```
UPDATE department SET department_name='Employee' WHERE  
department_id=103;
```

```
INSERT INTO department  
VALUES  
(104,'DEVELOPER',-30000);
```

```
INSERT INTO department  
VALUES  
(104,'DEVELOPER',30000);
```

```
DELETE FROM department WHERE department_id=104;
```

```
INSERT INTO employee  
VALUES  
(1,'Rahul',101,8888888888,'2001-04-12','2010-07-13'),  
(2,'Anuj',102,7777777777,'2003-06-10','2004-05-11'),  
(3,'Aman',103,6666666666,'2006-05-20','2009-09-11'),  
(4,'Naman',103,5555555555,'2006-06-25','2009-08-11'),  
(5,'Karan',103,4444444444,'2006-03-12','2009-05-11');
```

```
DELETE FROM employee WHERE employee_id=3;
```

```
INSERT INTO project  
VALUES  
(11,'P1',103,'2025-08-14','2025-09-14'),  
(12,'P2',103,'2025-08-14','2025-08-30');
```

```
-- DQL
```

```
SELECT * FROM department;
```

```
SELECT * FROM employee;
```

```
SELECT * FROM project;
```

```
-- DCL
```

```
CREATE ROLE reporting_user
```

```
LOGIN
```

```
PASSWORD
```

```
'user123';
```

```
GRANT SELECT ON department TO reporting_user;
```

```
REVOKE SELECT ON department FROM reporting_user;
```

```
GRANT SELECT ON project TO reporting_user;
```

```
REVOKE CREATE ON SCHEMA PUBLIC FROM reporting_user;
```

```
-- QUERY FROM reporting_user
```

```
SELECT * FROM project;
```

4. Output:

```

53 VALUES
54 (1, 'Rahul', 101, 8888888888, '2001-04-12', '2010-07-13'),
55 (2, 'Anuj', 102, 7777777777, '2003-06-10', '2004-05-11'),
56 (3, 'Aman', 103, 6666666666, '2006-05-20', '2009-09-11'),
57 (4, 'Naman', 103, 5555555555, '2006-06-25', '2009-08-11'),
58 (5, 'Karan', 103, 4444444444, '2006-03-12', '2009-05-11');
59
60 DELETE FROM employee WHERE employee_id=3;
61
62 INSERT INTO project
63 VALUES
64 (11, 'P1', 103, '2025-08-14', '2025-09-14'),
65 (12, 'P2', 103, '2025-08-14', '2025-08-30');
66

```

Data Output Messages Notifications

Showing rows: 1 to 4 Page No: 1							
	employee_id [PK] integer	employee_name character varying (20)	department_id integer	employee_contact character varying (20)	join_date date	end_date date	status character varying (20)
1	1	Rahul	101	8888888888	2001-04-12	2010-07-13	active
2	2	Anuj	102	7777777777	2003-06-10	2004-05-11	active
3	4	Naman	103	5555555555	2006-06-25	2009-08-11	active
4	5	Karan	103	4444444444	2006-03-12	2009-05-11	active

5. Learning Outcomes:

1. About query writing in PostgreSQL.
2. About various DDL, DML and DCL commands.
3. About the application of CHECK constraint.
4. About role-based privileges to secure data.