Experiment 1

Name: Mimanshu Gahlaut
UID: 24BAI70038
Branch: BE CSE AIML
Group: 24AIT KRG G1
Semester: 4th
Date: 09/01/26
Subject Name: DBMS
Subject Code: 24CSH-298

AIM:

To design and implement a **Library Management System database** using appropriate tables, primary keys, foreign keys, and constraints, and to perform **DML operations** along with **DCL commands** such as role creation, privilege granting, and revoking to ensure database security.

Software Requirements

- **Database Management System:**
    - PostgreSQL
- **Database Administration Tool:**
    - pgAdmin

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.

CODE:

```
CREATE TABLE books(
        id INT PRIMARY KEY,
        name VARCHAR(50) NOT NULL,
        author_name VARCHAR(50) NOT NULL,
        count INT CHECK(count>0)
)

CREATE TABLE library_visitors(
        user_id INT PRIMARY KEY,
        user_name VARCHAR(20) NOT NULL,
        age INT CHECK(age>=18) NOT NULL,
        email VARCHAR(40) UNIQUE NOT NULL
)

CREATE TABLE book_issue(
        book_issue_id INT PRIMARY KEY,
        book_id INT NOT NULL,
        user_id INT NOT NULL,
        FOREIGN KEY (book_id) REFERENCES books(id),
        FOREIGN KEY (user_id) REFERENCES library_visitors(user_id),
        book_issue_date DATE NOT NULL
)

INSERT INTO books VALUES(1, 'Harry Potter', 'R. Snape', 1)
INSERT INTO books VALUES(2, 'Avengers', 'Stan Lee', 3)

SELECT * FROM books

INSERT INTO library_visitors VALUES(101, 'Robert', 20, 'abc@gmail.com')

UPDATE library_visitors SET email='Robert@gmail.com' WHERE user_id = 101

SELECT * FROM library_visitors

INSERT INTO book_issue VALUES(1234,1,101,'2026-01-07')

SELECT * FROM book_issue

DELETE FROM books WHERE id = 2

SELECT * FROM books
```

```
CREATE ROLE librarian WITH LOGIN PASSWORD 'PASSWORD'

GRANT SELECT, INSERT, DELETE, UPDATE ON books TO librarian
GRANT SELECT, INSERT, DELETE, UPDATE ON library_visitors TO librarian
GRANT SELECT, INSERT, DELETE, UPDATE ON book_issue TO librarian

REVOKE SELECT, INSERT, DELETE, UPDATE ON books FROM librarian
```

OUTPUT:

Table books:

	id [PK] integer	name character varying (50)	author_name character varying (50)	count integer
1	1	Harry Potter	R. Snape	1
2	2	Avengers	Stan Lee	3

Table library_visitors:

	user_id [PK] integer	user_name character varying (20)	age integer	email character varying (40)
1	101	Robert	20	Robert@gmail.com

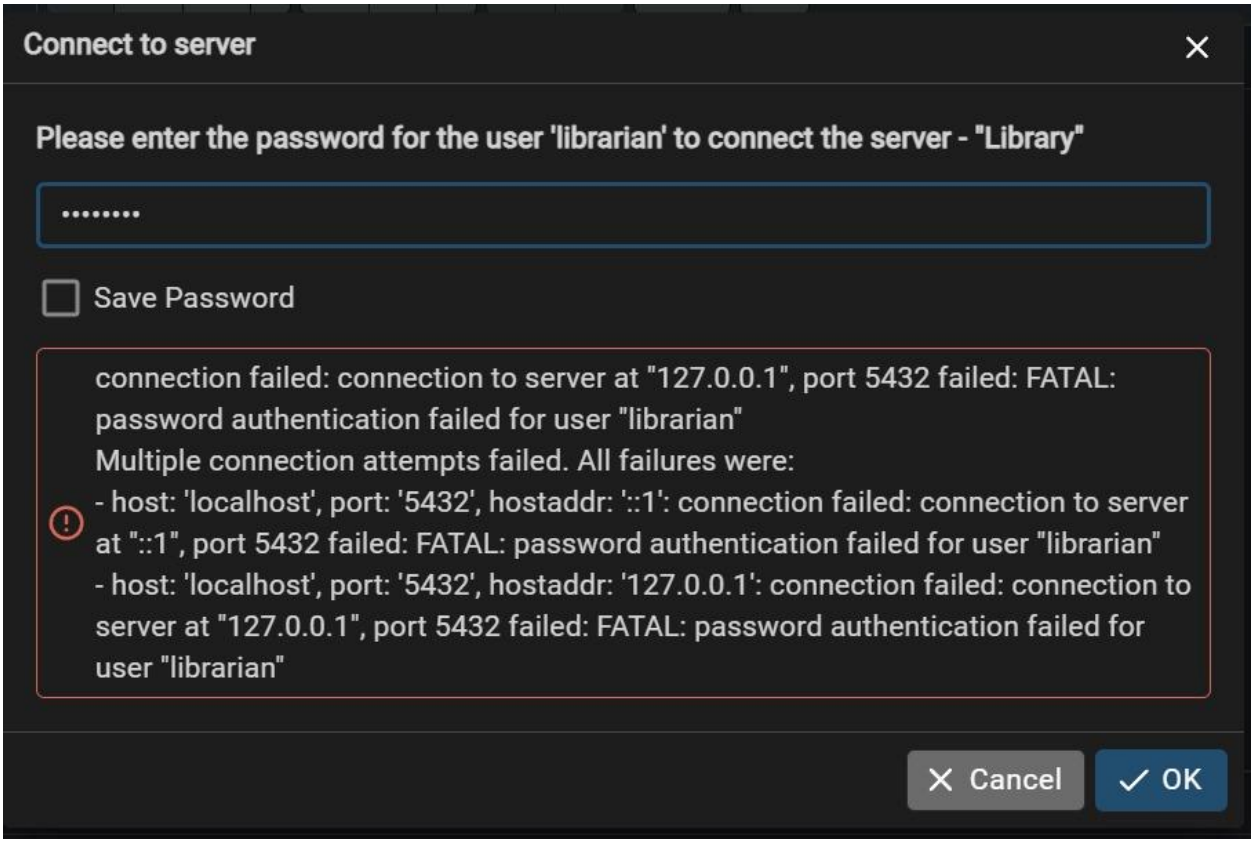
Table book_issue:

	book_issue_id [PK] integer	book_id integer	user_id integer	book_issue_date date
1	1234	1	101	2026-01-07

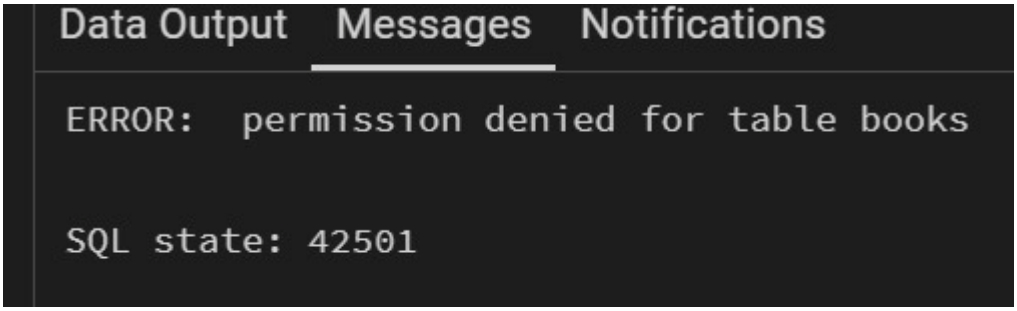
Table books after updation:

	id [PK] integer	name character varying (50)	author_name character varying (50)	count integer
1	1	Harry Potter	R. Snape	1

New Role creation:



Permission revoked:



Learning Outcomes:

- Understand how to design relational databases from real-world problems.
- Apply primary key, foreign key, and other integrity constraints.
- Perform basic SQL operations like CREATE, INSERT, UPDATE, DELETE, and SELECT.