SQL Injection Mini-Project

📌Project Title

SQL Injection Attack and Prevention Techniques

📖Description

This project was developed as part of the **Security and Privacy** module. It demonstrates how SQL Injection attacks work on an insecure authentication system and how such attacks can be prevented using secure coding practices.

The application provides two login modes: - **Vulnerable Login**: susceptible to SQL Injection attacks. - **Secure Login**: protected using prepared statements (parameterized queries).

The goal of this project is educational: to understand the risks of SQL Injection and the importance of secure database programming.

🛠️Technologies Used

- Programming Language: **Python**
- Database: **SQLite**
- Environment: Console-based application

📂Project Structure

```
sql-injection-project/
│
├── app.py
├── database.py
├── login_vulnerable.py
├── login_secure.py
├── security.db
├── README.md
```

📩How to Run the Project

✂️Requirements

- Python 3.x installed on your system

✒️Steps

1. Clone or download the repository:

   ```
   git clone <repository-link>
   ```

2. Navigate to the project folder.
3. Run the database initialization script (only once):

   ```
   python database.py
   ```

4. Run the main application:

   ```
   python app.py
   ```

5. Choose between:
6. Vulnerable Login
7. Secure Login

🧪Testing SQL Injection

Vulnerable Login Example

```
Username: ' OR '1'='1
Password: anything
```

✅Login succeeds (authentication bypassed)

Secure Login Result

Using the same input: ❌Login fails

This confirms that prepared statements effectively prevent SQL Injection attacks.

📊Educational Outcomes

- Understanding how SQL Injection attacks occur
- Observing real exploitation on vulnerable code
- Learning how prepared statements protect databases
- Comparing insecure vs secure authentication mechanisms

🔍Disclaimer

This project is for **educational purposes only**. The demonstrated attacks should not be used on real systems without authorization.

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🔗GitHub Repository

(Add your GitHub repository link here)