Project Proposal: Secure User Authentication System

1. Title

Secure User Authentication System Using Java and OOP

2. Purpose

The project aims to develop a secure user authentication system in Java that applies Object-Oriented Programming principles. It solves the problem of insecure login systems by implementing password hashing, role-based access, and modular code.

3. Goals and Key Functionalities

- User registration and login
- Password hashing with BCrypt
- Role-based access
- Password reset
- GUI using Swing

4. Tech Stack

Programming Language: Java

Frameworks/Libraries: Java Swing, jBCrypt, JDBC

Database: MySQL or SQLite

5. Use of OOP

Encapsulation: Private fields, getters/setters

Inheritance: Role-based user classes

Polymorphism: Method overloading/overriding

Abstraction: Interfaces for services

6. Project Timeline

1. Requirements & Design - 2 days

2. Database Setup - 2 days

3. Basic Functionality - 3 days

4. Role Access & GUI - 4 days

5. Security & Reset - 3 days

6. Testing - 2 days

7. Docs - 2 days

7. Final Product

A secure and user-friendly Java authentication system that can be integrated into various apps requiring secure user login and access control.

8. Summary

This project combines cybersecurity practices with core OOP principles to produce a scalable, reusable, and secure authentication solution.

9. References

- Oracle Java Docs

- jBCrypt: https://www.mindrot.org/projects/jBCrypt/

- JDBC Tutorials

- OWASP Guidelines

10. Development So Far

- Developed: Registration, Login, Password hashing, Role-based GUI

- Remaining: Password Reset, 2FA, Testing

- Challenges: JDBC configuration and GUI layout

- New Learnings: BCrypt usage, Swing design patterns