Online Banking System - Java Console Application

1. Project Overview
The Online Banking System is a Java-based console application designed to simulate basic banking operations. It incl
und transfer, and transaction history tracking. This project is built with modular design principles using multiple pacl
, and data handling.

2. Technologies Used
- Java SE 11+
- SHA-256 password hashing (for basic security)
- Java Collections API (Map, List)
- VS Code / Command-line

3. Project Structure

```
OnlineBankingSystem/
□□□ main/
□   □□□ BankApp.java          # Main entry point (UI and control flow)
□□□ model/
□   □□□ Account.java         # Account class with balance and transactions
□   □□□ Transaction.java      # Transaction log with timestamp
□□□ service/
□   □□□ BankService.java       # Business logic (login, transfer)
□□□ data/
□   □□□ BankDatabase.java       # Simulated in-memory database
□□□ util/
□   □□□ SecurityUtil.java      # Password hashing with SHA-256
□□□ README.txt              # Setup and usage instructions
```

4. Key Features

4.1 User Authentication
- Users must provide correct username and password.
- Passwords are hashed using SHA-256 and compared with stored hashes.

4.2 Account Management
- Each user has a unique account number, balance, and transaction history.

4.3 Fund Transfers
- Users can transfer money to another user by specifying their account number.
- The system checks for sufficient balance and logs transactions on both sides.

4.4 Transaction History
- A list of recent transactions is displayed with type, amount, and timestamp.

5. Sample Demo Users

Username	Password	Account No	Balance
alice	pass123	1001	5000.00
bob	bob@123	1002	3000.00

6. How to Compile and Run

6.1 Compile All Files
```bash
javac main/BankApp.java model/*.java service/*.java data/*.java util/*.java
```

```

```

6.2 Run the Application
```bash
java main.BankApp
```

7. Code Walkthrough

7.1 BankApp.java
- Handles console input/output
- Manages user login and displays menu options
- Interacts with `BankService` to perform operations

7.2 Account.java
- Contains account details (account number, username, password hash, balance)
- Stores list of `Transaction` objects

7.3 Transaction.java
- Each object represents a single financial activity (deposit, withdrawal, transfer)

7.4 BankService.java
- Validates user login
- Performs secure fund transfers
- Connects business logic with data layer

7.5 BankDatabase.java
- Holds pre-created user accounts in memory using `HashMap`
- Acts as a pseudo-database

7.6 SecurityUtil.java
- Hashes passwords securely using SHA-256

8. Limitations & Future Enhancements
- Currently uses in-memory data (no persistent storage)
- No GUI – runs in console only
- No exception handling for incorrect input types

Future Features:
- MySQL or SQLite database integration
- JavaFX GUI
- Transaction export (CSV or PDF)
- Multi-user session support

9. Conclusion
This project serves as a functional prototype of an online banking system using core Java concepts. It follows a modu
further expansion.