Problem Statement: ATM Simulation System

Overview

Design and implement an ATM Simulation System that allows users to perform basic banking transactions such as checking account balance, withdrawing cash, depositing cash, and transferring funds between accounts. The system should provide a user-friendly interface to simulate the experience of using an Automated Teller Machine (ATM).

Requirements

User Authentication:

Users must be able to authenticate themselves using a unique account number and a personal identification number (PIN).

The system should allow a maximum of three attempts to enter the correct PIN before locking the account temporarily.

Account Management:

Each user should have an account with the following attributes:

Account Number

Account Holder Name

Account Balance

PIN

Transactions:

The system should allow the following transactions:

Check Balance: Display the current balance of the user's account.

Withdraw Cash: Allow users to withdraw a specified amount, ensuring that the account has sufficient funds and that the amount is within the ATM's withdrawal limit.

Deposit Cash: Allow users to deposit a specified amount into their account.

Transfer Funds: Allow users to transfer funds to another account by entering the recipient's account number and the amount to be transferred.

Transaction History:

Maintain a transaction history for each account, logging details of each transaction performed (type, amount, date, and time).

User Interface:

Provide a simple command-line interface or graphical user interface (GUI) for users to interact with the ATM system.

Display appropriate messages for successful transactions, errors, and prompts for user actions.

Error Handling:

Implement error handling for invalid inputs, such as:

Invalid account number or PIN

Insufficient funds for withdrawal

Invalid amount for deposit or transfer

Non-existent recipient account for transfers

Security:

Ensure that sensitive information (such as PIN) is not displayed on the screen during input.

Lock the user account after three failed login attempts for a temporary period.

Additional Considerations

Implement a simple database or in-memory data structure to store user accounts and transaction history.

The system should be modular, allowing for easy updates and enhancements in the future.

Consider edge cases, such as the attempt to withdraw an amount greater than the account balance or the ATM's cash limit.

Deliverables

Source code for the ATM Simulation System.

Documentation detailing system design, usage instructions, and any assumptions made during development.

Test cases to verify the functionality of the system.

By meeting these requirements, the ATM Simulation System will provide a realistic and efficient simulation of ATM operations, enhancing users' understanding of banking transactions.