

ATM Requirements

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Product Overview

The software to be designed will control an Automated Teller Machine (ATM). The ATM should be capable of providing one or more of the following services/transactions:

1. An authenticated user must be able to make a cash withdrawal from the accounts linked to the card.
2. An authenticated user must be able to make a deposit to the accounts linked to the card.
3. An authenticated user must be able to make a balance inquiry of the accounts linked to the card.

The ATM will service one customer/user at a time. A customer will be required to insert an ATM card and enter a personal identification number (PIN) which will be sent to the bank for validation as part of each transaction. The user will then be able to perform one transaction. The card will be retained in the machine until the user session ends.

Central Service

Central service is used for communication purposes between the ATM software and the Bank service.

- Authentication: Checking card/PIN-combination
- Account access service
 - Checking account balance
 - Checking transaction fee. The bank to which the card belongs can charge an additional amount of money for withdrawing. Before confirmation of withdrawing the transaction fee will be displayed. This fee can be based on the selected withdrawal amount.
 - Withdrawal/depositing of money must be authorized by central service.
 - Confirmation that money has been taken must be sent to central service.
 - Notification that ejected money wasn't taken and was retracted must be sent to central service.
- Upon an authentication request the central service responds with either
 - Accept → continue
 - Reject → try again
 - Confiscate card, show message → send card to Confiscated Card slot
- Receives maintenance alerts regarding the ATM

Functional Requirements

Welcome Screen

- Language selection is possible from the welcome screen and will affect all messages of UI.
- Out of order / no more receipts message is displayed if the case.

User Authentication

- The user is required to insert his card into the Card Slot and provide his/her Personal Identification Number (PIN). Both the PIN and the card number are sent to the Central Server for verification and authentication.
- A user's PIN code can NEVER be mentioned on screen, on receipt or elsewhere.
- Authentication must precede the following actions: withdrawal, deposit, balance

Once the user is successfully authenticated, he is able to use one of the following transactions.

Transactions

- **Cash withdrawal:** A withdrawal transaction asks the authenticated user to choose from a predefined set of possible amounts or to indicate a customized amount. All amounts are constrained by the note types available in the Vault. If the transaction is approved by the central service, the money is dispensed in the Outgoing Slot. The card is then ejected, and the user is signaled (with sound) to take the money. The central service is notified if the user forgets to take the card or money.
- **Cash deposit:** A deposit transaction asks the authenticated user to insert money in the note and/or coin drawers. The inserted money is scanned for validation. The value of the inserted money is displayed on the screen and when the user presses done, a message is sent to the Central Service to verify the deposit and the deposited amount is transferred to the incoming vault.
- **Balance Inquiry for the accounts to the card.** The authenticated user can check one of his/her account balance. No further action is required, once the transaction is approved by the Central Service.

Before verifying transactions with the central service, the user may always cancel the process by pressing the Cancel button. After a complete transaction, a user can choose to print a receipt. Then the card is ejected.

Printing Receipts

The ATM will provide the customer with a printed receipt, *upon the customer request*, for each successful transaction, showing the following data:

- Date
- Time
- ATM ID
- Type of transaction
- Account number
- Card number
- Amount of withdrawal/deposit or available balance of the affected account

Timeouts

Specified time frames (timeouts) are used for securing transactions with the current user, by preventing personal information losses, thievery attempts against the user's card and/or money.

- Upon timeouts, current process must be aborted and the system should return to the welcome screen.

- All functionality that awaits user input may provoke a timeout that will eject the card.
- If the user does not take his/her card after ejection, it will be confiscated.
- If the user does not take his/her money, the money is confiscated and put in the Forgotten Money Vault with a receipt on top identifying the transaction.
- Upon communication with Central Service a timeout should be handled. Upon timeout eject card and enter out-of-order mode and try again to communicate in specified time intervals.
- Before starting timeout a jammed card will be pulled back by the card slot and sent to the Confiscated Card Stack.
- If this fails a timeout will start. If the card is still jammed after this timeout, the machine will go Out of Order.

Alarms

Sensors are present and may alert the maintenance crew (via the Central Service) of the following fatal errors. These errors takes the machine in Out Of Order mode.

- Card slot jammed and timeout expired (meaning that the jam is assumed to be permanent)
- Transports for depositing and withdrawal jammed
- Confiscated Card Stack full
- Forgotten money vault full
- Network down (cannot provoke a message to Central Service)
- Log printer jammed or out of ink
- Forgotten money printer jammed or out of ink

Messages are also been sent in one of the below cases:

- Outgoing stack(s) at low levels
- Incoming stack(s) at high levels
- Receipt printer out of paper, ink or jammed

If both withdrawal and depositing have become unavailable the machine will go out of order.

Non-Functional Requirements

The following are non-functional requirements for the ATM:

- The user must enter the PIN correctly within three attempts
- The ATM can be shut down and restarted
- The cash dispenser can be opened and refilled with cash
- The cash withdrawal / waiting is done under 5 seconds
- The supported languages are English, French, Spanish and Chinese
- The ATM types supported are Sweden and UK
- All transactions must be secured