

ATM Machine System Design

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System Requirements

To support the ATM works, it needs to go through the following steps:

1. User inserts an ATM card, the card reader reads the card information and request PIN number. Then the user needs to use the keypad to enter the Personal Identification Number (PIN) for authentication.
2. After being authenticated, the ATM extracts account information associated with the card. Then user can choose one of three transactions:
 - Balance inquiry
 - Cash and check deposit
 - Cash withdraw
3. Accounts has two account types, checking account and saving account. The user can request a print receipt of the balance for each account.
4. There are two types of deposit, one is cash deposit, and the other is check deposit.
 - For cash deposit, user puts the cash in a deposit slot. The ATM will show the deposit amount on screen and ask user to confirm.
 - The check deposit follows the same procedure, user inserts check in the check deposit slot, then the ATM shows the check amount on screen to get the user's confirmation. When it's all done, the user can choose whether to print a receipt.

5. If users want to withdraw cash, they need to enter the withdrawal amount. System will confirm the request withdrawal amount is less than the balance amount. Then ATM will dispense the money from cash dispenser. After confirming the cash amount, user can request a print receipt.

Use Case Diagram

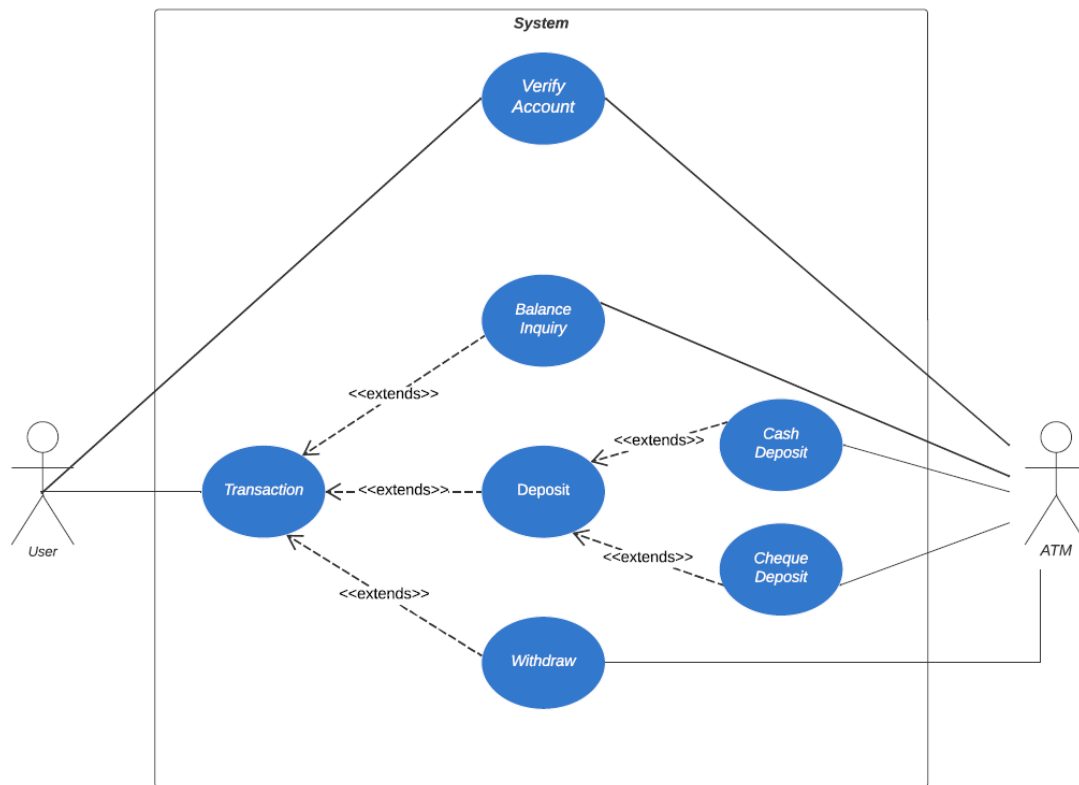
We have two main actors in our system:

1. User: Users can access and check balance on both saving and checking account, making cash and check deposit, and withdraw cash.
2. ATM: Verify account information like PIN number, give authorization, and update the deposit and withdraw transactions.

Here are the top use cases of the ATM System:

1. Users should be able to access the accounts using their PIN number.
2. Check balance of each account and request print out.
3. Users can make both cash and check deposit transactions and request print out.
4. Users can withdraw money and request print out.

ATM Use Case Diagram

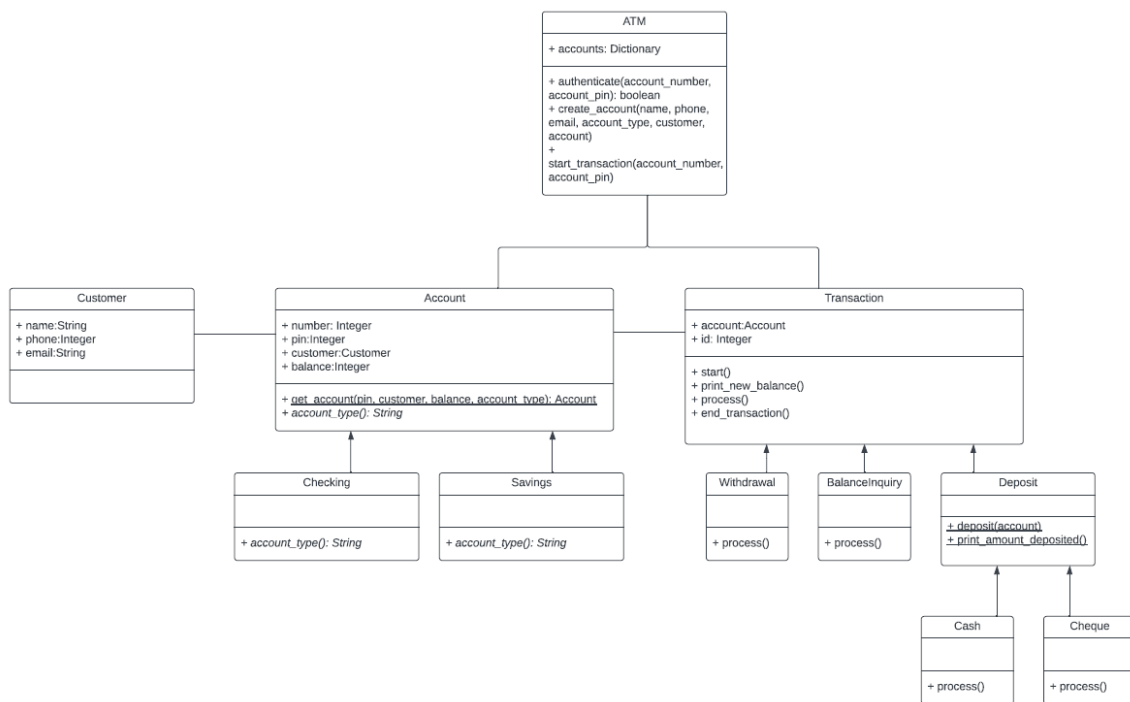


Class Diagram

The main classes we are using are:

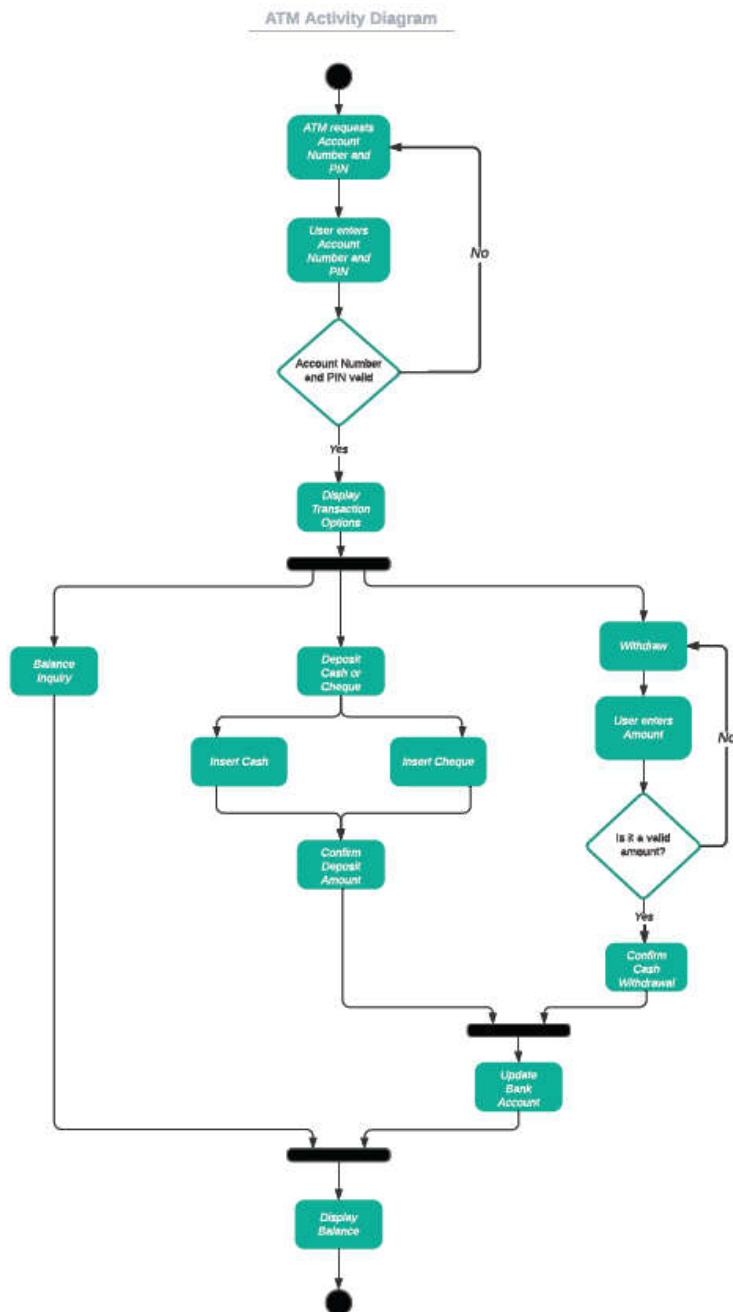
1. ATM: ATM class is the enter point of the transaction cycle. The other classes are all supporting this ATM class. It should have the function to verify the user's pin, if the pin is wrong, the ATM class should ask user to re-enter the PIN. After creating a ATM class object, this object could create customer, saving and checking accounts, and start the transaction. When the current transaction finished, the system can start another transaction cycle.

2. Customer class stores the customer attributes, such as customer name, phone number and email address.
3. Account class includes two account types, one is checking account, the other is saving account. Since we didn't use database to store the customer data, we create the account and balance locally for demonstration use.
4. Transaction class is a parent class of withdraw class, balance inquiry class, and deposit class. The transaction class is the enter point for customers to start either of the three transactions.



Activity Diagram

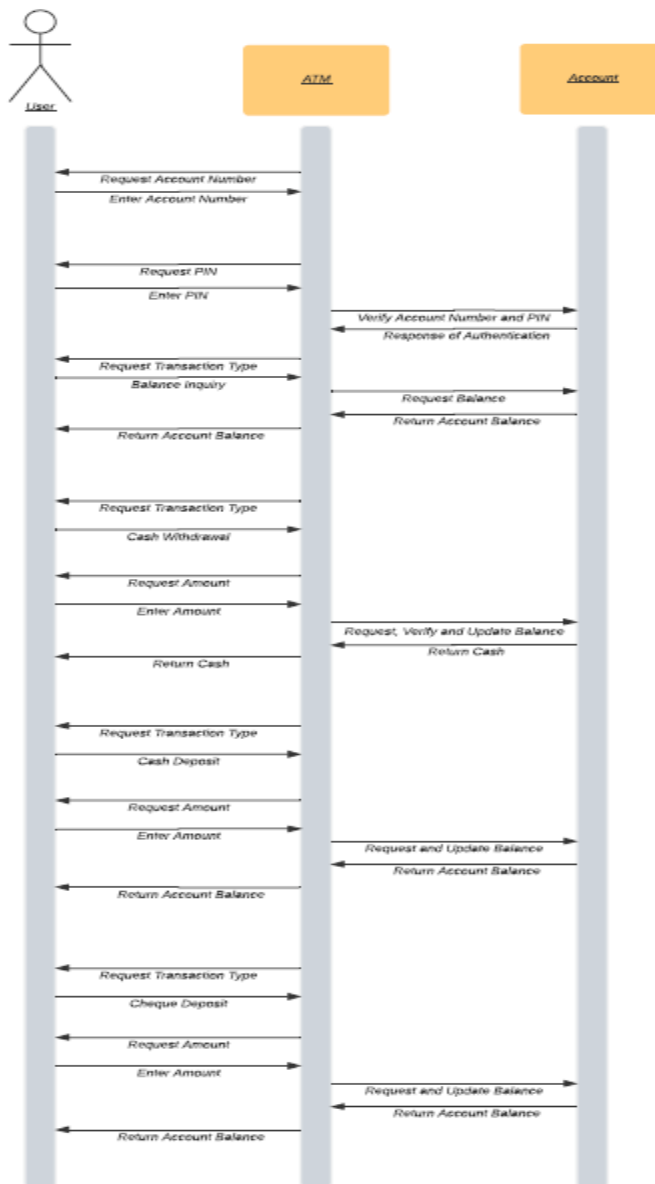
The activity diagram shows the process for the whole ATM transaction cycle. It starts from the PIN request and end with the display of balance.



Sequence Diagram

Sequence Diagram shows the transactions require communication between the ATM machine and bank system. Every time the user enters a request, ATM machine must connect to the bank system to get response, for example, update the balance after deposit or withdraw.

ATM Sequence Diagram



Code

Please see the attached code file.