# CS255 Module 6 Assignment

Matthew Biletnikoff

# Diagram Interpretation

The provided UML activity and sequence diagrams illustrate the ATM cash withdrawal process from two different perspectives. The activity diagram shows the overall workflow that a user follows when interacting with the ATM, while the sequence diagram focuses on the communication and interactions between the different participants: the user, the ATM, and the bank. In this scenario, the user begins by inserting their bank card and entering their PIN. The ATM sends this information to the bank for verification. If the PIN is correct, the user is prompted to enter the desired withdrawal amount. The bank verifies that the account has sufficient funds and confirms the transaction. If approved, the ATM dispenses the requested cash, prints a receipt if required, and ejects the card. If the PIN is invalid or there are insufficient funds, the ATM notifies the user and either allows another attempt or ends the session.

# Design Analysis and Improvements

While the diagrams outline the basic ATM cash withdrawal flow, there are a few important gaps in logic and functionality. The first issue is the lack of security measures for repeated invalid PIN entries. Without a limit, an unauthorized person could repeatedly attempt different PINs until successful, creating a serious security risk. This could be addressed by setting a maximum number of attempts, typically three, after which the ATM retains the card and ends the session. The second issue is the absence of an explicit check to confirm that the ATM has enough physical cash on hand to fulfill the withdrawal request. Even if the bank approves the transaction, the ATM may not be able to dispense the requested amount if its cash supply is low. Adding a local cash availability check before dispensing funds would improve reliability. Other refinements that could enhance the user experience include allowing the user to cancel the transaction at any point, providing an option to skip printing a receipt, and implementing a timeout feature to automatically end a session after a period of inactivity. These changes would improve both the security and usability of the ATM system.

# Revised UML Activity Diagram

To address the most critical issue, I revised the activity diagram to include a maximum of three PIN attempts before retaining the card and ending the session. This significantly improves security by reducing the risk of brute-force attacks. I also moved the cash dispensing step to occur only after both bank approval and an ATM cash availability check, ensuring that funds can be dispensed without errors. The improved diagram also shows optional receipt printing and card ejection before the session ends, regardless of whether the transaction was successful. These updates make the process more secure, reliable, and user-friendly.

A diagram of a financial system

AI-generated content may be incorrect.

# References

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