# CS 255 Module 6 Assignment Tyler Ellis

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**1. Diagram Interpretation**  
 The activity and sequence diagrams both describe the ATM withdrawal process. In the activity diagram, the user enters a PIN which the system verifies. If the PIN is correct, the user then specifies the withdrawal amount. The system checks if the amount is available and, if so, dispenses cash before generating and printing a receipt. Meanwhile, the sequence diagram highlights interactions among the User, ATM, and Bank. The user inserts a card and enters a PIN. The ATM sends this PIN to the Bank for verification, and once confirmed, the ATM asks for the withdrawal amount. After the user enters the amount, the ATM dispenses the requested cash. Information exchanged includes the PIN, the requested withdrawal amount, and confirmation messages or error notices (such as insufficient funds). These two diagrams offer different viewpoints of the same use case: the activity diagram shows the flow of decisions, while the sequence diagram shows the order of messages passed between the system components.  
  
**2. Design Analysis (At Least Two Deficiencies)**

**Deficiency 1: Insufficient Error Handling**

One weakness is that neither diagram shows how the system responds if the ATM cannot communicate with the Bank (ex: network errors). Currently, the diagrams assume that verification and balance checks always happen successfully. In a real-world scenario, the user may have their transaction canceled or see an error message if the communication fails. Accounting for these alternate flows would enhance the design by clarifying what steps the user and ATM should take when external services are unavailable.

**Deficiency 2: No PIN Re-Entry or Lock Mechanism**

In the activity diagram, if the PIN is wrong, the system simply terminates. In many ATMs, users are given multiple attempts to re-enter the PIN before the system locks the card or retains it. Similarly, the sequence diagram does not indicate what happens after a wrong PIN is detected. Including a loop or alternative flows for multiple incorrect PIN attempts, along with a lockout or card-capture mechanism, would improve realism and security.  
  
  
**Change Breakdown:**  
 This improved activity diagram addresses the deficiency in PIN handling. Instead of simply ending on the first incorrect PIN, users now have up to three tries before the system locks the card and ends the process. These changes add a realistic security measure and enhance the overall functionality of the design.  
  
