**Part One: Diagram Interpretation**

Diagram

Description automatically generatedFigure 1 demonstrate the use case for a withdrawal function in an ATM system. Figure 1 shows a UML activity diagram, where the focus is on the activity of the user. The user interacting with the ATM needs to enter the PIN associated with the card. Next, the PIN is verified. If it is incorrect, the diagram goes straight to the end point. If it is correct, then it proceeds to ask for the withdrawal amount. After an amount is specified by the user, the amount requested is compared to the amount available. If the amount is available, the ATM dispenses the requested cash, then generates a receipt. If the amount is not available, the machine skips the dispense action and goes straight to the generation of a receipt. After a receipt is generated, it is then printed. After the receipt is printed, the activity ends. Figure 2 demonstrates the same use case—a withdrawal function in an ATM system. The focus is the interaction between the relationships between objects. In this diagram, those objects are the user, the ATM, and the bank. The user initiates the transaction, the ATM facilitates it, and the bank verifies that the transaction is legitimate.

Figure : UML Activity Diagram

Diagram

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Figure : UML Sequence Diagram

**Part 2: Design Analysis and Improvements**

The activity diagram (Figure 1) is logically sound. It has verifications in the sequence of events, such as verifying the amount against the balance and verifying the PIN is correct. There could be some added activities to represent additional features that would improve user experience. Based on my own experience with ATMs, there are two that come to mind:

1. An activity that allows the user to choose bill denominations
2. An activity that allows the user to choose whether or not to print the receipt

The sequence diagram (Figure 2) has some flaws. The two that immediately come to mind when comparing it to Figure 1 are:

1. The absence of checking the amount requested against the account balance
2. The absence of receipt generation and printing

These two features are present in the activity diagram but omitted in the sequence diagram. The absence of these features would not be obvious if the verification of the PIN was not present in the diagram. Validating the amount requested against the account balance is essential to preventing overdrafts. Generating and printing a receipt, though less critical than account validation, is important to maintain consistency with the activity diagram.

Because of the critical nature of the first improvement for Figure 2, I will choose that as my improvement for Part 3.

**Part 3: Revised Sequence Diagram**

Diagram

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Figure : Revised Sequence Diagram