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CS-255

6-3 Assignment: Interpreting UML Diagrams

1. **Write a short, paragraph-length response interpreting the diagrams. Be sure to address the following questions:**
   1. **What use case is being described by these diagrams and What interactions are involved in this use case? What information is being passed back and forth?**

The illustrations show a typical use case scenario that involves taking money out of an ATM. The UML activity diagram provides a thorough picture of the process's sequential stages. The user inserts their card, enters their PIN, selects an account, enters the withdrawal amount, and the ATM handles the withdrawal procedure and disburses the funds at the end. The user, ATM, and bank interactions throughout the cash withdrawal process are shown in the sequence diagram, which completes the activity diagram. The card is inserted, the PIN is entered, and an account is chosen at the user's initiative. The ATM then verifies the PIN, asks the customer for the withdrawal amount, and then contacts the bank to find out the account balance. The ATM releases the monies to the user when the bank confirms the withdrawal request. In order to guarantee the smooth operation of the cash withdrawal process, many pieces of information are transferred between the user, ATM, and bank throughout these interactions, including card information, PIN, account selection, withdrawal amount, and balance confirmation.

   1. **These diagrams describe one basic design for this use case. Analyze the design by identifying *at least two* deficiencies in the logic or functionality of the current design. Think about ways that you could address these deficiencies to improve the logic or functionality of the design.**

Insufficient User Instructions is first deficiency

The lack of sufficient user advice in the current design is a glaring issue. How the ATM interacts with the user throughout each stage is not shown in either the UML activity diagram or the sequence diagram. To ensure that consumers understand each step of the process and are guided through it, it is important to give clear instructions and prompts.

Both diagrams should include user prompts and feedback to improve user guiding. For instance, extra notations representing messages or on-screen instructions for the user at each stage can be added to the UML activity diagram. The sequence diagram can also show how the ATM contacts the user to make a request for action.

A lack of transaction confirmation is a second deficiency.

The absence of transaction confirmation in the current architecture is another significant flaw. The illustrations do not show how the user is told that the transaction has been completed and the monies have been successfully withdrawn. Users could be unclear of whether their transaction was completed or not without this confirmation. And even error confirmation, because if they put an invalid pin or something they should get some type of confirmation, or error handling message so i think lack of confirmation sticks with error handling as well.

To correct this shortcoming, both diagrams should show the transaction's concluding phase, in which the ATM gives the user a confirmation message. A final activity for transaction confirmation can be added to the UML activity diagram. Similar to how the message exchange between the user and the ATM to confirm the transaction's success should be depicted in the sequence diagram. And simple error handling messaging when entering the wrong pin.

Insufficient Network Security is third deficiency

The absence of network security measures is another flaw. Neither illustration takes into consideration the safe data transfer between the bank and the ATM. Sensitive

information like the user's PIN and transactional information might be intercepted without the correct encryption.

The two diagrams might use secure communication methods to increase network security. The usage of encryption techniques like SSL/TLS when the ATM connects with the bank should be shown in the sequence diagram. User data is kept private and secure during transmission because of this.

Now with correcting these deficiencies or flaws, we are able to have this be a secure design.

1. **Choose *one* of the deficiencies that you identified. Then reconstruct a UML activity *or* sequence diagram to improve functionality. Use the CASE tool Lucidchart to reconstruct the diagram. Be sure to use proper UML notation and diagram flow.**

Initial ← (Insert Card)

Insert Card ← Enter Pin

Enter Pin 2x ← Valid Pin? ← yes (Select the ammount to take) ← No (Error Invalid Pin)

Select Amount ← Enter Withdrawal AMount

Enter Withdrawal AMount ← Enough in account? (Sufficent Balance)

Sufficient Balance? ← yes (Continue with withdraw) ← No (Insufficent Balance alert)

Processing the withdraw ← Start dispensing cash

Final dispensing of Cash confirmation ← Confirmed?

Confirmed? ← yes (Final take cash) ← No (Transaction Canceled)

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