Modeling Behavior using Activity and Sequence Diagrams

In this lab, you will be creating behavior models of two different systems. Activity and sequence diagrams are good at capturing aspects of behavior that is discrete and synchronous. Activity diagrams are better at depicting branching behavior while sequence diagrams are good for depicting communication between objects. Both will be used in this lab.

One interesting problem that arises is that if there are two representations of behavior, one given in activity diagrams and one in sequence diagrams, the models can contradict each other. Carefully consider this as you develop your models of behavior.

ATM Machine

Develop an set of diagrams for an ATM machine depicting a number of scenarios. A scenario will be captured by a sequence diagram. Since there are multiple possible behaviors, multiple scenarios will be required.

Your model may include this hypothetical scenario for withdrawing money from an account:

The customer goes to the ATM machine insert the card to the machine and enter the pin number. The Bank (Control system) authorizes the user and if that is a valid customer let the customer to enter the value for the withdraw otherwise, the transaction ends and the machine returns the card.

For the next step the control system check the available balance and process the transaction if possible (assuming the system does not let the balance to become negative). If the transaction is impossible, an error message is displayed and the system prompts to enter another transaction. At any time when prompted to enter a transaction, the user may cancel, at which point the ATM machine will close the session and eject the card.

ATM machine prints the receipt and ejects the card.

The last step is for the customer to get the money from the money slot and get the receipt and bank card.

Needham-Schroeder (Lowe) Protocol

Develop two scenarios representing showing the communication between client and server in the Needham-Schroeder protocol assuming public key cryptography is available. In one scenario, depict the intended sequence of communication between two parties. There is a well knows man-in the middle attack on this protocol. Show this attack in an alternate scenario.

There is a very good description of this protocol at

`http://en.wikipedia.org/wiki/Needham-Schroeder_protocol.`

For extra credit, create another scenario using the well known fix to the protocol.