ECE 355
Software Engineering

Tutorial: Assignment 5
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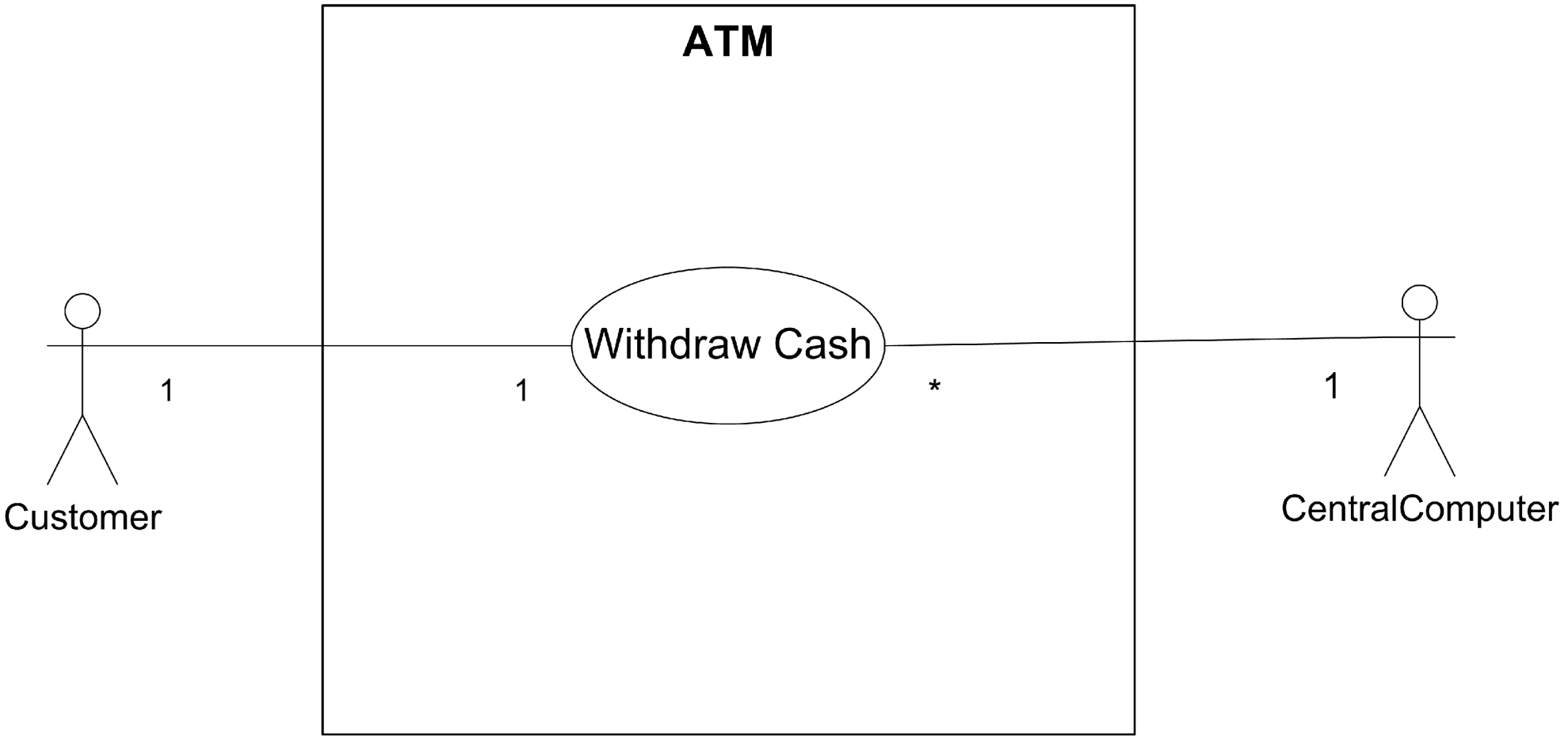
Problem Description

- You are to design the software for an automated teller machine (ATM). The ATMs are capable of only **withdrawal of cash** for this example. An ATM accepts a cash card, interacts with the user, verifies the PIN number provided, carries out the transaction, dispenses cash, and prints receipts. ATMs communicate with a central computer, which clears the transactions with the appropriate bank.

Problem Description

- To do
  - Draw a use case diagram for the ATM
  - Describe the use case
  - Draw a domain class diagram for the ATM
  - Draw a design-level sequence diagram to implement the use case
  - Draw the collaboration diagram corresponding the sequence diagram
  - Draw a design-level class diagram of the ATM software
  - Draw state diagrams for active objects in your design

Use Case Diagram



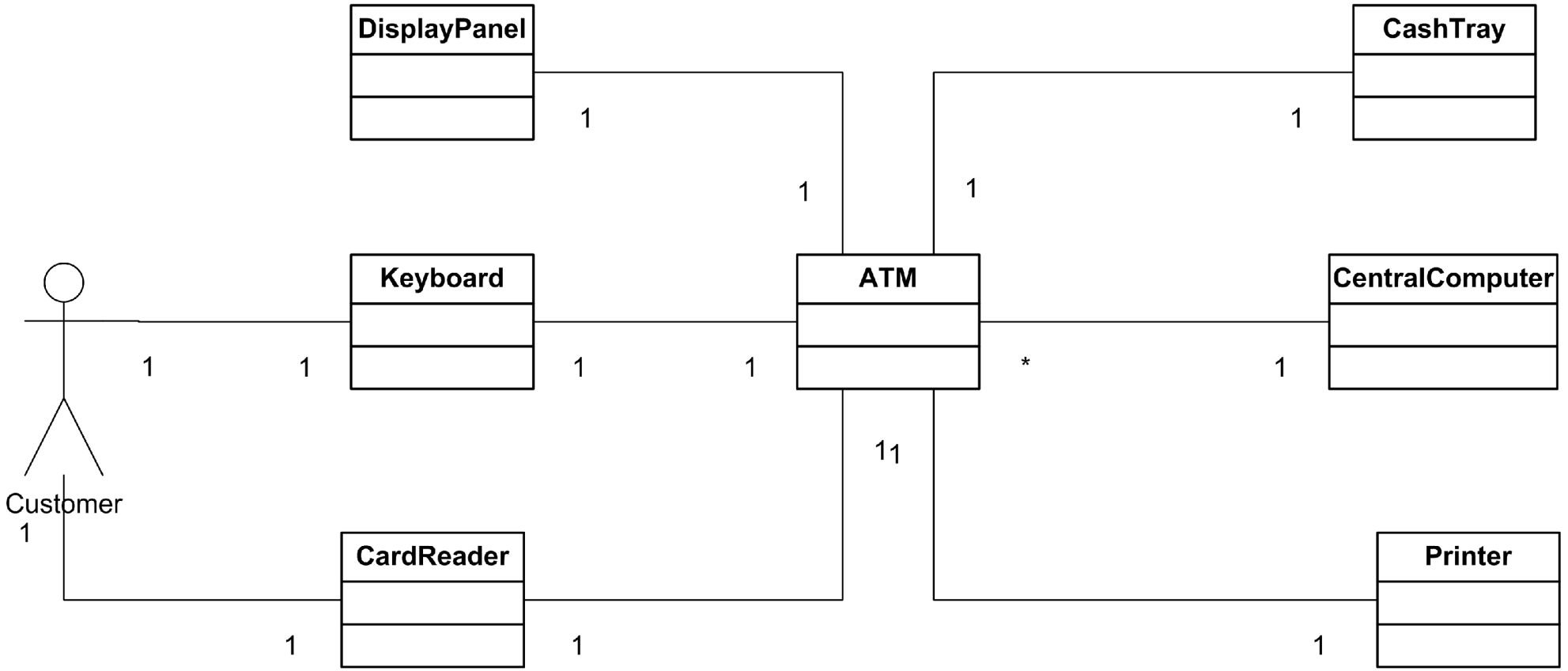
Use Case Description

Primary Actor: Customer
Goal in context: Customer withdraws cash
Level: User Level
Stakeholders and Interests:
Customer: wants to withdraw cash
Bank: deducts money from customer's account
Preconditions:
ATM is ready, customer has a cash card
Trigger: Customer interacts with ATM by inserting a cash card
Frequency of use: several per day
Minimum guarantee:
Customer gets his card back and no money is deducted from customer's account
Success guarantees:
Customer gets requested amount of cash and receipt. Bank deducts the money from customer's account

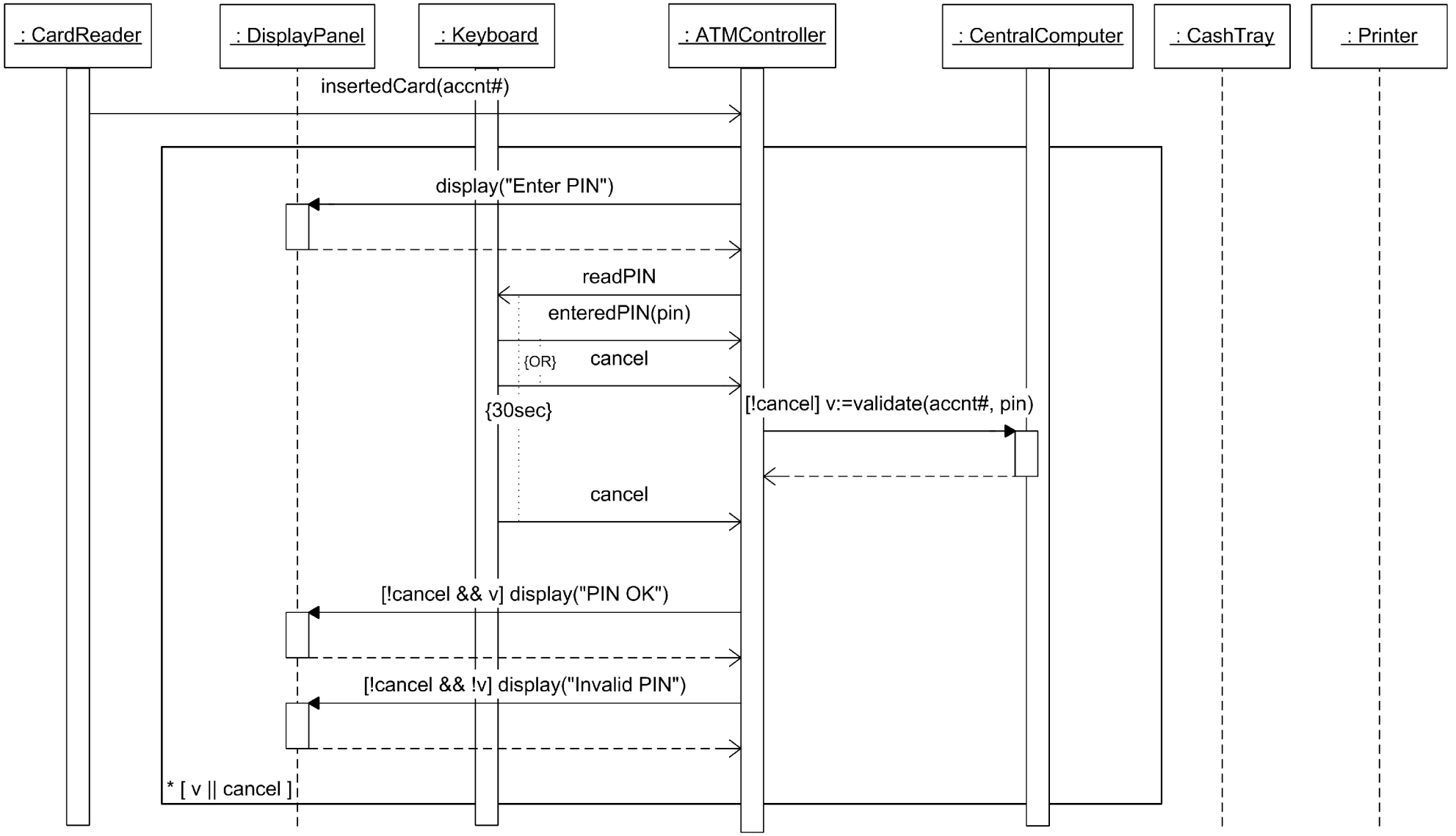
Main Success Scenario:
1. Customer inserts cash card in the card reader
2. Customer enters the PIN
3. Customer enters the desired amount
4. ATM dispenses desired amount of cash
5. ATM prints a receipt
6. ATM returns customer's cash card

Extensions:
2a. The entered PIN is invalid – customer enters the PIN again
3a. insufficient money in cash tray – customer enters new amount
3b. insufficient money on customer's account – customer enters new amount
2b, 3c. Customer presses Cancel – ATM returns the cash card
2c, 3d. Customer does not enter anything for 30 seconds – ATM returns the cash card

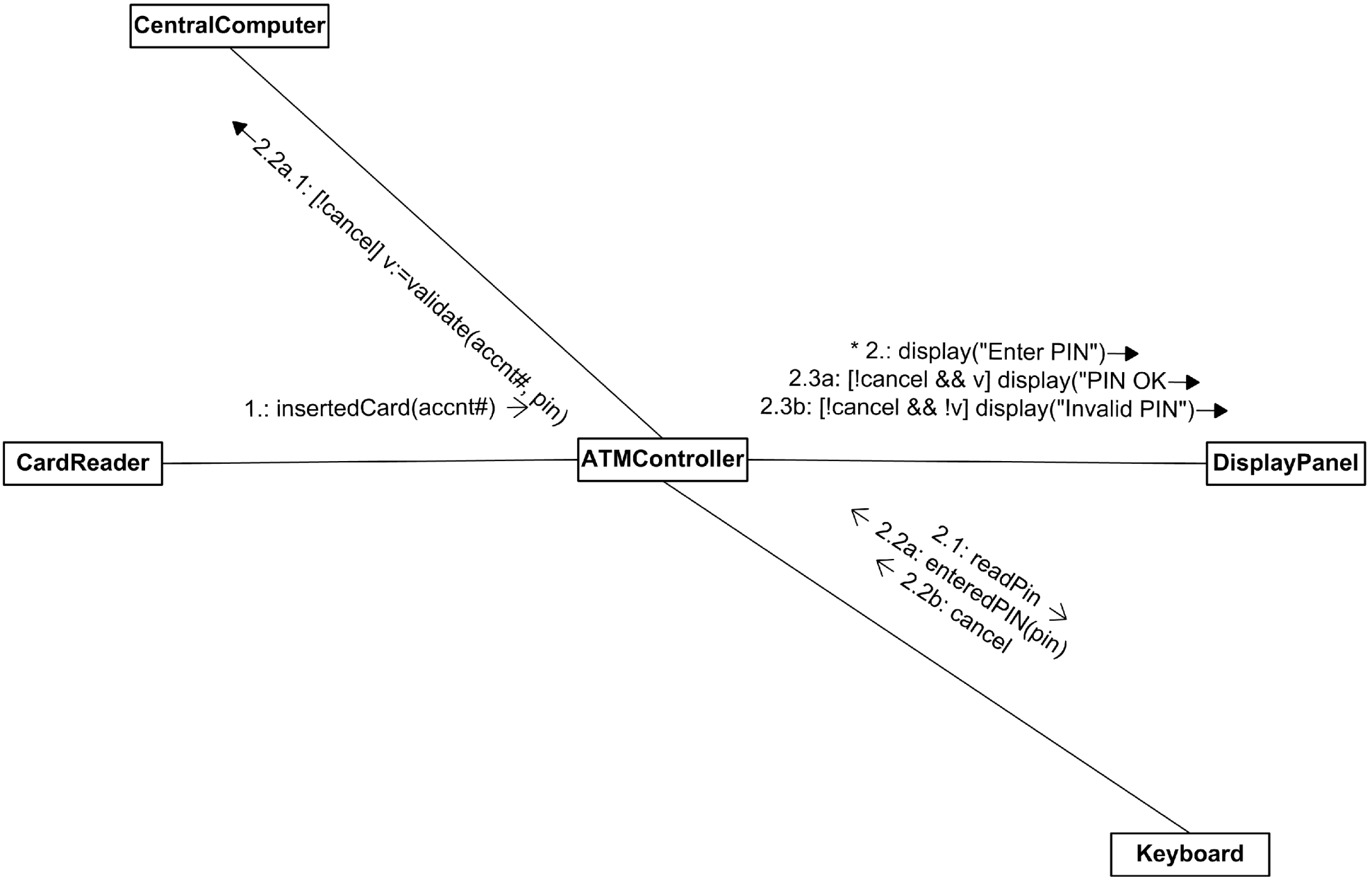
Domain Class Diagram



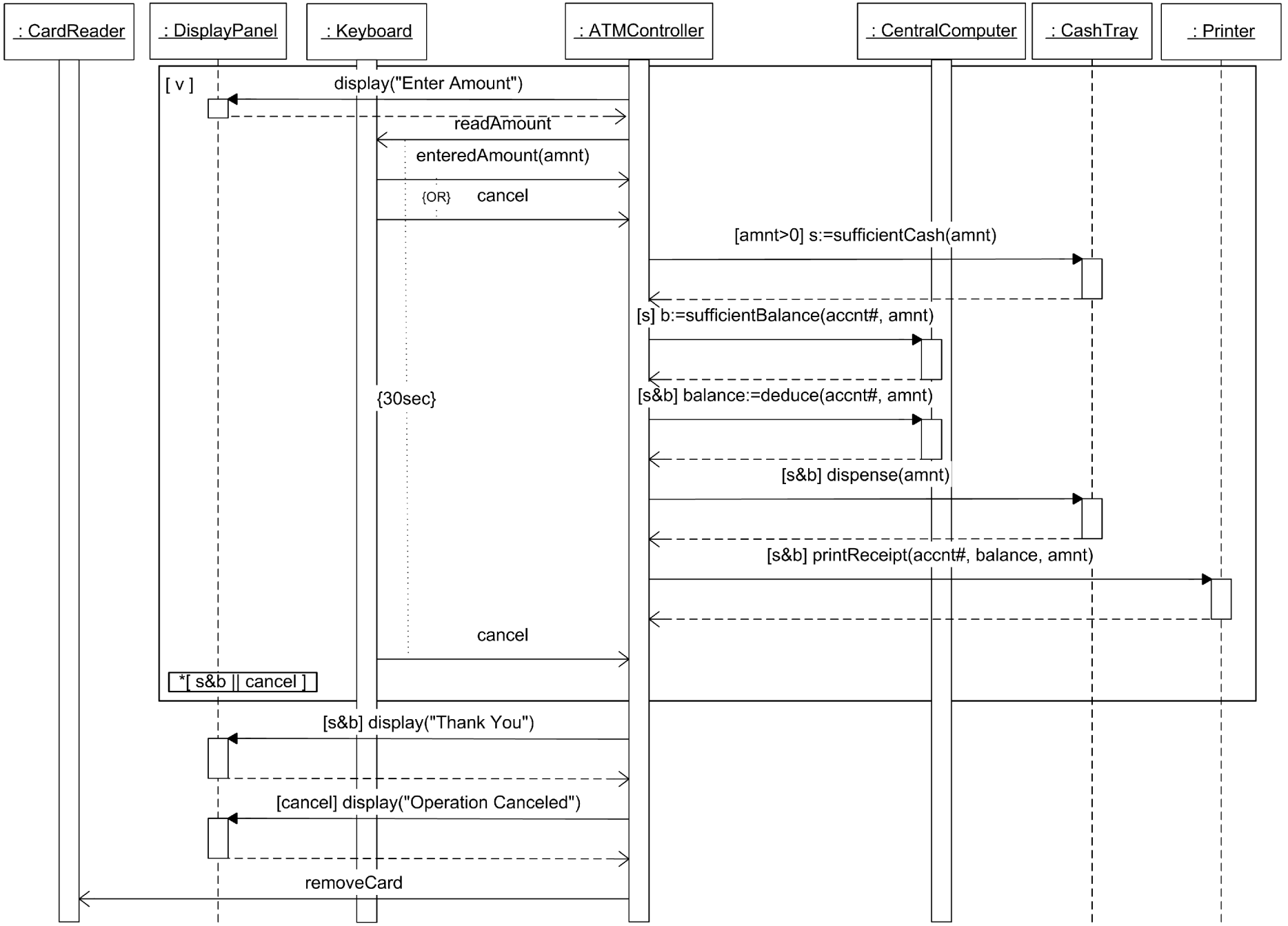
Authentication - Sequence Diagram



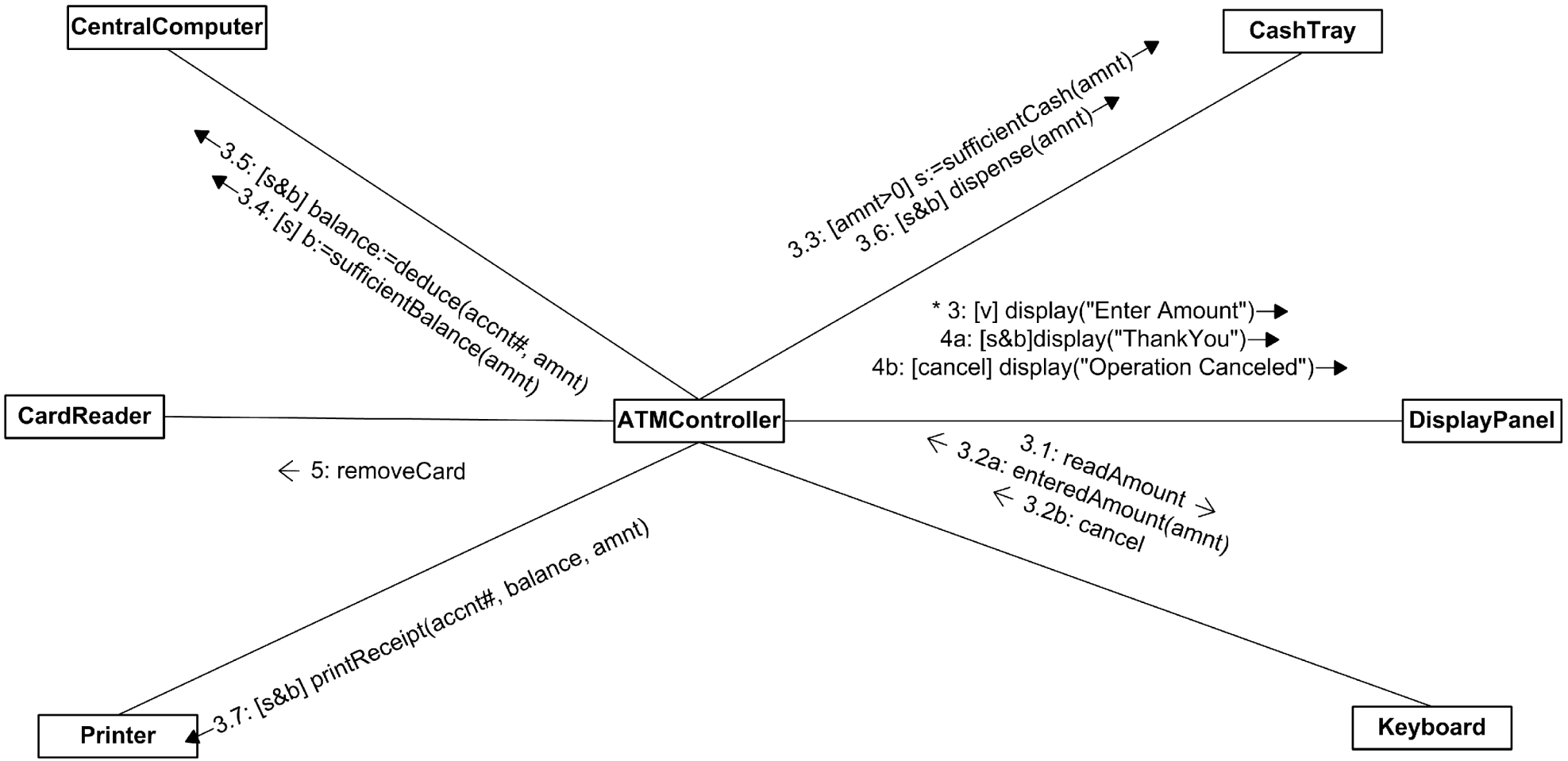
Authentication - Collaboration Diagram



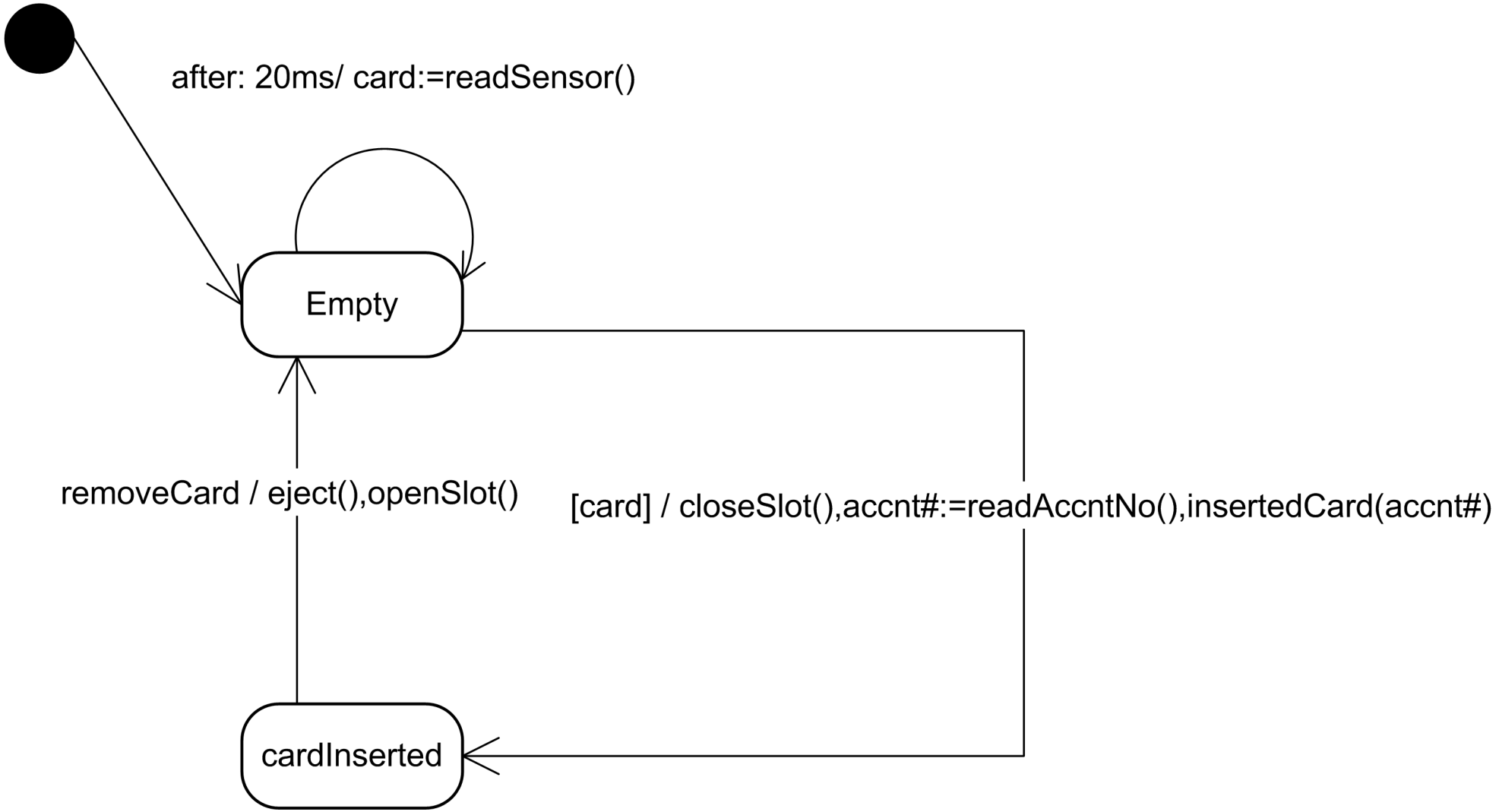
Transaction - Sequence Diagram



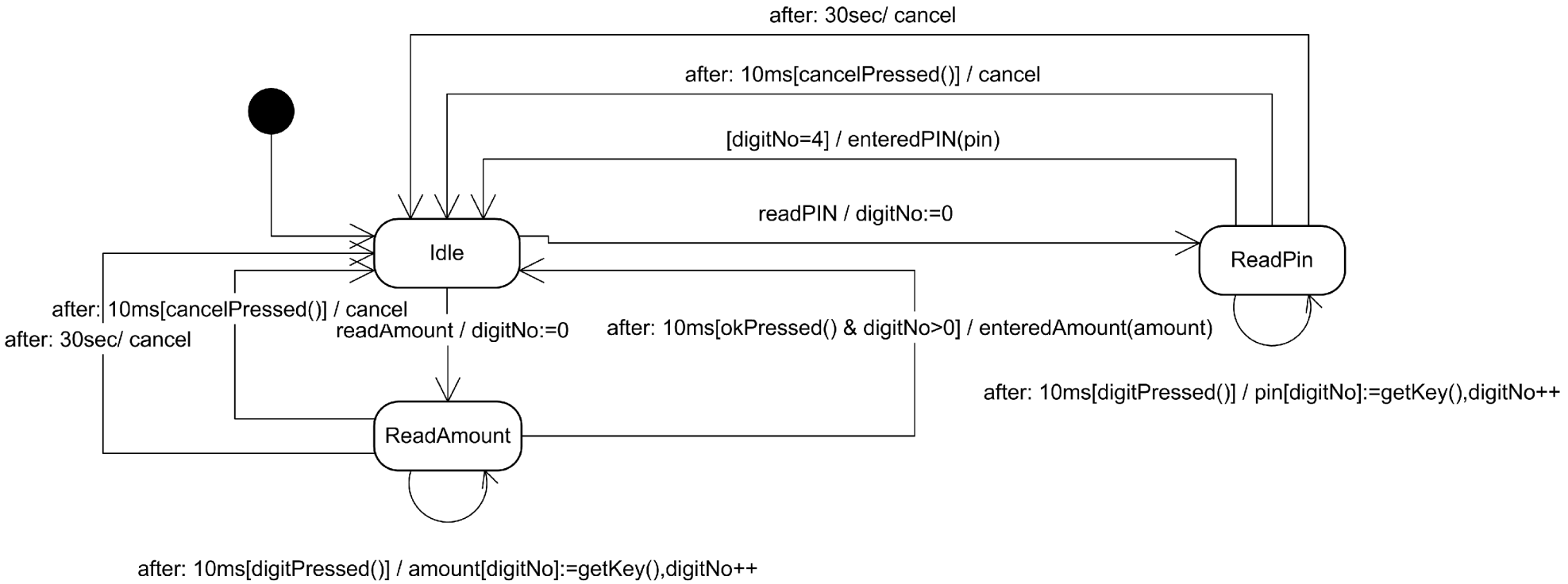
Transaction - Collaboration Diagram



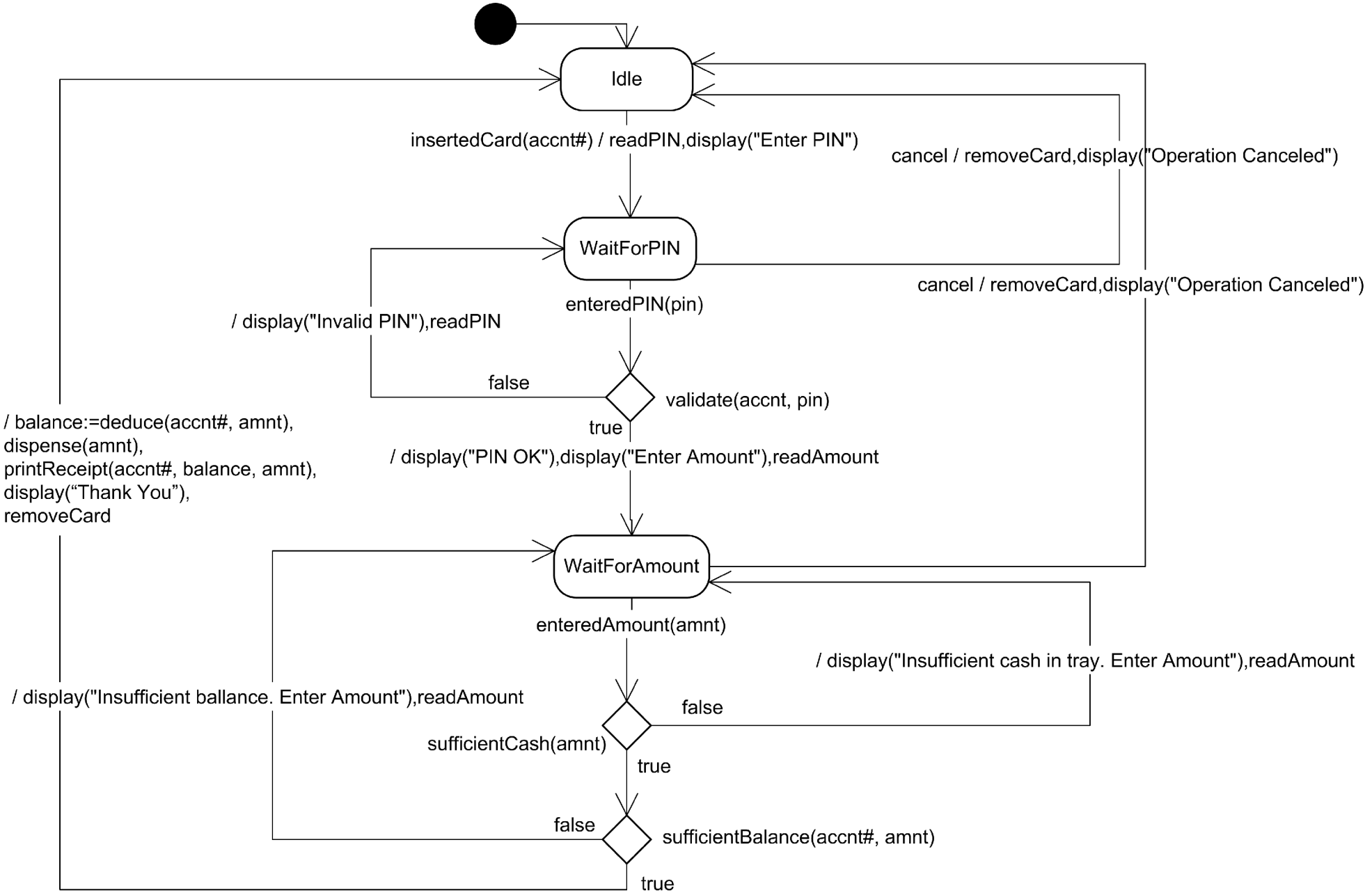
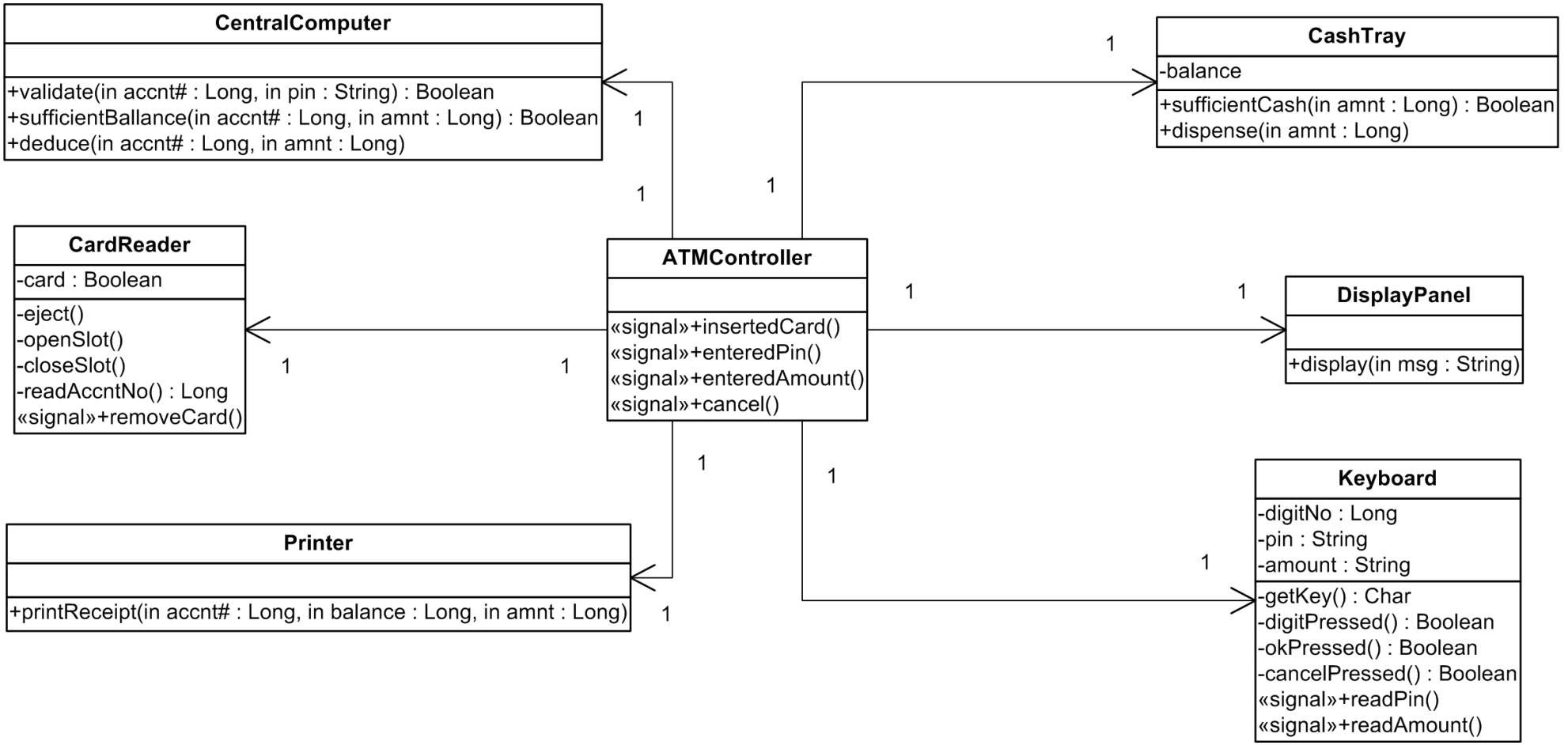
Card Reader – State Diagram



Keyboard – State Diagram



ATM Controller – State Diagram



Design Class Diagram