Lecture06: Analysis Model (II)

EGCI340: SOFTWARE DESIGN

Outline

- Behavioral Model: Sequence Diagram
- State Machine Diagrams

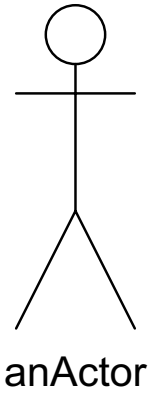
Sequence Diagram

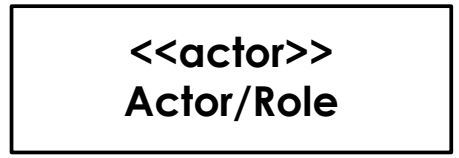
- Sequence diagrams is a behavioral model to describe the internal dynamic aspects of an information system that supports the business processes in an organization
- Sequence diagrams are one of two types of interaction diagrams
- They illustrate the objects that participate in a use case and the messages that pass between them over time for one use case

Sequence Diagram Syntax

AN ACTOR

- Person or system that derives benefit from and is external to the system
- Stick figure (default) or if a non-human actor is involved, as a rectangle with <<actor>> in it (alternative)
- Participate in a sequence by sending and/or receiving messages
- Place across the top of the diagram

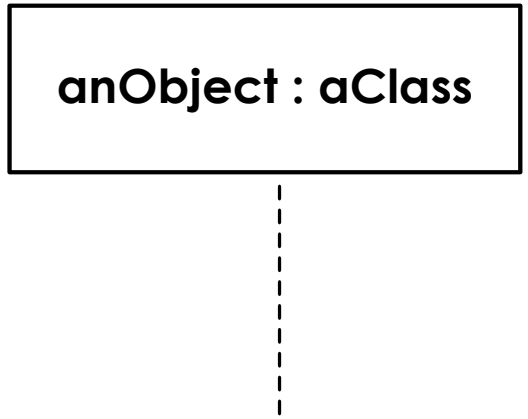




Sequence Diagram Syntax (Cont.)

AN OBJECT

- Participate in a sequence by sending and/or receiving messages
- Place across the top of the diagram



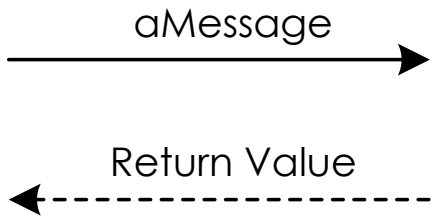
Sequence Diagram Syntax (Cont.)

AN EXECUTION OCCURANCE

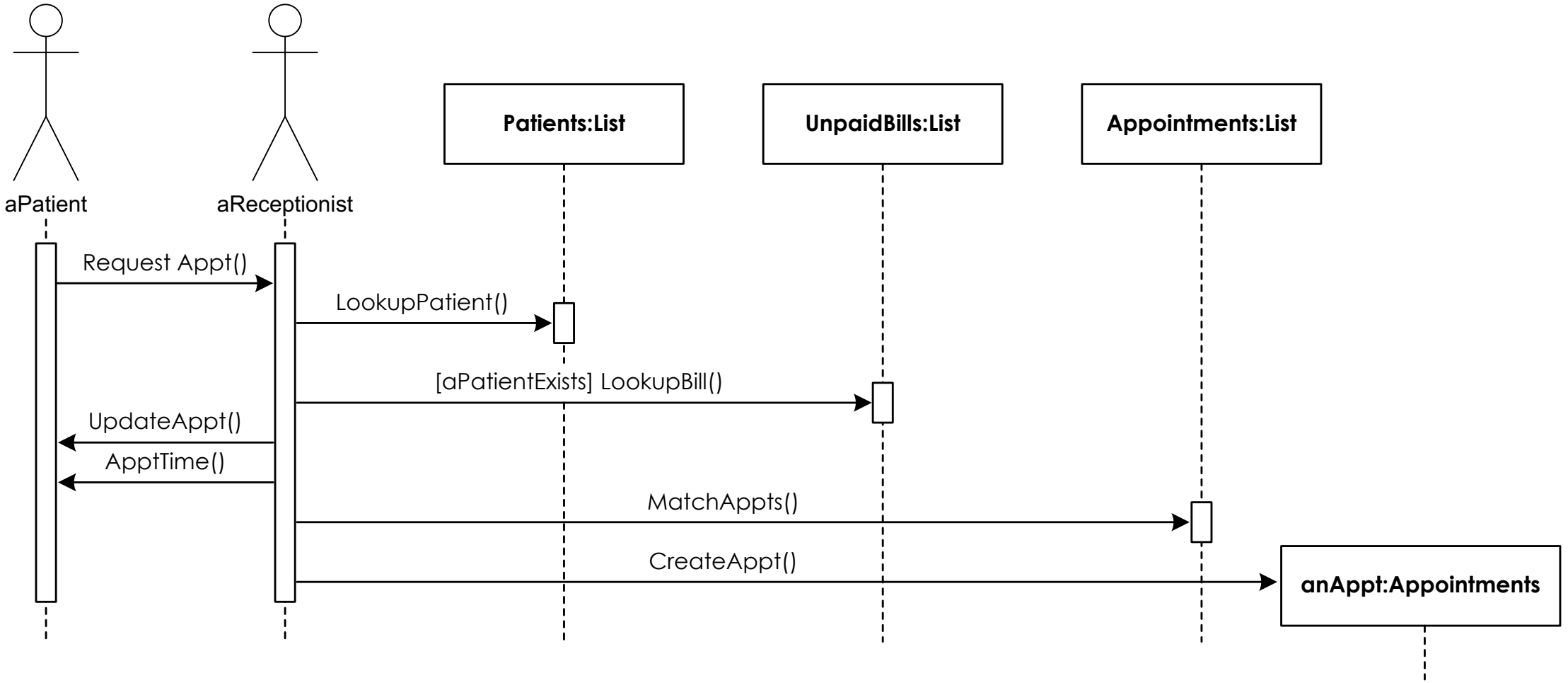
- Long narrow rectangle placed atop a lifeline
- Denotes when an object is sending or receiving message

A MESSAGE

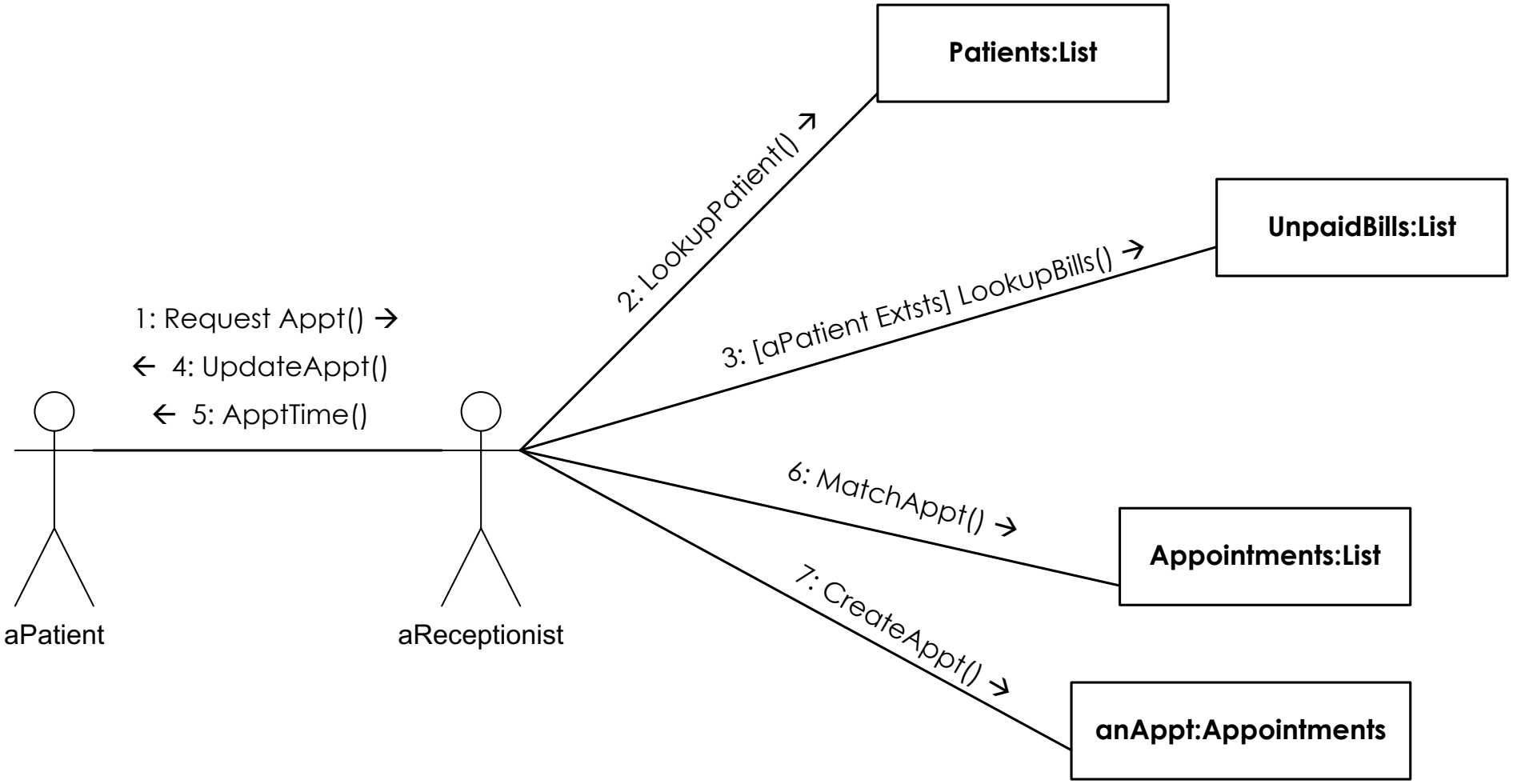
- Convey information from one object to another one
- An operation call is labeled with the message being sent and a solid arrow, which a return is labeled with the value being returned and show as a dash arrow



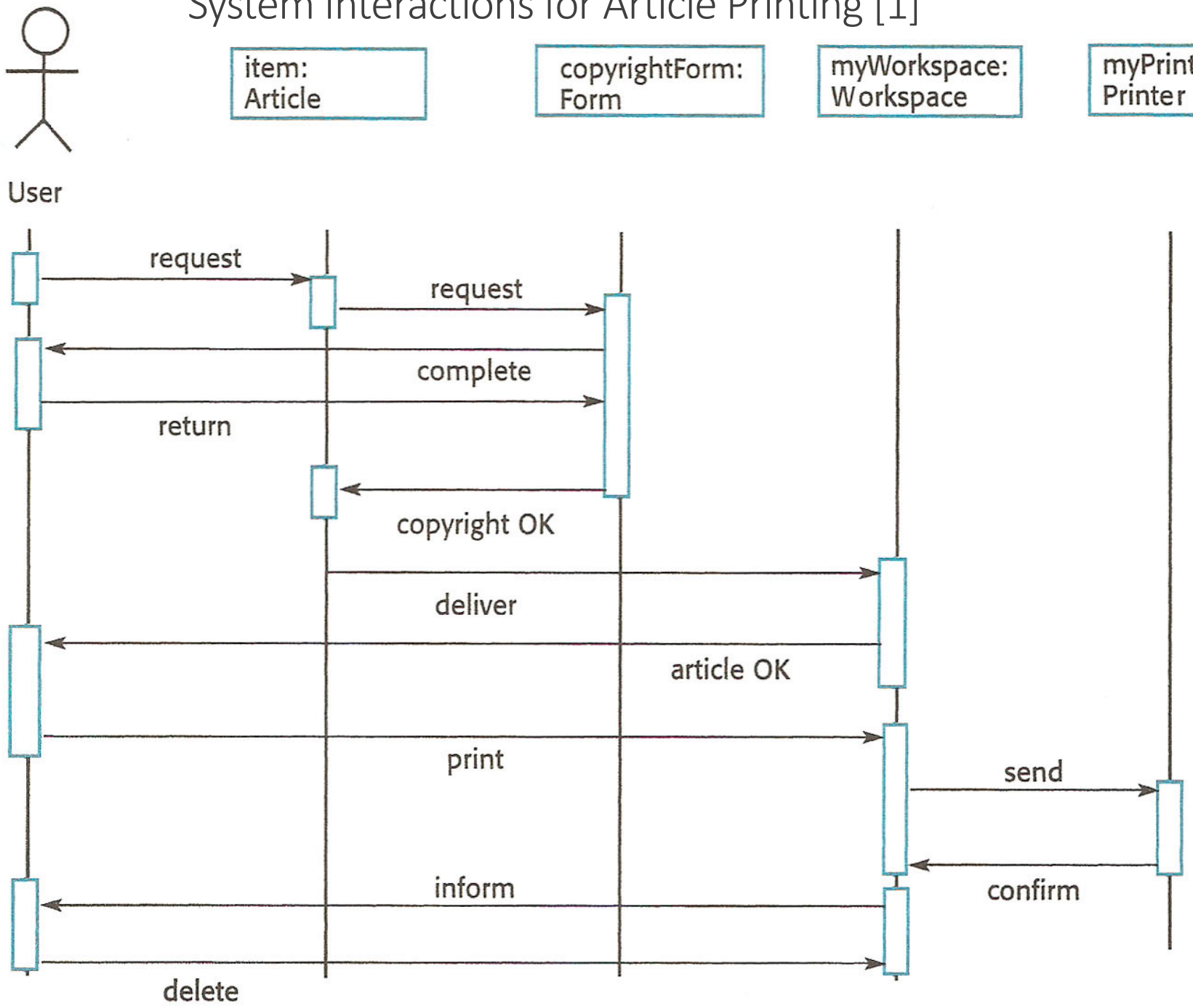
Example 9: Sequence Diagram



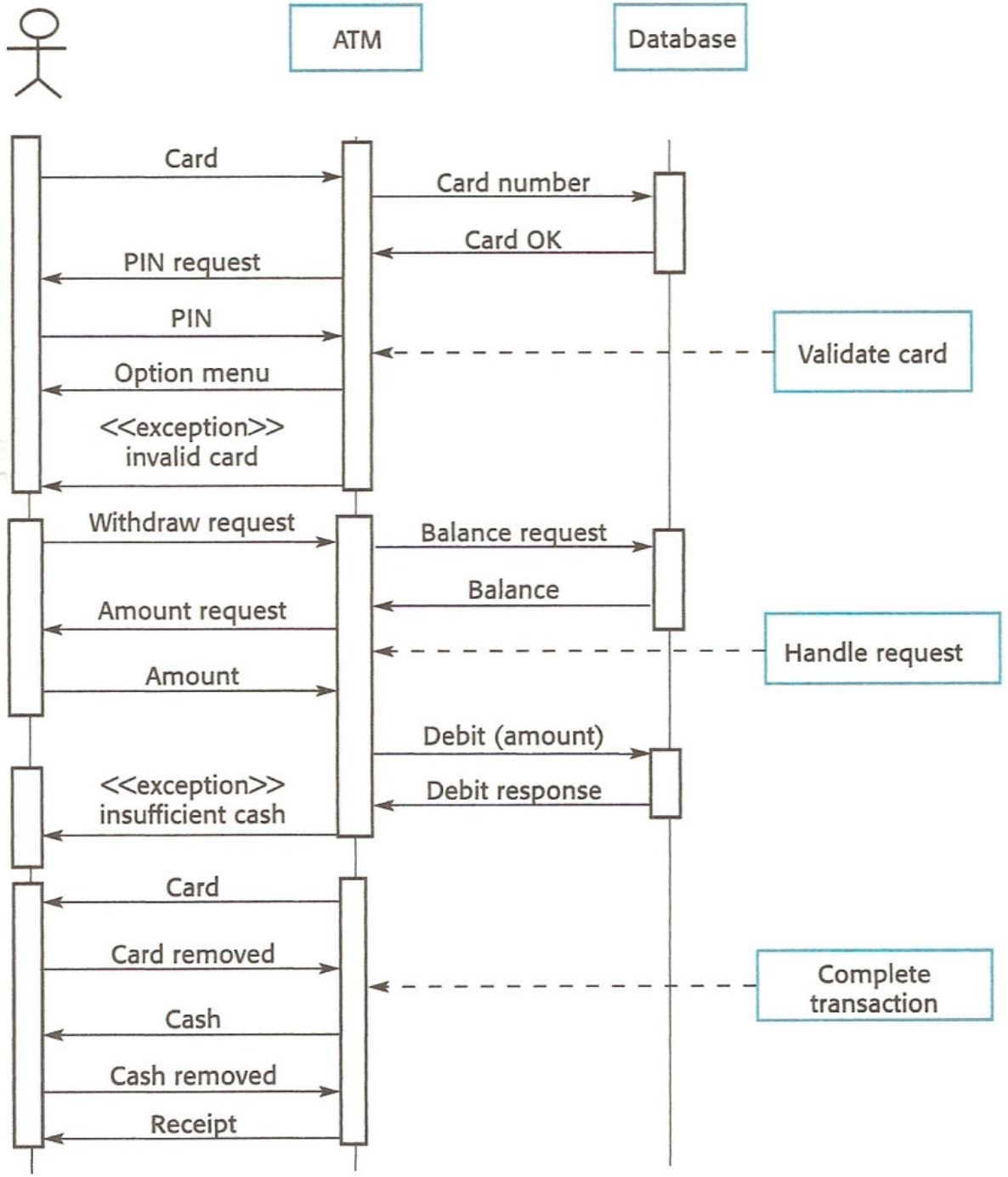
Example 10: Communication Diagram



System Interactions for Article Printing [1]



Sequence Diagram of ATM Withdrawal



State Machine Diagrams

- Dynamic model
- Show the different states that a single object passes through during its life in response to events, along with its responses and actions

State Machines Syntax

A STATE

- Show as a rectangle with rounded corners
- Has a name that represents the state of an object

AN INTITIAL STATE

- Show as a small filled-in-circle
- Represent the point at which an object begins to exist

State Machines Syntax (Cont.)

A FINAL STATE

- Show as a circle surrounding a small solid filled circle
- Represent the completion of activity

AN EVENT

- A noteworthy occurrence that triggers a change in state
- A designated condition becoming true, the receipt of an explicit signal from one object to another, or the passage of a designated period of time
- Label a transaction

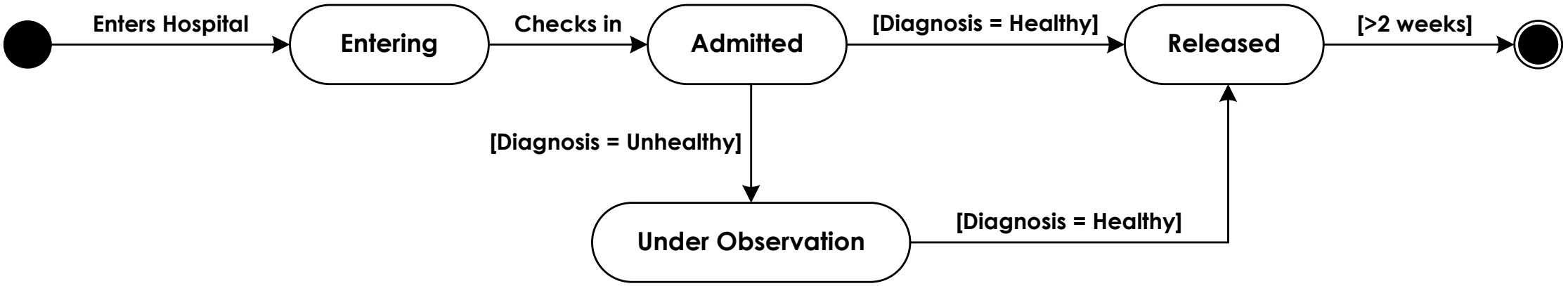
anEvent

State Machines Syntax (Cont.)

A TRANSACTION

- Indicate that an object in the first state will enter the second state
- Triggered by the occurrence of the event labeling the transaction
- Show as a solid arrow from one state to another, labeled by the event name

Example 11: Behavioral State Machine Diagram



Write the state machine diagram for diabetes screening

Initial symptoms

a) BMI is not in the normal range

b) There are polyuria and polydipsia

If Yes for both (a) and (b) then Suspected Diabetes

- Test the Fast Plasma Glucose (FPG) and wait for 8 hours to check the result
  - If FPG level < 100 then Normal
  - If FPG level: 100-125 then Pre-diabetes
  - If FPG level > 125 then Diabetes (Type II)

If No for (a) or (b) then Normal

Write the state machine diagram for diabetes screening

Write the state machine diagram for diabetes screening

Reference

1. Ian Sommerville, Software Engineering 10th Edition, Pearson, April 2015

Any Questions?

:O)

Thank you

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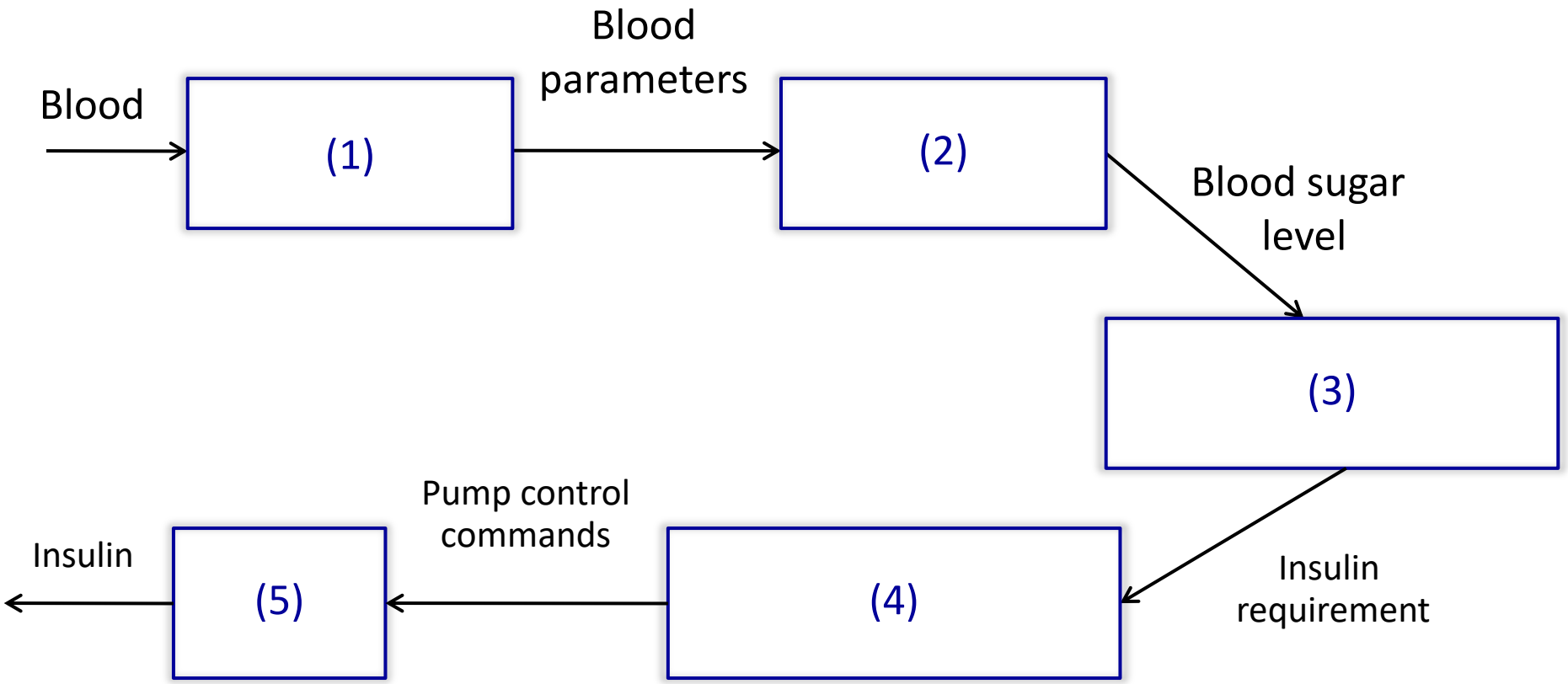

Blood sugar analysis

Insulin pump

Blood sugar sensor

Insulin Requirement Computation

Insulin delivery controller

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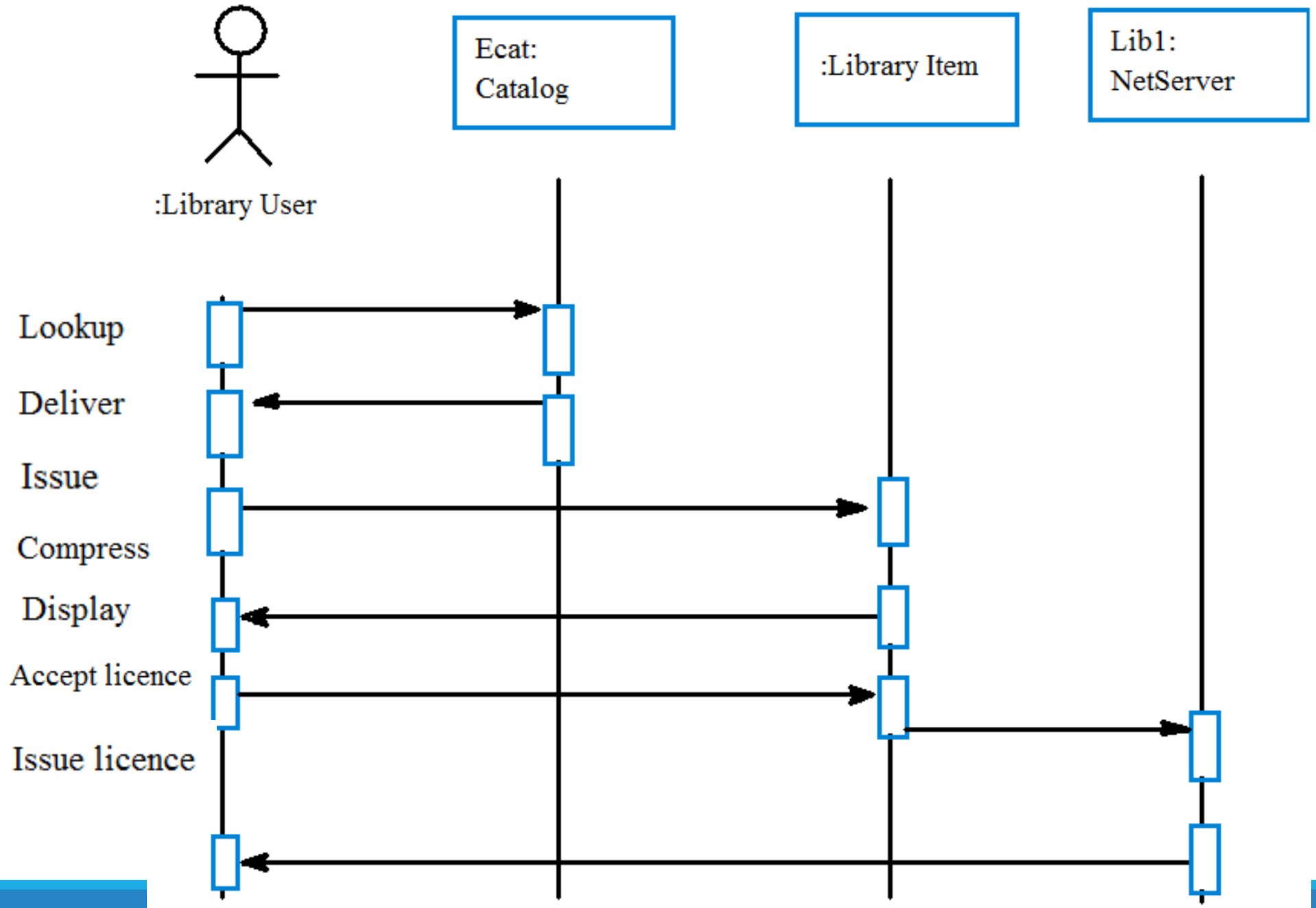
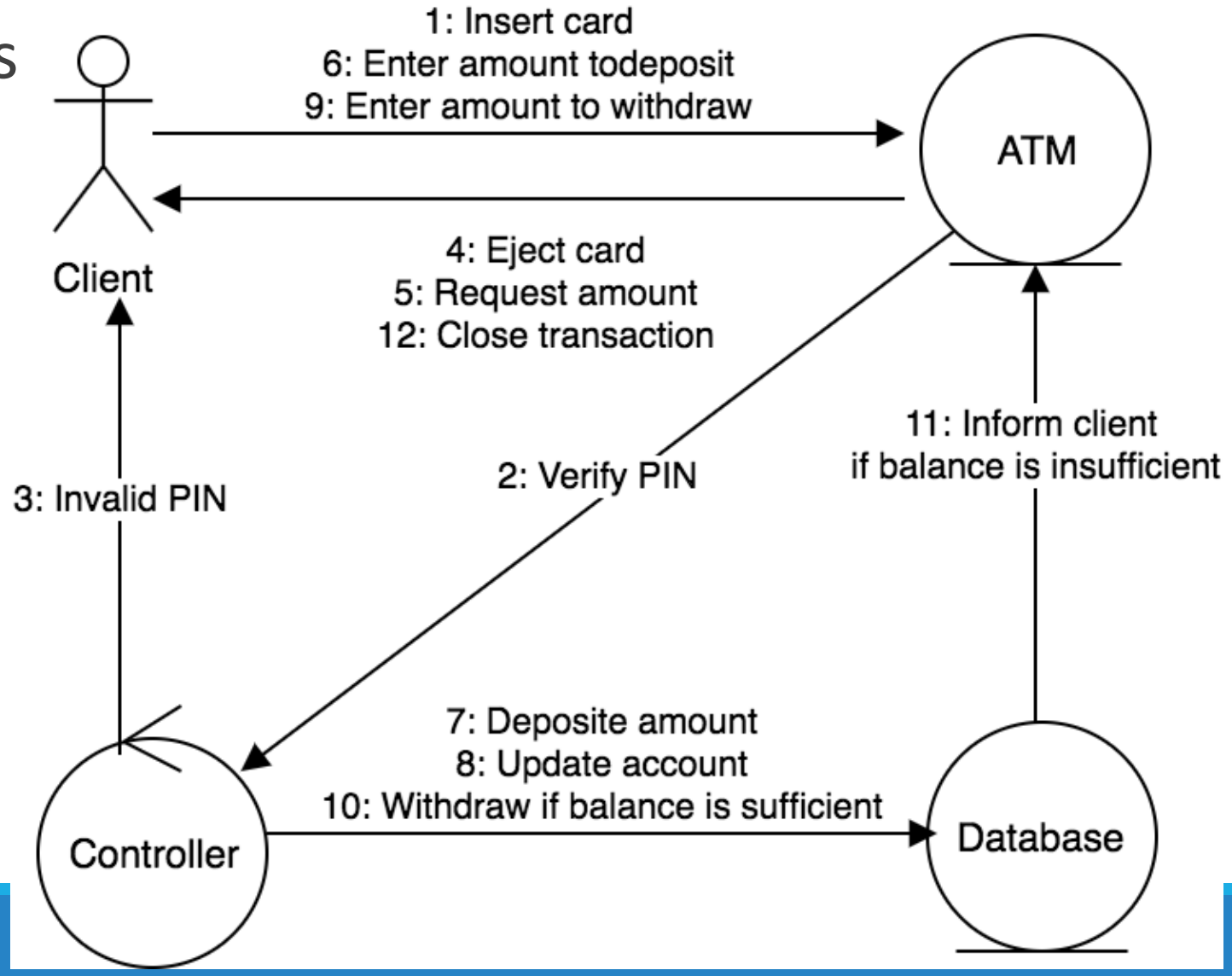
Draw diagram here


:Library User
Ecat:
Catalog
:Library Item
Lib1:
NetServer
Lookup
Deliver
Issue
Compress
Display
Accept licence
Issue licence

Draw diagram here

Convert Collaboration Diagram to Sequence Diagram

Withdraw Process



Convert Collaboration Diagram to Sequence Diagram

Withdraw Process

Convert Sequence Diagram to Activity Diagram

Withdraw Process

Draw diagram here

Convert Sequence Diagram to Activity Diagram

Withdraw Process

Draw Activity Diagram of Withdraw Process

Draw diagram here

Draw Use-case Diagram of Withdraw Process

Use-case Diagram: Draw a Use-case Diagram of Withdraw Process

Draw diagram here