5. Activity Diagram and Sequence Diagram

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Topics Covered

- Activity diagrams
- Elements of activity diagram
- Example of activity diagram
- Sequence diagram
- Elements of Sequence diagram
- Example of Sequence diagram

Activity Diagram

- **Activity Diagrams** to illustrate the flow of control in a system and refer to the steps involved in the execution of a use case.
- An activity diagram focuses on condition of flow and the sequence in which it happens.
- Activity diagrams describe the workflow behavior of a system.
  - Activity diagrams are used in process modeling and analysis of during requirements engineering.
  - A typical business process which synchronizes several external incoming events can be represented by activity diagrams.

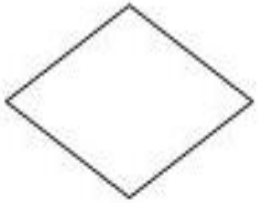
Elements of Activity Diagram

Activity Initial Node

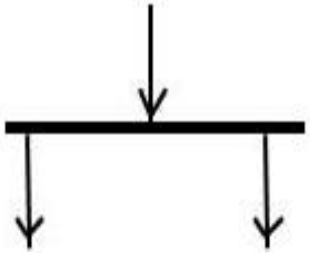
Activity End Node

Transition

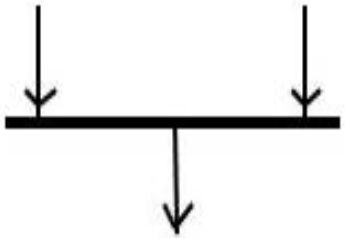
Action



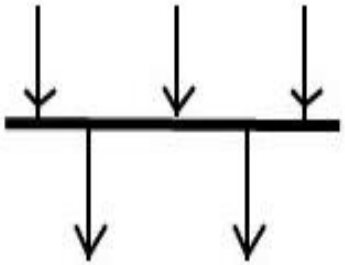
Decision



Fork

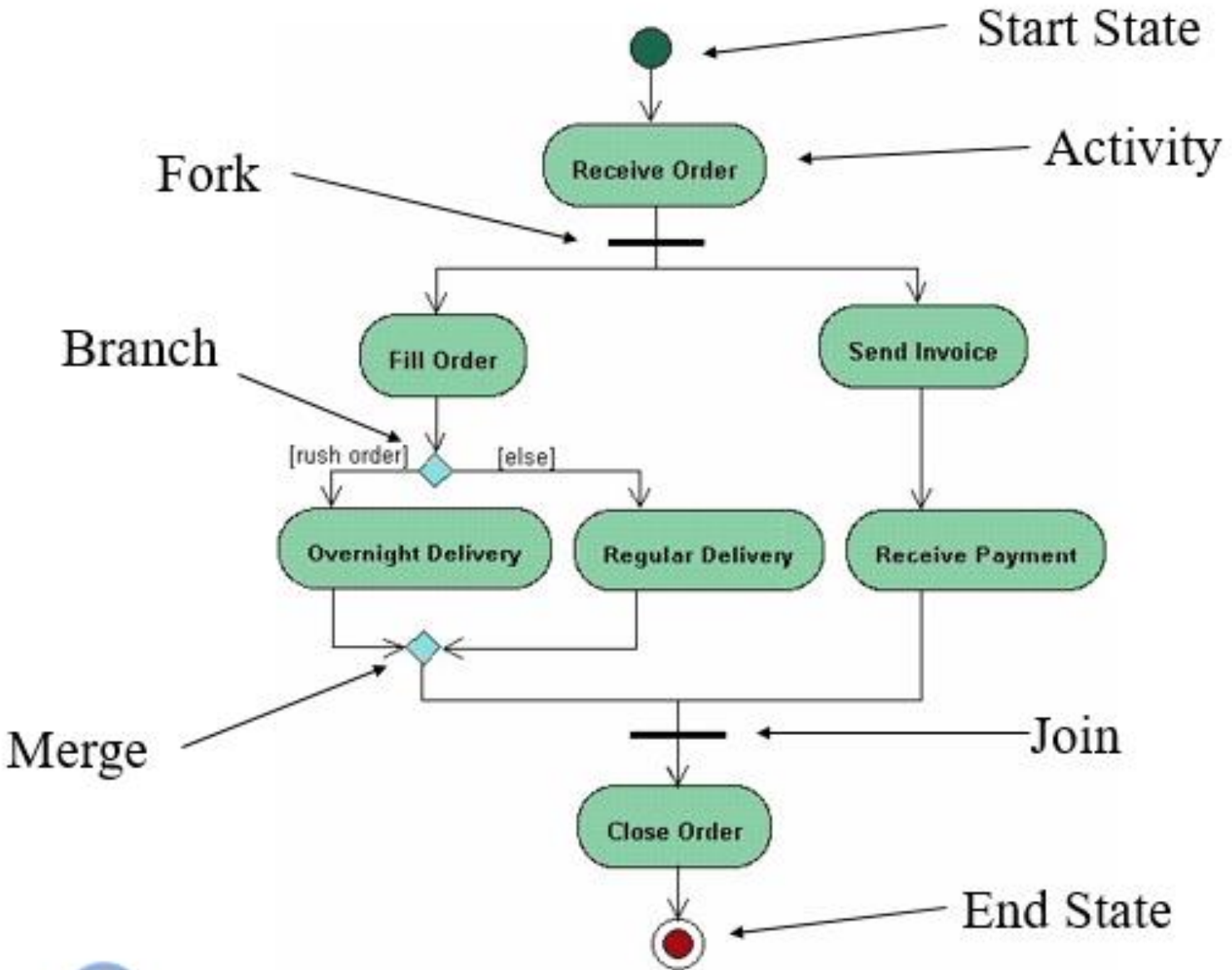


Join

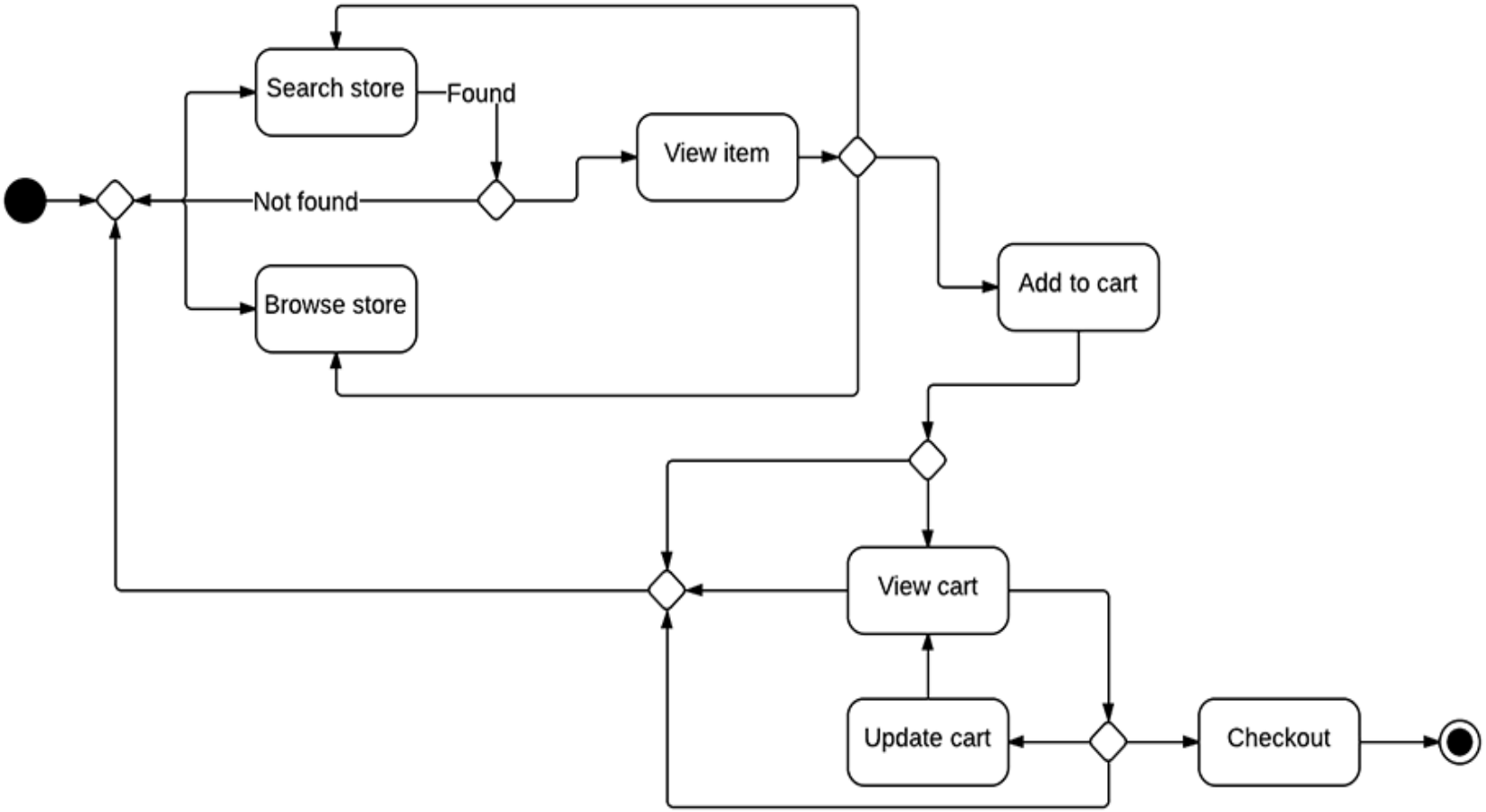


Rendezvous

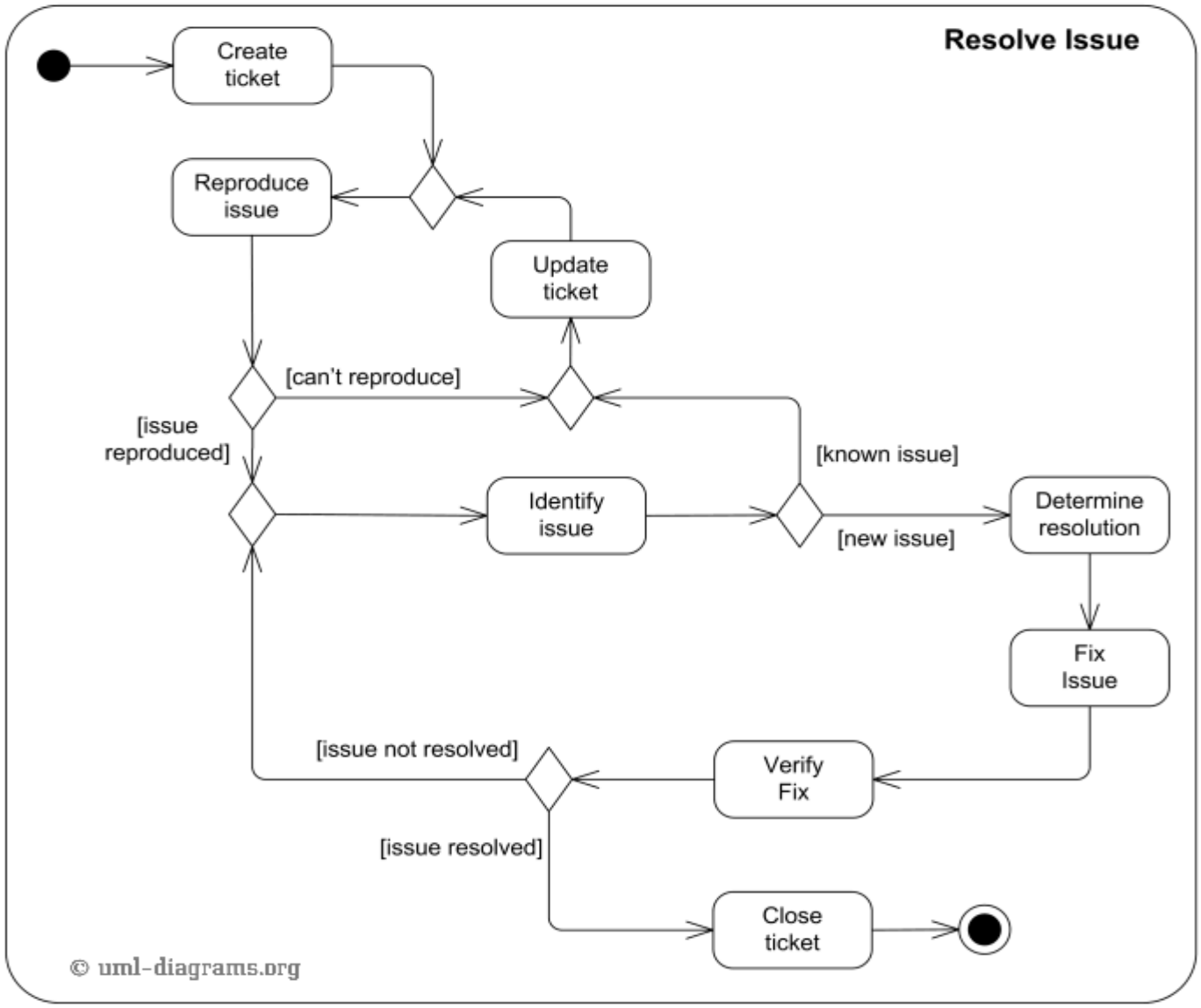
Activity Diagram - Examples



Activity Diagram (Search Store)



Activity Diagram (Search Store)



Activity Diagram

Sequence Diagram

- A **sequence diagram** describes an interaction among a set of objects participated in a collaboration (or scenario), arranged in a chronological order;
- It shows the objects participating in the interaction by their "lifelines" and the messages that they send to each other.
- Sequence diagrams can be useful references for businesses and other organizations. Try drawing a sequence diagram to:
  - Represent the details of a UML use case.
  - Model the logic of a sophisticated procedure, function, or operation.
  - See how objects and components interact with each other to complete a process.
  - Plan and understand the detailed functionality of an existing or future scenario.

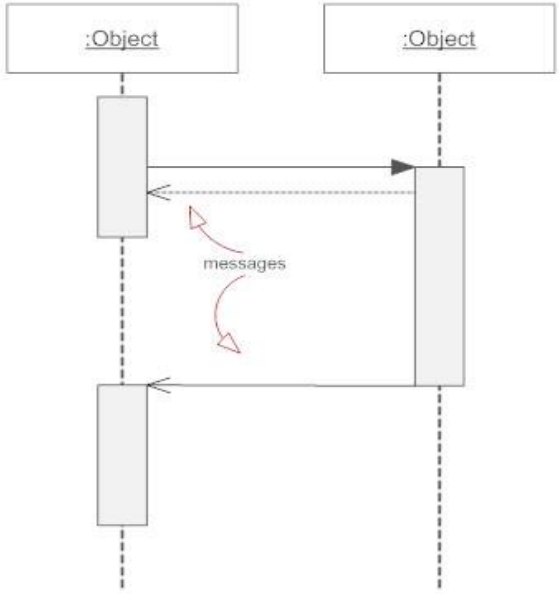
Basic Sequence Diagram Notations

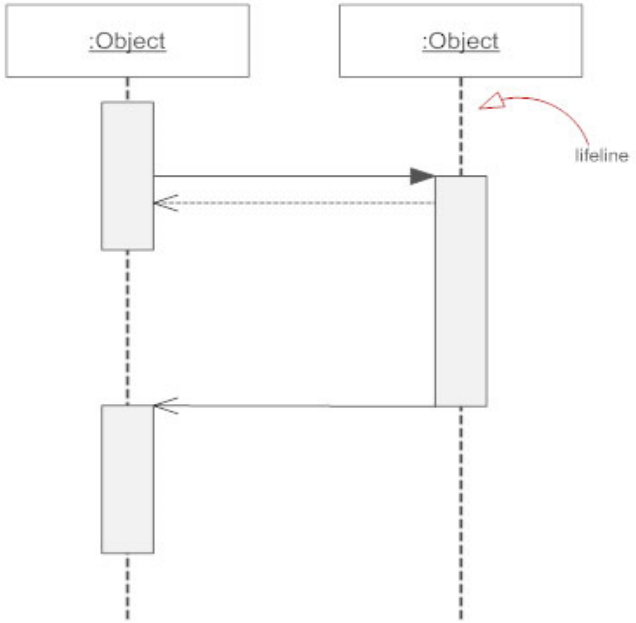
Object symbol

Activation or Execution Occurrence

Actor

:User



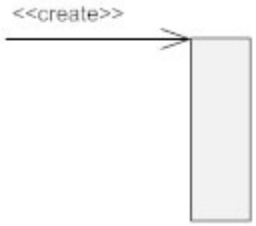


Types of Messages in Sequence Diagrams

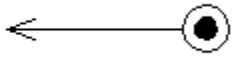
Simple, also used for asynchronous

Synchronous

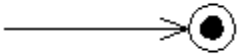
Reply or return message



Create message



Found message



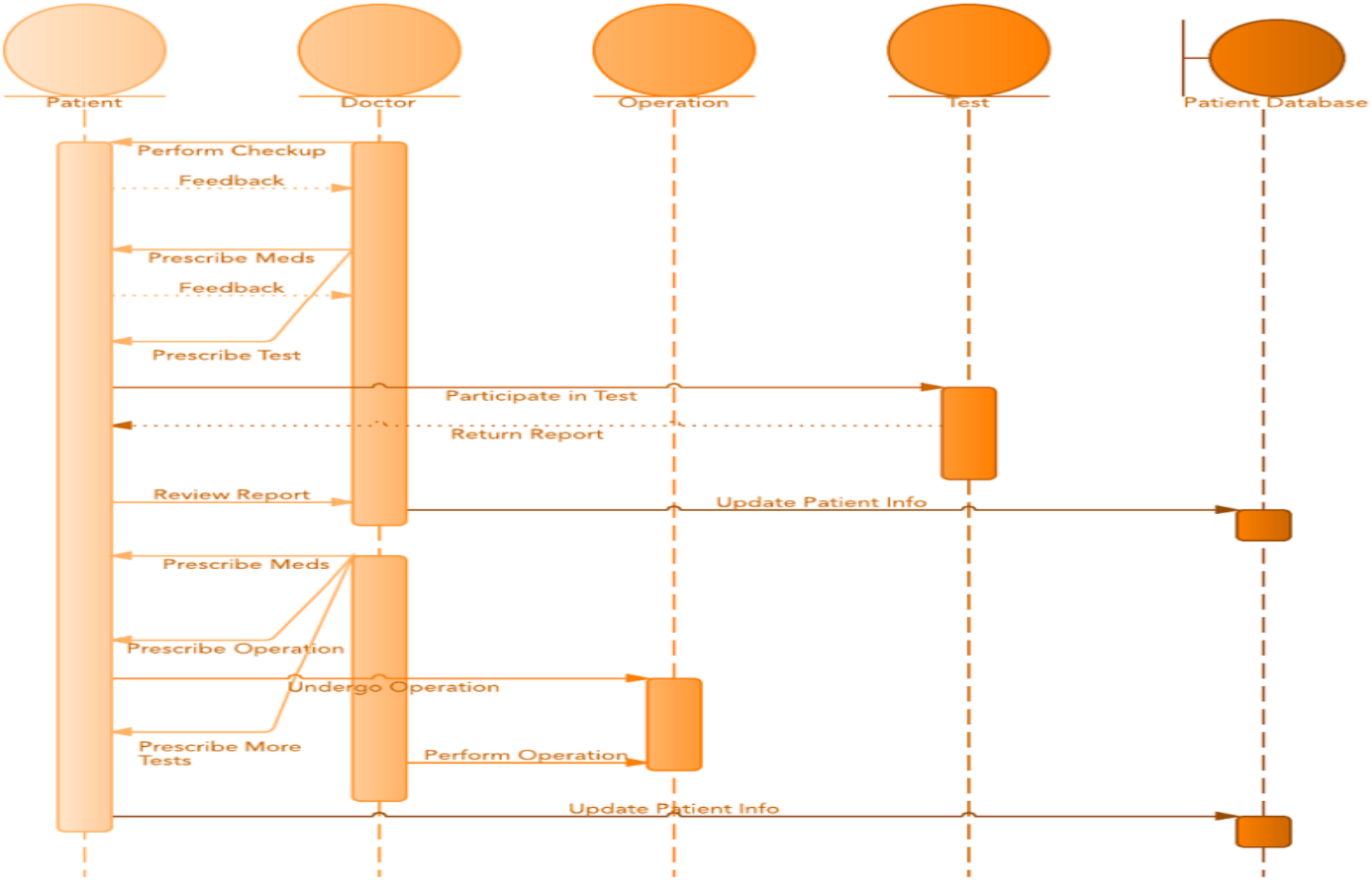
Lost message

Delete message

Sequence diagram of a hospital management system

Technology has completely transformed the field of medicine, as it has with most industries. A hospital information system, also known as a hospital information system, helps doctors, administrators, and hospital staff managing all of the activities and information collected at a hospital, including checkups, prescriptions, appointments, and information on the patients and their caretakers. The diagram below provides a simple view of how the primary processes operate with each other over time. You can use Laucidchart to reshape the diagram any way you choose and to share it with your colleagues or collaborators.

Sequence diagram of a hospital management system



Sequence diagram for ATM systems

An ATM allows patrons to access their bank accounts through a completely automated process. You can examine the steps of this process in a manageable way by drawing or viewing a sequence diagram. The example below outlines the sequential order of the interactions in the ATM system. Just click to edit the template, and customize the sequence diagram so it suits your own needs.

Sequence diagram for ATM systems

Patron

ATM

Control

Database

Insert card

Verify PIN

Invalid PIN

Eject card

Request amount

Enter deposit amount

Deposit amount

Update account

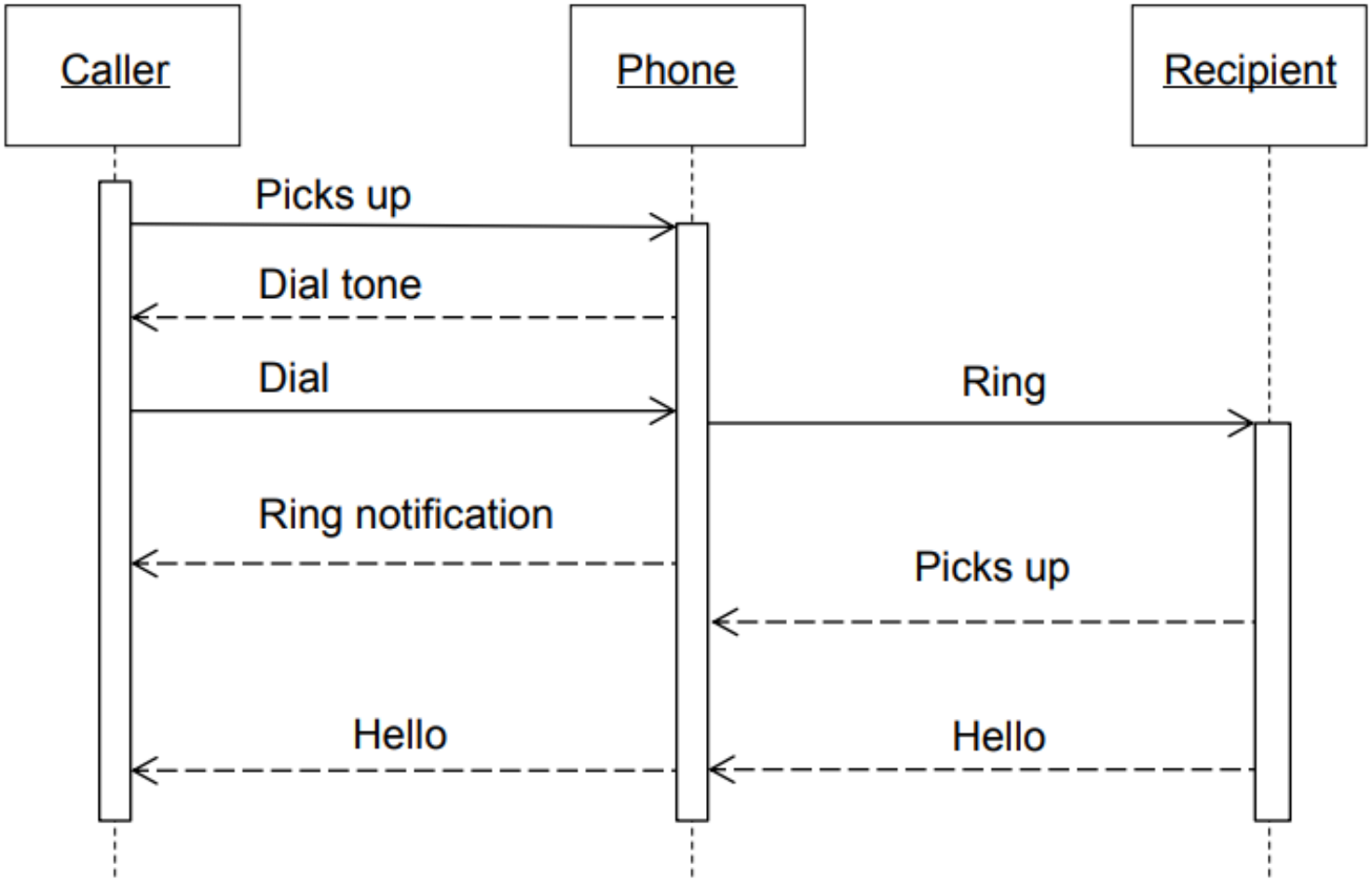
Enter withdrawal amount

Withdraw if sufficient funds

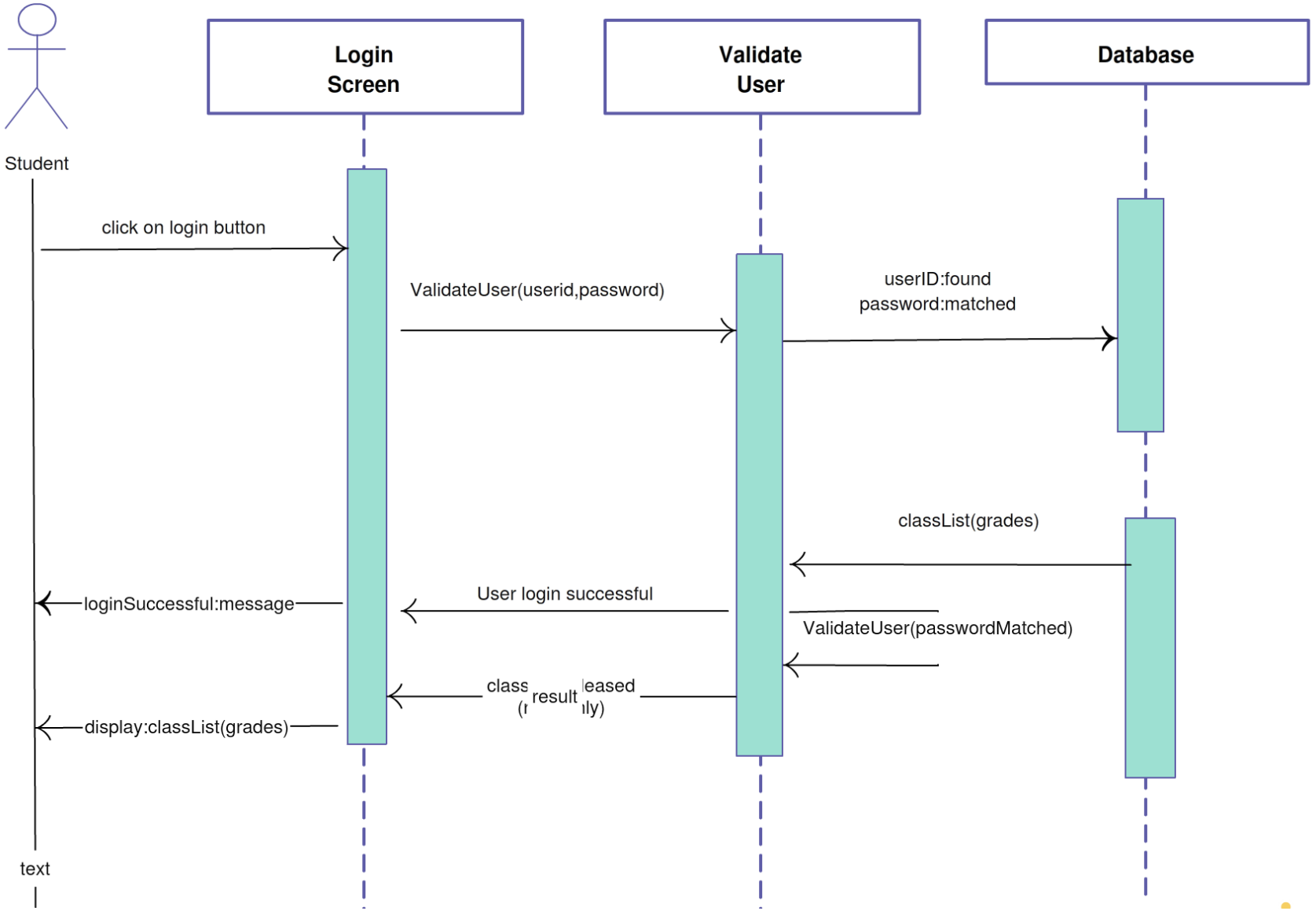
Tell patron if insufficient funds

Conclude transaction

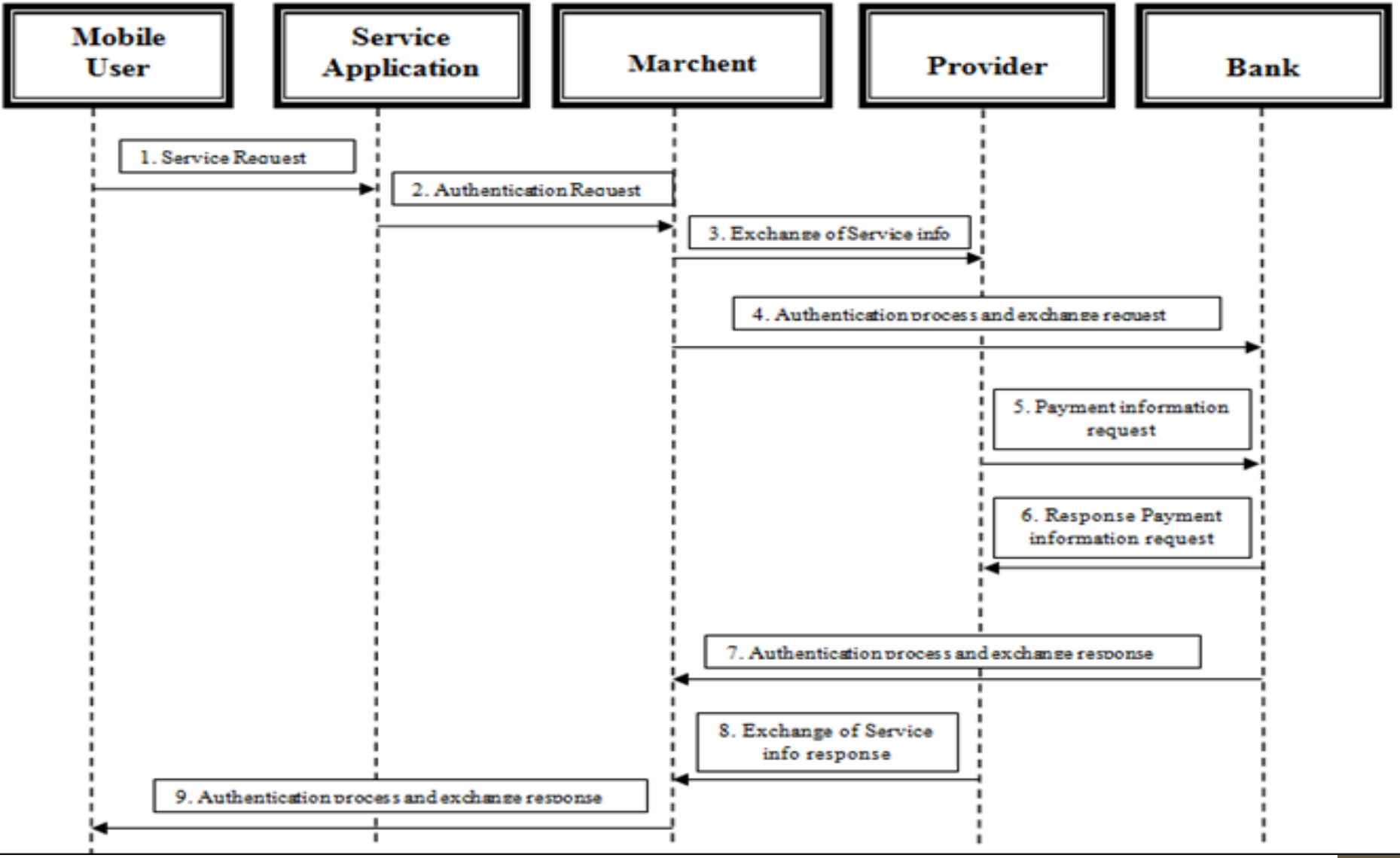
Sequence Diagram (make a phone call)



Sequence Diagram (Student Login)



Sequence Diagram (Payment System)



References:

1. **Software Engineering A practitioner's Approach**

   by Roger S. Pressman, 7th edition, McGraw Hill, 2010.

2. **Software Engineering by Ian Sommerville,**

   9th edition, Addison-Wesley, 2011