System Analysis and Design

Eighth Edition

Alan Dennis, Barbara Wixom, Roberta M. Roth

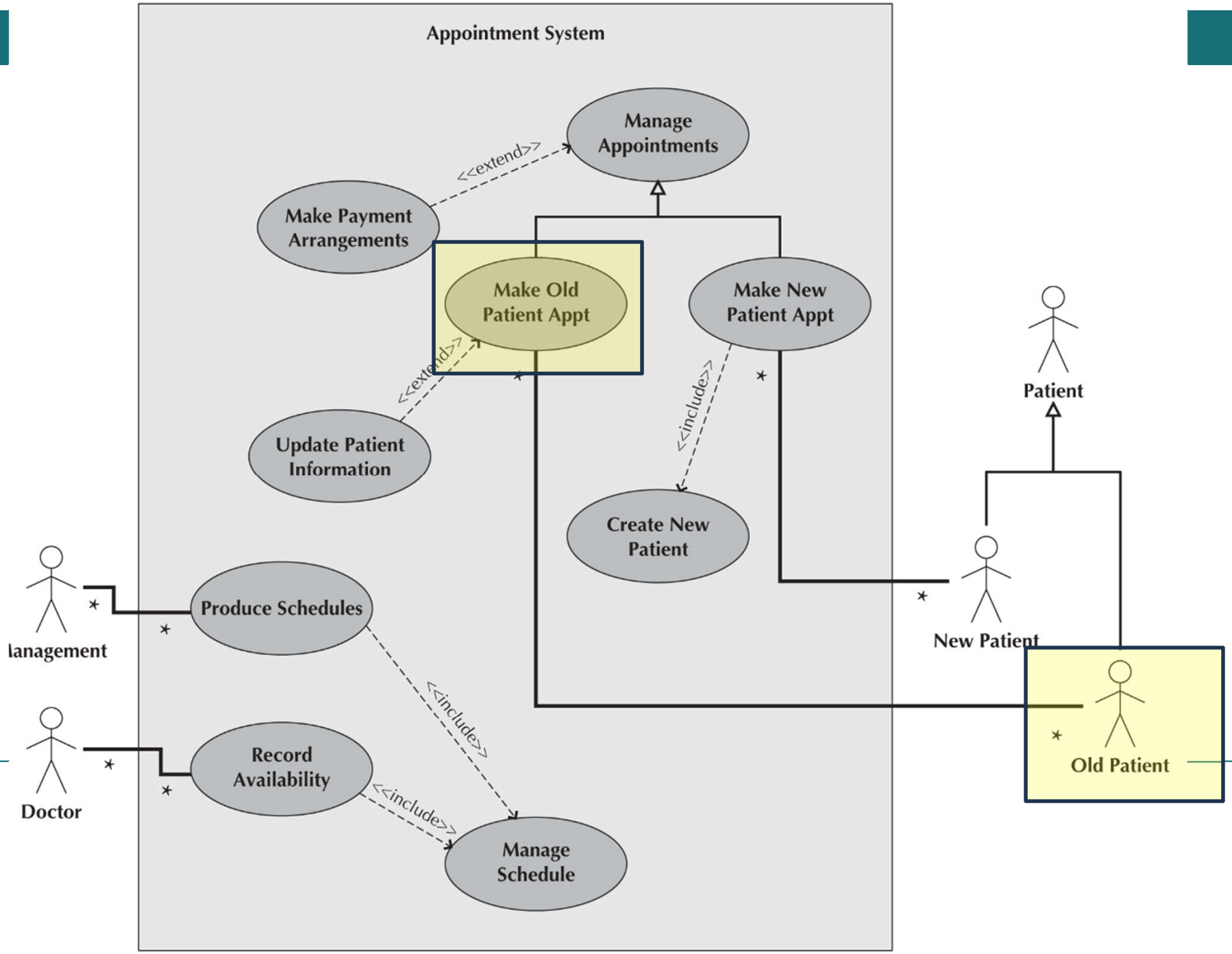
Chapter 6

Behavioral Modeling

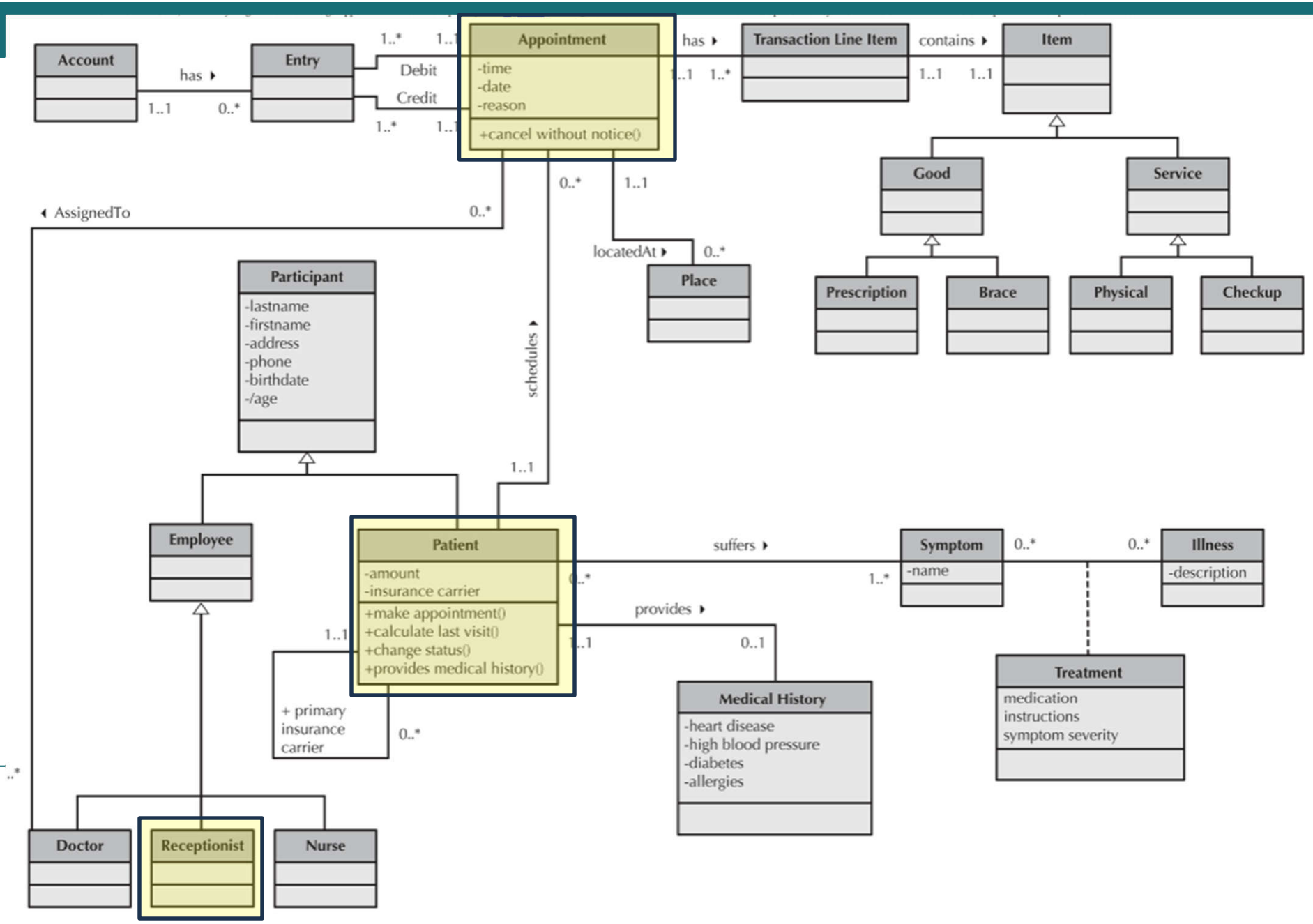
Objectives

- Behavioral Modeling with Sequence Diagrams

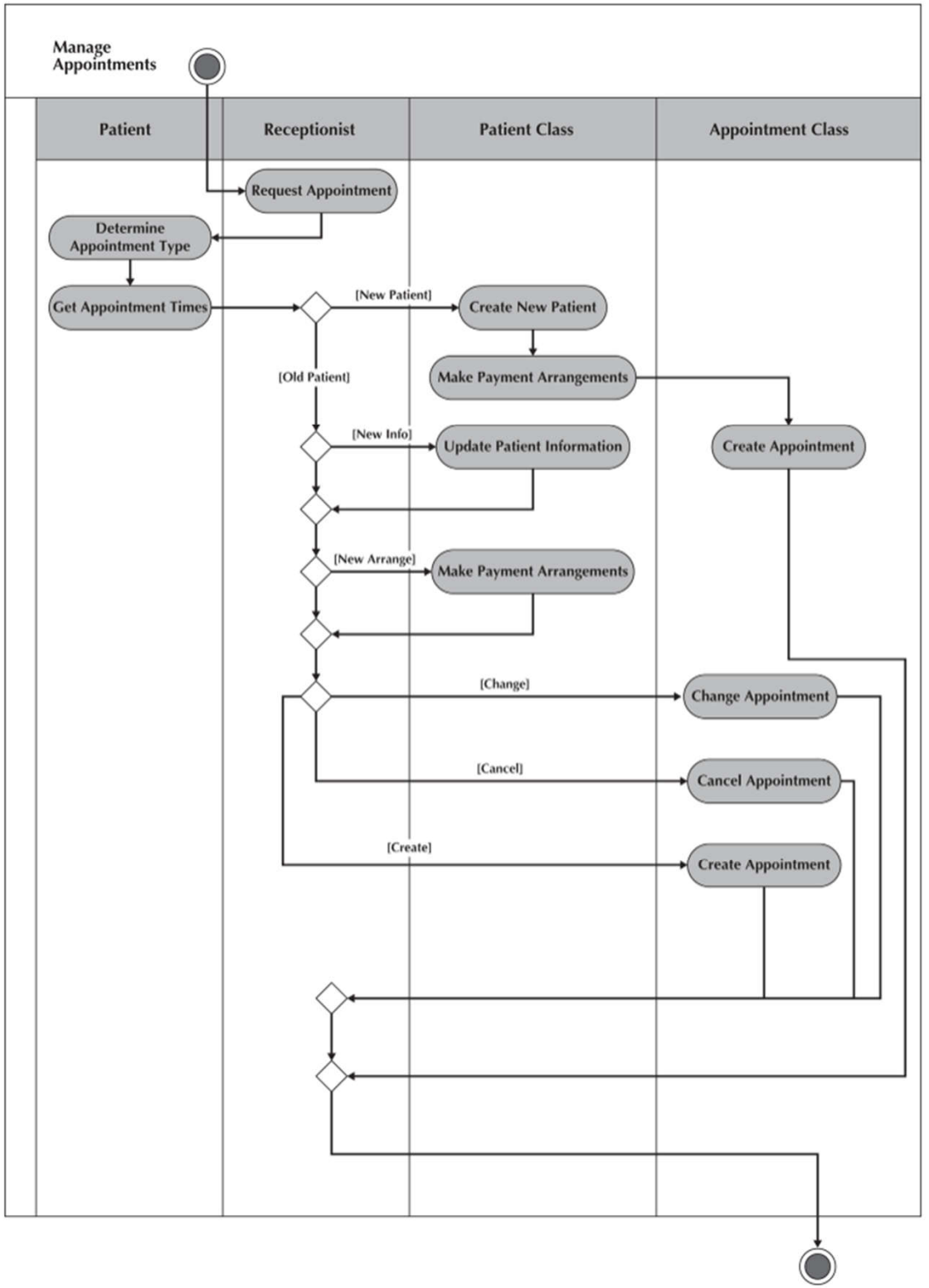
Appointment Case Study

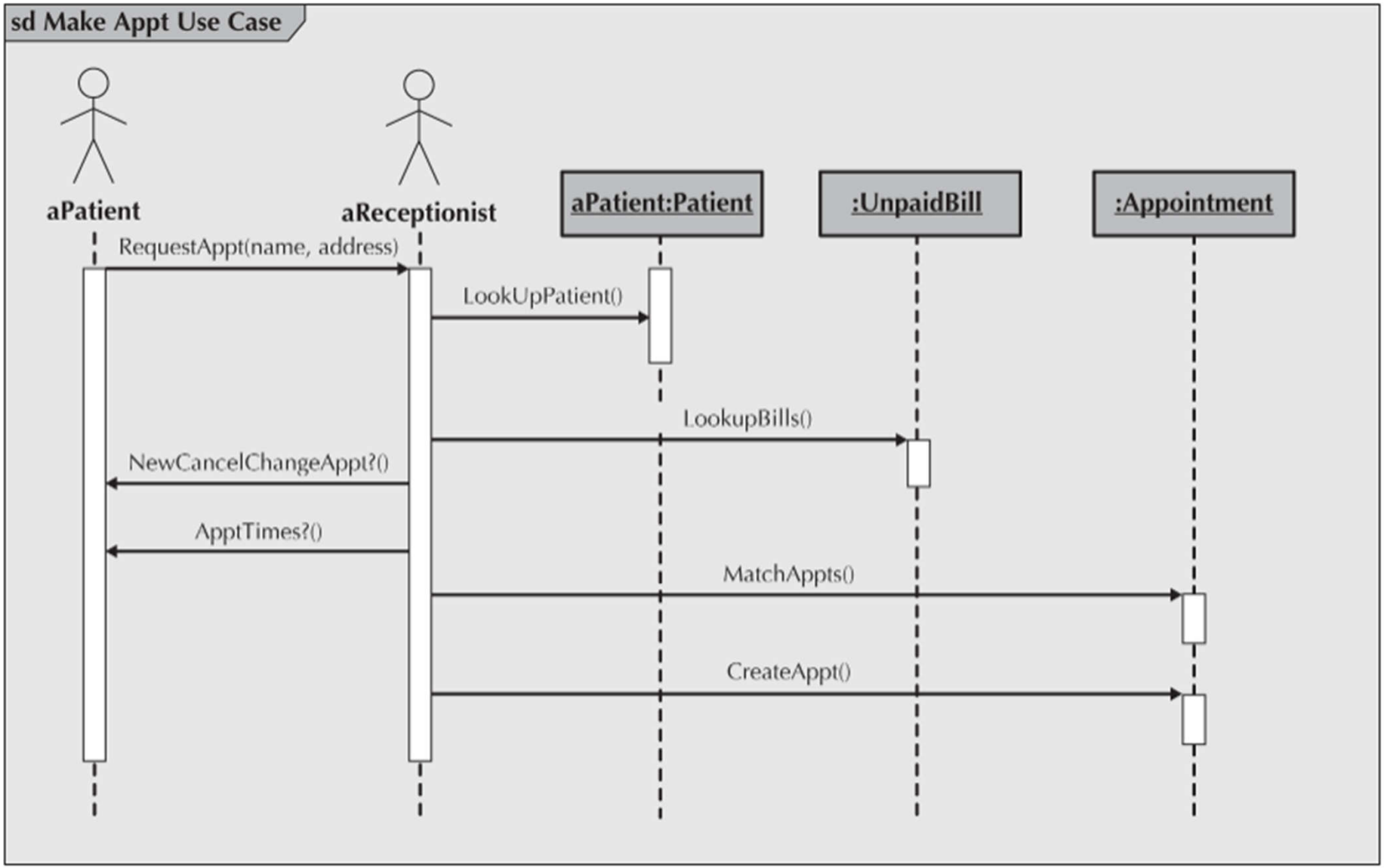


Appointment Case Study



Appointment Case Study




sd Make Appt Use Case
aPatient
aReceptionist
aPatient:Patient
:UnpaidBill
:Appointment
RequestAppt(name, address)
LookUpPatient()
LookupBills()
NewCancelChangeAppt?()
ApptTimes?()
MatchAppts()
CreateAppt()

Element of a Sequence Diagram

- The Sequence Diagram above shows an instance sequence diagram that depicts the objects and messages for the Make Old Patient Appt use case.
- In this specific instance, the Make Old Patient Appt process only portrays the successful scenario of creating an appointment.
- Actors and objects that participate in the sequence are placed across the top of the diagram using actor symbols and object symbols.
  - Notice that the actors and objects are aPatient, aReceptionist, aPatient, UnpaidBill, and Appointment.2 For each of the objects, the name of the class of which they are an instance is given after the object's name (e.g., aPatient means that aPatient is an instance of the Patient class).

Element of a Sequence Diagram

- A dotted line runs vertically below each actor and object to denote the lifeline of the actors and objects over time.
- Sometimes an object creates a temporary object; in this case, an X is placed at the end of the lifeline at the point where the object is destroyed (not shown).
- A thin rectangular box, called the execution occurrence, is overlaid onto the lifeline to show when the classes are sending and receiving messages.
- A message is a communication between objects that conveys information with the expectation that activity will ensue. Many different types of messages can be portrayed on a sequence diagram. However, in the case of using sequence diagrams to model use cases, two types of messages are typically used: operation call and return.

Element of a Sequence Diagram

- Operation call messages passed between objects are shown using solid lines connecting two objects with an arrow on the line showing which way the message is being passed.
- Argument values for the message are placed in parentheses next to the message's name.
- A return message is depicted as a dashed line with an arrow on the end of the line portraying the direction of the return.
- The information being returned is used to label the arrow. However, because adding return messages tends to clutter the diagram, unless the return messages add a lot of information to the diagram, they can be omitted.

Element of a Sequence Diagram

Term and Definition	Symbol
An actor: ■ Is a person or system that derives benefit from and is external to the system. ■ Participates in a sequence by sending and/or receiving messages. ■ Is placed across the top of the diagram. ■ Is depicted either as a stick figure (default) or, if a nonhuman actor is involved, as a rectangle with <<actor>> in it (alternative).	 anActor <<actor>> anActor
An object: ■ Participates in a sequence by sending and/or receiving messages. ■ Is placed across the top of the diagram.	anObject : aClass
A lifeline: ■ Denotes the life of an object during a sequence. ■ Contains an X at the point at which the class no longer interacts.	
An execution occurrence: ■ Is a long narrow rectangle placed atop a lifeline. ■ Denotes when an object is sending or receiving messages.	
A message: ■ Conveys information from one object to another one. ■ A operation call is labeled with the message being sent and a solid arrow, whereas a return is labeled with the value being returned and shown as a dashed arrow.	aMessage() ReturnValue
A guard condition: ■ Represents a test that must be met for the message to be sent.	[aGuardCondition]:aMessage()
For object destruction: ■ An X is placed at the end of an object's lifeline to show that it is going out of existence.	X
A frame: ■ Indicates the context of the sequence diagram.	Context