UNIVERSITY OF INFORMATION TECHNOLOGY

Faculty of Information Systems

Chapter 2

Requirements determination and analysis

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LEARNING OBJECTIVES

1. Understand methods for Determining user requirements.
2. Have ability to use suitable method for specific situations.
3. Understand the rules and style guidelines for use cases and use case diagrams
4. Understand the process used to create use cases and use case diagrams

CONTENTS

1. [Review] Methods for Determining user requirements
2. Use case
3. Use case model
4. The process used to create use cases and use case diagrams

[Review]
Methods for Determining user requirements

Methods for Determining user requirements

1. Requirements
2. Methods for Determining user requirements

Requirements

- A requirement is simply a statement of what the system must do or what characteristics it needs to have:
  - the business needs (business requirements)
  - the users need to do (user requirements)
  - the software should do (functional requirements);
  - characteristics the system should have (nonfunctional requirements);
  - and how the system should be built (system requirements).

Requirements

Functional requirements

1. The system must check incoming customer orders for inventory availability.
2. The system should allow students to view a course schedule while registering for classes
3. The system must retain customer order history for 3 years
4. The system must include real-time inventory levels at all warehouses.

Requirements

Nonfunctional requirements

1. The system can run on handheld devices.
2. The system should be able to work on any Web browser
3. The system should be available for use 24 hours per day, 365 days per year.
4. The system supports 300 simultaneous users from 9–11 A.M.; 150 simultaneous users at all other times
5. Only direct managers can see personnel records of staff
6. The system includes all available safeguards from viruses, worms, Trojan horses, etc.
7. Company policy is to buy computers only from Dell, send salary to staff just using Vietcombank.
8. Personal information is protected in compliance with the Data Protection Act.

Methods for Determining User Requirements

1. Interview
2. Questionnaires
3. Analyse documents
4. Observation
5. Joint Application Design (JAD)
6. STROBE

Use case analysis

Use case analysis

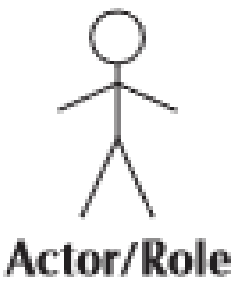
- A use case diagram visually represents the interaction between users and the information system
- In a use case diagram, the user becomes an actor, with a specific role that describes how he or she interacts with the system

Use case analysis

1. Actor
2. Use case
3. System
4. Association Relationship
5. Include Relationship
6. Extend Relationship
7. Generalization Relationship

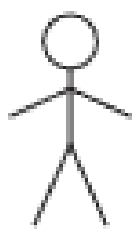
Actor

- A person / system that derives benefit from and is external to the system
- Is labeled with its role
- Is placed outside the system boundary
- Can be associated with other actors using a specialization / superclass association

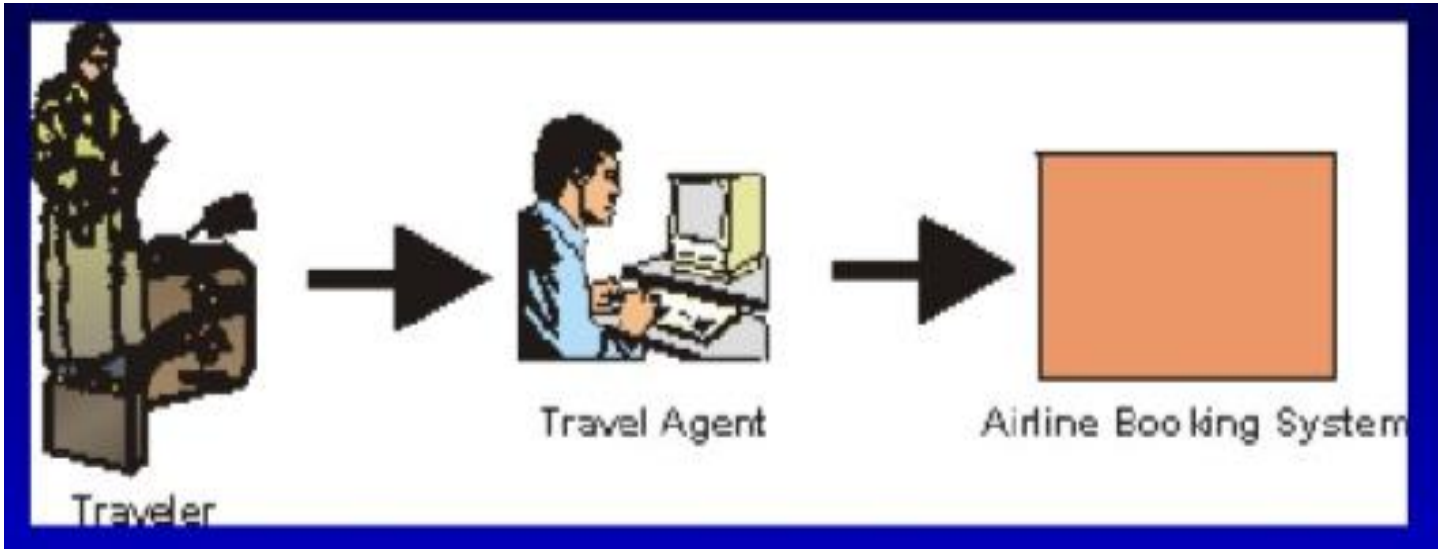


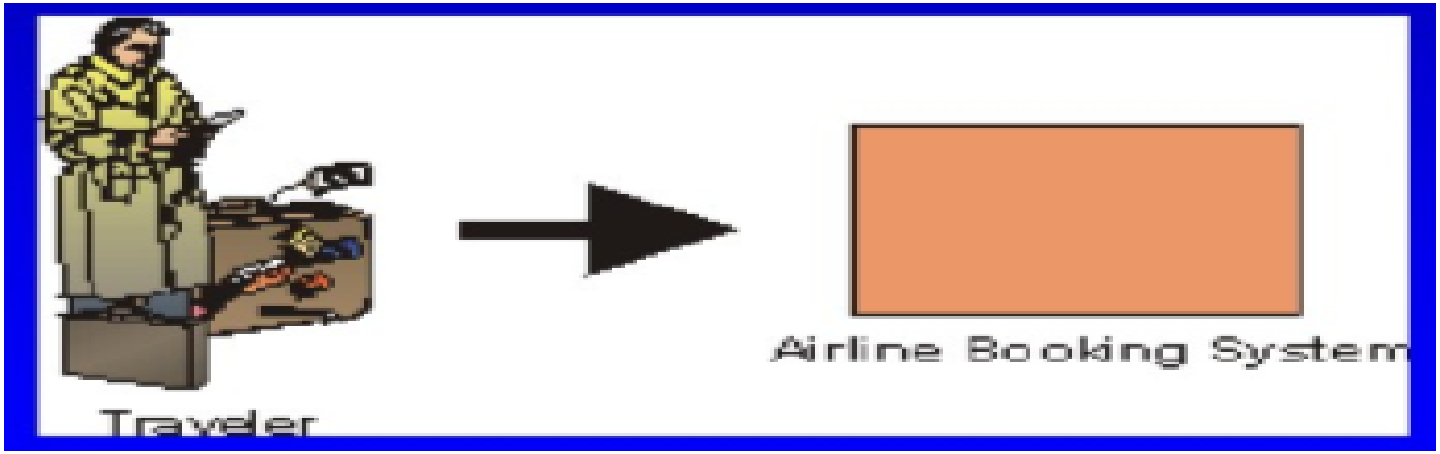

Customer


Patient


Doctor

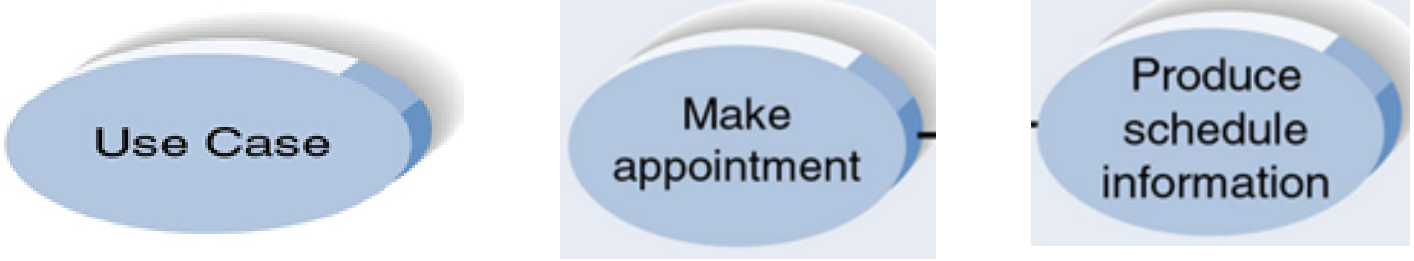
Actor


Traveler
Travel Agent
Airline Booking System


Traveler
Airline Booking System

Use case

- Represents a major piece of system functionality
- Can extend another use case
- Can include another use case
- Is placed inside the system boundary
- Is labeled with a descriptive verb-noun phrase

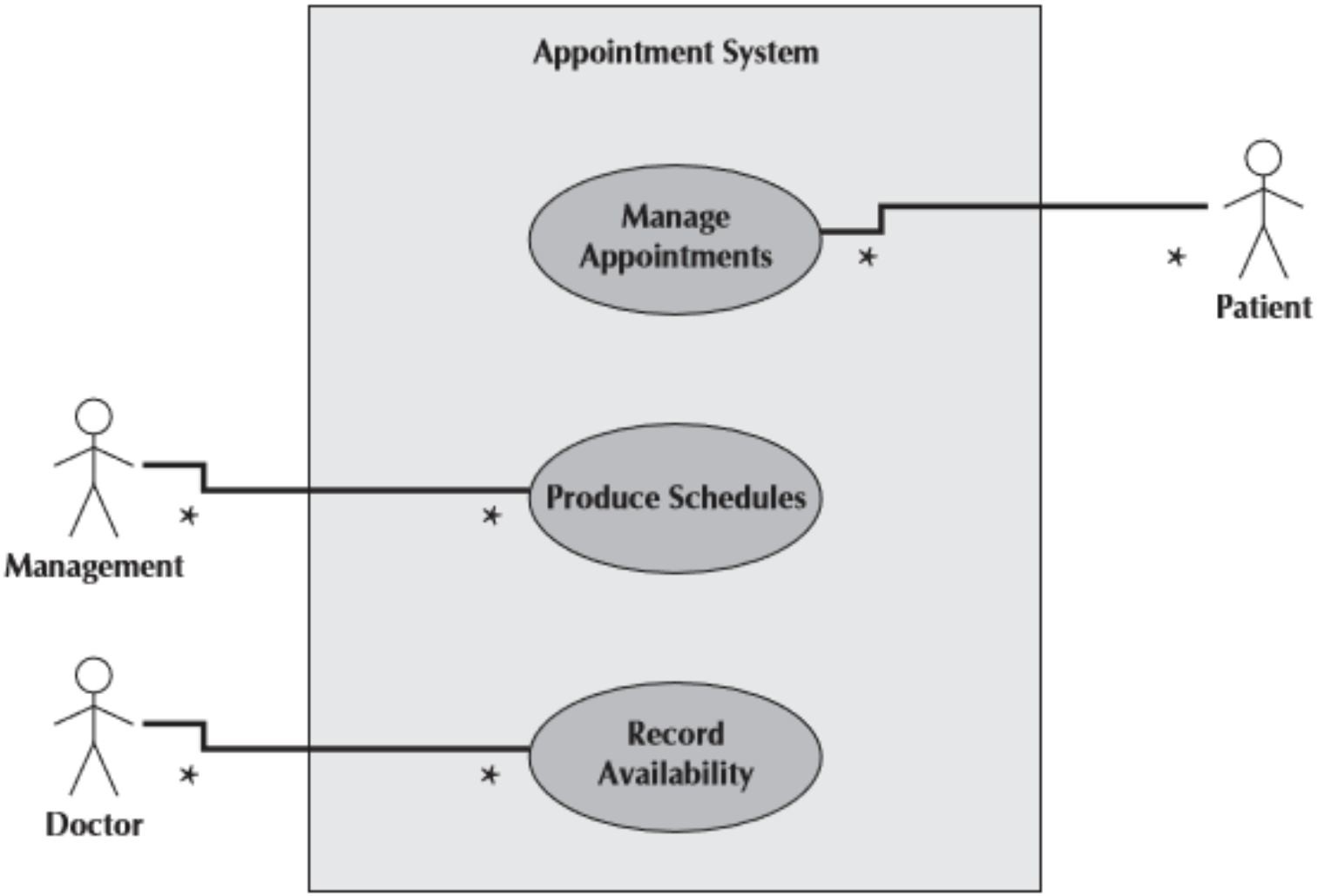


System boundary - Association relationship

- System boundary
  - Includes the name of the system inside or on top
  - Represents scope of the system

- Association relationship
  - Links an actor with the use case

Use case analysis



Include relationship

- Represents the inclusion of the functionality of one use case with in another
- The arrow is drawn from the based use case to the used use case

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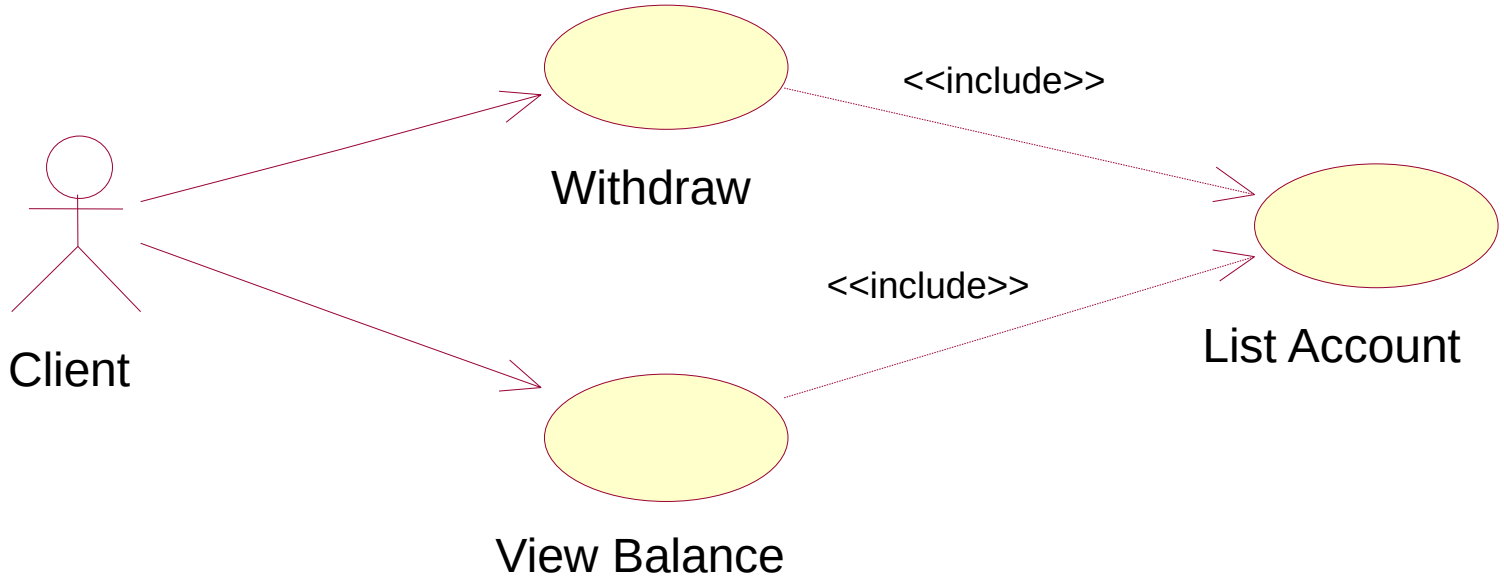
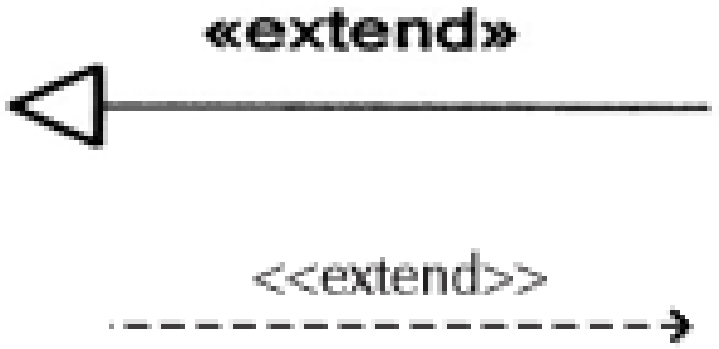


Extend relationship

- Represents the extension of the use case to include optional behavior
- The arrow is drawn from the extension use case to the based use case



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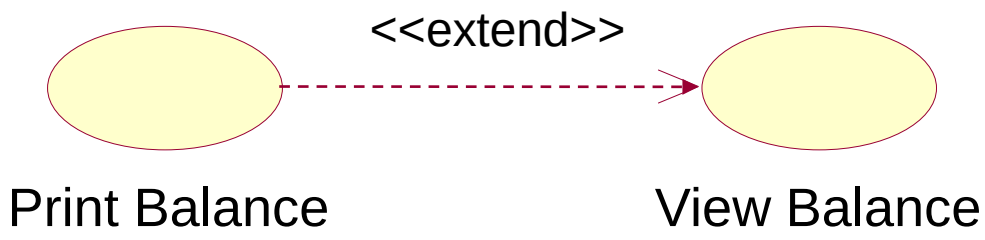
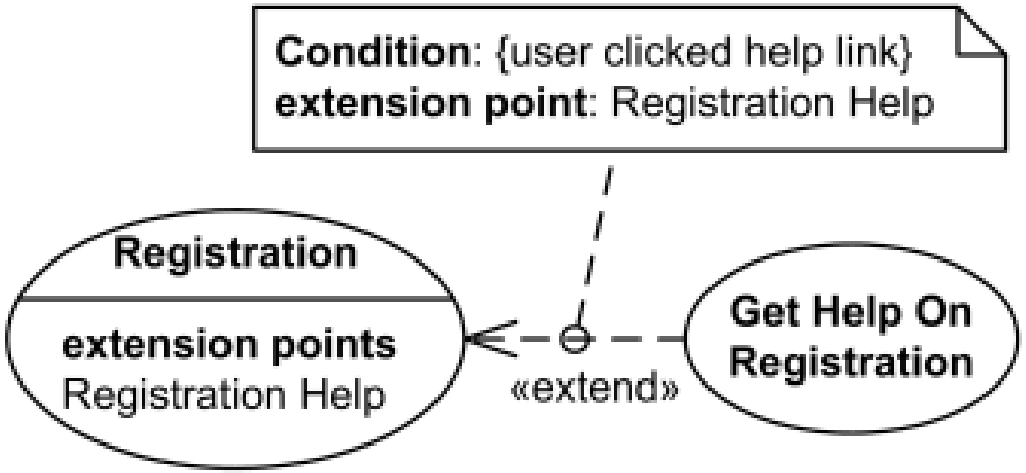


Extend relationship

http://www.uml-diagrams.org/use-case-extend.html

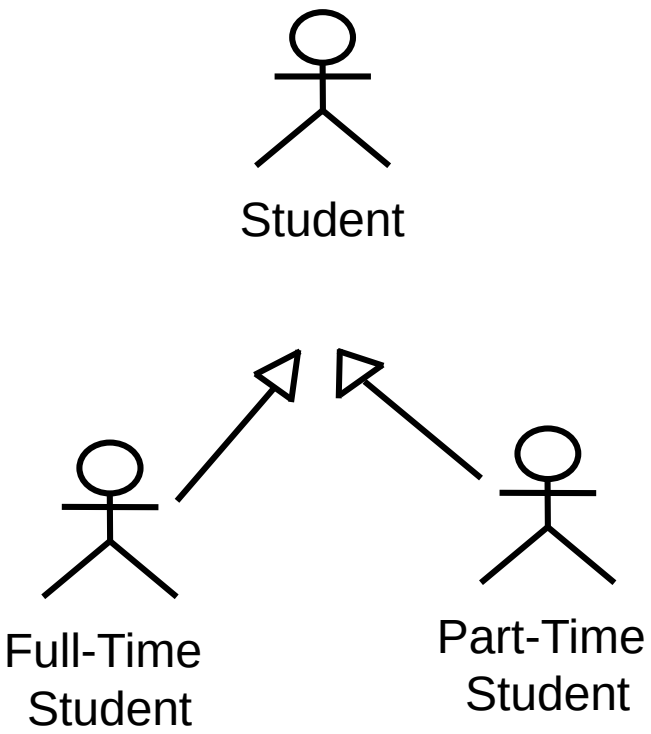
Registration *use case is complete and meaningful on its own.*
It could be extended with optional ***Get Help On Registration*** *use case.*



Registration use case is conditionally extended by Get Help On Registration use case in extension point Registration Help.

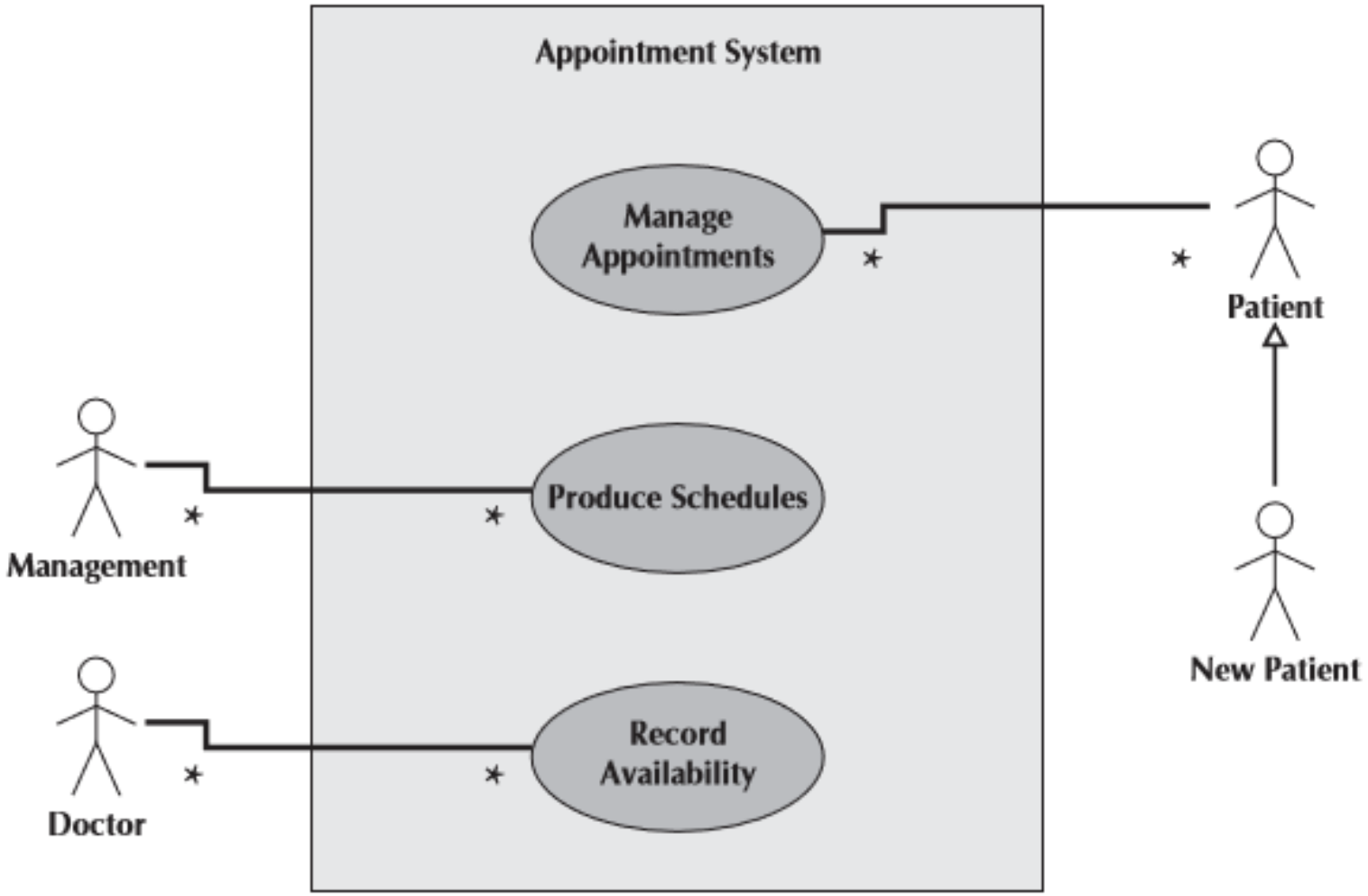
Generation relationship

- Represents a specialized use case to a more gereralized one.



Generation relationship

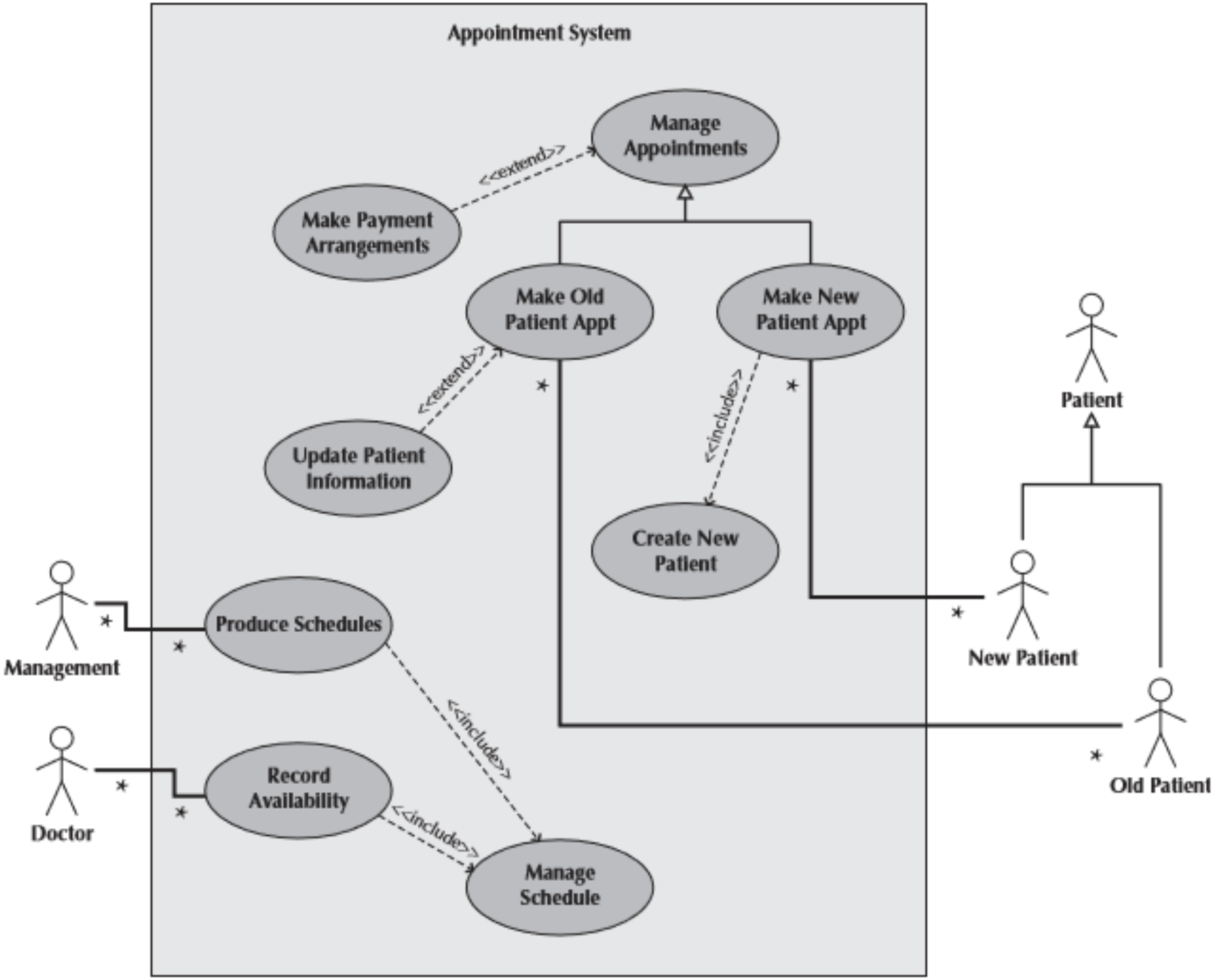
- Use case with specialized actor

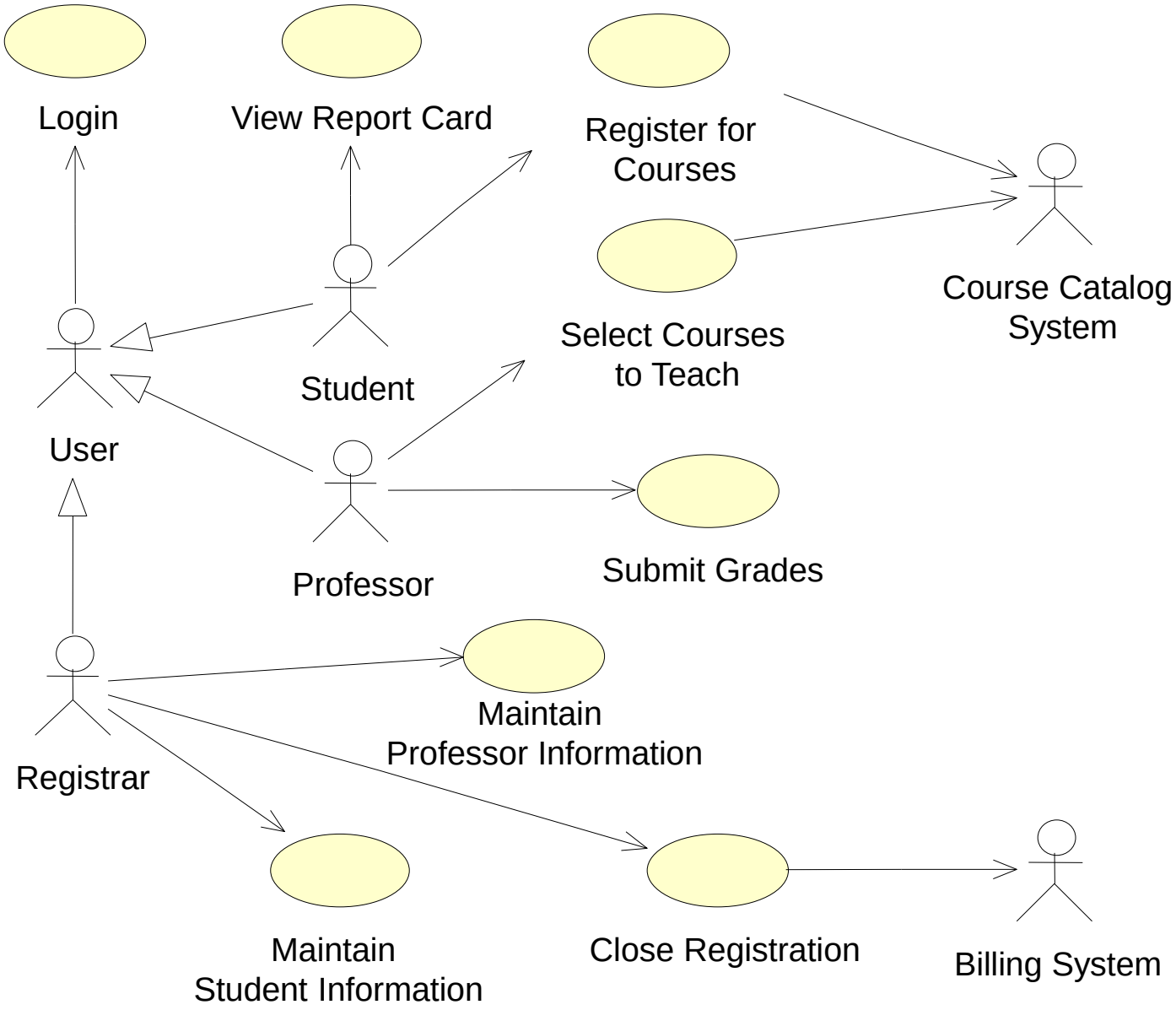


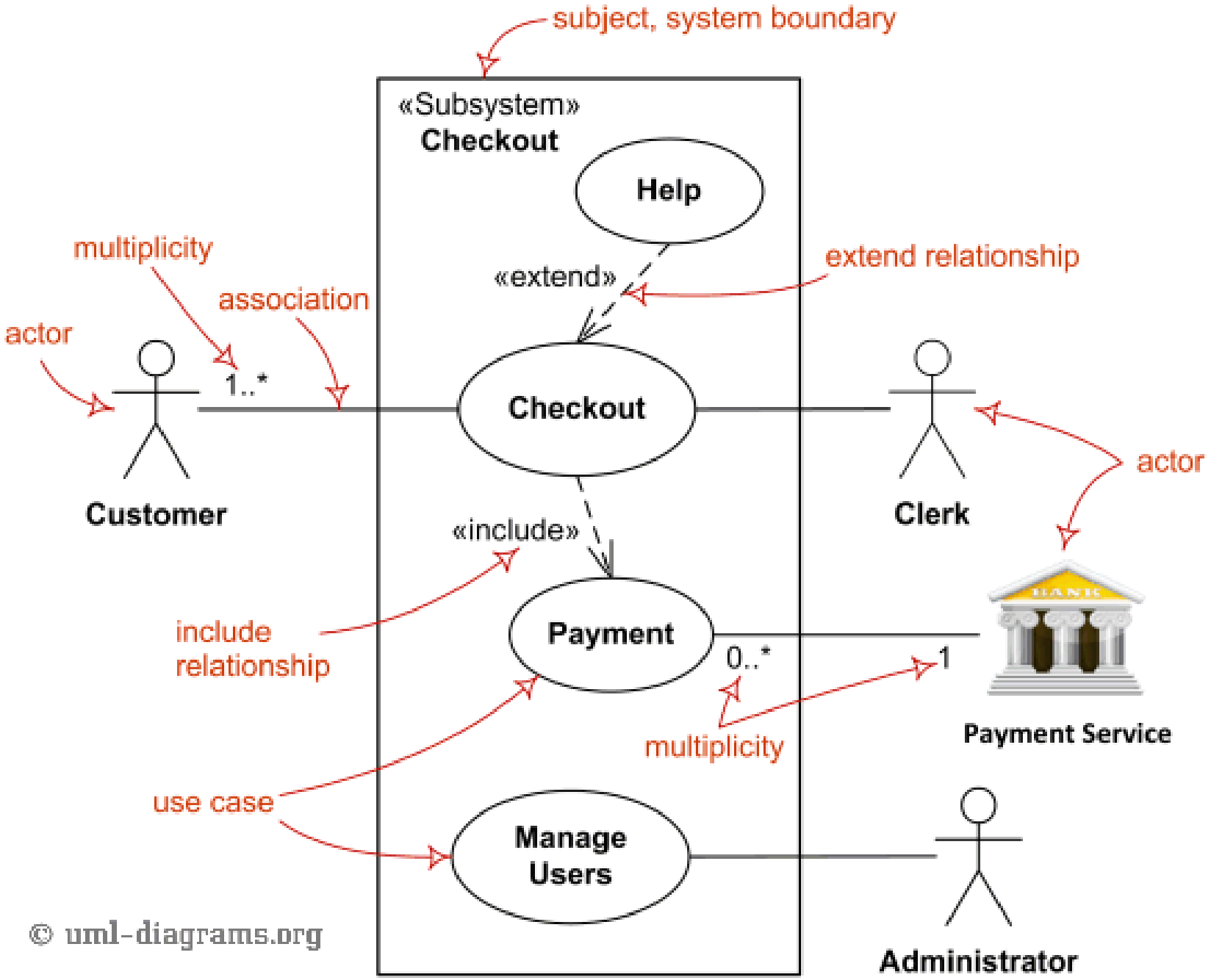
USE CASE MODEL

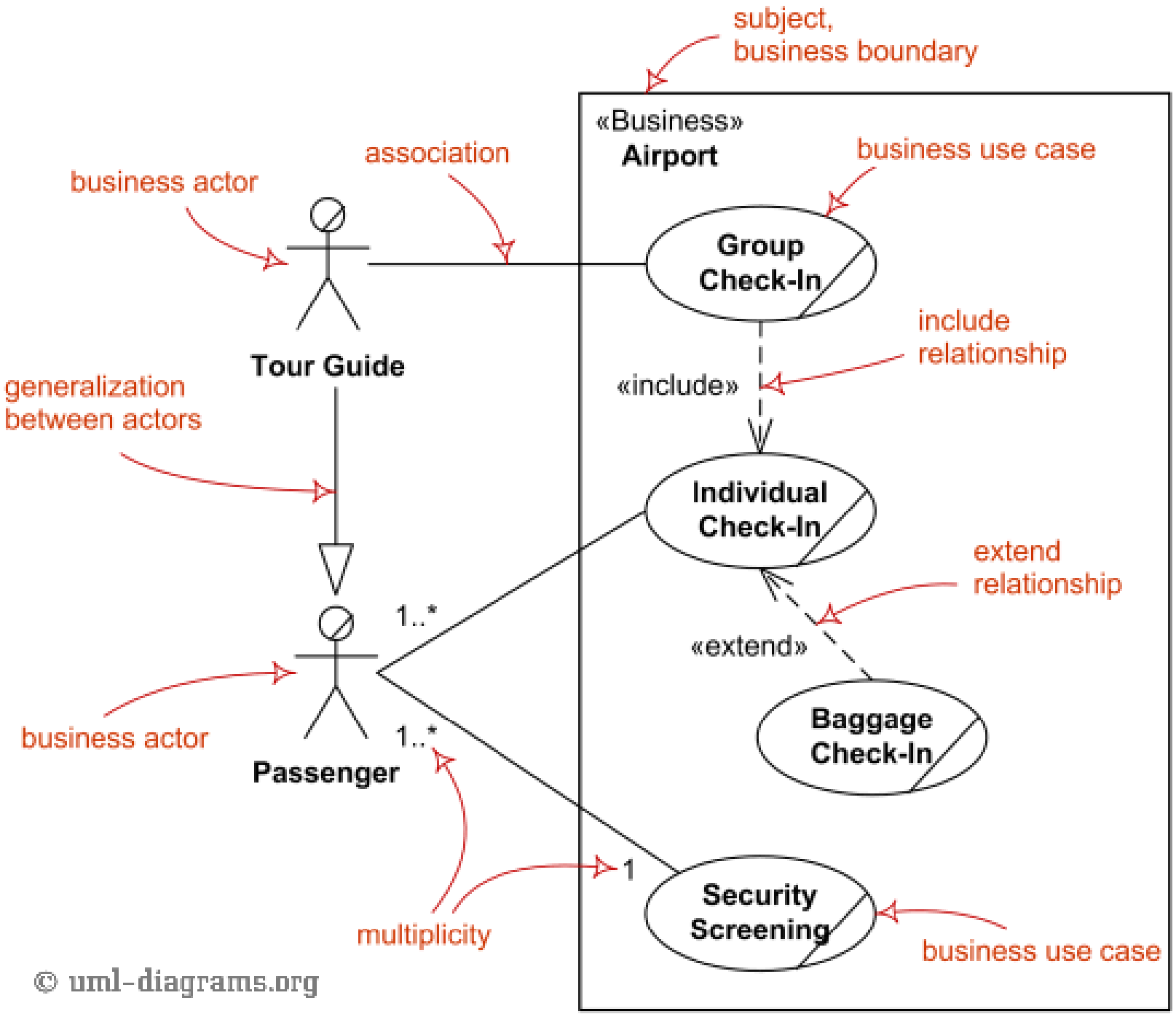
Use case model

- Use-case model / diagrams present a graphical overview of the main functionality of a system.


Appointment System
Manage Appointments
<<extend>>
Make Payment Arrangements
Make Old Patient Appt
Make New Patient Appt
<<extend>>
<<include>>
Update Patient Information
Create New Patient
Patient
Management
Produce Schedules
New Patient
<<include>>
Doctor
Record Availability
<<include>>
Manage Schedule
Old Patient


Login
View Report Card
Register for Courses
Course Catalog System
Select Courses to Teach
Student
User
Professor
Submit Grades
Registrar
Maintain Professor Information
Maintain Student Information
Close Registration
Billing System


subject, system boundary
«Subsystem»
Checkout
Help
«extend»
extend relationship
multiplicity
association
actor
1..*
Checkout
Customer
Clerk
actor
«include»
include
relationship
Payment
0..*
1
multiplicity
Payment Service
use case
Manage
Users
Administrator
© uml-diagrams.org


subject,
business boundary
«Business»
Airport
business use case
association
business actor
Group
Check-In
include
relationship
Tour Guide
«include»
generalization
between actors
Individual
Check-In
extend
relationship
1..*
«extend»
business actor
Baggage
Check-In
1..*
Passenger
1
Security
Screening
multiplicity
business use case
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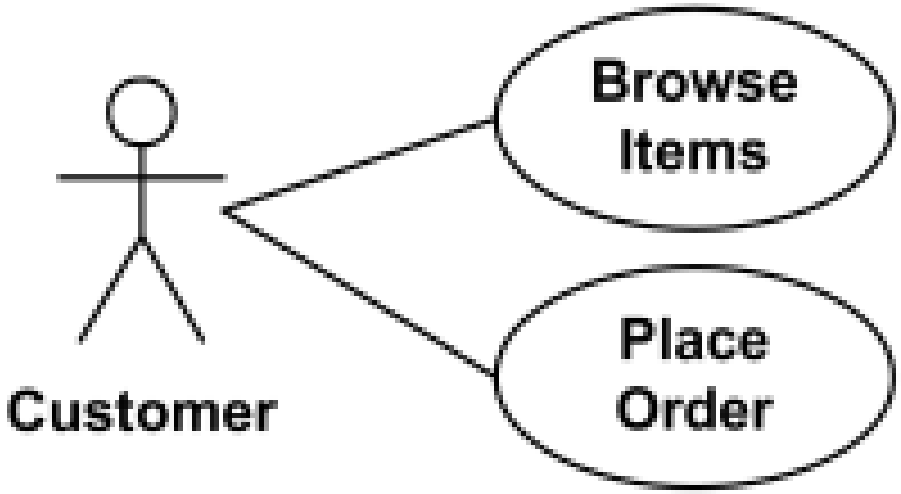
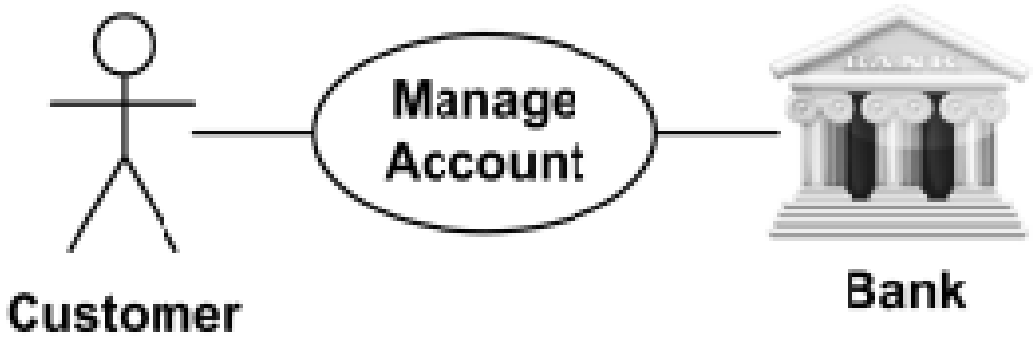
Association Between Actor and Use Case

- An actor could be associated to one or several use cases.



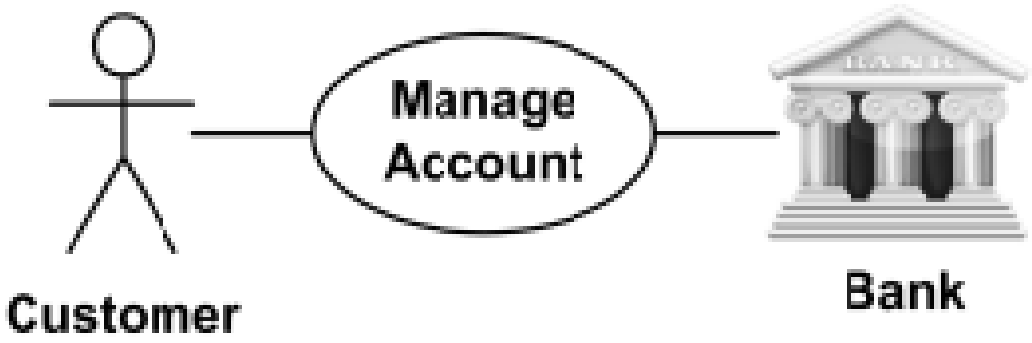
Association Between Actor and Use Case

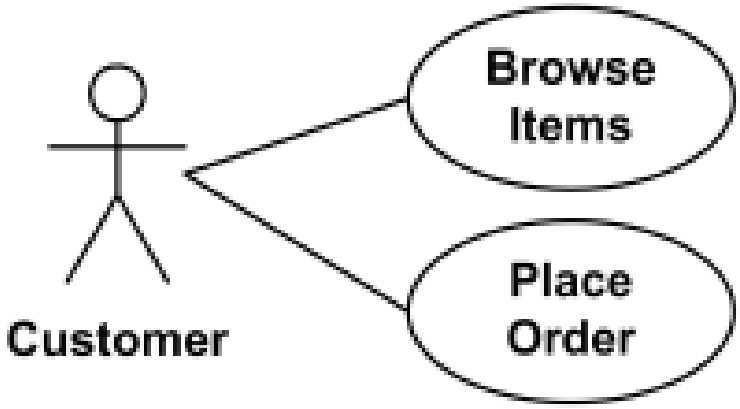
- A use case may have one or several associated actors



Association Between Actor and Use Case

- Multiplicity of an Actor, optional
- Value: 0. 1. 2. *. 2..5





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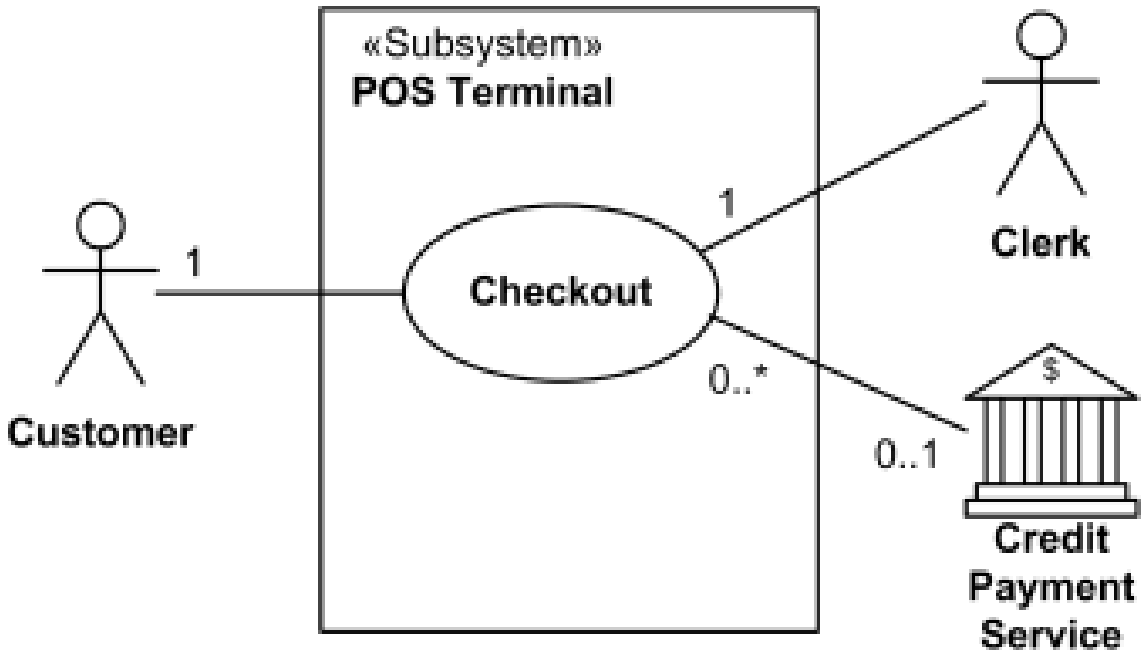
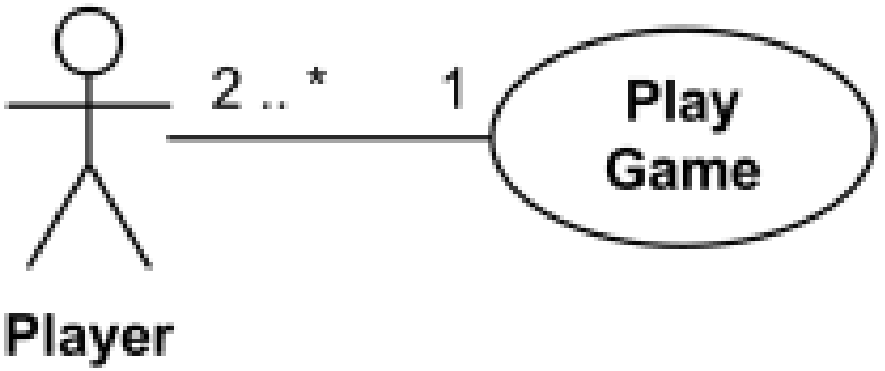
- Value: 0, 1, 2, *, 2..5



- *Checkout use case requires Customer actor, hence the 1 multiplicity of Customer.*
- *The use case may not need (Credit Payment Service) thus the 0..1 multiplicity.*

Association Between Actor and Use Case

- Multiplicity of an Actor, optional
- Value: 0, 1, 2, *, 2..5



- *2 actor instances (Players) are involved in the "Play Game" use case.*

The process used to create use cases and use case diagrams

The process used to create use cases and use case diagrams

- ✓ Use-case Descriptions
- ✓ Steps for creating Use-case Diagrams

Use-case Descriptions

1. Use case name
2. Primary actor
3. Stakeholders are interests
4. Brief description
5. Trigger
6. Relationship
7. Normal flow of events
8. Sub-flows
9. Alternate/exceptional flow

Use-case Descriptions Example

1. Use case name: *Manage Appointment*
2. Primary actor: *Patient*
3. Stakeholders are interests:
   - ✓ *Patient – wants to make, change, or cancel an appointment*
   - ✓ *Doctor – wants to ensure patient's needs are met in a timely manner*
4. Brief description: *This use case describes how we make, changing, or cancelling an appointment.*
5. Trigger: *Patient calls and asks for a new appointment, or changing or cancelling an existing appointment*

Use-case Descriptions Example

6. Relationships:
   - ✓ Association*: Patient actor*
   - ✓ Include*: Make Payment Arrangements*
   - ✓ Extend*: Create New Patient*

Use-case Descriptions Example

7. Normal flow of events
   1. The Patient contacts the office regarding an appointment (appt.)
   2. The Patient provides the Receptionist with his or her name, address, phone number.
   3. The Receptionist validates that the Patient exists in the Patient database
   4. The Receptionist executes the Make Payment Arrangements use case
   5. The Receptionist asks Patient if he or she would like to do:
      a. If the Patient wants to make a new appointment: the S-1 (new appointment sub-flow) is performed
      b. If the Patient wants to cancel an existing appointment: the S-2 (cancel appointment sub-flow) is performed
      c. If the Patient wants to change an existing appointment: the S-3 (change appointment sub-flow) is performed

Use-case Descriptions Example

8. Subflows

S-1: New appointment

1. The Receptionist asks the Patient for possible times
2. The Receptionist matches the Patient's desired appointment times with available times and schedules new appointment

S-2: Cancel appointment

1. The Receptionist asks the Patient for the appointment time
2. The Receptionist finds the current appointment time in the database and cancels it

S-3: Change appointment

1. The Receptionist performs S-2: cancel appointment
2. The Receptionist performs S-1: new appointment

Use-case Descriptions Example

9. Alternate or exceptional flow

   3a: The Receptionist executes the Create New Patient use case

   S-1, 2a1: The Receptionist proposes some alternative appointment times based on what is available in the appointment schedule

   S-1, 2a2: The Patient chooses one of the proposed times or decides not to make an appointment

The process used to create use cases and use case diagrams

- ✓ Use-case Descriptions
- ✓ Steps for creating Use-case Diagrams

Steps for creating Use-case Diagrams

- Identify major use cases
  1. Review requirements definition
  2. Identify subject's boundaries
  3. Identify primary actors and goals
  4. Identify business processes
  5. Review current set of use cases

Steps for creating Use-case Diagrams

- Creating a use case diagram
  1. Place and draw use cases
  2. Place and draw actors
  3. Draw subject's boundary
  4. Add associations

The process used to create use cases and use case diagrams

- ✓ Use-case Descriptions
- ✓ Steps for creating Use-case Diagrams


QUESTIONS
ANSWERS