EAST WEST UNIVERSITY

CSE347

Information System Analysis and Design

Nishat Tasnim Niloy

Lecturer

Department of Computer Science and Engineering

Faculty of Science and Engineering

Topic:6

Use Case Diagram

What is Use Case

- A formal way of representing how a business system interacts with its environment
- Illustrates the activities that are performed by the users of the system
- A scenario-based technique in the UML
- A sequence of actions a system performs that yields a valuable result for a particular actor.

Use Case

- Use case diagrams describe what a system does from the standpoint of an external observer. The emphasis is on what a system does rather than how.
- Use case diagrams are closely connected to scenarios. A scenario is an example of what happens when someone interacts with the system.

Use Case Analysis

- Actor:
  - A user or outside system that interacts with the system being designed in order to obtain some value from that interaction
- Use Cases describe scenarios that describe the interaction between users of the system (the actor) and the system itself.

Use Cases for a medical clinic

- *A patient calls the clinic to make an appointment for a yearly checkup. The receptionist finds the nearest empty time slot in the appointment book and schedules the appointment for that time slot.*
- We want to write a use case for this scenario.
- Remember: A use case is a summary of scenarios for a single task or goal.

Use Cases for a medical clinic

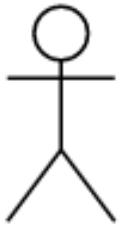
- As we read the scenario, define those people or systems that are going to interact with the scenario.
- *A **patient** calls the clinic to make an appointment for a yearly checkup. The **receptionist** finds the nearest empty time slot in the appointment book and schedules the appointment for that time slot.*

Questions for Identifying People Actors

- Who is interested in the scenario/system?
- Where in the organization is the scenario/system be used?
- Who will benefit from the use of the scenario/system?
- Who will supply the scenario/system with this information, use this information, and remove this information?
- Does one person play several different roles?
- Do several people play the same role?
- Does one person play several different roles?
- Do several people play the same role?

Actors

- An Actor is outside or external the system. It can be a:
  - Human
  - Peripheral device (hardware)
  - External system or subsystem
  - Time or time-based event
  - Database etc.

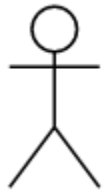


- Whether human or not, represented by stick figure with the name of the actor
- Actors are NOT a part of the system (external to the system)
- A single actor may represent multiple physical users

Identifying Actors

- A use case is a summary of scenarios for a single task or goal.
- An actor is who or what initiates the events involved in the task of the use case. Actors are simply roles that people, or objects play.
- So, from the previous scenario, what or who is the actor????

- The actor is a **Patient.**



Patient

Use Case Component

- The use case has three components.
- The **use case task** referred to as the use case that represents a feature needed in a software system.
- The **actor**(s) who trigger the use case to activate.
- The **communication** line to show how the actors communicate with the use case

Use Case and Function

- Each use case in a use case diagram describes one and only one function in which users interact with the system
- May contain several “paths” that a user can take while interacting with the system
- Each path is referred to as a scenario
- Use Case Labelled using a descriptive verb-noun phrase represented by an oval

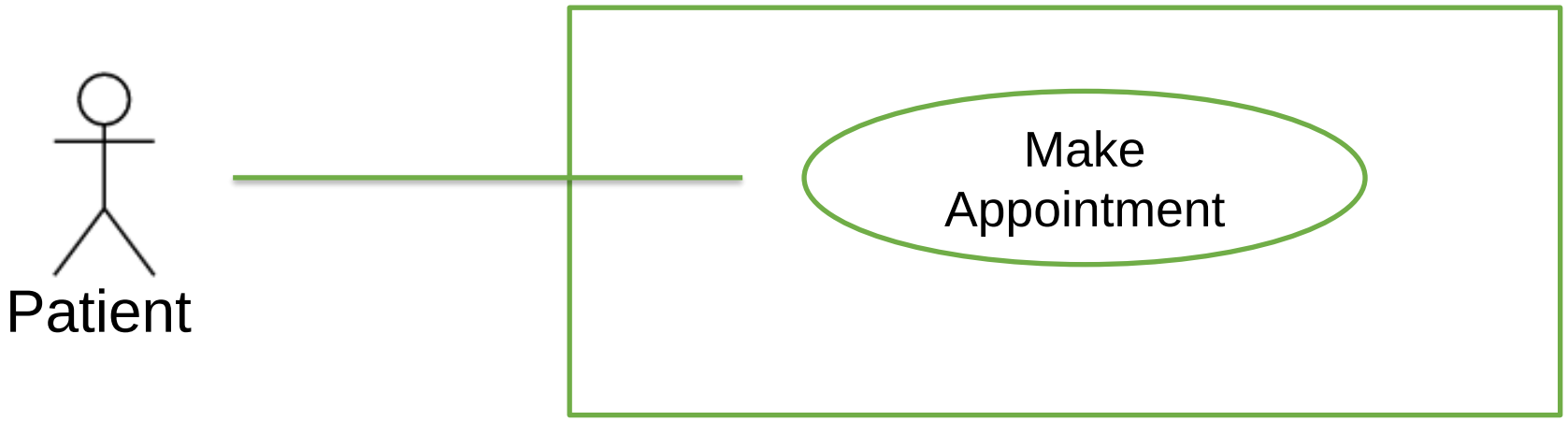
- Such as

Use case: Relationship

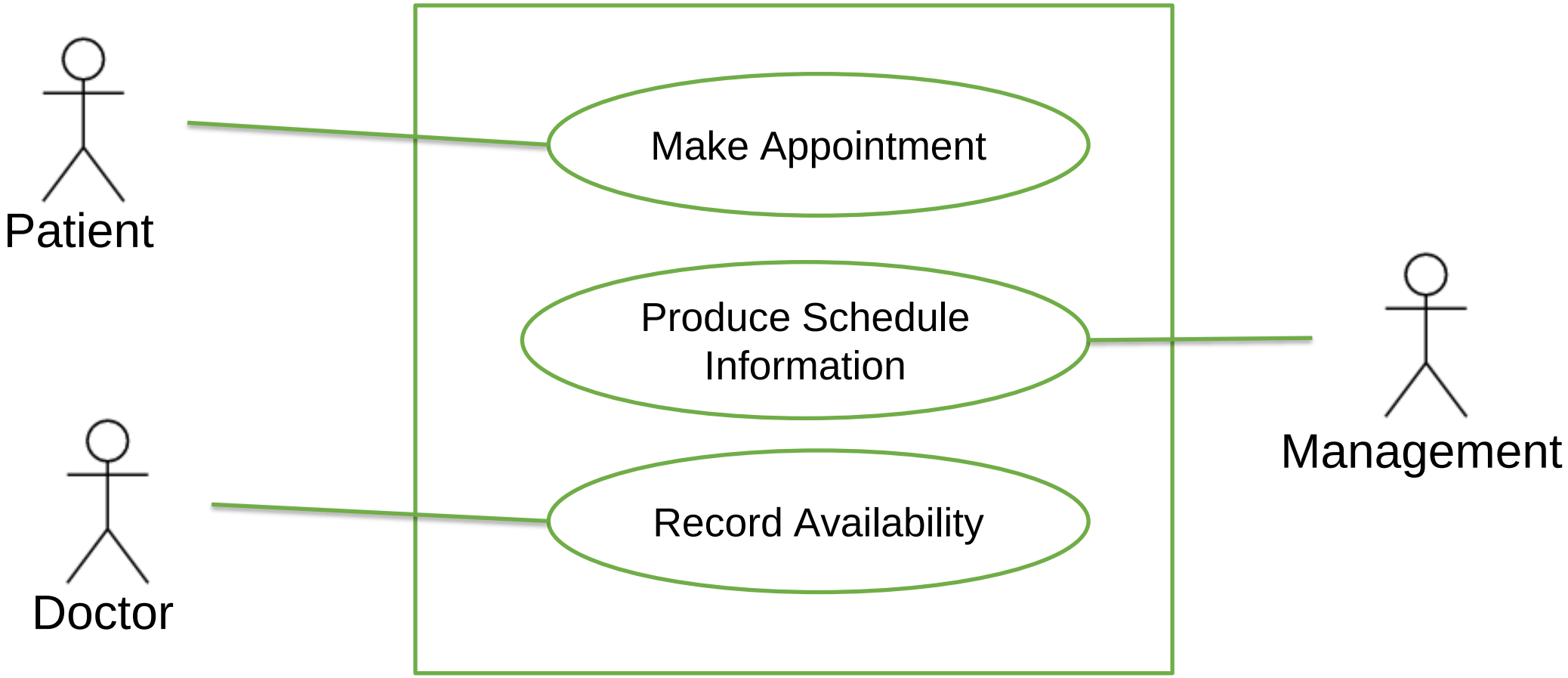
- Relationship represent communication between actor and use case
- Depicted by line or double-headed arrow line

Use case: Relationship

- Boundary
  - A boundary rectangle is placed around the perimeter of the system to show how the actors communicate with the system.



Use case Diagram



Types of Relationship

- Generalization 
- Include 

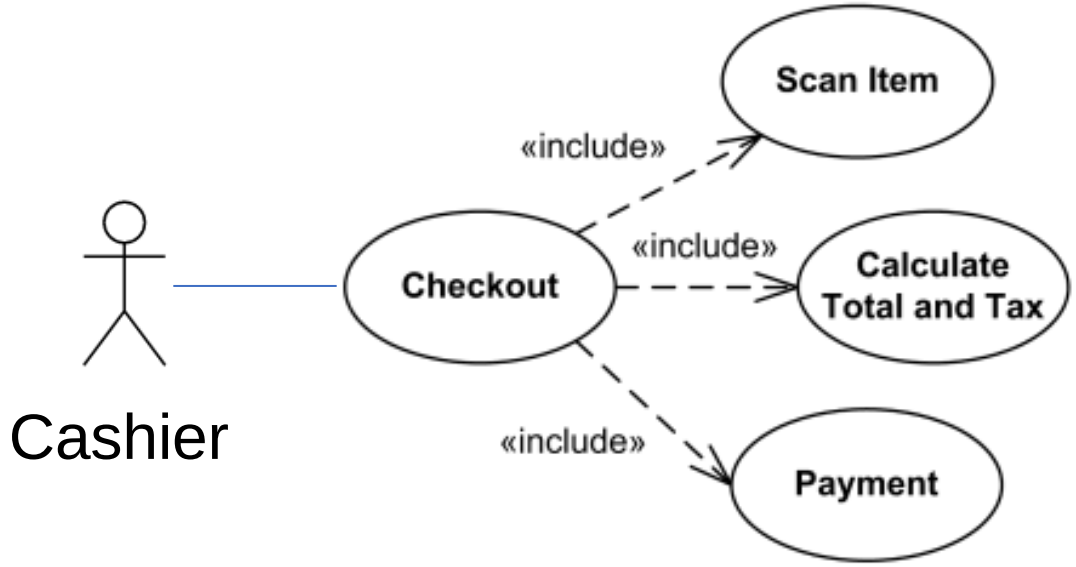
- Extend 

Components of Use case Diagram

- Generalization
  - Relationship Represented by a line and a hollow arrow From
    - child to parent

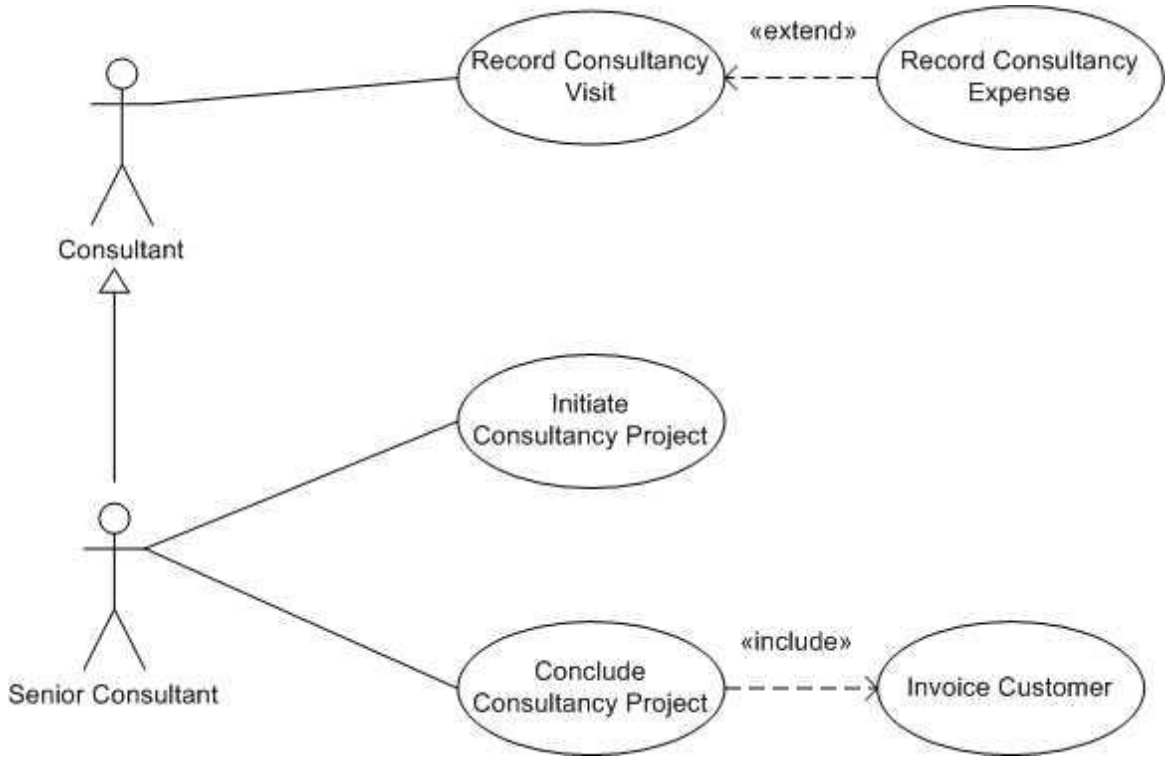
Use Case Diagram Relationship

- Include Relationship
  - Represents the inclusion of the functionality of one use case within another
  - Arrow is drawn from the base use case to the used use case
  - Write << include >> above arrowhead line

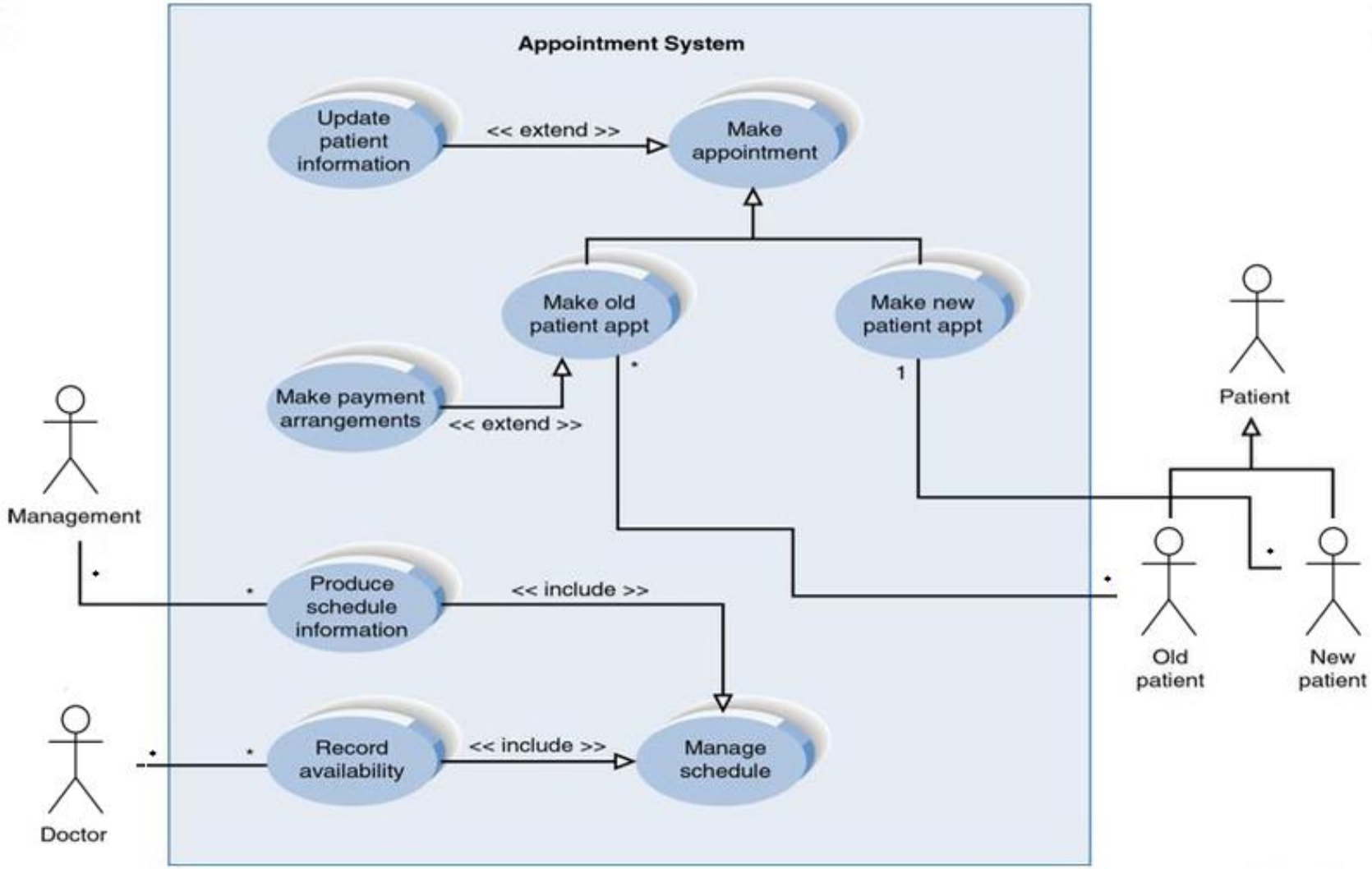


Use Case Diagram Relationship

- Extend Relationship
  - Represents the extension of the use case to include optional functionality
  - Arrow is drawn from the extension use case to the base use case
  - Write << extend >> above arrowhead line



Relationship: Medical Clinic Example



Use Case Relationships

- Pros:
  - Reduces redundancy in use cases
  - Reduces complexity within a use case

- Cons:
  - May introduce complexity to use case diagram
  - Mainly talking about extend, include, and generalization relationships.
  - 95% of relationships on a use case diagram is association

Benefits of Use Case

- Relatively easy to write and easy to read
- Comprehensible by users
- Engage the users in the requirements process
- Force developers to think through the design of a system from a user viewpoint
- Identify a context for the requirements of the system
- Critical tool in the design, implementation, analysis and testing process
- Rapid change allows exploratory approach
- Serve as inputs to the user documentation

Difficulties with Use Cases

- As functional decompositions, it is often difficult to make the transition from functional description to object description to class design
- Reuse at the class level can be hindered by each developer “taking a Use Case and running with it”. Since UCs do not talk about classes, developers often wind up in a vacuum during object analysis, and can often wind-up doing things their own way, making reuse difficult
- Use Cases make stating non-functional requirements difficult
- Testing functionality is straightforward, but unit testing the particular implementations and non-functional requirements is not obvious

Use Case Model Survey

- The Use Case Model Survey is to illustrate, in graphical form, the universe of Use Cases that the system is contracted to deliver.
- Each Use Case in the system appears in the Survey with a short description of its main function. Participants:
  - Domain Expert
  - Architect
  - Analyst/Designer (Use Case author)
  - Testing Engineer