



SNS COLLEGE OF ENGINEERING

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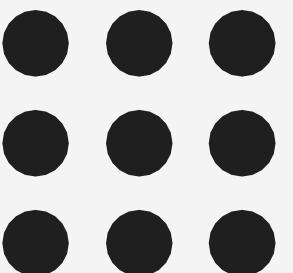
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Department of Artificial Intelligence and Data Science

3/26/2025

**SOWMIYA R/AP/AI&DS/23ITT203 OBJECT ORIENTED SOFTWARE
ENGINEERING/SNSCE**





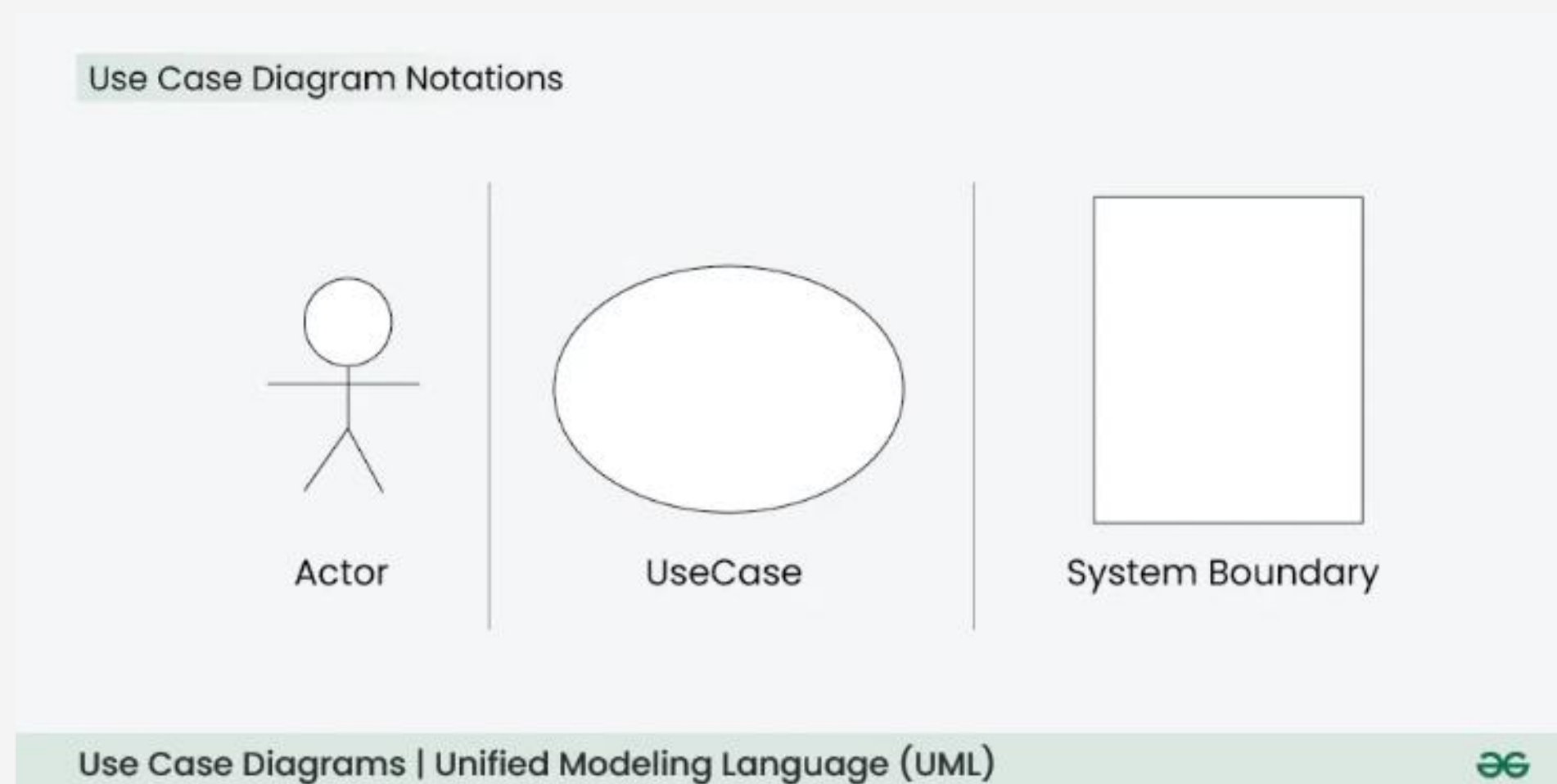
Use case diagram



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What is a Use Case Diagram?

- A Use Case Diagram is a type of Unified Modeling Language (UML) diagram that represents the interaction between actors (users or external systems) and a system under consideration to accomplish specific goals.
- It provides a high-level view of the system's functionality by illustrating the various ways users can interact with it.





When to apply Use Case Diagram?

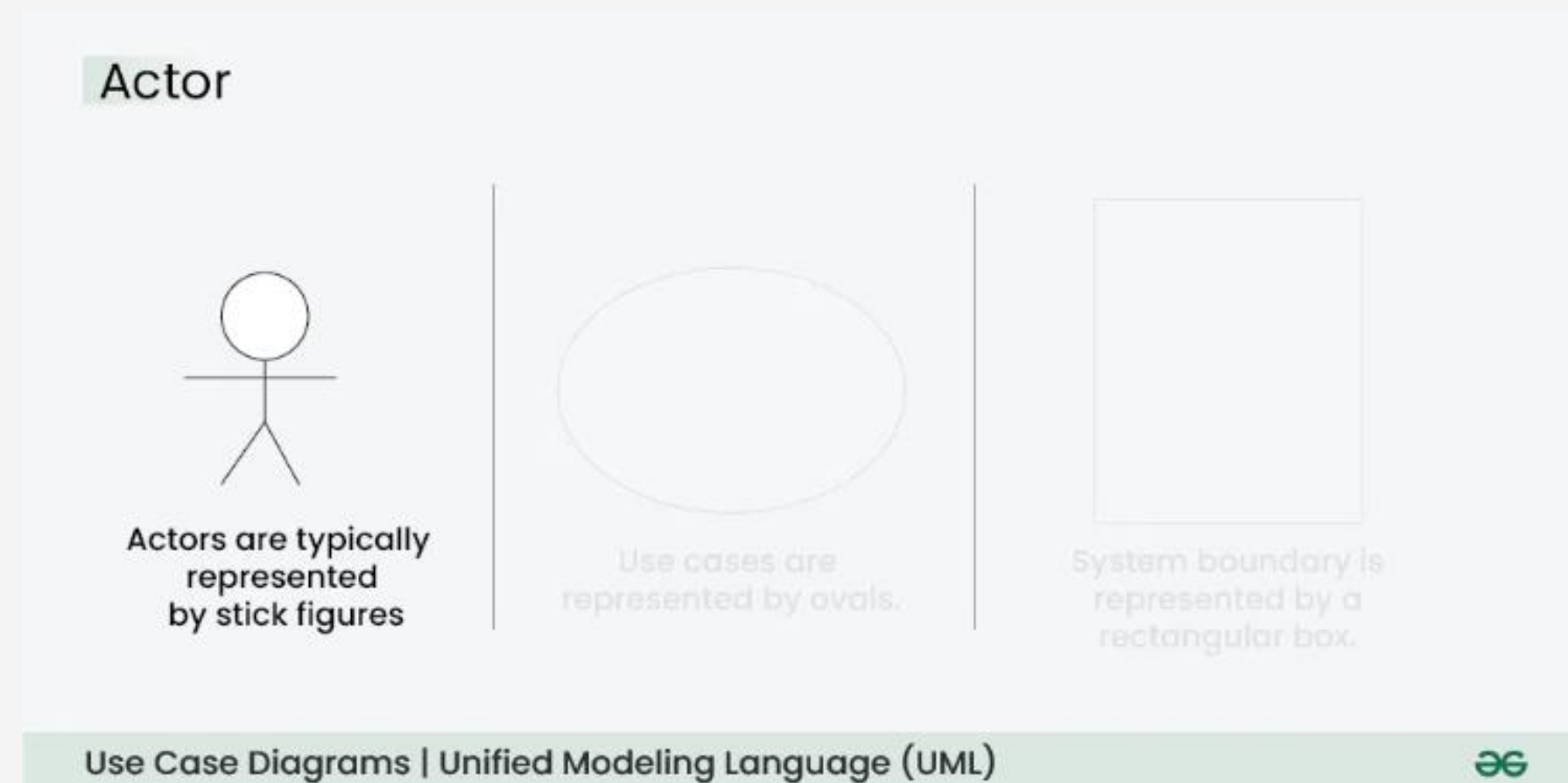
Use case diagrams are useful in several situations. Here's when you should consider using them:

- When you need to gather and clarify user requirements, use case diagrams help visualize how different users interact with the system.
- If you're working with diverse groups, including non-technical stakeholders, these diagrams provide a clear and simple way to convey system functionality.
- During the system design phase, use case diagrams help outline user interactions and plan features, ensuring that the design aligns with user needs.
- When defining what is included in the system versus what is external, use case diagrams help clarify these boundaries.

Use Case Diagram Notations

1. Actors

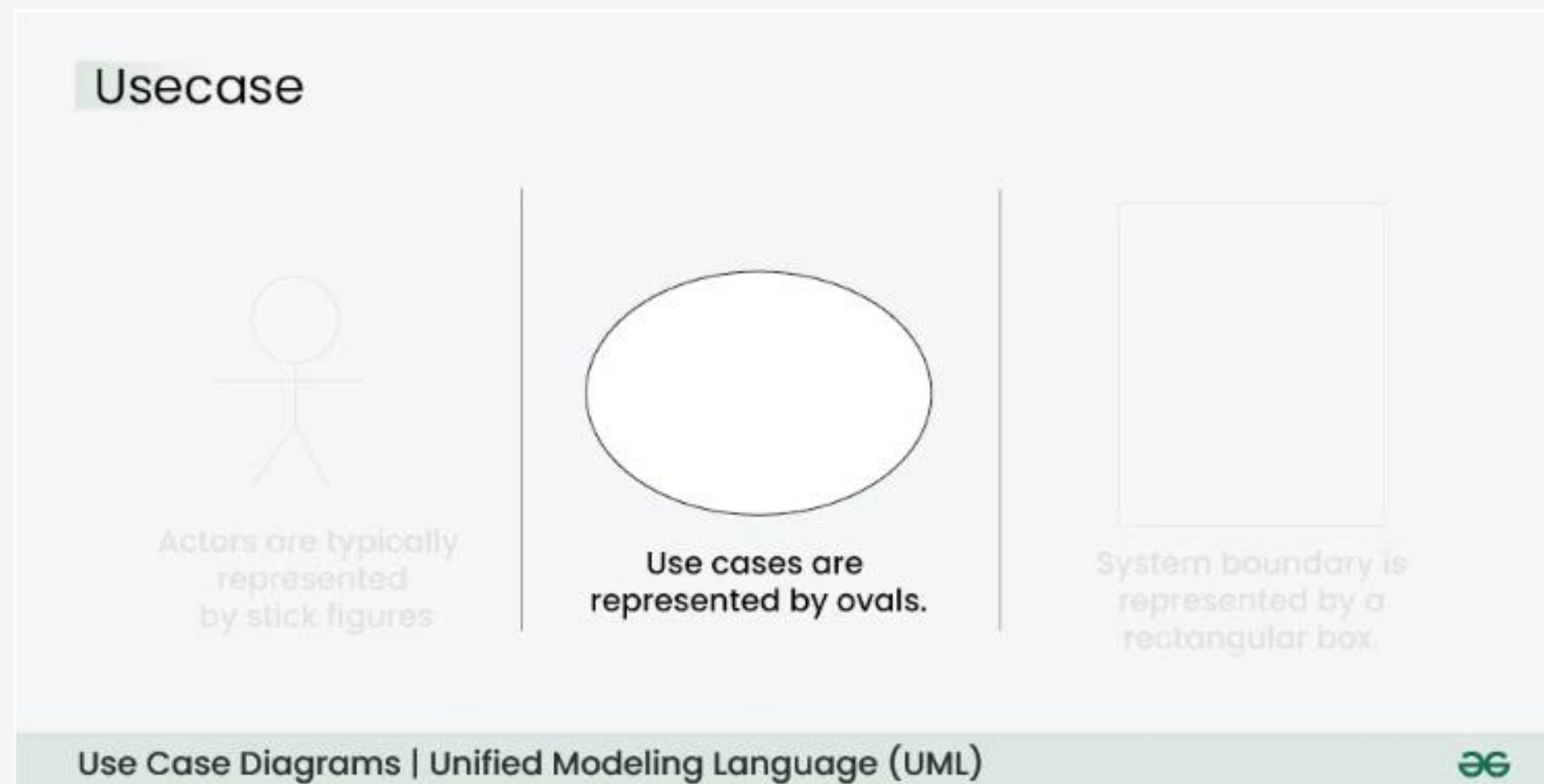
Actors are external entities that interact with the system. These can include users, other systems, or hardware devices. In the context of a Use Case Diagram, actors initiate use cases and receive the outcomes. Proper identification and understanding of actors are crucial for accurately modeling system behavior.



Use Case Diagram Notations

2. Use Cases

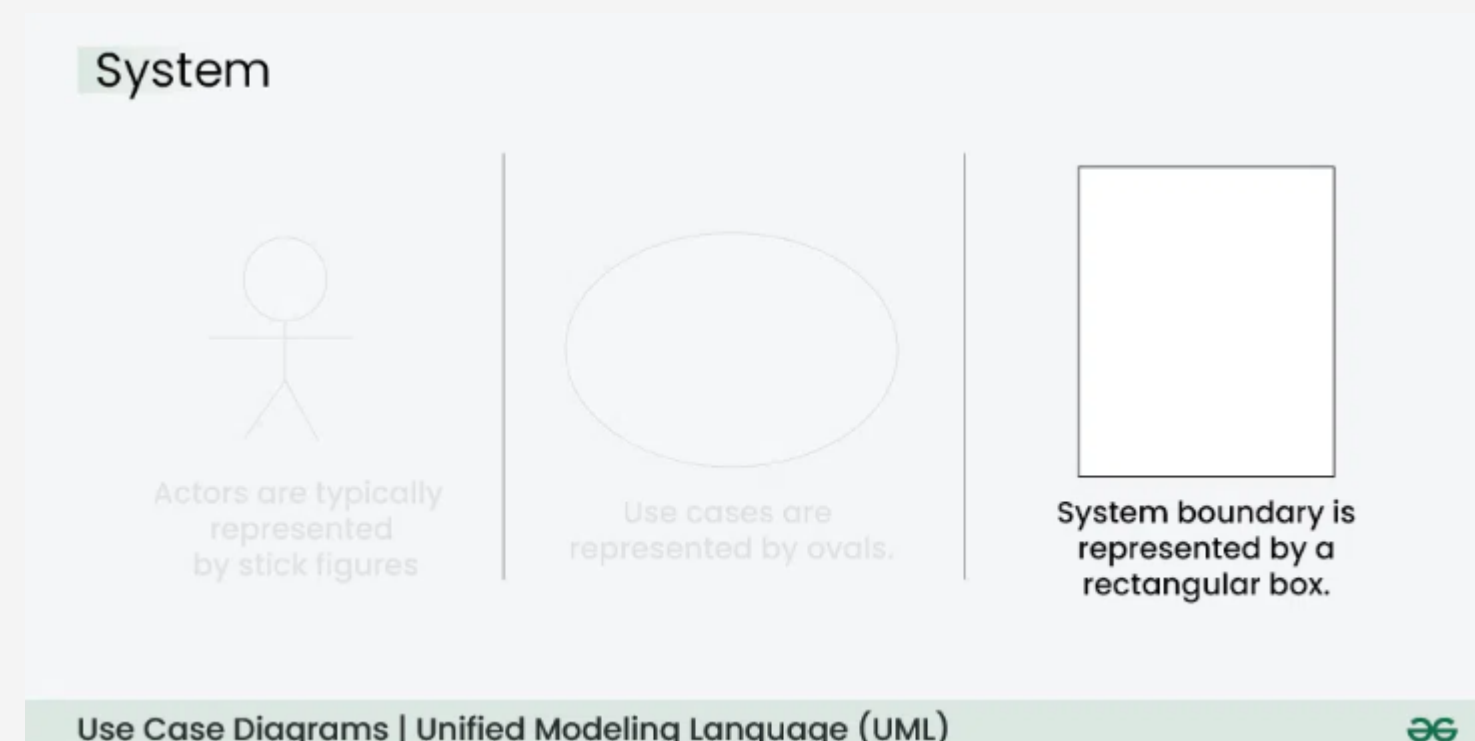
Use cases are like scenes in the play. They represent specific things your system can do. In the online shopping system, examples of use cases could be "Place Order," "Track Delivery," or "Update Product Information". Use cases are represented by ovals.



Use Case Diagram Notations

3. System Boundary

- The system boundary is a visual representation of the scope or limits of the system you are modeling.
- It defines what is inside the system and what is outside. The boundary helps to establish a clear distinction between the elements that are part of the system and those that are external to it.
- The system boundary is typically represented by a rectangular box that surrounds all the use cases of the system.
- The purpose of system boundary is to clearly outlines the boundaries of the system, indicating which components are internal to the system and which are external actors or entities interacting with the system.



1. Association Relationship

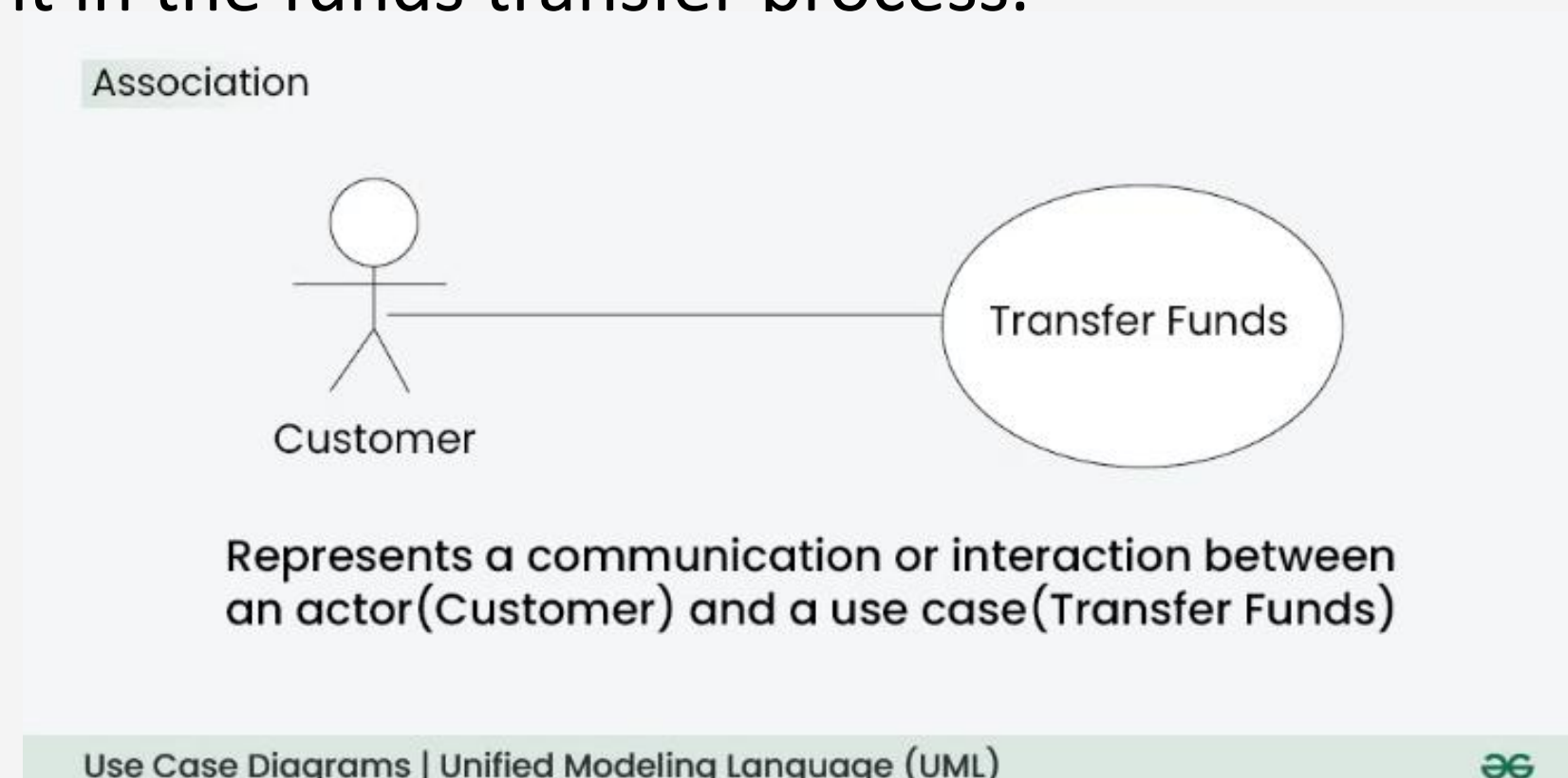
The Association Relationship represents a communication or interaction between an actor and a use case. It is depicted by a line connecting the actor to the use case. This relationship signifies that the actor is involved in the functionality described by the use case.

Example: Online Banking System

Actor: Customer

Use Case: Transfer Funds

Association: A line connecting the "Customer" actor to the "Transfer Funds" use case, indicating the customer's involvement in the funds transfer process.



Use Case Diagram Relationships

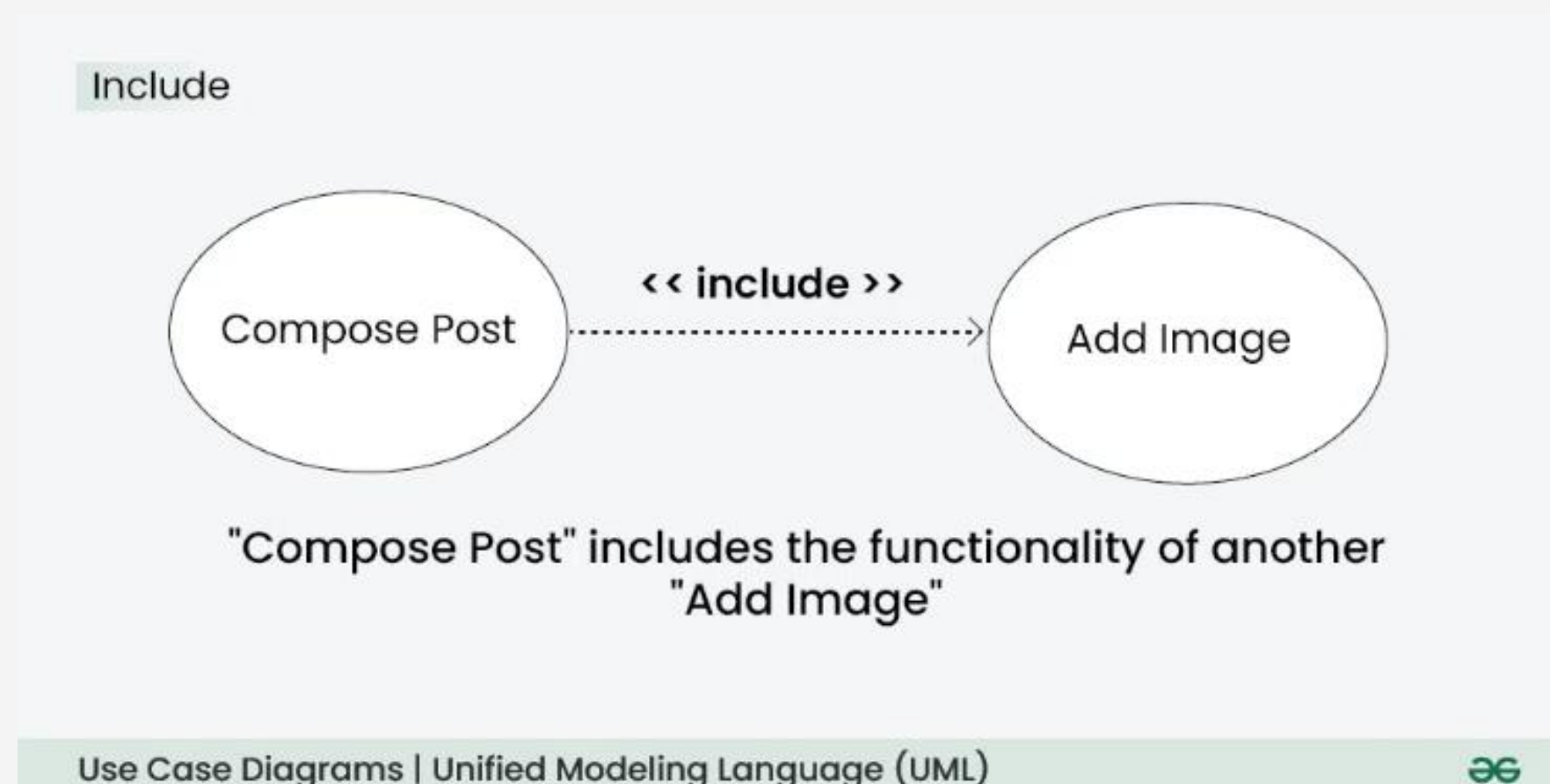
2. Include Relationship

The Include Relationship indicates that a use case includes the functionality of another use case. It is denoted by a dashed arrow pointing from the including use case to the included use case. This relationship promotes modular and reusable design.

Example: Social Media Posting

Use Cases: Compose Post, Add Image

Include Relationship: The "Compose Post" use case includes the functionality of "Add Image." Therefore, composing a post includes the action of adding an image.



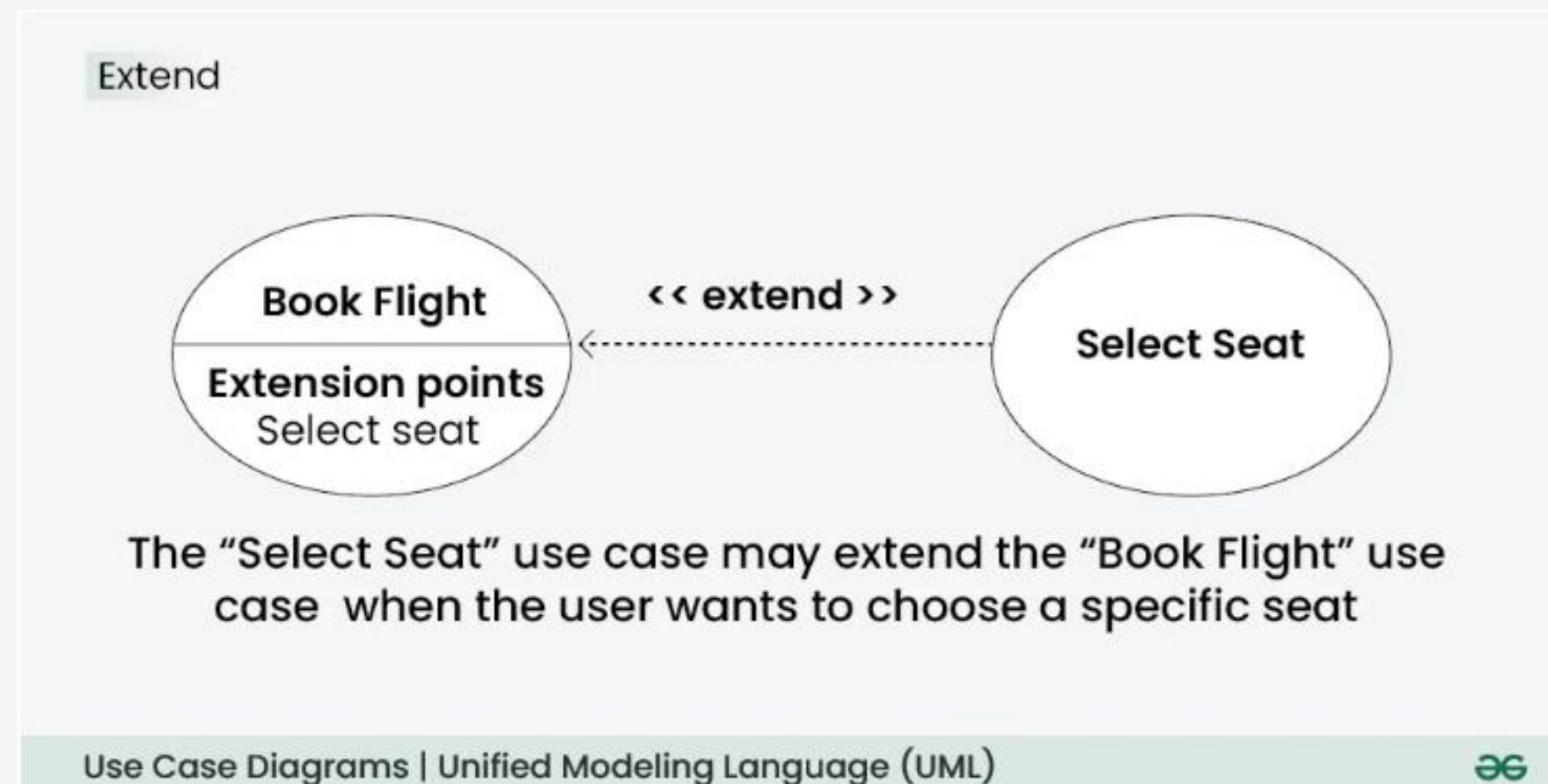
3. Extend Relationship

The Extend Relationship illustrates that a use case can be extended by another use case under specific conditions. It is represented by a dashed arrow with the keyword "extend." This relationship is useful for handling optional or exceptional behavior.

Example: Flight Booking System

Use Cases: Book Flight, Select Seat

Extend Relationship: The "Select Seat" use case may extend the "Book Flight" use case when the user wants to choose a specific seat, but it is an optional step.



Use Case Diagram Relationships

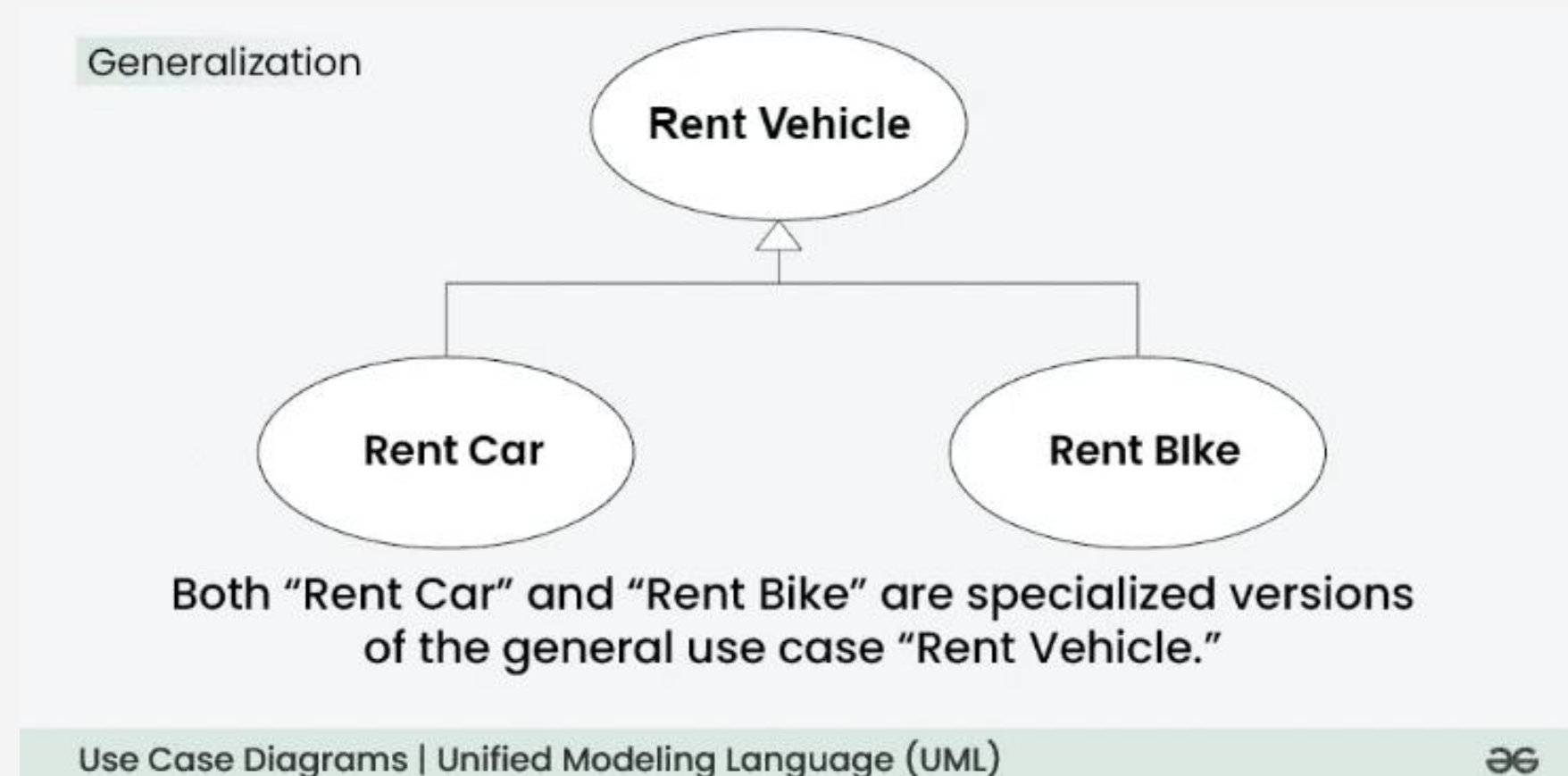
4. Generalization Relationship

The Generalization Relationship establishes an "is-a" connection between two use cases, indicating that one use case is a specialized version of another. It is represented by an arrow pointing from the specialized use case to the general use case.

Example: Vehicle Rental System

Use Cases: Rent Car, Rent Bike

Generalization Relationship: Both "Rent Car" and "Rent Bike" are specialized versions of the general use case "Rent Vehicle."





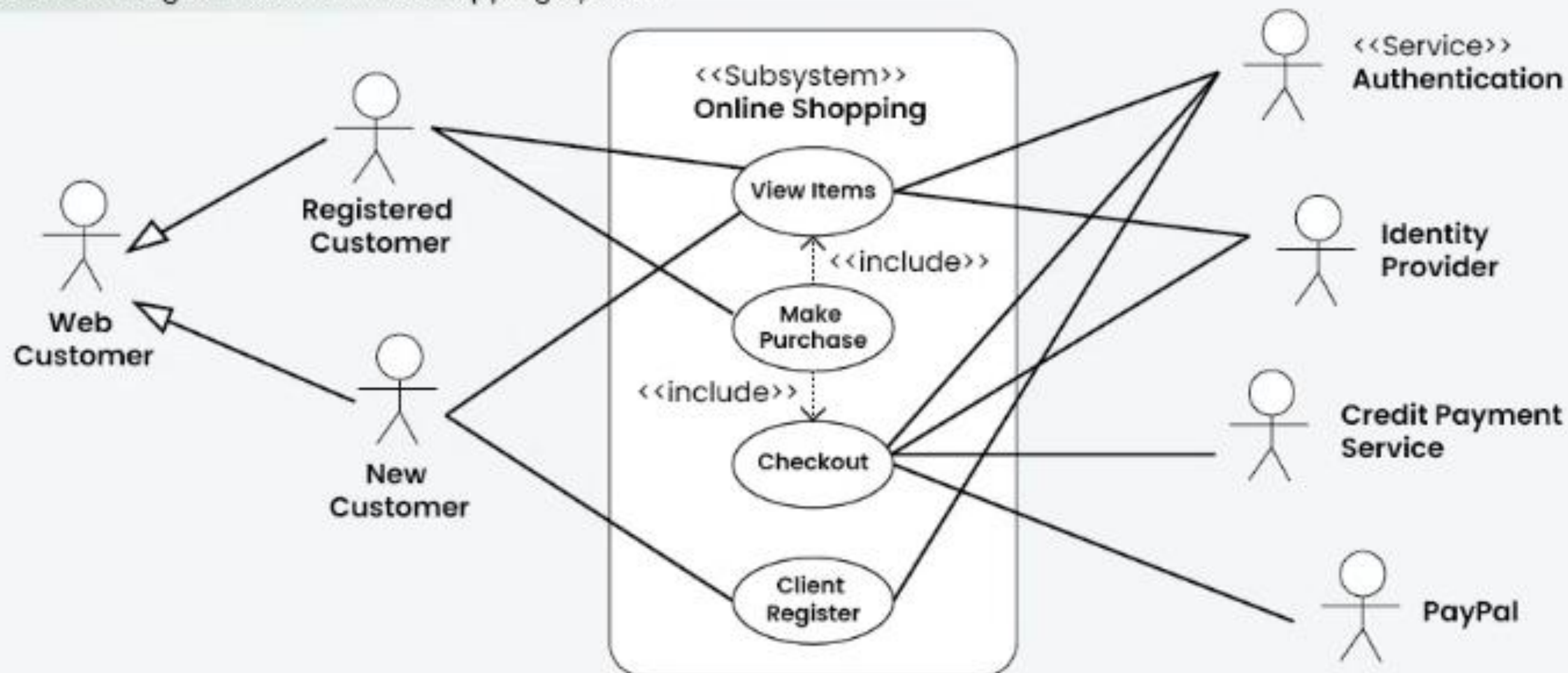
How to draw a Use Case diagram in UML?



- Step 1: Identify Actors
- Step 2: Identify Use Cases
- Step 3: Connect Actors and Use Cases
- Step 4: Add System Boundary
- Step 5: Define Relationships
- Step 6: Review and Refine
- Step 7: Validate

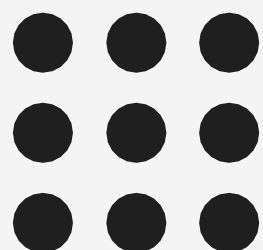
Use case diagram of an Online Shopping System

Use Case diagram of an Online Shopping System



Use Case Diagrams | Unified Modeling Language (UML)





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