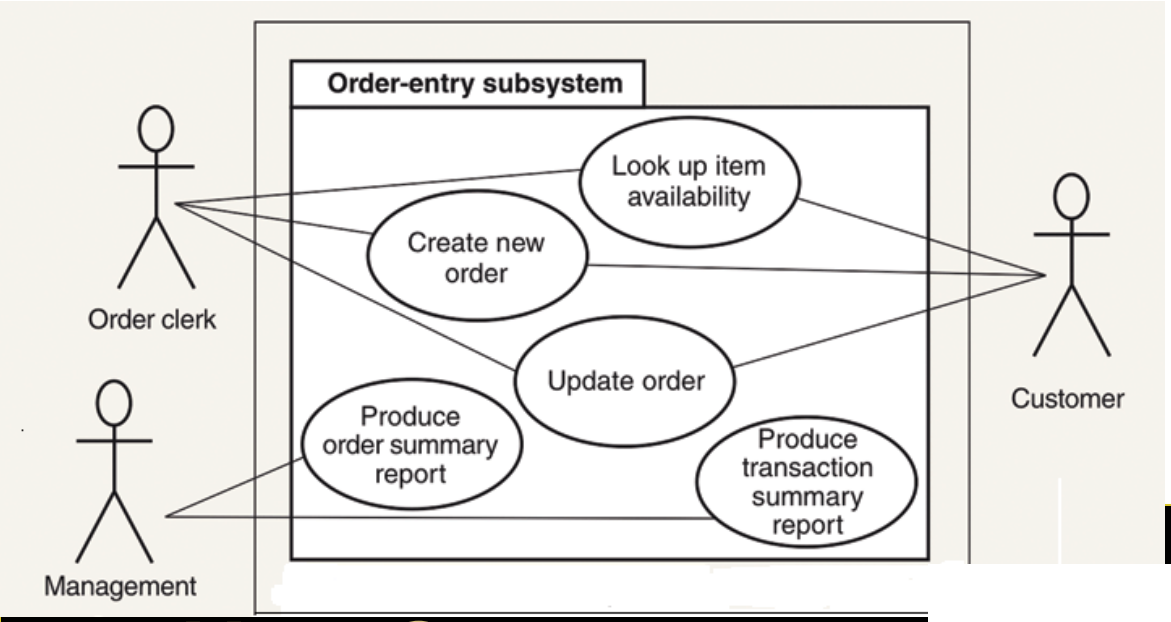
Use Cases

CSCI-4448 - Boese

University of Colorado **Boulder**



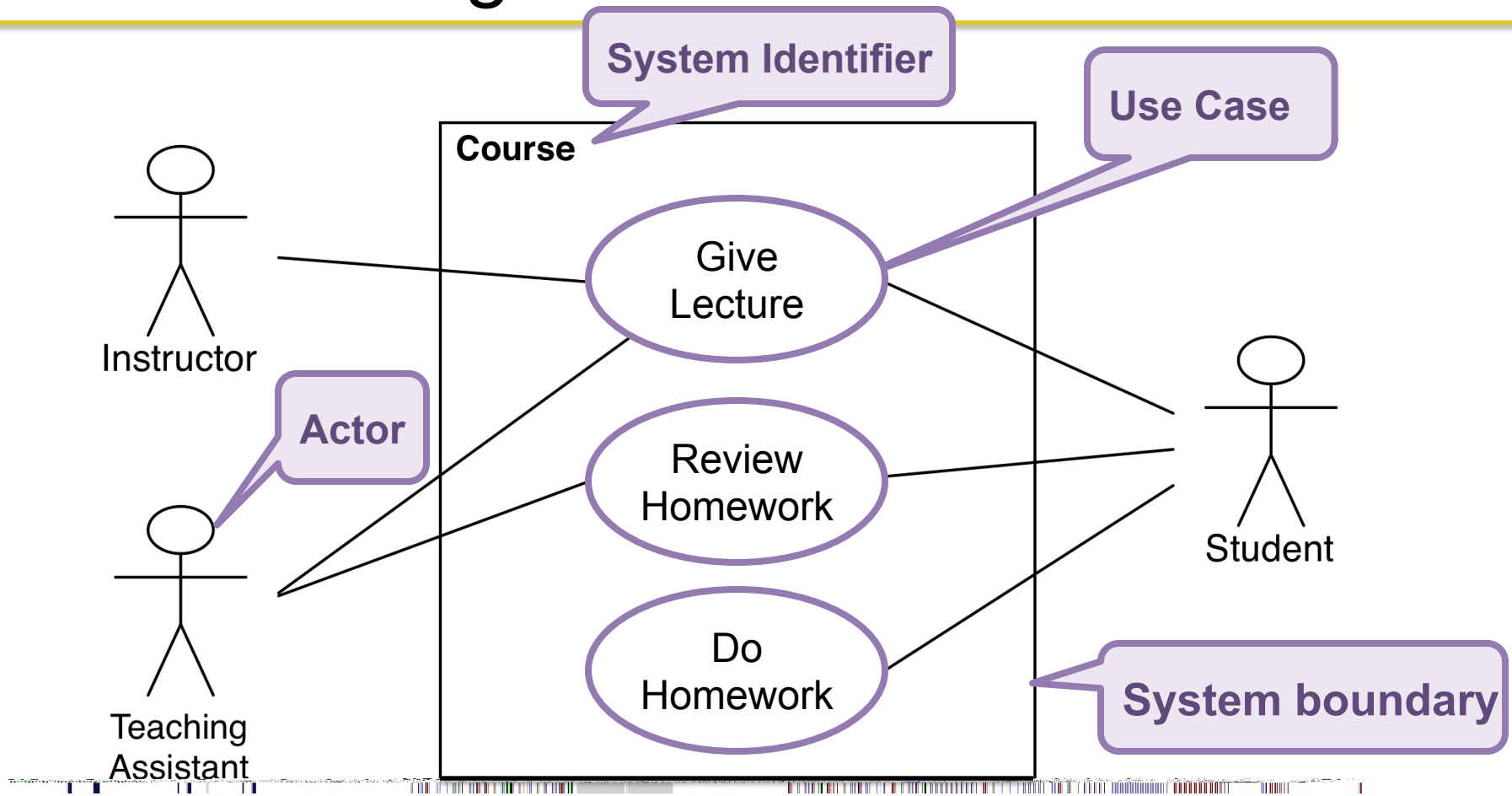
Use Cases Overview

Example Use Case

Use Case ID:	UC-01
Use Case Name:	Search on CCSS
Description:	Teacher can find a passage stimuli and instructions with grading rubrics based on a specific Common Core State Standard.

Actors:	Teachers		
Pre-conditions:	Stimuli Passages and Tasks collection have items in them, and tasks have been associated to stimuli passages. All tasks are tagged to CCSS.		
Post-conditions:	Teacher finds both a stimuli passage and a task to go with it that is tagged for a specific CCSS.		
Frequency of Use:	Daily by teachers		
Flow of Events:		**Actor Action**	**System Response**
	1.	Log in to EQUELLA.	
	2.	Click on Search in navigation menu.	
	3.	Enter a CCSS and click Search button.	List of tasks displayed that are tagged to this standard.
	4.	Click on title of a task.	Access to download instructions with rubrics, and link to the stimuli passage.
	5.		
Variations:	3. Use Browse By CCSS to search for tasks tagged to a specific CCSS.		
Notes and Issues:			
Developer Notes:			

Use case diagrams



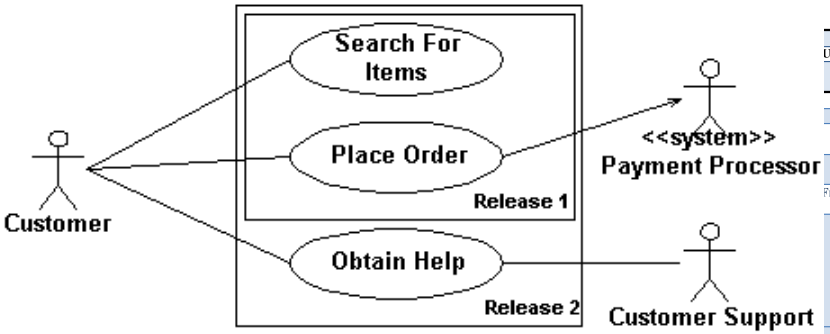
Use case diagrams represent the functionality of the system from the **user's point of view**

Use Cases

Use Cases

- Shows user roles and how they will use the system.
- Objective is to provide an **overview** of the system (including actors and the functions they perform)
- Types
  - Diagrams
  - Text

Use cases are widely regarded as one of the important artifacts needed to successfully develop complex software systems.



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Use Cases

- Why?
  - Plan: *define the scope*
  - Estimate: *estimate efforts and track progress*
  - Analyze: *basis for understanding requirements without knowledge of software design/technology*
  - Architect/Design: *trace design to requirements*
  - Test: *basis for acceptance tests*
  - Document: *basis for user documentation*

Use Cases

Identify Scenarios of usage (user/actor stories):

- Examples of typical user or actor interactions with the system.
- Defined by a flow of events
- Scenarios are user driven and not system driven (user perspective)
- Example: Medical Clinic Software:
  - *Scenario 1: Patient contacts the scheduler to make an appointment. He finds out that the office is closed.*
  - *Scenario 2: Patient contacts the doctor to request medication, the doctor responds to him with the name of the medication.*

Requirements Elicitation Process

Identify Use Cases:

- Once scenarios of usage are identified, use cases are defined to model the main user-based processes of the system.
- Example: Medical Clinic Software
  - *"Make an Appointment" use case*
  - *"Request Medication" use case*

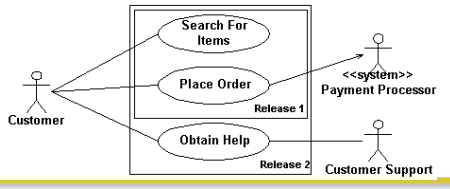
Use Case Diagrams

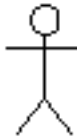
Use Case Diagrams

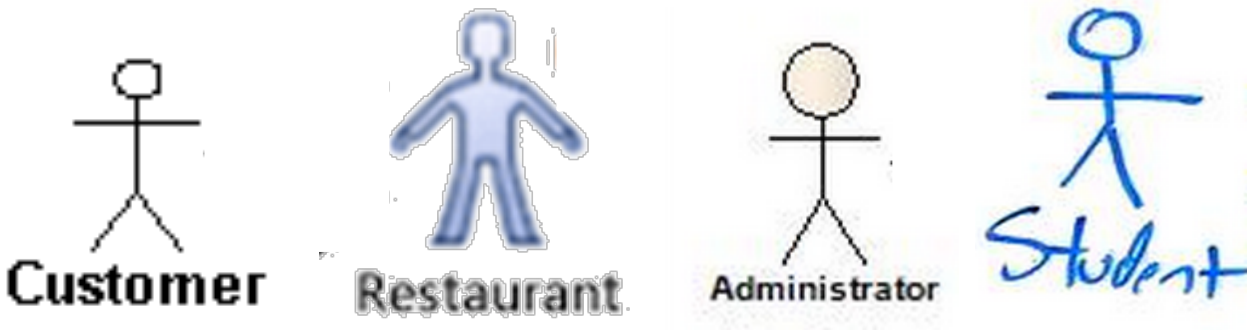
Use Case Diagrams

- 4 Main Components
  - Actors
  - The System
  - Use Cases (Services)
  - Relationships between these elements

Use Case Diagrams - Components

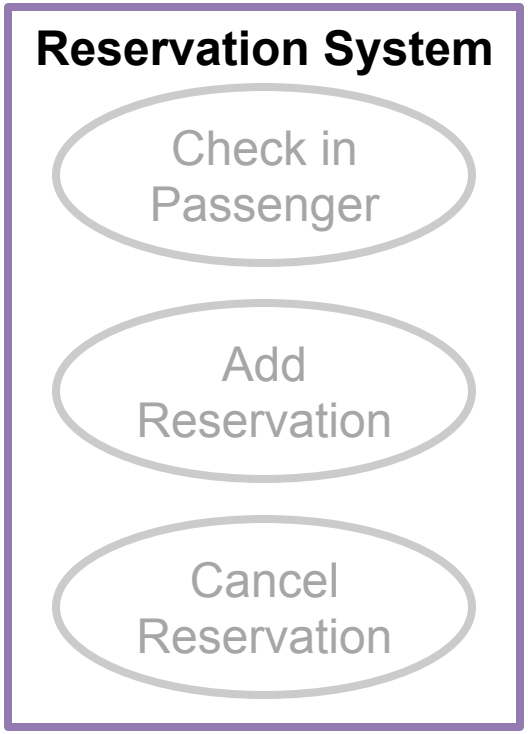


- **Actors** 
  - Noun
  - External entity - Person, organization, device, or external software component that **interacts with your system**
  - E.g., Customer, student, teacher, customer support, the system, inspector, supervisor, manager, ISP, 3rd party software, physical environment (e.g, Weather)

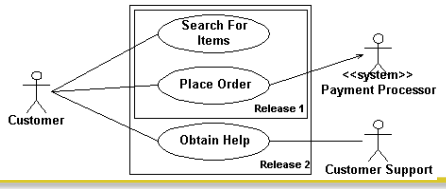


Use Case Diagrams - Components

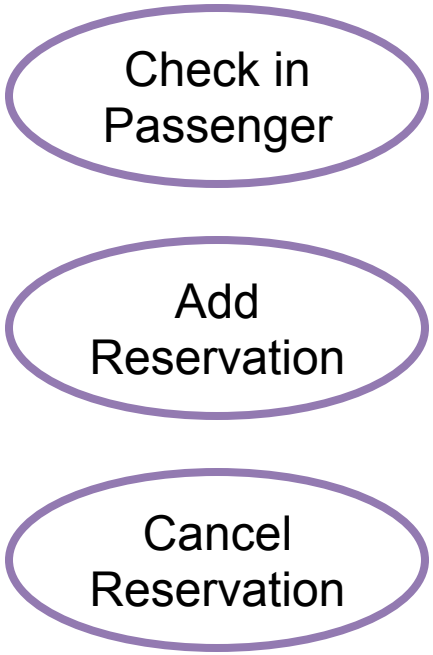
- **System**
  - Noun
  - Rectangle represents system boundary
  - What you are developing.
    - *Small software component, whose actors are just other software components*
    - *Complete application*
    - *Large distributed suite of applications deployed over many computers and devices*
  - E.g., Meal Ordering Website, Meal Delivery Business, Website Version 2.



Use Case Diagrams - Components

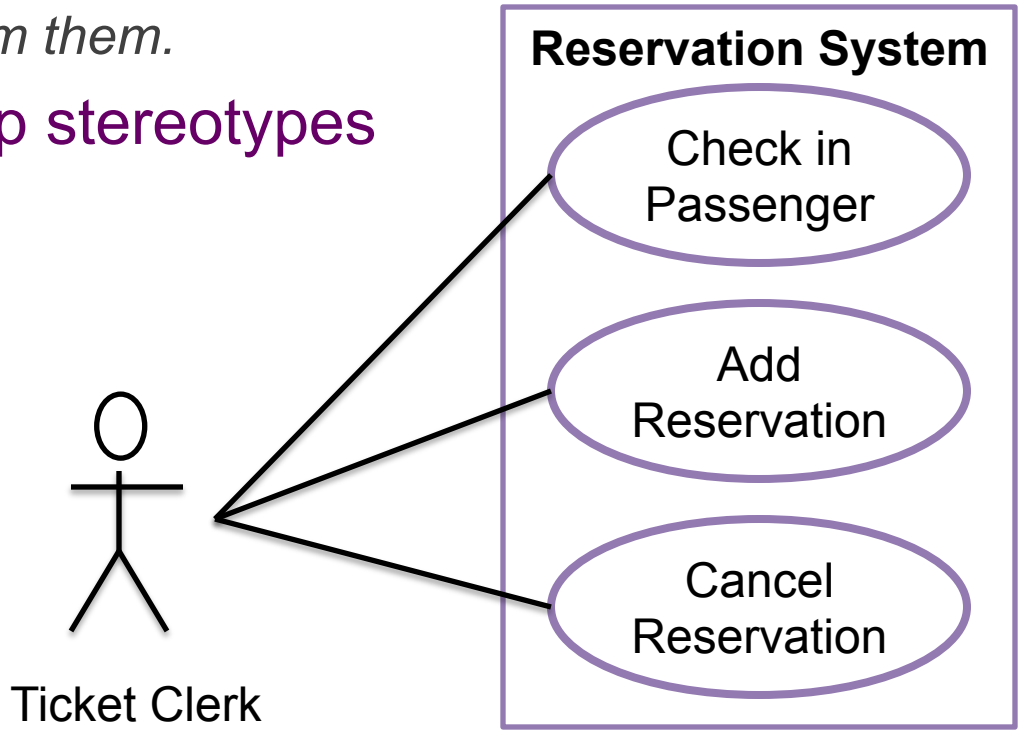


- **Use Cases (Services)**
  - Verb - Noun
  - **Actions** that are performed by one or more actors in the pursuit of a particular goal.
  - Functionality provided by the system.
  - E.g., Order Meal, Update Menu, Process Payment, Check in Passenger, Add Reservation, Cancel Reservation.

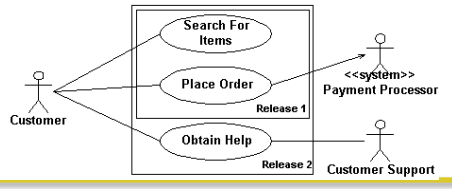


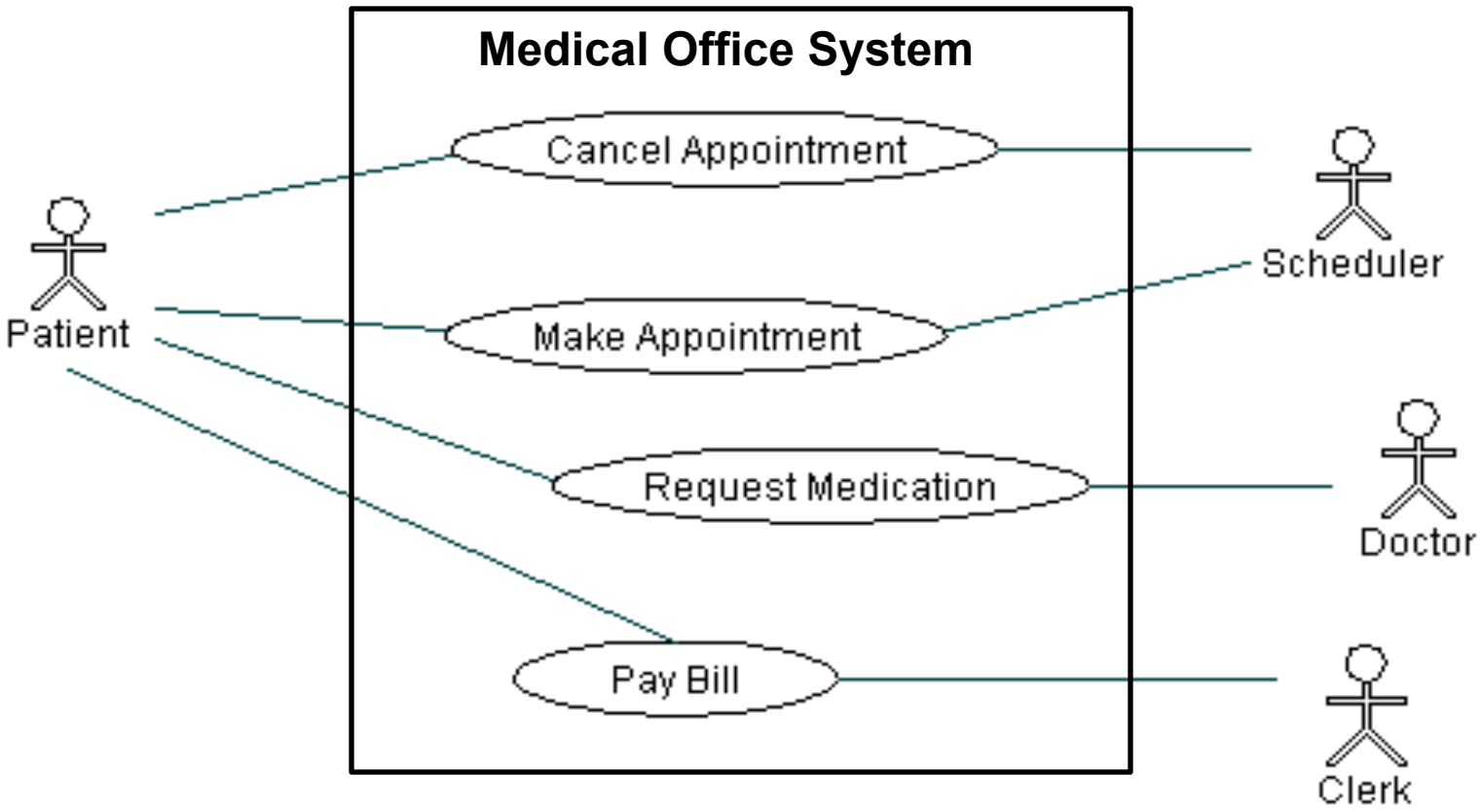
Use Case Diagrams - Components

- **Relationships**
  - Line
    - *Lines to associate the use case services to the actors who perform them.*
  - Lines with relationship stereotypes
    - *Generalization*
    - *Include*
    - *Extend*

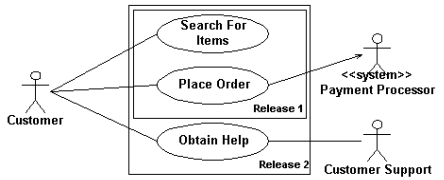


Use Case Diagrams - Example

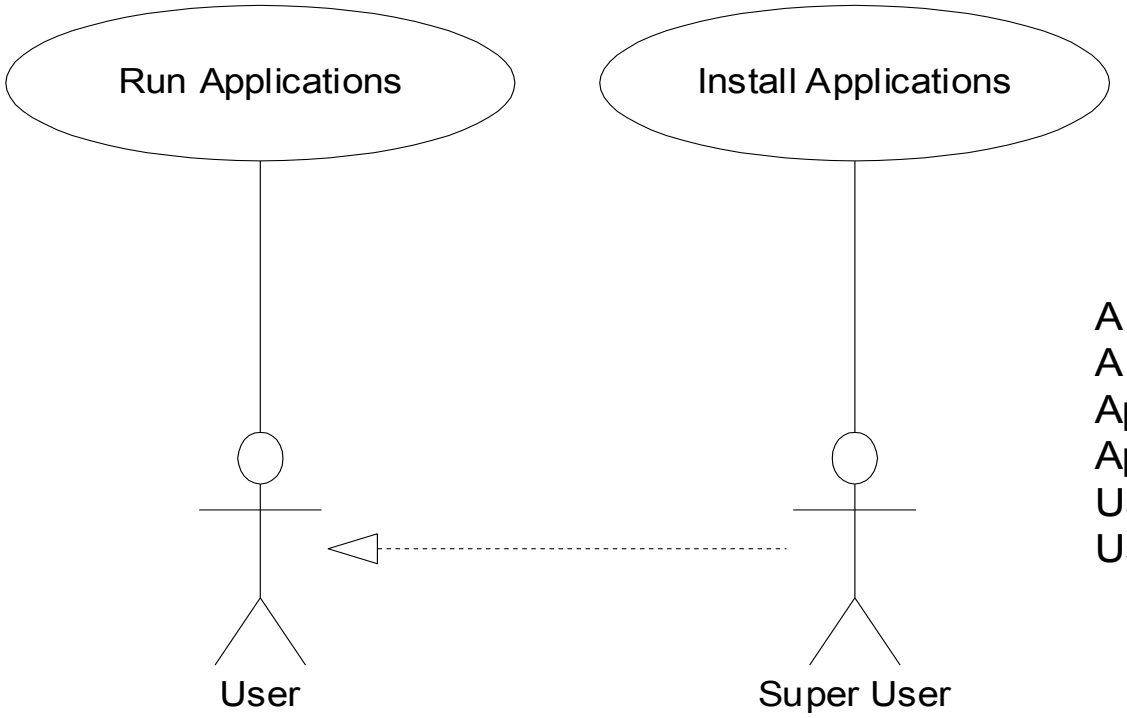




Use Case Diagram Rules

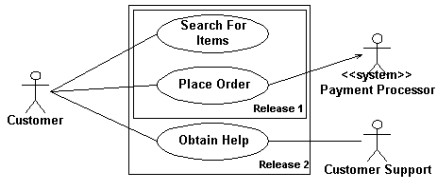


- The only valid relationship between an actor and another actor is *generalization*



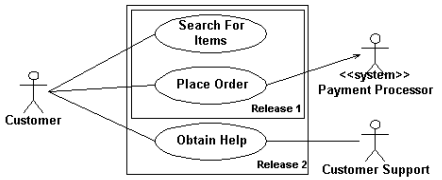
A User can Run Applications. A Super User can Install Applications and Run Applications, since a Super User is a specialization of User.

Use Case Diagram Rules

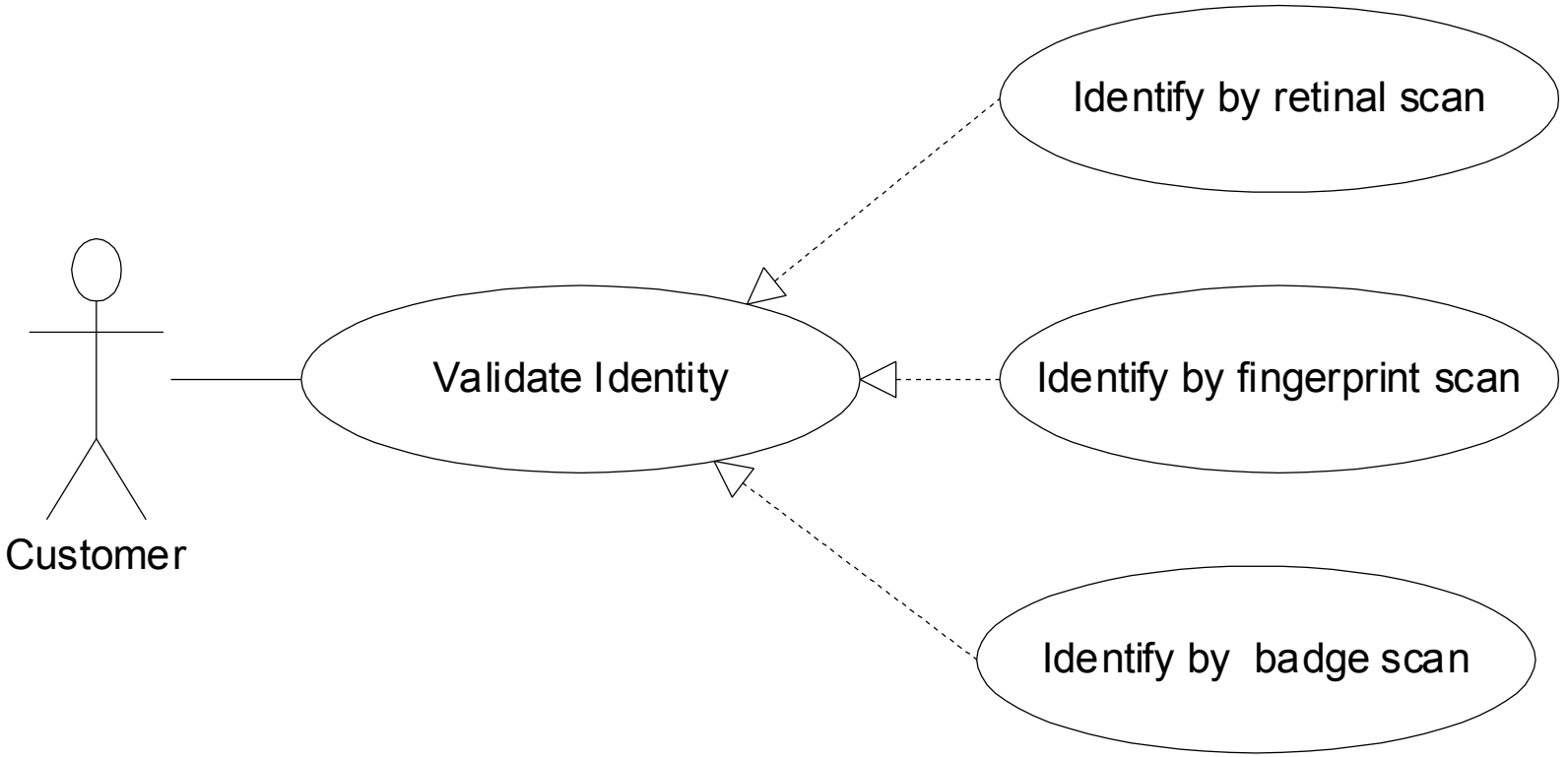


- Use only the following relationships *between use cases*
  - ***generalization***
    Show that a use case is a specialization of another use case
  - ***include***
    Show that the process of doing use case X also requires doing a use case Y.
  - ***extends***
    Show that one use case conditionally augments (or extends) the behavior of another use case. A variant.

Use Case Diagram Rules



- the ***generalization*** relationship



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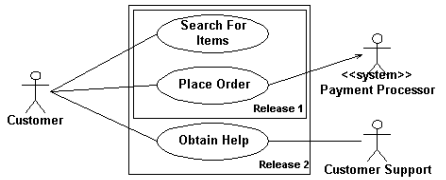

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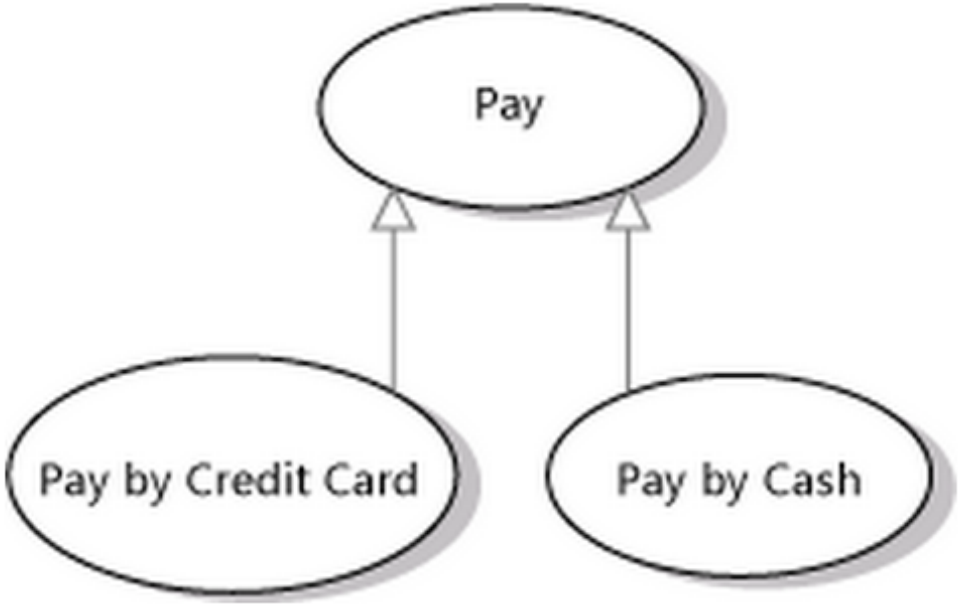

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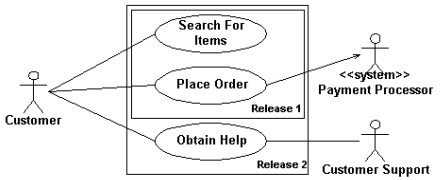
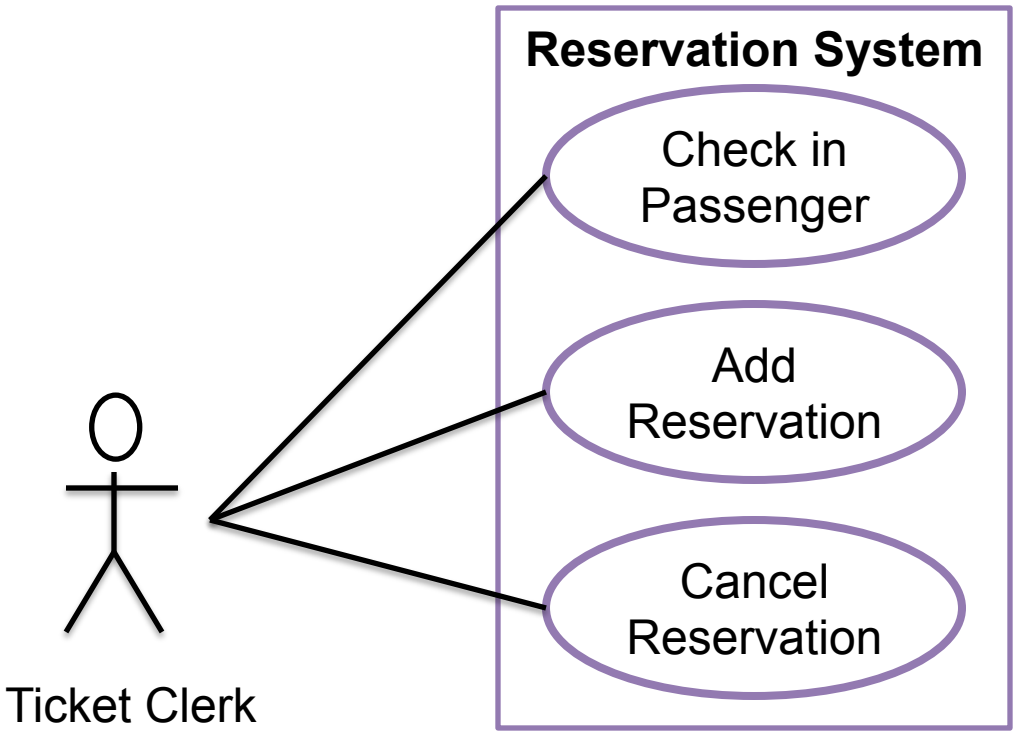
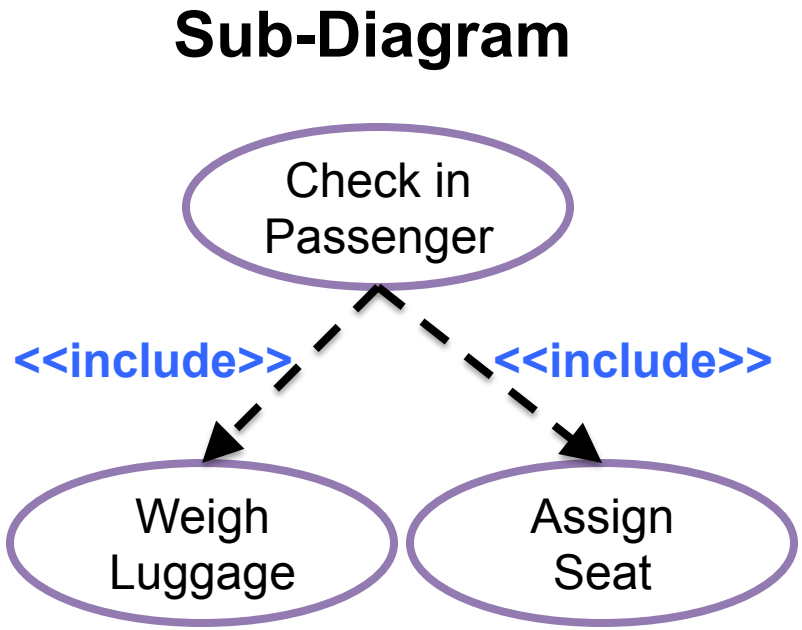


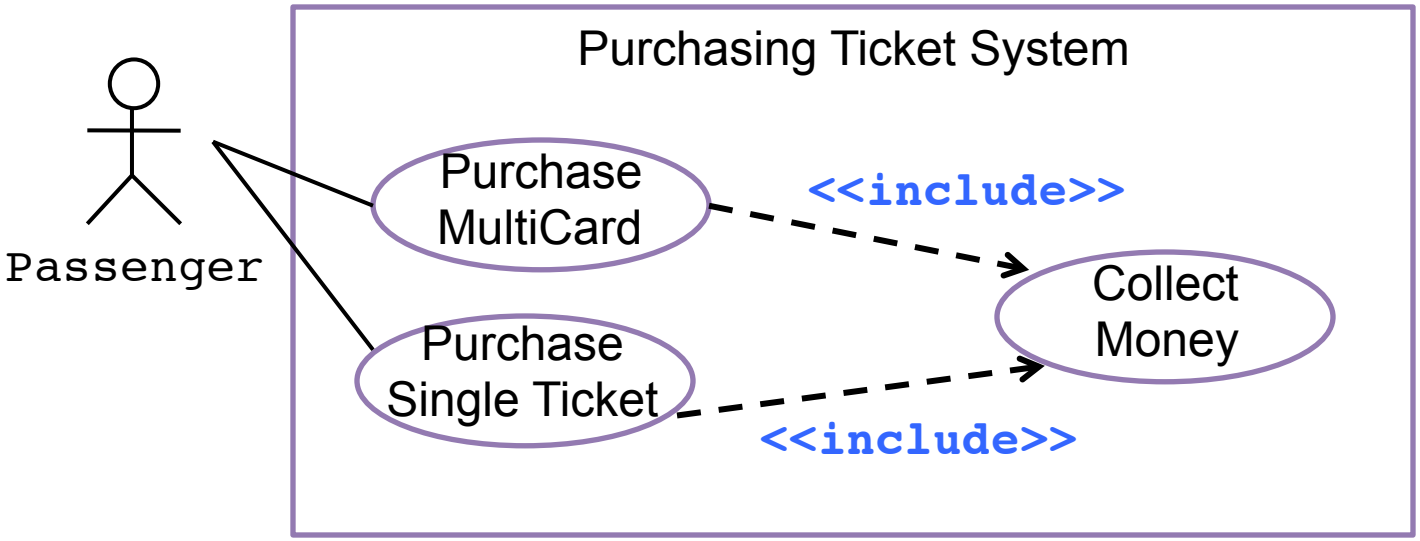
- The ***<<include>>*** relationship





The <<*includes*>> Relationship

- `<<include>>` relationship represents common functionality needed in more than one use case
- `<<include>>` behavior is factored out for reuse, not because it is an exception
- The direction of a `<<include>>` relationship is to the using use case (unlike the direction of the `<<extends>>` relationship).



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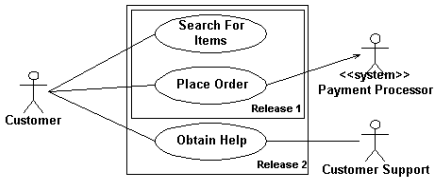
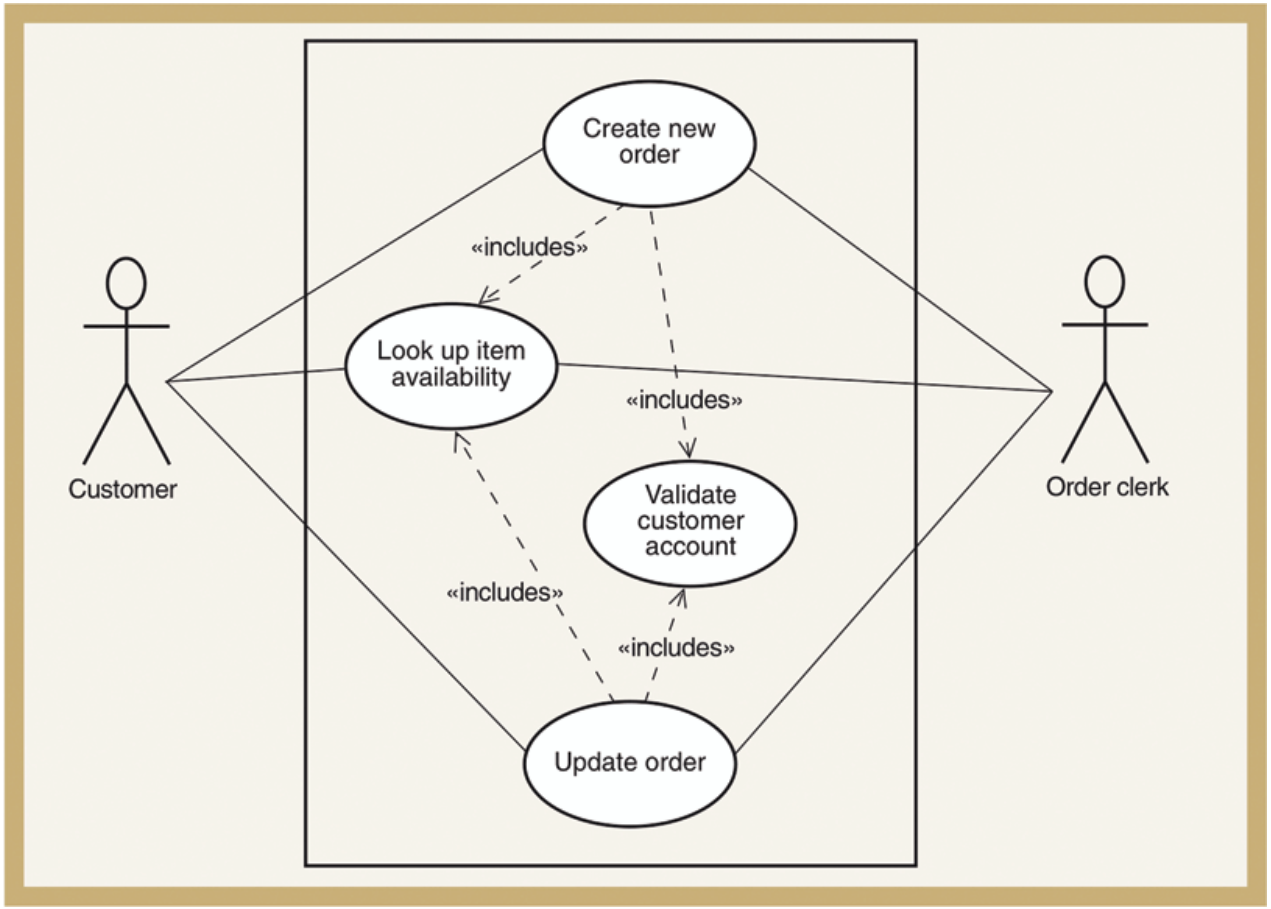


- The ***include*** relationship



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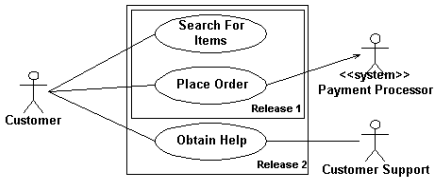
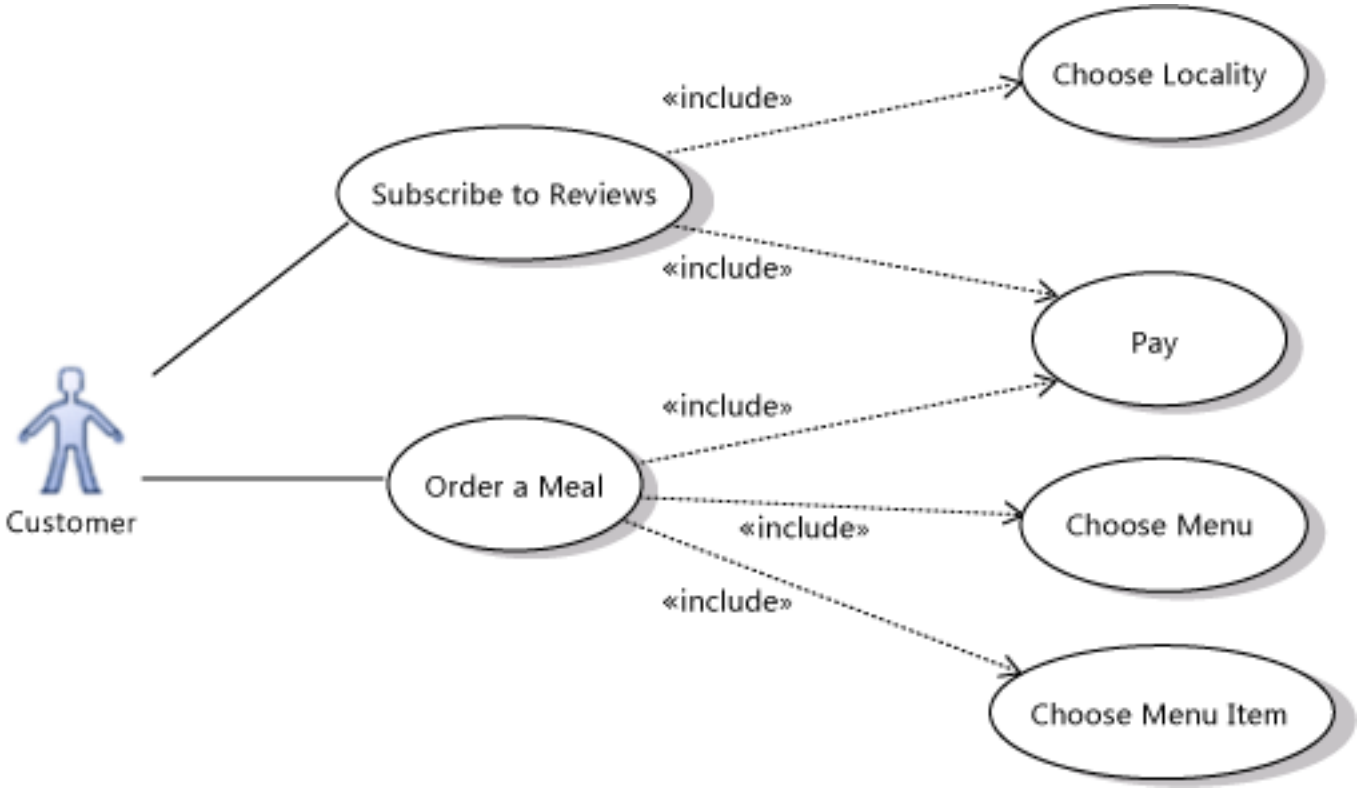


- *The **include** relationship*



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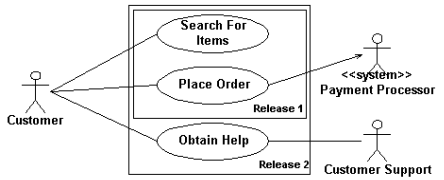
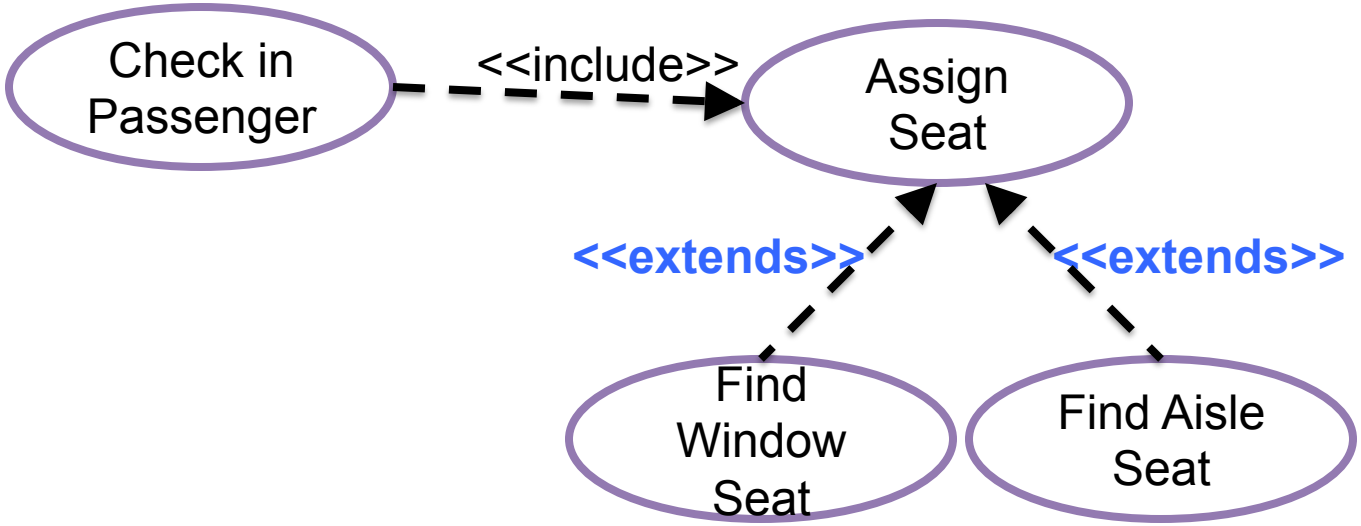
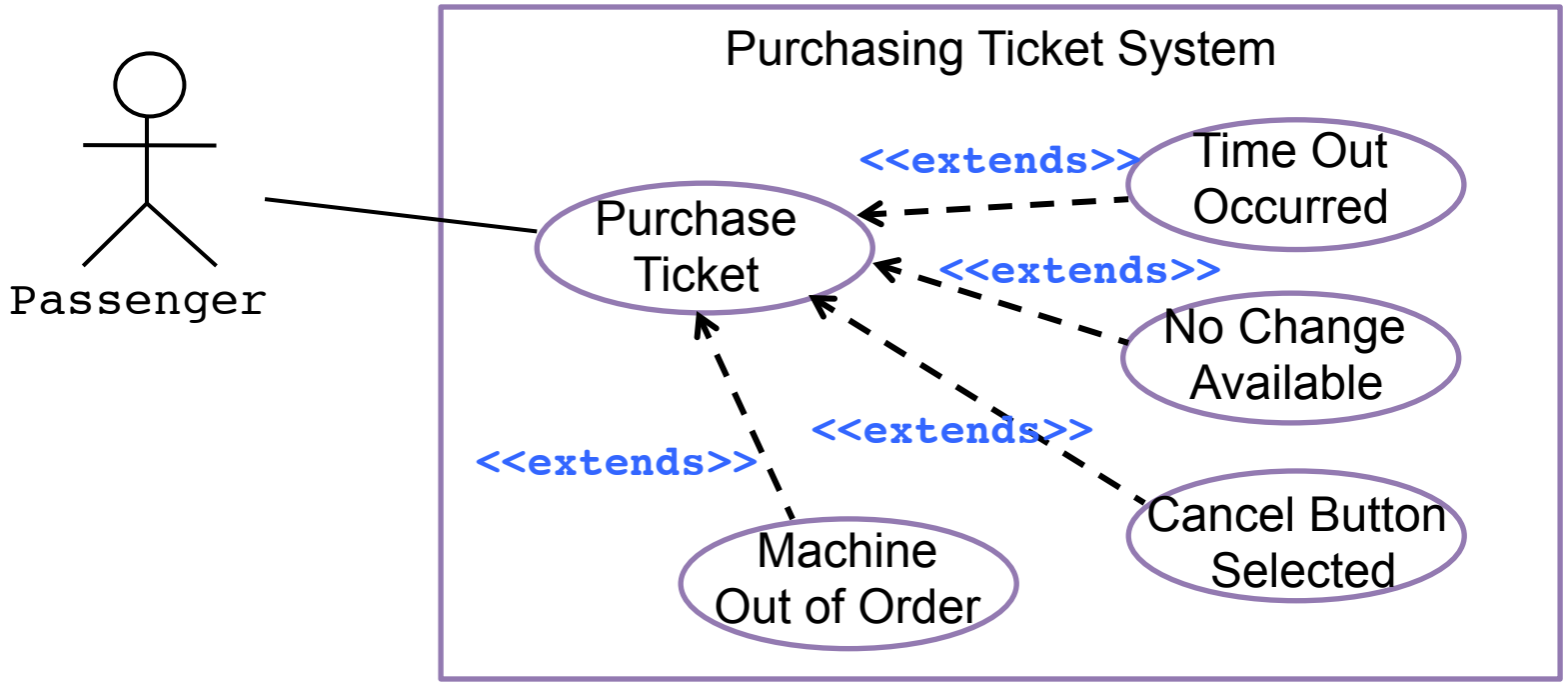


- *The **extends** relationship*

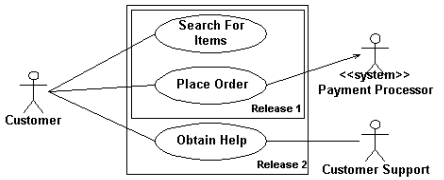


The <<*extends*>> Relationship

- The extension event flows are factored out of the main event flow for **clarity**
- The **direction** of an `<<extends>>` relationship is to the extended use case
- Use cases representing exceptional flows can extend more than one use case.



Use Case Diagrams - Example



system name
Clinic
system boundary
Cancel Appointment
Make Appointment
Check Patient Record
Request Medication
Defer Payment
Pay Bill
Extension points
More Treatment
Bill Insurance
<<include>>
<<include>>
<<extend>>
include use case
extend use case
extension point
child use case
generalization
Patient
Scheduler
Doctor
Clerk

Use Case Document Templates

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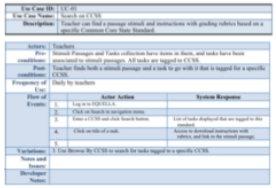
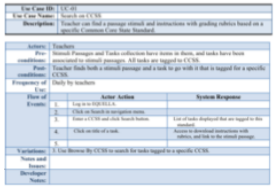
Use Case Documents



Use Case Identification

- **Use Case ID**
  Functional requirements can be traced back to a labeled use case.
- **Use Case Name**
  These reflect the tasks the user needs to be able to accomplish using the system. Include an action verb and a noun.
  Some examples:
  - View part number information.
  - Manually mark hypertext source and establish link to target.
- **Description**
  Description of the reason for and outcome of this use case.

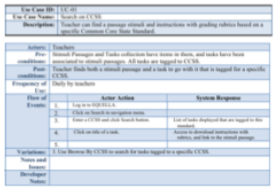
Use Case Documents



Use Case Details

- **Actors**
  - *Participating actors using the system*
- **Pre-Conditions**
  Tasks the actor needs to be able to accomplish using the system before starting this use case. Include an action verb and a noun.
  Examples:
  - *User's identity has been authenticated via SSO.*
  - *There are items in the system to search on based on the search terms.*
- **Post-Conditions**
  Describe the state of the system at the conclusion of the use case execution.
  Examples
  - *Teacher has downloaded syllabus.*
  - *New item is created with instructions uploaded and tagged to common core standards*

Use Case Documents



- **Frequency of Use**

  How often do the actors execute this use case?

  - *Use this knowledge to help prioritize this use case!*

- **Flow of Events**

  List of steps the actors go through to execute the use case.

  - *Designate what the user does vs the system's response.*

- **Variations**

  Variations on the flow (instead of creating separate use cases).

- **Notes and Issues**

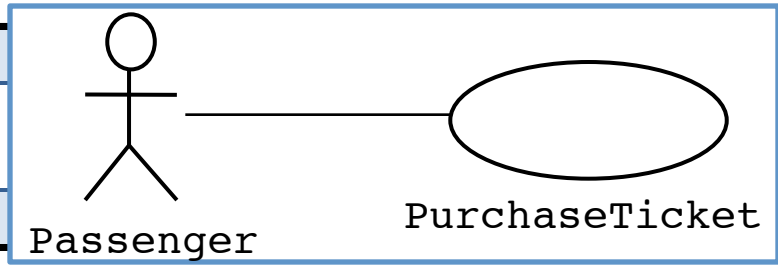
  Any notes or problems.

- **Developer Notes**

  Notes specifically for the developers.

Example Use Case

Use Case ID:	UC-02
Use Case Name:	Purchase Ticket
Description:	Passenger can purchase a ticket



Actors:	Passenger		
Pre-conditions:	Passenger stands in front of ticket distributor. Passenger has sufficient money to purchase ticket.		
Post-conditions:	Passenger has ticket.		
Frequency of Use:	Frequently throughout the day by passengers.		
Flow of Events:		**Actor Action**	**System Response**
	1	Select number of zones to travel.	Ticket Distributor displays the amount due.
	2	Insert money, at least the amount due.	Ticket Distributor returns change. Ticket Distributor issues ticket.
	3	Take ticket from Ticket Distributor.	
Variations:	2. User does not have enough money.		
Notes and Issues:			
Developer Notes:			

Another Example Template

USE CASE <Use case code>	<Use case name>	Date:	<date of the last change >
		Version:	<use case version>

Description:	<use case brief description>	
User priority:	<development priority requested set by users>	
Performance:	<requested performance>	
Primary actor:	<primary actor name> <primary actor interest in this service>	
Secondary actor:	<secondary actor name> < secondary actor interest in this service>	
Preconditions:	<description of the conditions which must be fulfilled before the use case can be executed>	
Post-condition	on success:	<description of the conditions that describe the state of a system after that this use case is successfully completed>
	on failure:	<description of the conditions that describe the state of a system after that this use case is unsuccessfully completed>
Trigger:	<description of the event that fires the use case>	

MAIN SCENARIO		
1.	<actor/ system>	<action description>
2.	<actor/ system>	<action description>
…	<actor/ system>	<action description>
n.	System:	Terminates use case successfully.
ALTERNATIVE SCENARIO: <condition which leads to this alternative scenario>		
h.1.	<actor/ system>	<action description>
		<action description>
h.n.	System:	Resumes use case at point x.y.
EXCEPTION SCENARIO: <condition which leads to this exception scenario>		
i.1.	<actor/ system>	<action description>
		<action description>
i.m.	System:	Terminates use case unsuccessfully.
ANNOTATION		
	<extra information>	