The User Requirements – User Stories & Use cases

LECTURE # 6
Chapter 6,7,8 – Karl Wiegers
Chapter 5 & 6 - Reference

User Requirements

- A necessary prerequisite to designing software that meets user needs is to understand what the users intend to do with it.
- User Requirements lie between the business requirements that set the objectives for the project and the functional requirements that describe what developers must implement.
- Two techniques for exploring user requirements: use cases and user stories.

Use Cases & User Stories

- A *use case* describes a sequence of interactions between a system and an external actor.
  - It results in the actor being able to achieve some outcome of value.

Sample use cases from various applications

Application	Sample use case
Airport check-in kiosk	Check in for a Flight Print Boarding Passes Change Seats Check Luggage Purchase an Upgrade
Online bookstore	Update Customer Profile Search for an Item Buy an Item Track a Shipped Package Cancel an Unshipped Order

- As used on agile development projects, **a user story** is a "short, simple description of a feature told from the perspective of the person who desires the new capability, usually a user or customer of the system"

Use Cases & User Stories

- User stories often are written according to the following template, although other styles also are used:
  - *As a <type of user>, I want <some goal> so that <some reason>*

Some sample use cases and corresponding user stories

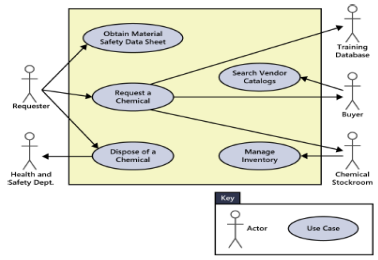
Application	Sample use case	Corresponding user story
Airport check-in kiosk	Check in for a Flight	As a traveler, I want to check in for a flight so that I can fly to my destination.
Accounting system	Create an Invoice	As a small business owner, I want to create an invoice so that I can bill a customer.
Online bookstore	Update Customer Profile	As a customer, I want to update my customer profile so that future purchases are billed to a new credit card number.

- With use cases, the next step is for the BA to work with user representatives to understand how they imagine a dialog taking place with the system to perform the use case.

Use case Modeling

- **Use case:** A typical sequence of actions that an actor performs in order to complete a given task
- **Actor:** Any agent that interact with the system to achieve a useful goal.
  - **Primary Actor:** The primary actor initiates a use case.
  - **Secondary Actor:** The secondary actor somehow participates in the successful completion of the use case.
- **Use-case diagram**: A diagram that depicts the interactions between the system and external systems and users.
- **Use-case narrative**: A textual description of the business events and how the user will interact with the system to accomplish the task.

Use Case Diagram illustration



Partial use case diagram for the Chemical Tracking System.

Use case diagrams & Scenarios

- Use case diagrams are closely connected to scenarios. A **scenario** is an example of what happens when someone interacts with the system.

Here is a scenario 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. "*

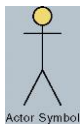
Use case Diagrams & Scenarios

- Use case diagrams are closely connected to scenario.
- A scenario is an example of what happens when someone interacts with the system.
- A scenario is a description of single instance of usage of the system.
- A use case is therefore a collection of usage scenarios and scenario is a specific instance of a use case.
- Example: A patient calls the clinic to make an appointment for yearly checkup. The receptionist finds the nearest empty slot in the appointment book and schedules the appointment for that time slot.

Basic Use-Case Symbols

- **Use case** – subset of the overall system functionality
  - Represented graphically by a horizontal ellipse with the name of the use case appearing above, below, or inside the ellipse.

- **Actor** – anything that needs to interact with the system to exchange information.
  - Could be a human, an organization, another information system, an external device, or even time.
- **Temporal event** – a system event triggered by time.
  - The actor is time.



Use Case Diagrams

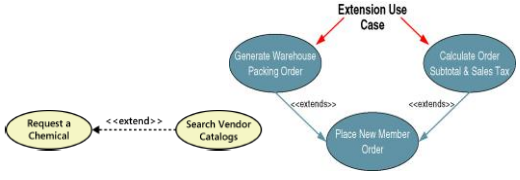
- To define system boundary (subject), actors, and use cases
  - Subject could be: a physical system, a component, a subsystem, a class
- To structure and relate use cases
  - Associate actors with use cases
  - Include relation
  - Extend relation
  - Generalization (of actors and use cases)

Use Case Association Relationship

- **Association** – a relationship between an actor and a use case in which an interaction occurs between them.
  - Association modeled as a solid line connecting the actor and the use case.
  - Association with an arrowhead touching the use case indicates that the use case was initiated by the actor.
  - Association lacking arrowhead indicates a receiver actor.
  - Associations may be bidirectional or unidirectional.

Use Case- Extends Relationship

- **Extension use case** – a use case consisting of steps extracted from a more complex use case in order to simplify the original case and thus extend its functionality.
- Relationship between the extension use case and the use case it is extending is called an *extends* relationship. Optional Functionality
  - Represented as an arrow headed line beginning at the extension use case and point to the use case it is extending.
  - Each extends relationship line is labeled "<<extends>>."

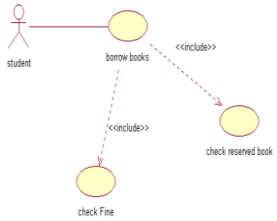


Use Case - Uses Relationship

*Includes: Inclusions allow one to express commonality between several different use cases

Abstract use case – a use case that reduces redundancy among two or more other use cases by combining the common steps found in those cases.

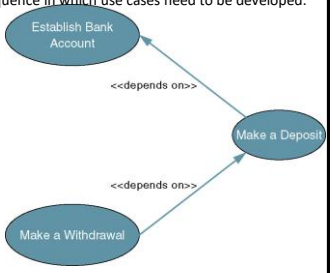
- An abstract case is available for use by any other use case that requires its functionality.
- Relationship between the abstract use case and the use case that uses it is called a *uses* (or *includes*) relationship.
- Depicted as an arrowheaded line beginning at the original use case and pointing to the use case it is using.
- Each uses relationship line is labeled "<<uses>>."



Use Case Depends On Relationship

Depends On – a use case relationship that specifies which other use cases must be performed before the current use case.

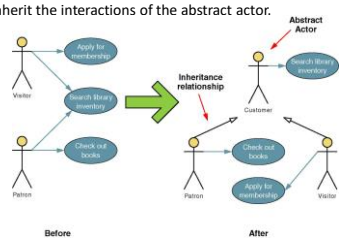
- Can help determine sequence in which use cases need to be developed.
- Depicted as an arrowheaded line beginning at one use case and pointing to a use case it is dependent on.
- Each depends on relationship line is labeled "<<depends on>>."



Use Case Inheritance Relationship

Inheritance – a use case relationship in which the common behavior of two actors initiating the same use case is extrapolated and assigned to a new *abstract* actor to reduce redundancy.

- Other actors can inherit the interactions of the abstract actor.
- Depicted as an arrowheaded line beginning at one actor and pointing to the abstract actor whose interactions the first actor inherits.



Use Case - Relationships and its Types

- Generalization:
- The child use case inherits the behaviour and meaning of the parent use case.
- The child may add to or override the behaviour of its parent.
- Notation & example:

Sample High-Level Version of a Use-Case Narrative

Member Services System

Author (s): ❶ **Date:** ❷ **Version:** ❸

Use-Case Name:	Place New Order ❹	**Use-Case Type** **Business Requirements:** ❺
Use-Case ID:	MSS-BUC002.00 ❻	
Priority:	High ❼	
Source:	Requirement — MSS-R1.00 ❽	
Primary Business Actor:	Club member ❾	
Other Participating Actors:	• Warehouse (external receiver) • Accounts Receivable (external server) ❿	
Other Interested Stakeholders: ⓫	• Marketing — Interested in sales activity in order to plan new promotions. • Procurement — Interested in sales activity in order to replenish inventory. • Management — Interested in order activity in order to evaluate company performance and customer (member) satisfaction.	
Description: ⓬	This use case describes the event of a club member submitting a new order for SoundStage products. The member's demographic information as well as his or her account standing is validated. Once the products are verified as being in stock, a packing order is sent to the warehouse for it to prepare the shipment. For any product not in stock, a back order is created. On completion, the member will be sent an order confirmation.	

Sample Expanded Version of a Use-Case Narrative

Member Services System

Author (s): _____ **Date:** _____ **Version:**

Use-Case Name:	Place New Order	**Use-Case Type** **Business Requirements:** ⓚ
Use-Case ID:	MSS-BUC002.00	
Priority:	High	
Source:	Requirement — MSS-R1.00	
Primary Business Actor:	Club member	
Other Participating Actors:	• Warehouse (external receiver) • Accounts Receivable (external server)	
Other Interested Stakeholders:	• Marketing — Interested in sales activity in order to plan new promotions. • Procurement — Interested in sales activity in order to replenish inventory. • Management — Interested in order activity in order to evaluate company performance and customer (member) satisfaction.	
Description:	This use case describes the event of a club member submitting a new order for SoundStage products. The member's demographic information as well as his or her account standing is validated. Once the products are verified as being in stock, a packing order is sent to the warehouse for it to prepare the shipment. For any product not in stock, a back order is created. On completion, the member will be sent an order confirmation.	
Precondition: ❶	The party (individual or company) submitting the order must be a member.	
Trigger: ❷	This use case is initiated when a new order is submitted.	

continued

Sample Expanded Version of a Use-Case Narrative (cont)

Typical Course of Events:	Actor Action	System Response
	Step 1: The club member provides his or her demographic information as well as order and payment information.	**Step 2:** The system responds by verifying that all required information has been provided. **Step 3:** The system verifies the club member's demographic information against what has been previously recorded. **Step 4:** For each product ordered, the system validates the product identity. **Step 5:** For each product ordered, the system verifies the product availability. **Step 6:** For each available product, the system determines the price to be charged to the club member. **Step 7:** Once all ordered products are processed, the system determines the total cost of the order. **Step 8:** The system checks the status of the club member's account. **Step 9:** The system validates the club member's payment if provided. **Step 10:** The system records the order information and then releases the order to the appropriate distribution center (warehouse) to be filled. **Step 10:** Once the order is processed, the system generates an order confirmation and sends it to the club member.

continued

Sample Expanded Version of a Use-

Alternate Courses:	**Alt-Step 2:** The club member has not provided all the information necessary to process the order. The club member is notified of the discrepancy and prompted to resubmit. **Alt-Step 3:** If the club member information provided is different from what was previously recorded, verify what was recorded is current, then update the club member information accordingly. **Alt-Step 4:** If the product information the club member provided does not match any of SoundStage's products, notify the club member of the discrepancy and request clarification. **Alt-Step 5:** If the quantity ordered of the product is not available, a back order is created. **Alt-Step 8:** If the status of the club member's account is not in good standing, record the order information and place it in hold status. Notify the club member of the account status and the reason the order is being held. Terminate use case. **Alt-Step 9:** If the payment the club member provided (credit card) cannot be validated, notify the club member and request an alternative means of payment. If the club member cannot provide an alternate means, cancel the order and terminate the use case.
Conclusion:	This use case concludes when the club member receives a confirmation of the order.
Postcondition:	The order has been recorded and if the ordered products were available, they were released. For any product not available a back order has been created.
Business Rules:	• The club member responding to a promotion or a member using credits may affect the price of each ordered item. • Cash or checks will not be accepted with the orders. If provided, they will be returned to the club member. • The club member is billed for products only when they are shipped.
Implementation Constraints and Specifications:	• GUI to be provided for Member Services associate, and web screen to be provided for club member.
Assumptions:	Procurement will be notified of back orders by a daily report (separate use case).
Open Issues:	1. Need to determine how distribution centers are assigned.

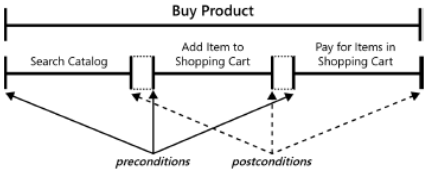
Related use case

- If in a narrative use case, there is a related use case reference, this means that the use case in consideration uses the other case in any of the form of relationship i.e. include, extends, inheritance.
- The used use case can be referred in the steps when its sequence arrives.

Preconditions and Post conditions

- *Preconditions* define prerequisites that must be met before the system can begin executing the use case. The system should be able to test all preconditions to see if it's possible to proceed with the use case.
- *Post conditions* describe the state of the system after the use case executed successfully. Post conditions can describe:
  - Something observable to the user
  - Physical outcomes
  - Internal system state changes

Aligning preconditions and post conditions



Normal Flow, Alternative Flows & Exceptions

- Normal flow are the typical course of events for the use case. These are by default scenarios.
- Normal flows are also called main flows, happy path, sunny day scenario, normal or basic course.
- Then there are secondary scenarios (Can be alternative or exceptions)
  - Alternative flows deliver the same business outcome (sometimes with variations) as the normal flow but represent less common or lower-priority variations in the specifics of the task or how it is accomplished.
  - Conditions that have the potential to prevent a use case from succeeding are called *exceptions*. Exceptions describe anticipated error conditions that could occur during execution of the use case and how they are to be handled

Step 1: identify Business Actors

- When looking for actors, ask the following questions:
  - Who or what provides inputs to the system?
  - Who or what receives outputs from the system?
  - Are interfaces required to other systems?
  - Are there events that are automatically triggered at a predetermined time?
  - Who will maintain information in the system?

Step 2: Identify Business Requirements Use Cases

- During requirements analysis, strive to identify and document only the most critical, complex, and important use cases, often called *essential* use cases.
- When looking for use cases, ask the following questions:
  - What are the main tasks of the actor?
  - What information does the actor need form the system?
  - What information does the actor provide to the system?
  - Does the system need to inform the actor of any changes or events that have occurred?
  - Does the actor need to inform the system of any changes or events that have occurred?

Sample Use-Case Glossary

Use-Case Name	Use-Case Description	Participating Actors and Roles
Submit Subscription Order	This use case describes the event of a potential member requesting to join the club by subscribing. ("Take any 12 CDs for one penny and agree to buy 4 more at regular prices within two years.")	• Potential member (primary business) • Distribution Center (external receiver)
Submit Subscription Renewal Order	This use case describes the event of a past member requesting to rejoin the club by subscribing. ("Take any 12 CDs for one penny and agree to buy 4 more at regular prices within two years.")	• Past member (primary business) • Distribution Center (external receiver)
Submit Member Profile Changes	This use case describes the event of a club member submitting changes to his or her profile for such things as postal address, e-mail address, privacy codes, and order preferences.	• Club member (primary business)
Place New Order	This use case describes the event of a club member submitting an order for SoundStage products.	• Club member (primary business) • Distribution Center (external receiver) • Accounts Payable/Receivable (external server)

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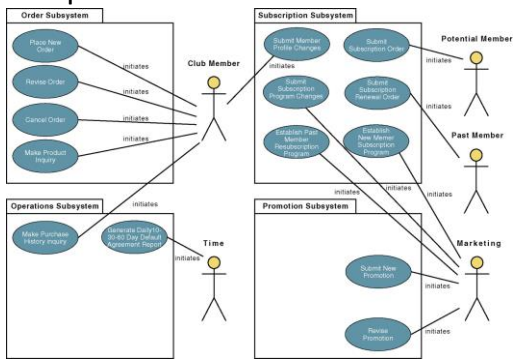
Step 3: Construct Use-Case Model



Step 4: Document Business Requirements Use-Case Narratives

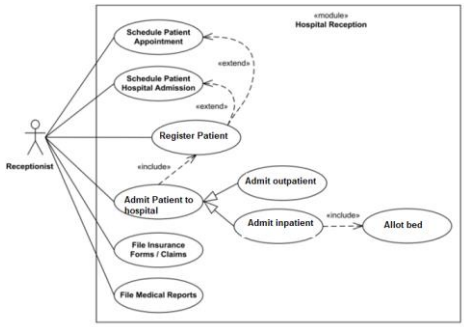
- Document first at high level to quickly obtain an understanding of the events and magnitude of the system.
- Then expand to a fully-documented business requirement narrative.
  - Include the use case's typical course of events and its alternate courses.

Use case traps to avoid

- Too many use cases
- Highly complex use cases
- Including design in the use case
- Including data definition in the use case
- Use cases that user don't understand

Sample Exercise – Use Case

- Draw a use case diagram for the hospital reception system. In this system, receptionist can schedule patient appointment and patient hospital admission after the patient registration. Admitting patient requires registration. Both types of patients i.e. outpatient and inpatient can be admitted in the hospital. Inpatient patients are allotted bed. Receptionist also checks the insurance and claim forms and put them in file. Patient medical report is also filed by the receptionist.



END OF LECTURE # 6

-COMING UP!!!!!!

-Business Rules

-Stakeholder Analysis (contd)

-Requirement Analysis & Specification

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