



Requirements: Use Case Models and Narratives

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Requirements Tool and Technique



- Use Case Model and Narratives
 - Alternative to natural language documents
- Why?
 - Deep understanding of the system and how it works, what it needs to do, relationship between step and actions
 - Process of careful thinking / communication

Some materials here incorporated and adapted from Robert V. Stumpf, Lavette C. Teague, Object-Oriented Systems Analysis and Design With UML, Pearson/Prentice Hall 2005, ISBN 013-143406-3

Overview (continued)

Use case diagrams show the use cases within the scope of the system and the actors in the environment with which each use case is associated.

There is a least one use case narrative for each use case. A use case narrative is a structured narrative showing what the system must do to respond to a specific event.

Overview

(continued)

We write an expanded use case narrative for every use case corresponding to an external event; these are the use cases in which there is input to the system.

An expanded use case narrative captures the sequence of messages from an actor to the system as well as the system's response to each message. The narrative also reveals the structure and content of the messages.

Use Case Heuristic



- There should be COMPLETE set of use cases
 - Nothing missing
 - Consider cases, alternatives, options, errors, recoveries
- But, Don't need to generate lots of similar cases with minor differences.
 - Each case should add new, interesting, information

Use Cases

A **use case** is the sequence of actions which occur when an actor uses a system to complete a process.

A use case is a model of a **requirement**.

A **use case name** is a short phrase beginning with a verb.

Use Cases

Think about the key steps user(s) of the system will do, what they want, how they interact

Use case

Submit Department Class Schedule.
Produce University Class Schedule.

Register for Classes.
Produce Class Roster.

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Identifying Actors

An **actor** is a person, organization, or system which interacts with a system by sending messages to the system or receiving messages from the system.

Actors play **roles** with respect to the system.

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Types of Actors

An **initiating actor** initiates a use case by initiating an **external event**. Thus, initiating actors provide system inputs.

A **participating actor** is involved in a use case but does not initiate it. Thus, participating actors receive system outputs.

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The Use Case Model

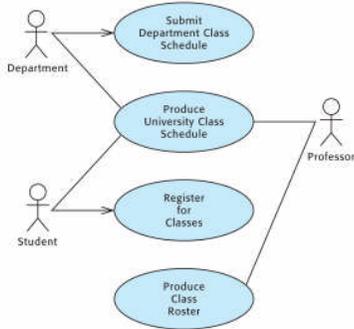
1. A **use case diagram** for the entire system – a **graphic model**
2. One or more **use case narratives** for each use case – descriptions in **text**
 - **high-level**
 - **expanded**

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Use Case Diagram

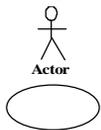
FIGURE 4.2



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Components of a Use Case Diagram



Actor: A named stick figure

Use case: An oval containing the use case name

Association between an initiating actor and a use case: a line with a stick arrowhead

Association between a participating actor and a use case: a line

The system boundary or a subsystem boundary may be shown as a rectangle.

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Show Off Time



- Who here is a good requirements thinker?
 - Willing to answer a few questions
- Let's make a use case diagram
 - Think like a careful customer for a new system....

Expanded Use Case Narrative

FIGURE 4.12

Use case: Register for Classes
Actors: Student
Purpose: Register a student for classes and record the student's schedule.
Overview: A Student requests the sections of class desired for a term. The system adds the Student to each section if there is space available. On completion, the system provides the Student with a list of the classes in which he or she is enrolled.
Type: Essential
Preconditions: Class schedule must exist. Student is known by the system.
Postconditions: Student was enrolled in the section.
Special Requirements: Student must get a system response within 10 seconds.

Flow of Events

ACTOR ACTION	SYSTEM RESPONSE
1. This use case begins when a Student desires to register for classes.	
2. The Student provides the Student's identifier and a list of the department code, course number, and section number for each section desired.	3. Adds the student to the section if there are seats available.
4. On completion of entry of the section requests, the Student indicates that the request is complete.	5. Produces a student class list for the Student.
6. The Student receives the student class list.	

Alternative Flow of Events

Line 3: Invalid department code and course number entered. Indicate error. Return to Step 2.
Invalid section number entered. Indicate error. Return to Step 2.
No seats remaining. Inform the Student. Return to Step 2.

Parts of an Expanded Use Case Narrative

Use Case Name:

Actors:

Purpose:

Overview:

Type: (Essential)

Preconditions:

Postconditions:

Special Requirements:

Flow of Events:

Actor Action

System Response

Alternative Flow of Events:

Terms in an Expanded Use Case Narrative

Precondition: A condition which must be true in order for the use case to begin and produce the desired results.

Postcondition: A condition which must be true after the use case has been completed.

Pre and Post Conditions Precise Systems Thinking



– Precondition

- Assumptions for this part of the system
- Guaranteed to be met by something else
- System set up to be sure they are met
- **No need to check them here**
 - Since they are guaranteed!

– Postcondition

- What is promised to those coming later
- System state: verifications, updates, changes, deletions...
- May be something else's precondition

– When used later on

Terms in an Expanded Use Case Narrative (continued)

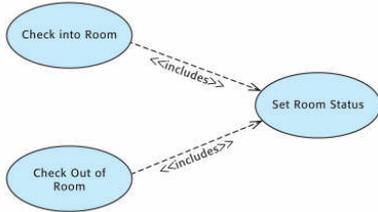
Special Requirements: A requirement which is critical to users' acceptance and use of the system.

Alternative Flow of Events: What the system should do in the case of exceptional conditions or errors.

Associations Between Use Cases

The «includes» association always occurs when the use case which includes it occurs.

FIGURE 4.14



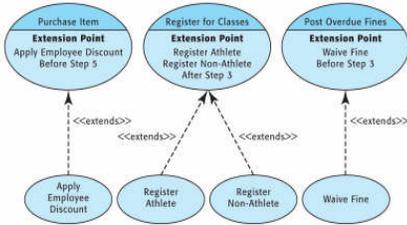
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Associations Between Use Cases (continued)

The occurrence of an «extends» association depends on a **true** condition in the use case which it extends.

FIGURE 4.15



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