Capturing Requirements – Use Case Specifications

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Objectives

- Learn how to **detail a use case**.
- Learn how to **write a use case specification.**

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Use Case Specification

- Known as "Detail a use case"
- Do this after use case modeling/diagram, where you have identified the actors and key use cases
- Consists of at least a use case name and a use case specification
- There's no UML standard for a use case specification.
- We will use a common template – see next slide.
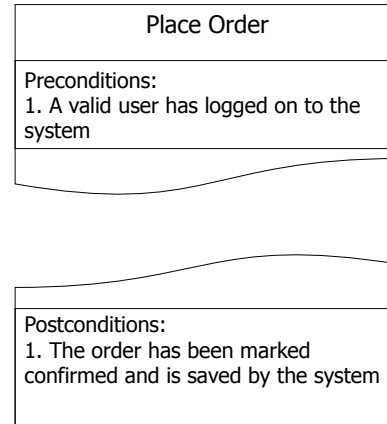
Use Case Specification

This is a very short sample.

use case name	**Use case: PaySalesTax**
use case identifier	**ID**: 1
brief description	**Brief description:** Pay Sales Tax to the Tax Authority at the end of the business quarter.
the actors involved in the use case	**Primary actors:** Time
	Secondary actors: TaxAuthority
the system state **before** the use case can begin	**Preconditions:** 1. It is the end of the business quarter.
the **actual steps** of the use case	**Main flow:** **implicit time actor** 1. **The use case starts when it is** the end of the business quarter. 2. The system determines the amount of Sales Tax owed to the Tax Authority. 3. The system sends an electronic payment to the Tax Authority.
the system state when the use case has **finished**	**Postconditions:** 1. The Tax Authority receives the correct amount of Sales Tax.
alternative flows	**Alternative flows:** None.

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Pre- and Post-conditions

- Preconditions and postconditions are *constraints*
- Preconditions constrain the state of the system *before* the use case can start
- Postconditions constrain the state of the system *after* the use case has executed
- If there are no preconditions or postconditions write "None" under the heading

Place Order
Preconditions: 1. A valid user has logged on to the system

Postconditions: 1. The order has been marked confirmed and is saved by the system

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Main Flow

- The flow of events lists the steps in a use case
- It *always* begins by an actor doing something
  - A good way to start a flow of events is: "The use case starts when an <actor> <function>"
- The main flow is always the *happy day* or *perfect world* scenario
  - Everything goes as expected and desired, and there are no errors, deviations, interrupts, or branches
  - Alternatives can be shown by branching or by listing under Alternative flows (see later)
- The flow of events should be a sequence of short steps that are:
  - Declarative
  - Numbered,
  - Time ordered

<number> The <something> <some action>

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Branching within a flow: If

- To show alternatives in flow of events:
  - **If Boolean expr**
- Indent and number to indicate the conditional part of the flow
- What happens if the condition is false:
  - **else**

    (see next slide)

Use case: ManageBasket
ID: 2
Brief description: The Customer changes the quantity of an item in the basket.
Primary actors: Customer
Secondary actors: None.
Preconditions: 1. The shopping basket contents are visible.

Main flow:
  1. **The use case starts when the Customer selects** an item in the basket.
  2. If the Customer selects "delete item"
    2.1 The system removes the item from the basket.
  3. If the Customer types in a new quantity
    3.1 The system updates the quantity of the item in the basket.

Postconditions: None.
Alternative flows: None.

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Repetition within a flow: For

- To indicate the start of a repetition in the flow of events: **For iteration expr**
- Iteration expression: number of repetitions of the indented text

| Use case: FindProduct |
|---|
| ID: 3 |
| Brief description:
The system finds some products based on Customer search criteria and displays them to the Customer. |
| Actors:
Customer |
| Preconditions:
None. |
| Main flow:
1. The use case starts when the Customer selects "find product".
2. The system asks the Customer for search criteria.
3. The Customer enters the requested criteria.
4. The system searches for products that match the Customer's criteria.
5. **If** the system finds some matching products then
  5.1 **For each product found**
    5.1.1. The system displays a thumbnail sketch of the product.
    5.1.2. The system displays a summary of the product details.
    5.1.3. The system displays the product price.
6. **Else**
  6.1. The system tells the Customer that no matching products could be found. |
| Postconditions:
None. |
| Alternative flows:
None. |

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Repetition within a flow: While

- When something repeats while some condition is true:
  - **While Boolean expr**

Use case: ShowCompanyDetails
ID: 4
Brief description: The system displays the company details to the Customer.
Primary actors: Customer
Secondary actors: None
Preconditions: None.

Main flow:
1. The use case starts when the Customer selects "Show company details".
2. The system display a web page showing the company details.
3. **While the Customer is browsing the company details**
   3.1 The system plays some background music.
   3.2 The system displays special offers in a banner ad.

Postconditions: 1. The system has displayed the company details. 2. The system has played background music. 3. The system has displayed special offers.
Alternative flows: None.

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Branching: Alternative flows

- We may specify one or more *alternative flows* through the flow of events:
  - Alternative flows **capture errors and interrupts**
  - Alternative flows *never* return to the main flow

Use case

alternative flows
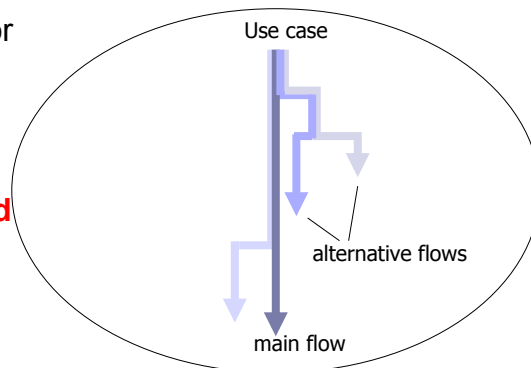
main flow

Only document enough alternative flows to clarify the requirements!

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Referencing Alternative Flows

- List the names of the alternative flows at the end of the use case
- Find alternative flows by examining each step in the main flow and looking for:
  - ☐ Alternatives
  - ☐ Exceptions
  - ☐ Interrupts

alternative flows

Use case: CreateNewCustomerAccount
ID: 5
Brief description: The system creates a new account for the Customer.
Primary actors: Customer
Secondary actors: None.
Preconditions: None.

Main flow:
1. The use case begins when the Customer selects "create new customer account".
2. While the Customer details are invalid
   2.1. The system asks the Customer to enter his or her details comprising email address, password and password again for confirmation.
   2.2 The system validates the Customer details.
3. The system creates a new account for the Customer.

Postconditions: 1. A new account has been created for the Customer.
Alternative flows: InvalidEmailAddress InvalidPassword Cancel

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An alternative flow example

notice how we name and number alternative flows

Alternative flow: CreateNewCustomerAccount:InvalidEmailAddress
ID: 5.1
Brief description: The system informs the Customer that they have entered an invalid email address.
Primary actors: Customer
Secondary actors: None.
Preconditions: 1. The Customer has entered an invalid email address
Alternative flow: 1. The alternative flow begins after step 2.2. of the main flow. 2. The system informs the Customer that he or she entered an invalid email address.
Postconditions: None.

always indicate how the alternative flow begins. In this case it starts after step 2.2 in the main flow

- The alternative flow may be triggered *instead* of the main flow - started by an actor
- The alternative flow may be triggered *after a particular step* in the main flow - after
- The alternative flow may be triggered *at any time* during the main flow - at any time

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When to use use case analysis

- They are the *best* choice when:
  - ☐ The system is dominated by functional requirements.
  - ☐ The system has many types of user to which it delivers different functionality.
  - ☐ The system has many interfaces.
- They are a *poor* choice when:
  - ☐ The system is dominated by non-functional requirements.
  - ☐ The system has few users.
  - ☐ The system has few interfaces.

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The Project Glossary

Project Glossary

Term1
 Definition
 Synonyms
 Homonyms
Term2
 Definition
 Synonyms
 Homonyms
Term3
 Definition
 Synonyms
 Homonyms
...

- It's important to capture the language of the domain in a project glossary
- The aim of the glossary is to define key terms
- You are building a vocabulary that you can use to discuss the system with the stakeholders

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Use Case Specification (Summary)

- Name of Use Case – verb phrase
- Actors
  - **Description of Actors involved in use case)**
- Pre-condition or Entry (of Main Flow) condition
  - **"This use case starts when…"**
- Main Flow/Flow of Events
  - **Psuedo-code natural English language**
- Post-condition/Exit condition
  - **"This use cases terminates when…"**
- Alternative Flows/Exceptions
  - **Describe what happens if things go wrong**
- Special Requirements (optional)
 - **Nonfunctional Requirements, Constraints)**

derived from Bruegge & Dutoit   **15**

Use Case Specification

	Use case: PaySalesTax
use case name	
use case identifier	**ID**: 1
brief description	**Brief description:**
the actors involved in the use case	**Primary actors:**
	Secondary actors:
the system state **before** the use case can begin	**Pre-conditions:**
the **actual steps** of the use case	**Main flow:** 1. 2. 3.
the system state when the use case has **finished**	**Post-conditions:**
alternative flows	**Alternative flows:**

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Write a use case spec for the "Create New Vendor" use case
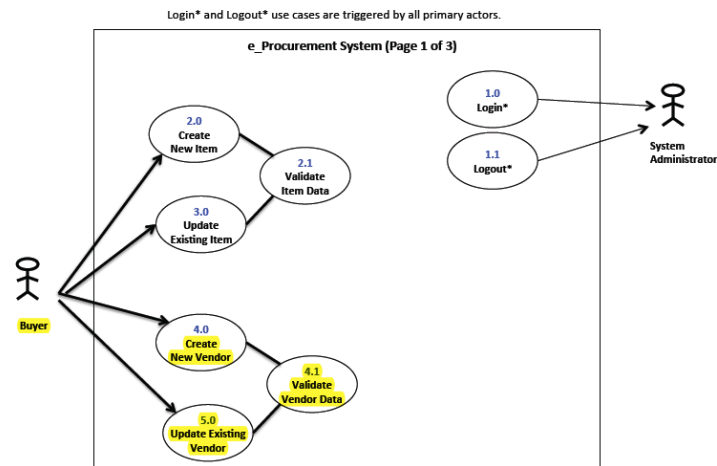
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To Learn More…

UML 2 and The Unified Process, Second Edition –
Jim Arlow and Ila Newstadt
Chapter 4

The Unified Modeling Language Reference Manual, Second Edition -
James Rumbaugh, Ivar Jacobson and Grady Booch
Chapter 6

Writing Effective Use Cases –
Alistair Cockburn

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