

Requirements Specification, Use Case Diagram

PB007 Software Engineering I

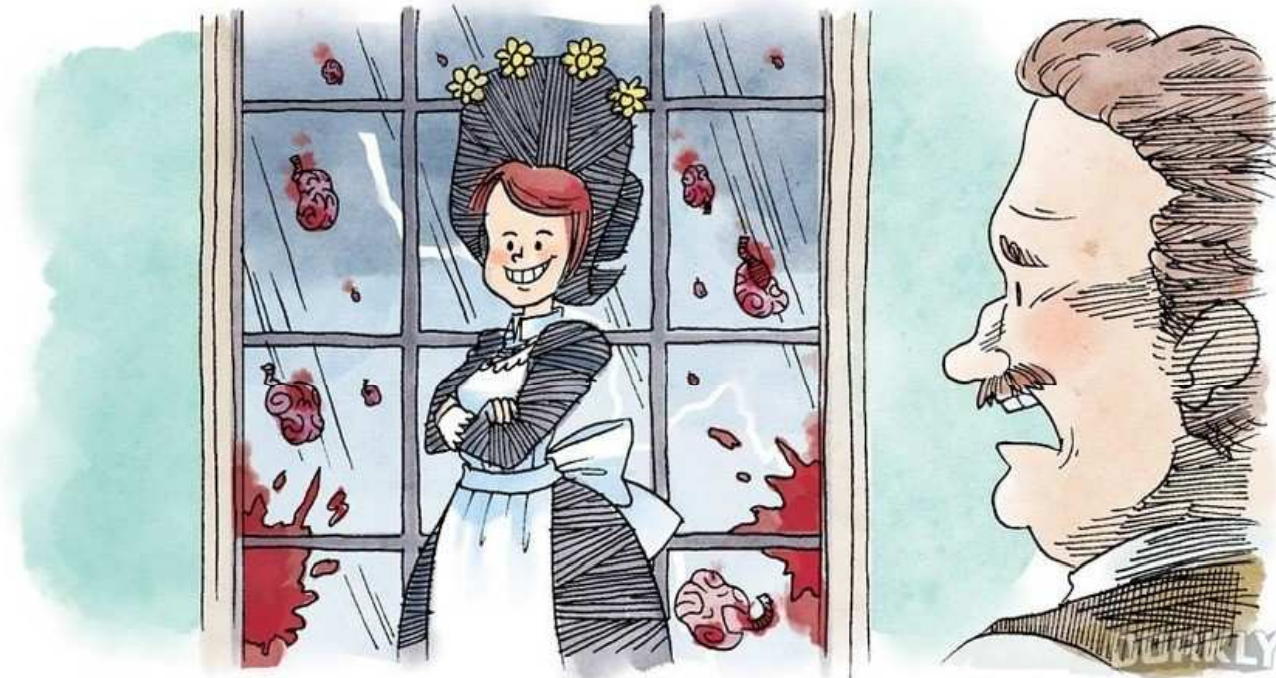
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We must do **EXACTLY** as written!

- Let's brainstorm...

We must do EXACTLY as written!

“NOOOOOOOOOOOO!” wailed Mr. Rogers in eldritch horror.



It was too late. The deed was done.
There is no god. Only Amelia Bedelia.

Functional Requirements

- **Functional requirement** tells **WHAT** the system should do (or should not do), i.e., describes the system's functionality.
 - Common format: <id><system><function>
- Examples:
 - 1. The ATM verifies the validity of inserted card
 - 2. The ATM verifies the PIN provided by the customer
 - 3. The ATM does not allow to withdraw more than 10 000 CZK for a single card within 24-hour period

Non-functional Requirements

- **Non-functional requirement** is a constraint imposed on the system. Often related to (quantitative) attributes like performance, security, availability, etc. It also includes environment and regulatory constraints.
 - **They must be testable!**
- **Příklady:**
 - 1. The ATM will be programmed in Rust
 - 2. The ATM will use 256-bit AES encryption for communication with bank
 - 3. The ATM will verify the card validity in less than 3 seconds.

Why do we distinguish between them?

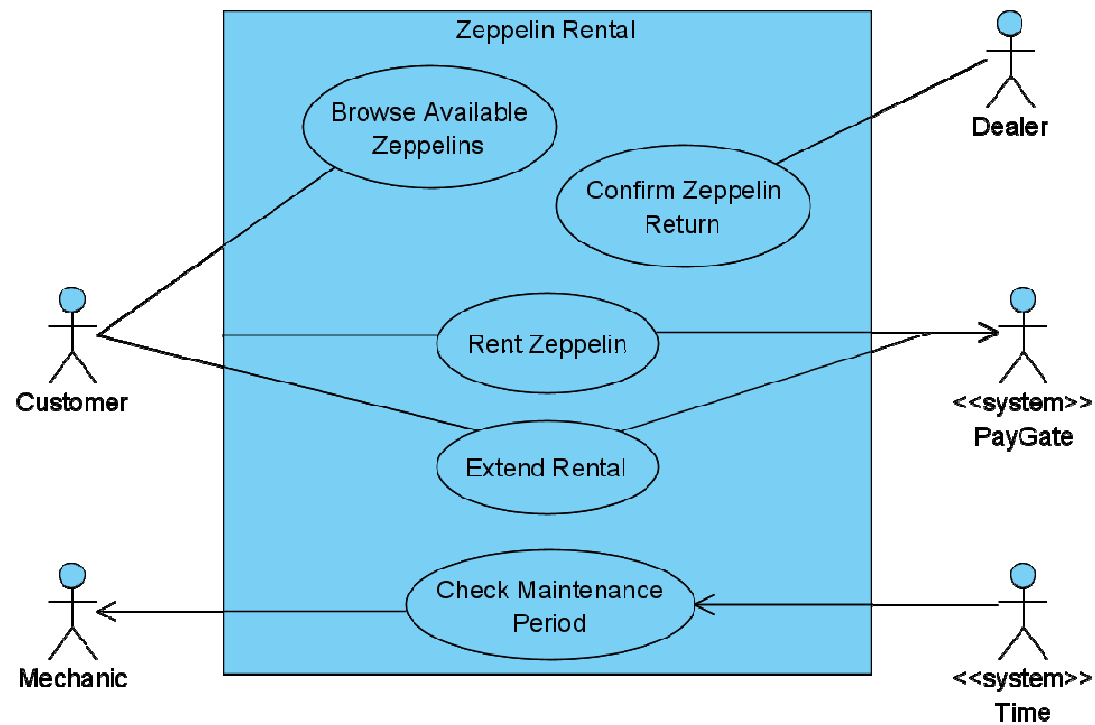
- Taxonomy
- Functional requirements are modelled in this course
 - It is relatively easy to do so
 - Easy to have an overview what is done and what needs work
- Non-functional requirements are tougher
 - Could be hidden
 - Could be forgotten
 - Could require specialized test cases, or approaches

Use Case Diagram

- **Use Case Diagram** is a method to capture FUNCTIONAL requirements in graphical way.
- A.K.A. The most important UML diagram [citation needed]
- It consists of:
 - **System boundary**
 - **Actors**
 - **Use cases**
 - **Relationships**

Use Case Diagram

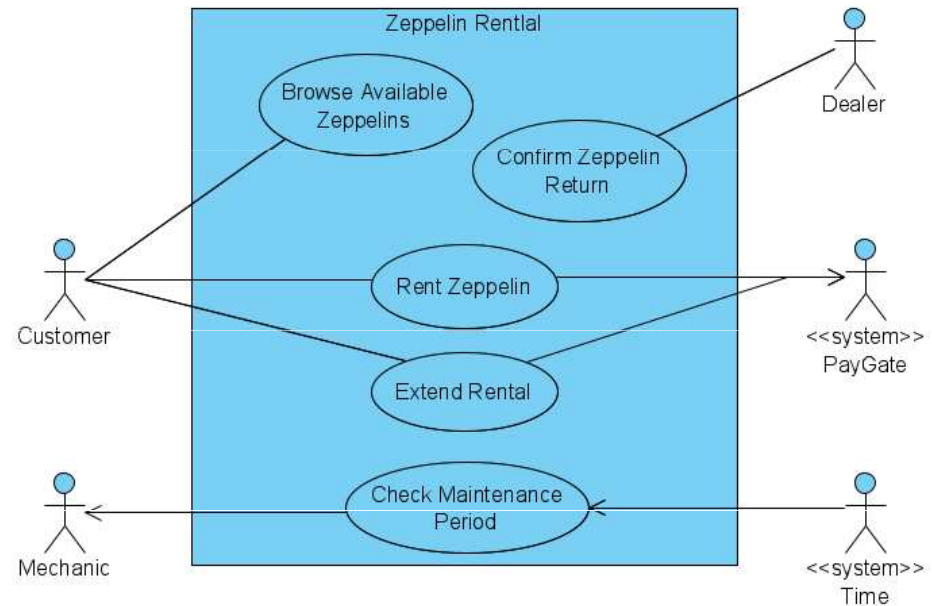
Example



Use Case Diagram

Actors

- A **role** that represents some external entity
 - External with respect to system
 - Directly communicate with the system
 - They are not a single specific person
 - On the other hand, a specific person can act as multiple actors, which could change over time
 - Actor must have meaningful name
 - Actor should have short description



Use Case Diagram

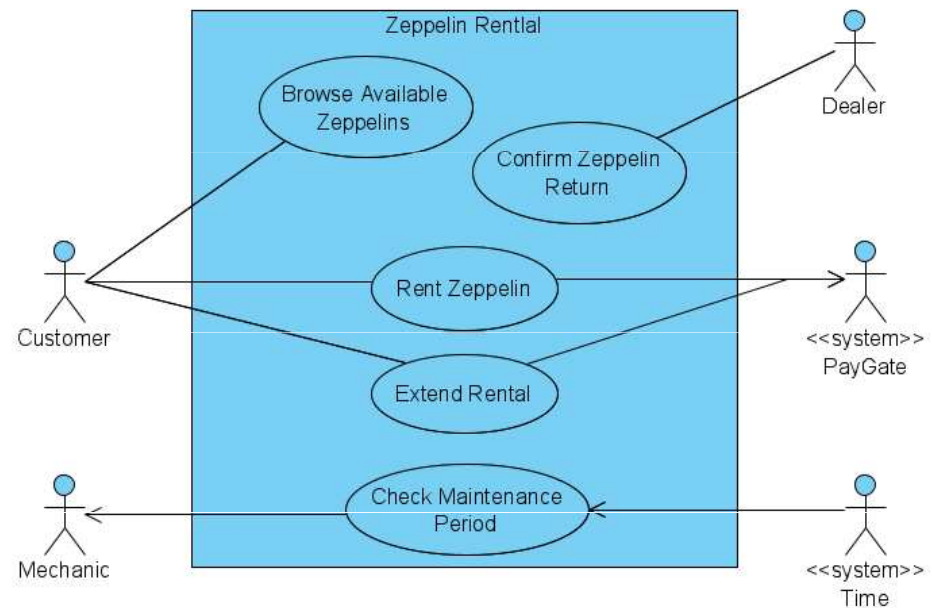
How to identify actors

- Who or what uses the system?
- What role they have in the interaction with the system?
- Are there any other systems involved?
- Who/what sends/receives data to/from the system?
- Are there any events occurring periodically?

Use Case Diagram

Use Cases

- Describes an interaction between the system and external actors. Actions that actors perform in the interaction.
- Use case always begins with some action initiated by actor (primary actor)
- Other actors might join this interaction (secondary actors)
- Use cases are described from actors' point of view
- The name should represent an activity or behaviour



Use Case Diagram

How to identify actors use cases

- What systems' functions are required by a particular actor?
- Does the system store or retrieve some data? Who triggers it?
- What is happening when a system state changes? Are actors notified about it?
- Are there any external events that affect the system? What alerts the system about these events?

Use Case Diagram

How to model it

- Recommended steps:
 - Define the system boundary
 - Find actors
 - Find use cases
 - Determine relationships between actors and uses cases
 - Specify use cases in detail

In this seminar...

Work, work

- Activity – Functional & Non-functional requirements
- Visual Paradigm demo
- Team work on project
 - Use case diagram

Task for this week

You gotta do what you gotta do

- Create a list of functional and non-functional requirements as a numbered list in the use case diagram specification
 - Order the functional requirements according to the user roles
 - Formulate 3 non-functional requirements (make them up)
- Based on the requirements list, create initial use case diagram
 - Meaning actors, use cases and communication associations between them
- Look for gaps in the project specification and ask about information you are missing.