Requirements Specification, Use Case Diagram

PB007 Software Engineering I
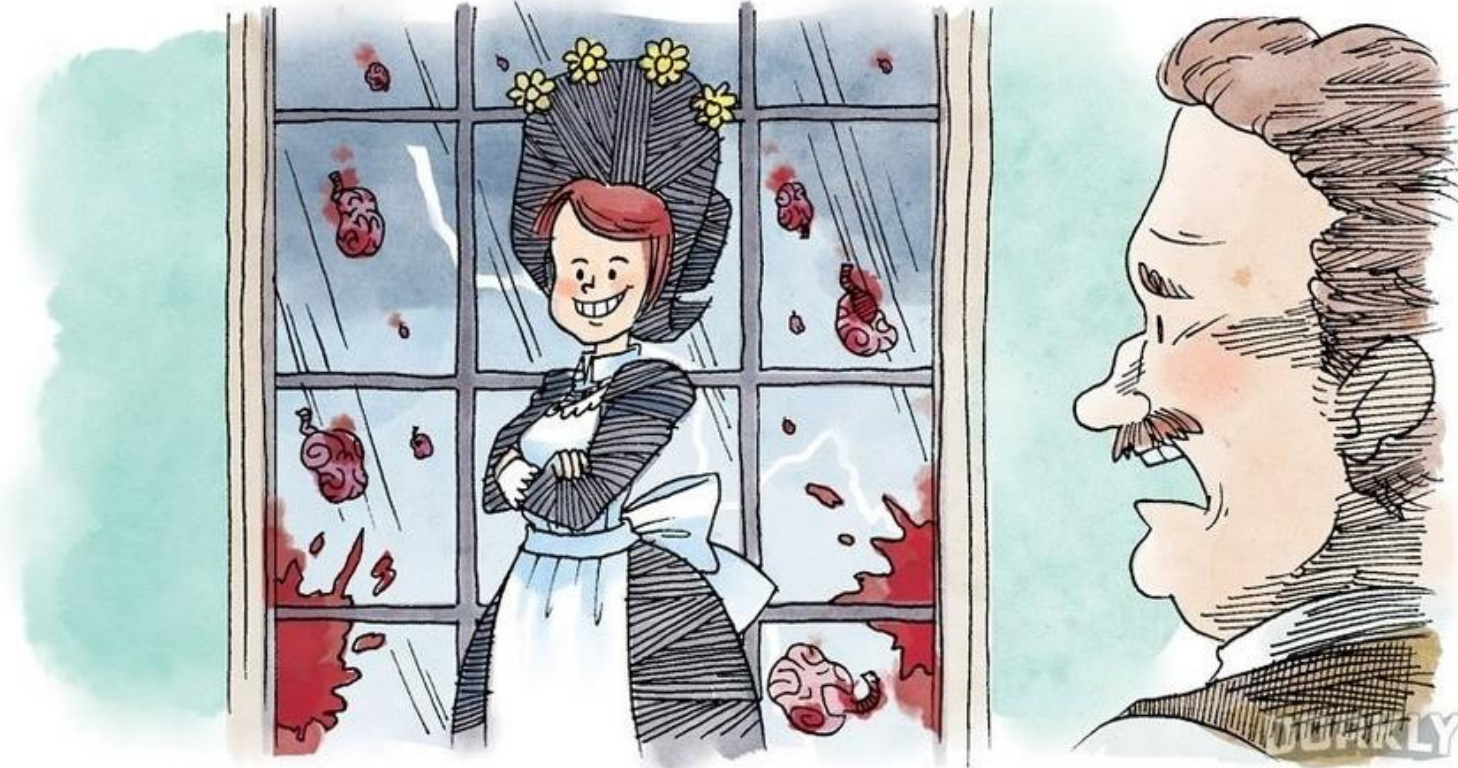
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We must do EXACTLY as written!

– Let's brainstorm…

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We must do EXACTLY as written!

PB007 Software Engineering I — Requirements Specification, Use Case Diagram

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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 that 10 000 CZK for a single card within 24-hour period

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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.
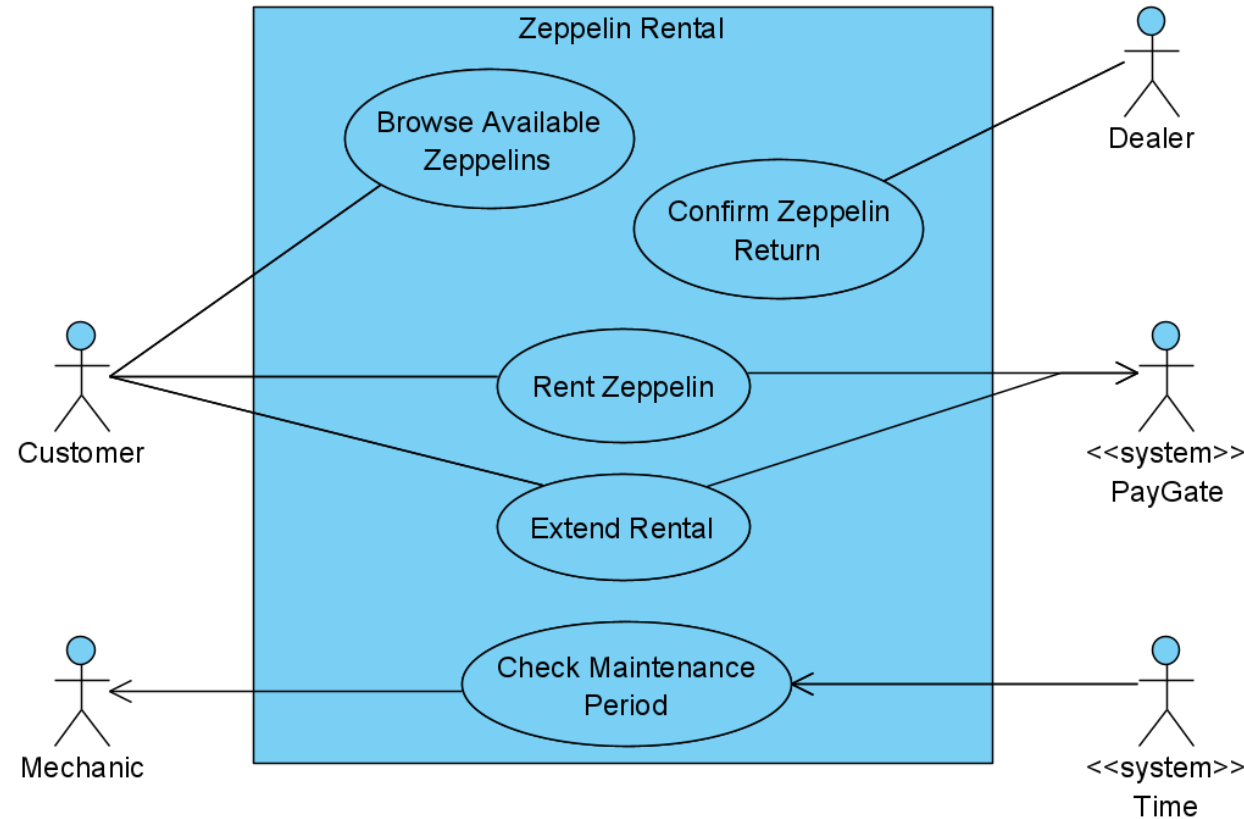
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Why do we distinguish between them?

— 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

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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**

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Use Case Diagram

Example

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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

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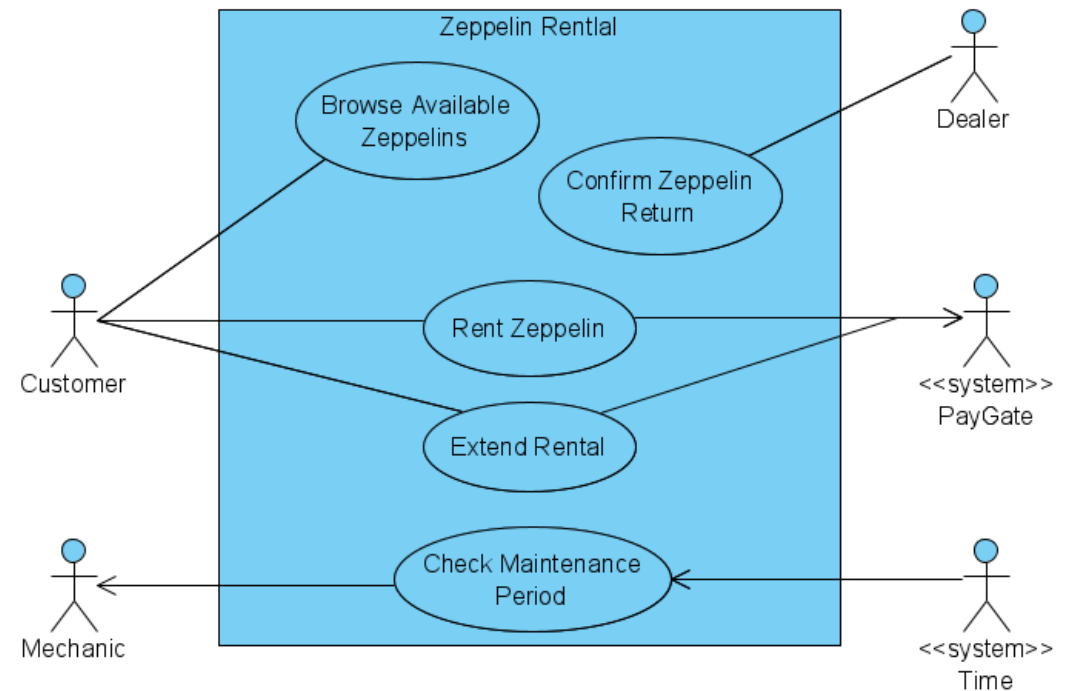
Use Case Diagram

How to identify actors

— Who or what uses the system?

— What role they have in the interaction?

— Are there any other systems involved?

— Who/what sends/receives data to/from the system?

— Are there any events occurring periodically?

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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

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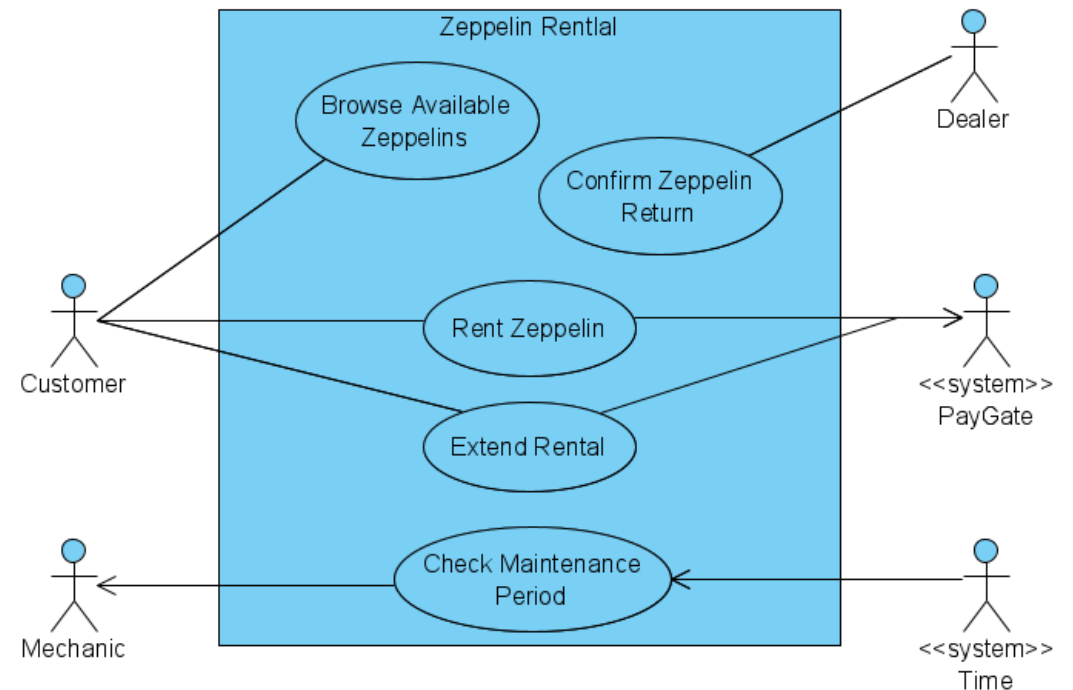
Use Case Diagram

How to identify actors use cases

— What systems' functions in 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?

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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

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In this seminar…

Work, work

— Activity – Functional & Non-functional requirements

— Visual Paradigm demo

— Team work on project
  — Use case diagram

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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.

— Do your part in peer review

- — Link to roster is in study materials

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