Advanced Use Case Diagrams, Textual Specifications

PB007 Software Engineering I

Bruno Rossi

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Relations in Use Case Diagrams

In addition to the associations between actors and use cases seen last week, there are further types of relations:

- generalization of actors;
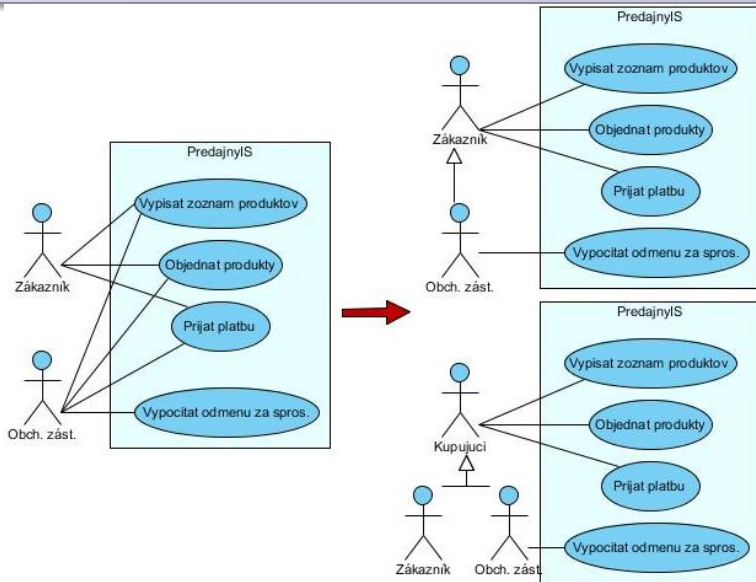- use case generalization;
- include;
- extend;

Actors Generalization

Generalization (inheritance) of actors is the relationship between the more general and specialized actors

- General actors are often abstract, i.e. they do not represent a real role in the system. Descending actors represent instead a specific role;
- A descending actor inherits all roles and parent links;
- Every time it is expected the use of a parent actor, we can use on of the descendants;
- It is generally suitable when multiple actors have a number of common use cases;
- Simplifies the semantics of the diagram;

Actors Generalization - an example

Use Case Generalization

Generalization (inheritance) of use cases is the relationship between the general and specialized use cases;

- A specialized use cases inherits the properties of its parent, and add new features by possibly overloading (changing) the inherited properties;
  Note: it cannot overload the parents' extension points
- The text specifications in the offspring should denote the changes from the parent use case;
- Parental use cases can be abstract (*recommended*), i.e. either no specification or incomplete specification of the flow of events;

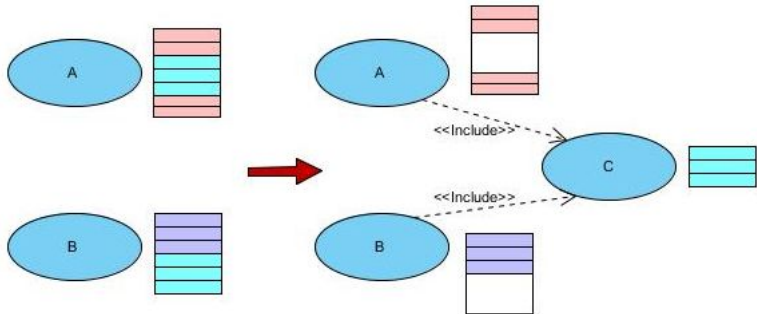# Use Case Generalization - an example
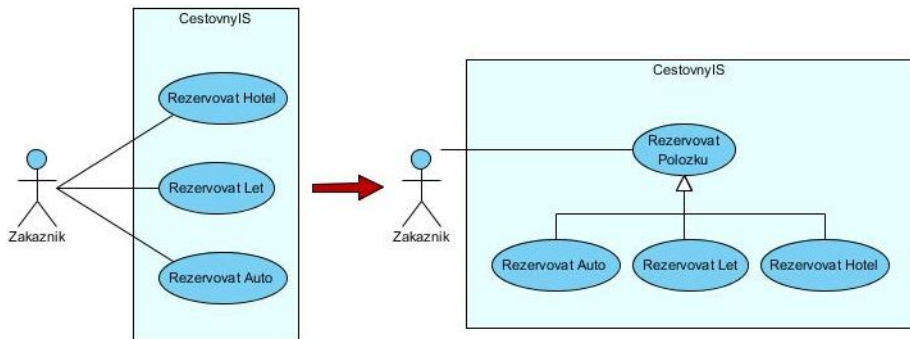
include

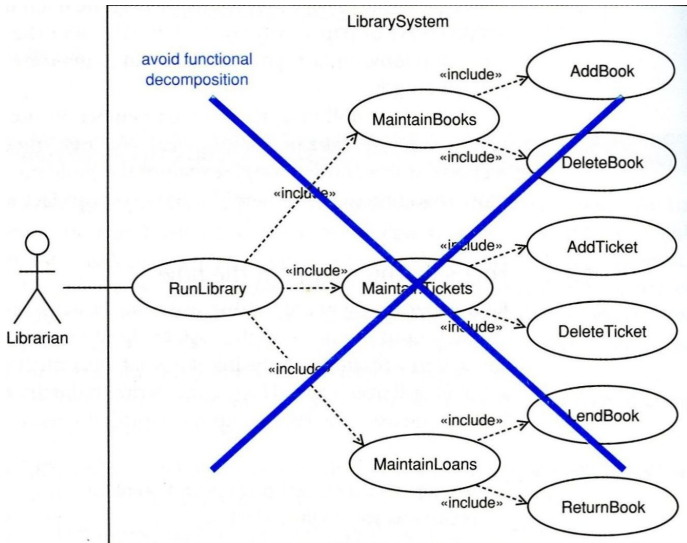include allows you to allocate repetitive steps in several use cases in a separate use case;

- The basic use case is incomplete without all the embedded use cases;
- Embedded use cases may or may not be comprehensive;
- Be careful about functional decomposition!

include

include

extend

The relationship extend is a way to add new behavior to existing use cases;

- The basic use case contains within the flow of events the so-called *extension points*;
- The extension use case specifies at which point the extension is attached;
- The basic use case does not know which point of the extension is attached to;
- Extension of use cases can contain several segments and each is designed to point to a different extension use case;
- More extension use cases can share the same extension points. In this case, it is appropriate to establish the conditions that determine which of them should be used in a given situation;

extend

specification of use cases
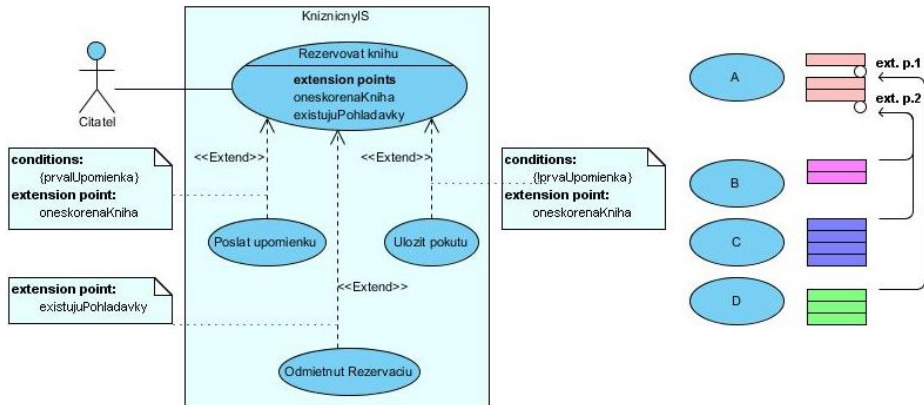
The textual use case specification should include:

- ID;
- A brief description;
- The primary actors;
- The secondary actors;
- Input conditions;
- The main flow of events;
- Output conditions;
- An alternative flow of events;

Flow of events

Main Flow, Primary Scenario events are a sequence of steps of interaction with the system in the ideal case (that is free from errors, interruptions, etc...);

- They always begin with some action of the primary actor. It is recommended to use the form::
  1. The use case begins when <actor><function>.
- The individual steps should be short, precise and understandable. Use the form:
  <id step><actor/system><action>
- You can use branching flow using keywords IF, FOR, WHILE

The **alternative flow** represents deviations from the main flow due to errors or interruptions. It can also be used to capture more complex branching, such as situations that are not exactly known if and when they will occur;

Resources

- http://sce.uhcl.edu/helm/rationalunifiedprocess/ process/artifact/ar_ucmod.htm
- http://www.karonaconsulting.com/downloads/UseCases_ IncludesAndExtends.pdf

Tasks

- Review the primary use case diagram from the previous exercise. Please correct any errors and consider the use of advanced relationships (include, extend, generalization);

- With a few sentences, document all use cases. This will serve to fully understand the model and select the use cases that will be further specified with the specifications;

- Choose three use cases for which to create a detailed textual documentation in the form of scenarios and event streams. It is appropriate that the use cases are related. The selection must be made by agreement with the instructor. Set the selected cases in VP to use a different colour than the others (e.g. light yellow color);

- Upload the **pdf report** to folder (**Week 03**).

- **Deadline:** Friday, 7.10.16 23:59

Reporting Configuration in VP