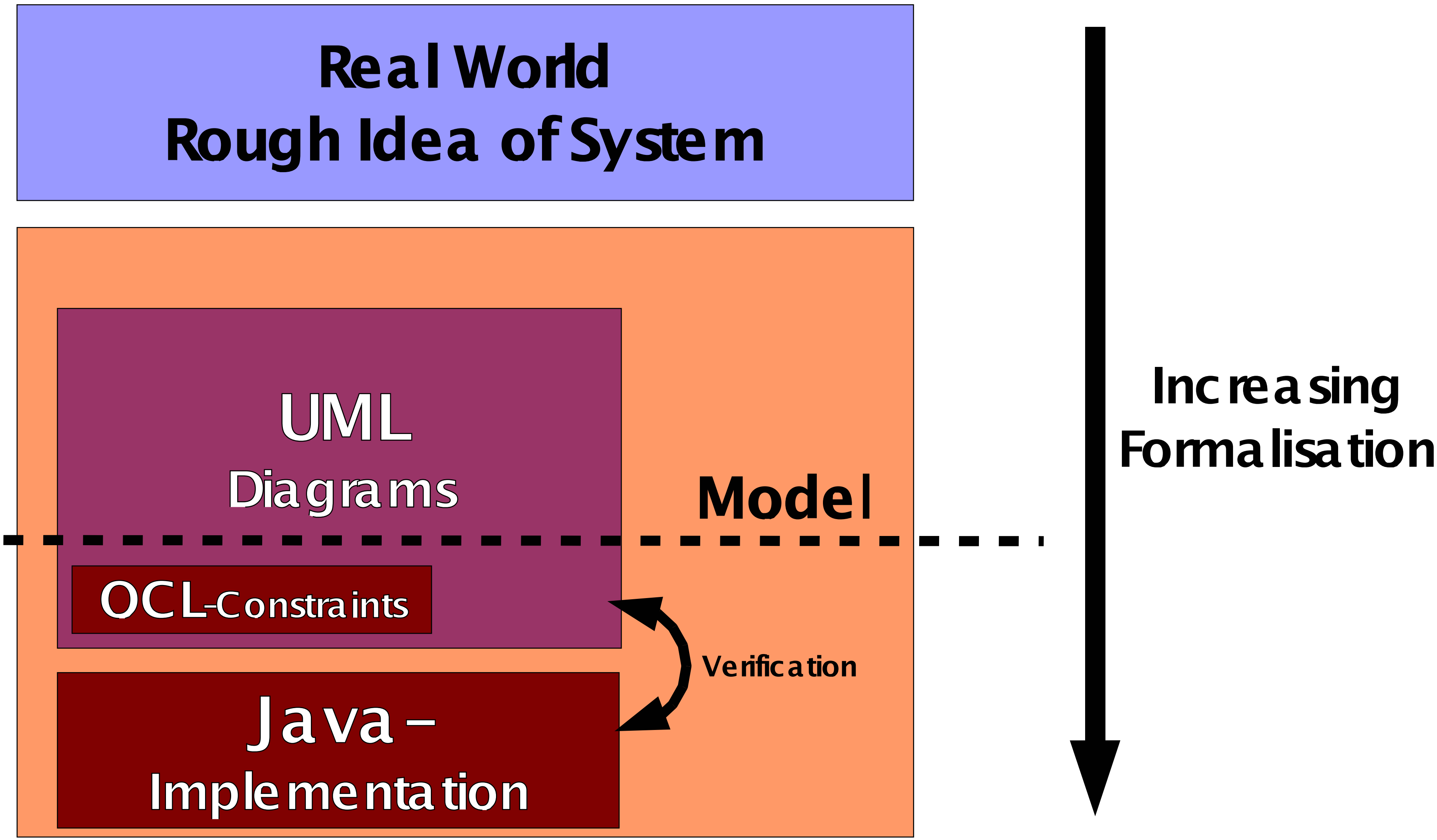
Entwicklung objektorientierter Software mit formalen Methoden

UML in 80 Minuten

Bernhard Beckert

UNIVERSITÄT KOBLENZ-LANDAU

Building Models



UML

Unified Modeling Language

- **Unified.** End to many similar approaches.

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  Standardised by OMG (Currently Version 2.0 in finalisation)

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- **Graphical.** Conglomerate of diagram types.

UML diagrams

- **Structure Diagrams**
- **Behaviour Diagrams**

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  - Class Diagram
  - Component Diagram
  - Composite Structure Diagram
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Use Case Diagrams. . .

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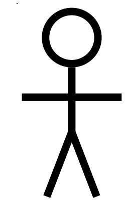
Use Case Diagrams...

"...a means for specifying required usages of a system"

Key concepts:

- **Actor.** Users or other systems interacting with the subject. Outside the system.



Mechanic

Use Case Diagrams…

“…a means for specifying required usages of a system”

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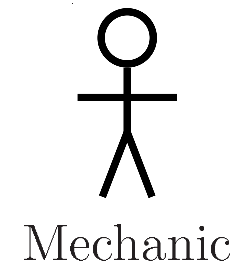

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Use Case Diagrams...

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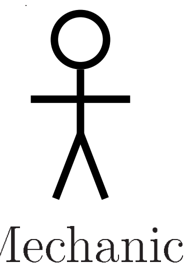


Key concepts:

- **Actor.** Users or other systems interacting with the subject. Outside the system.

- **Use Case.** Type of an occurrence of an emergent behaviour.
- **Subject.** The system that implements the use case.
- ...and some "lines" between use cases and actors and between use cases (with stereotypes ≪includes≫ and ≪extends≫).

Scenario

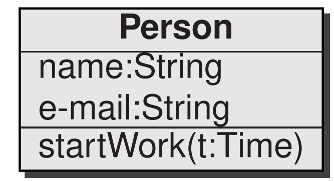
A paper is written by some persons, its authors. A paper can be submitted to a conference or a workshop. It is not allowed to submit it to several events in parallel. A submitted paper can be accepted or rejected. The decision whether a paper is accepted or rejected is based on the reports of at least 3 persons, the referees, which are different from the authors. The reports consist of marks indicating the quality of the paper: “accept”, “reject”, “weakly accept” and “weakly reject”. There are short and long papers. After acceptance of a paper it is published and one of the authors gives a talk at the conference or workshop.

What does a Use Case Diagram look like?

Class Diagrams

Key concepts:

Class.



A classification of a set of objects in a system.

Attributes **Operations/Methods**

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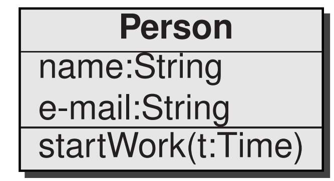
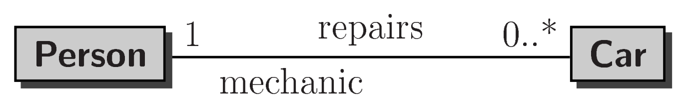


Attributes **Operations/Methods**

Association.

Relationship between instances of classes.



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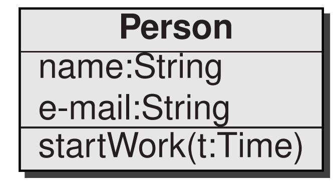

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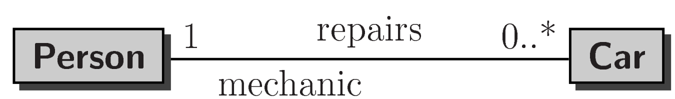
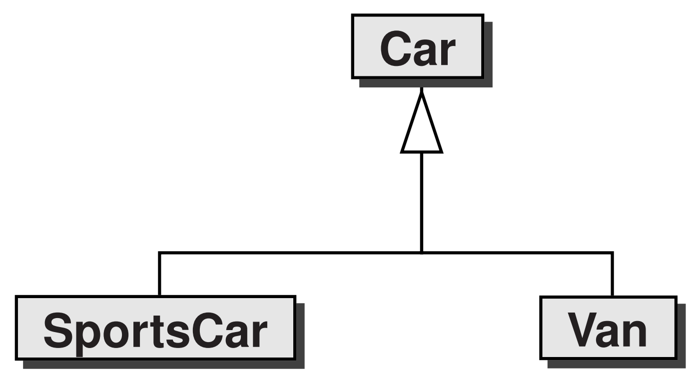


Generalisation.

Specialisation-/Generalisation relationship between classes.



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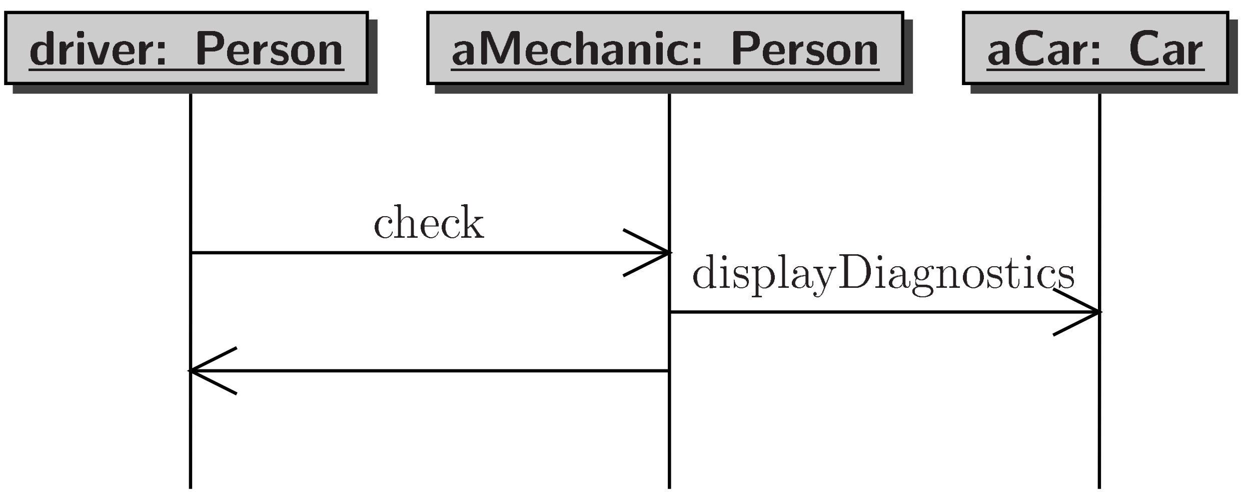
Sequence Diagrams

Interaction. A situation during the runtime of a system.



Sequence Diagrams

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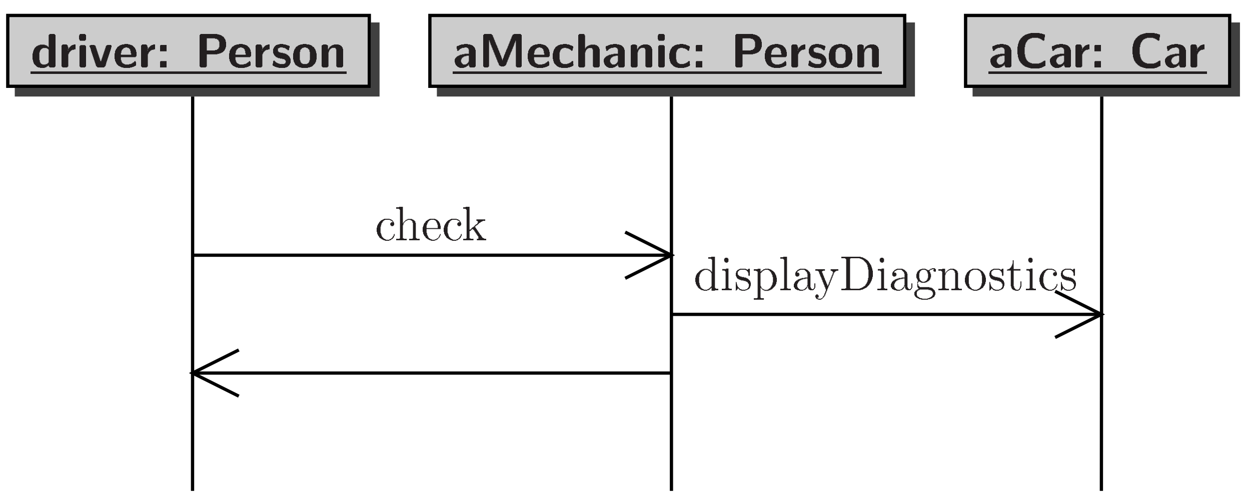
Lifeline. An individual participant in the Interaction. Usually: An instance of a class.

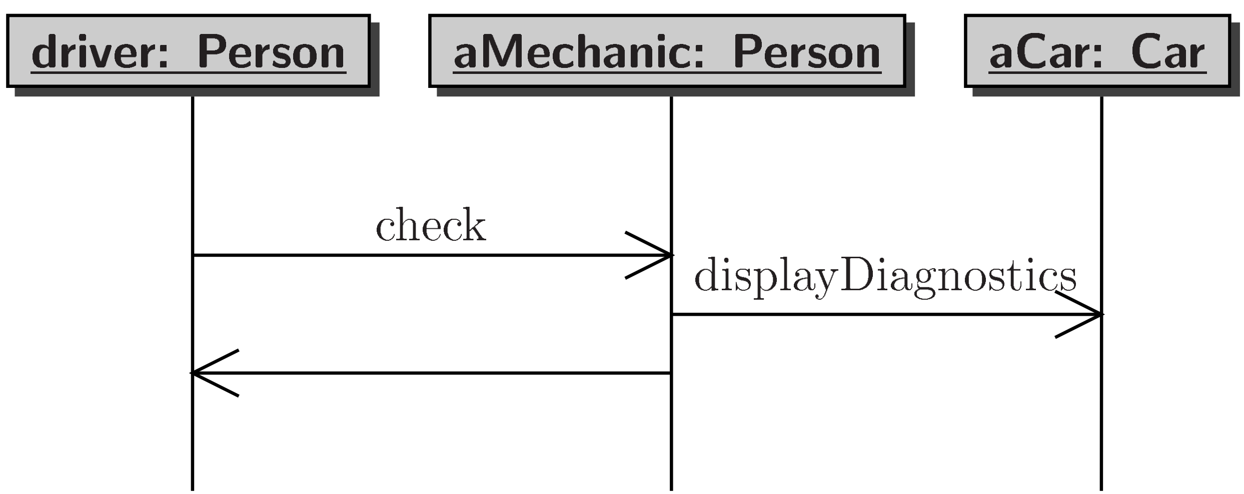


Sequence Diagrams

Interaction. A situation during the runtime of a system.

Lifeline. An individual participant in the Interaction. Usually: An instance of a class.

Message. A particular communication between Lifelines of an Interaction.



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(Behavioural) State Machine Diagrams

"Used to specify behaviour of various model elements, e.g. to model the behaviour of class instances."

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Key concepts:

State. Models a situation during which some (usually implicit) invariant condition holds.

Simple State   Composite State   Submachine State

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Simple State   Composite State   Submachine State

Transition. Directed relationship between a source and a target vertex ($\approx$state).

Is labelled with: event [guard] / action

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How could a UML state machine diagram look like?

Literature

Martin Fowler:

UML distilled: applying the standard object modeling language,

Object Technology Series. Addison-Wesley, Reading/MA, 1998.

(dt: UML konzentriert)

UML 2.0 Superstructure Final Adopted Specification.

http://www.omg.org/cgi-bin/doc?ptc/2003-08-02