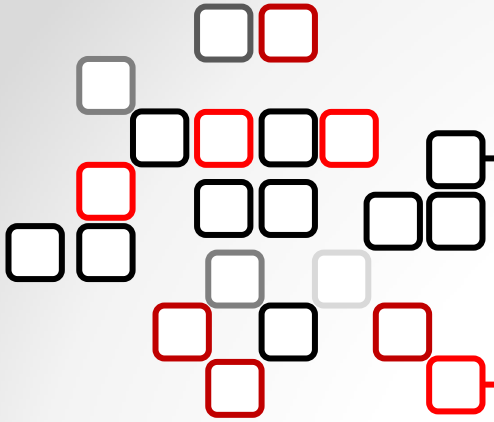
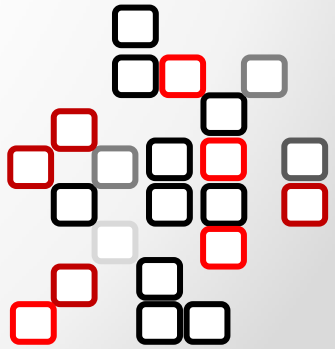


Autonomous Systems

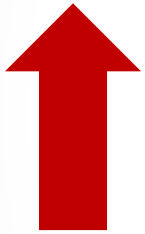
Lecture 07
Introduction into the AML
Part 02



Martina Husáková, 2017/2018

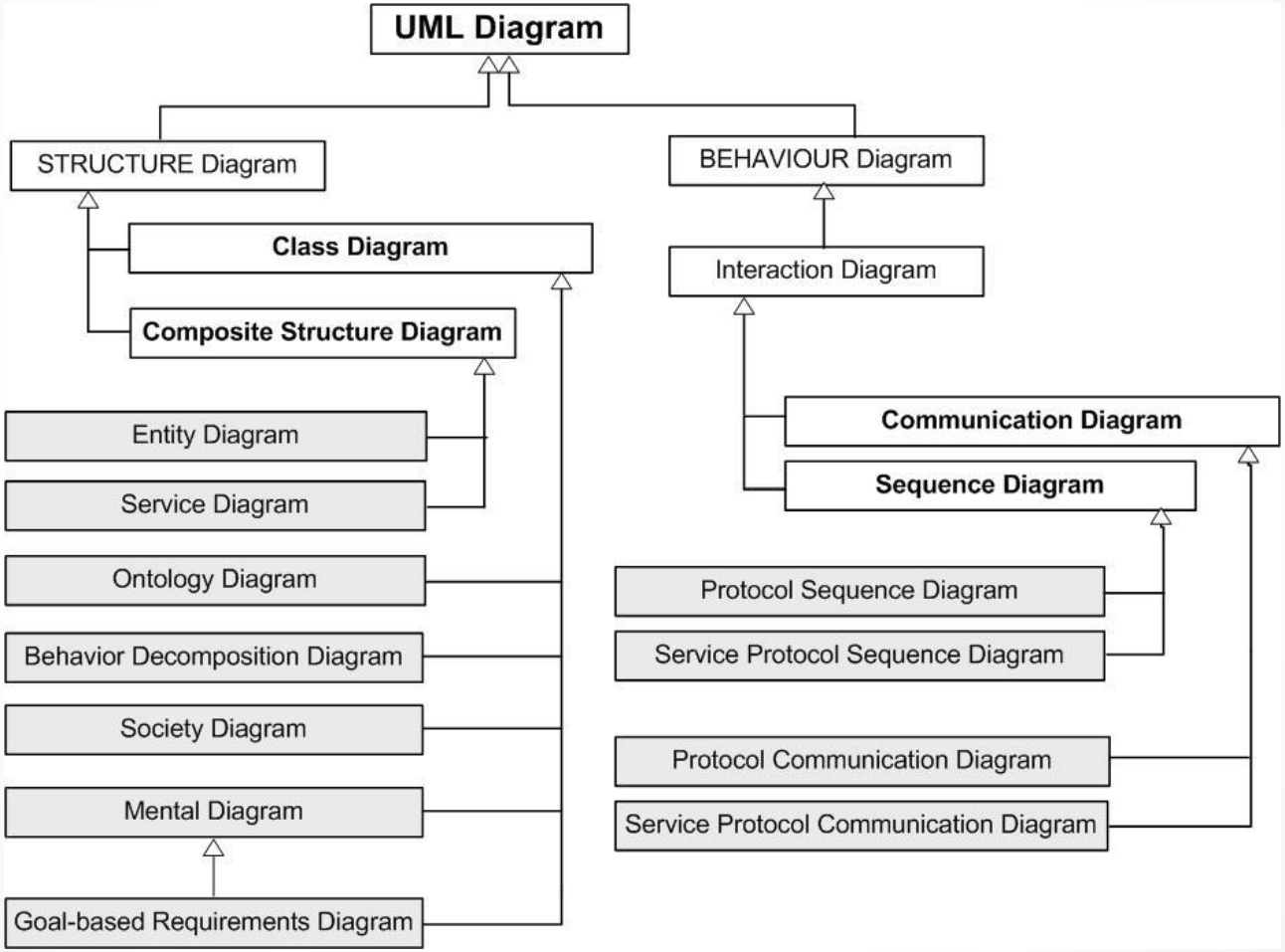
Content of the lecture

- **Perceptor-effector diagram**
- **Service diagram**



Modelling architecture of an agent

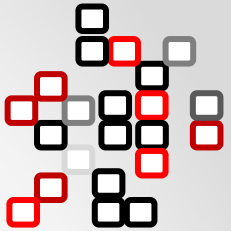
AML diagrams



Citation: Husáková, M.: Conceptual Modelling in Computational Immunology. Bruckner Publishing. Academic Series(2015)

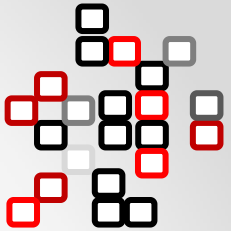
Perceptor-effector diagram

Introduction (1)



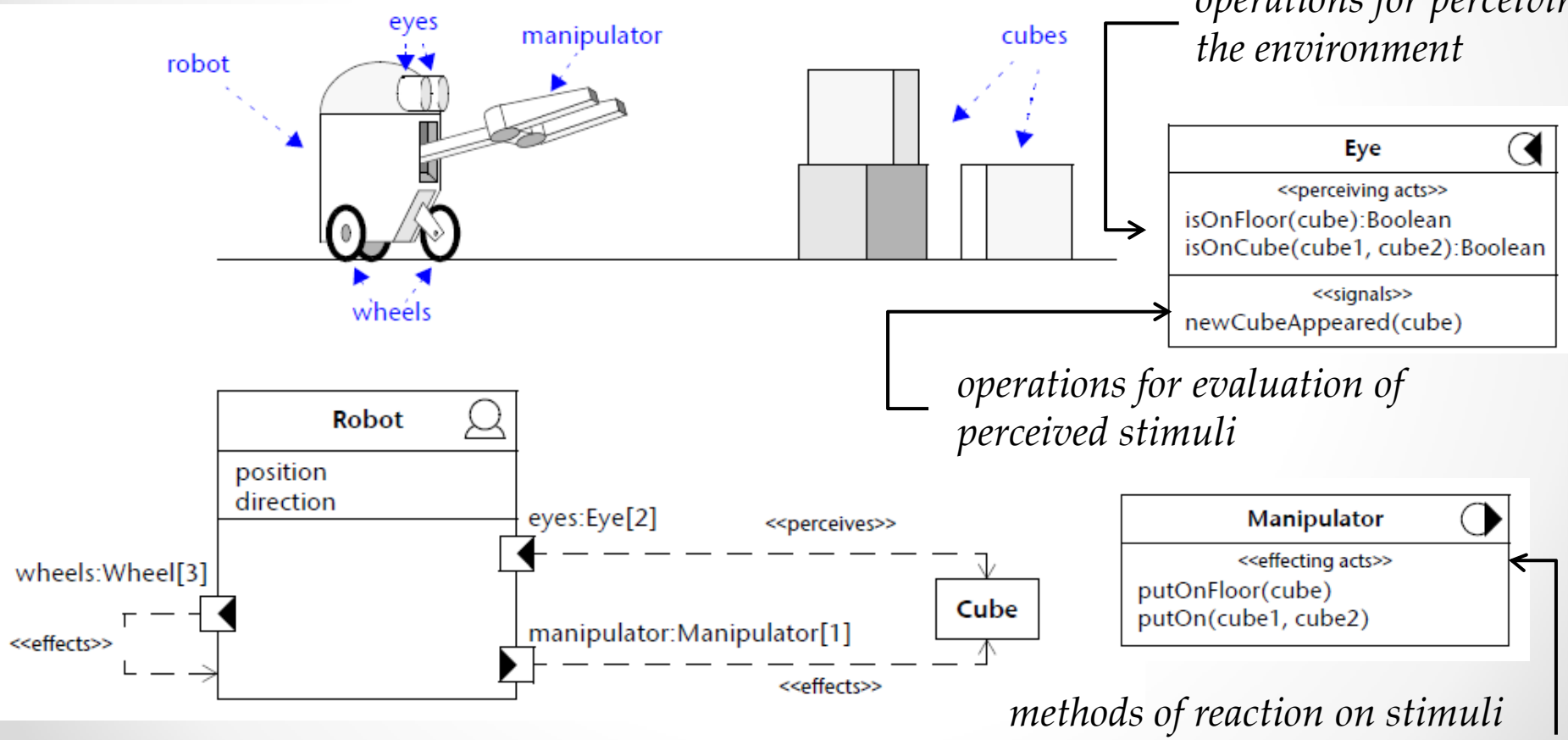
- It can be perceived as the extension of the entity diagram for modelling internal structure (architecture) of an entity type (the most often for agent types)
- Diagram models structural aspects which are related to the stimuli received with the sensors (actuators) and reactions on these stimuli with the actuators (effectors)

Perceptor-effector diagram
Introduction (2)



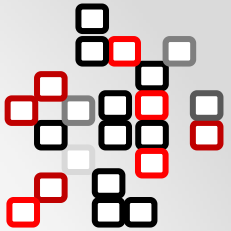
- **The most important elements of the diagram:**
  - **Perceptor type**: UML class for representation of the class of sensors (sensor type)
  - **Effector type**: UML class for representation of the class of actuators (actuator type)
  - **Sensor (perceptor)**: UML port for modelling particular sensor of the sensor type
  - **Effector (actuator)**: UML port
  - **Perceives**: UML dependency representing perceiving of stimuli by entity type with sensors
  - **Effects**: UML dependency representing reactions on stimuli by entity type with actuators

Perceptor-effector diagram
Example



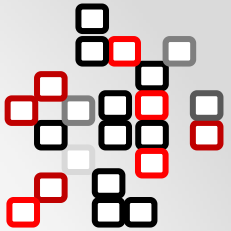
Service diagram

Introduction (1)



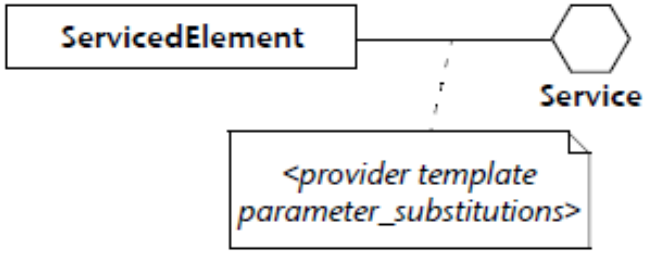
- Extension of the UML Composite Structure Diagram
- Diagram is used for specification of services
- Service: coherent block of functionality that is offered by the entity type (service provider) or used by the entity type (service client)
- A service is perceived in the internal or the external point of view
  - Internal view: a service is integrated inside the architecture of the entity type where integral parts of the entity type use/offer this service
  - External view: entity type is a whole that offers/uses the service to other in the environment

Service diagram
Introduction (2)

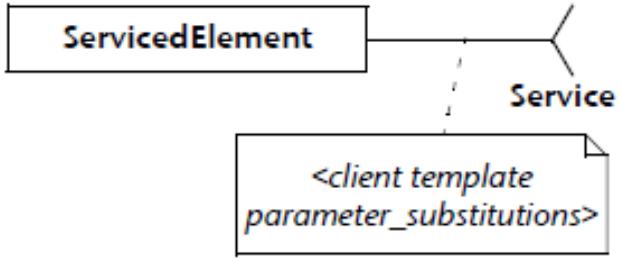


- **Service diagram uses these the most important elements:**
  - **Service specification** is represented by the interaction protocols representing relation between service provider and service client
  - **Service protocol**: interaction protocol representing interaction between service provider and client
  - **Service provision**: UML dependency – an entity type offers the service to the client
  - **Service usage**: UML dependency – an entity type uses the service that is offered by the service provider

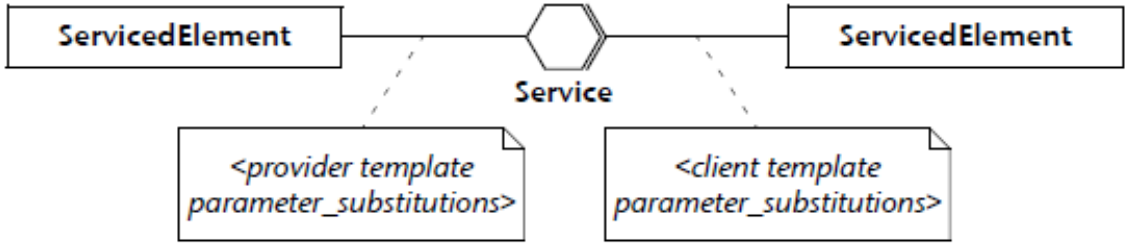
Service diagram
Introduction (3)



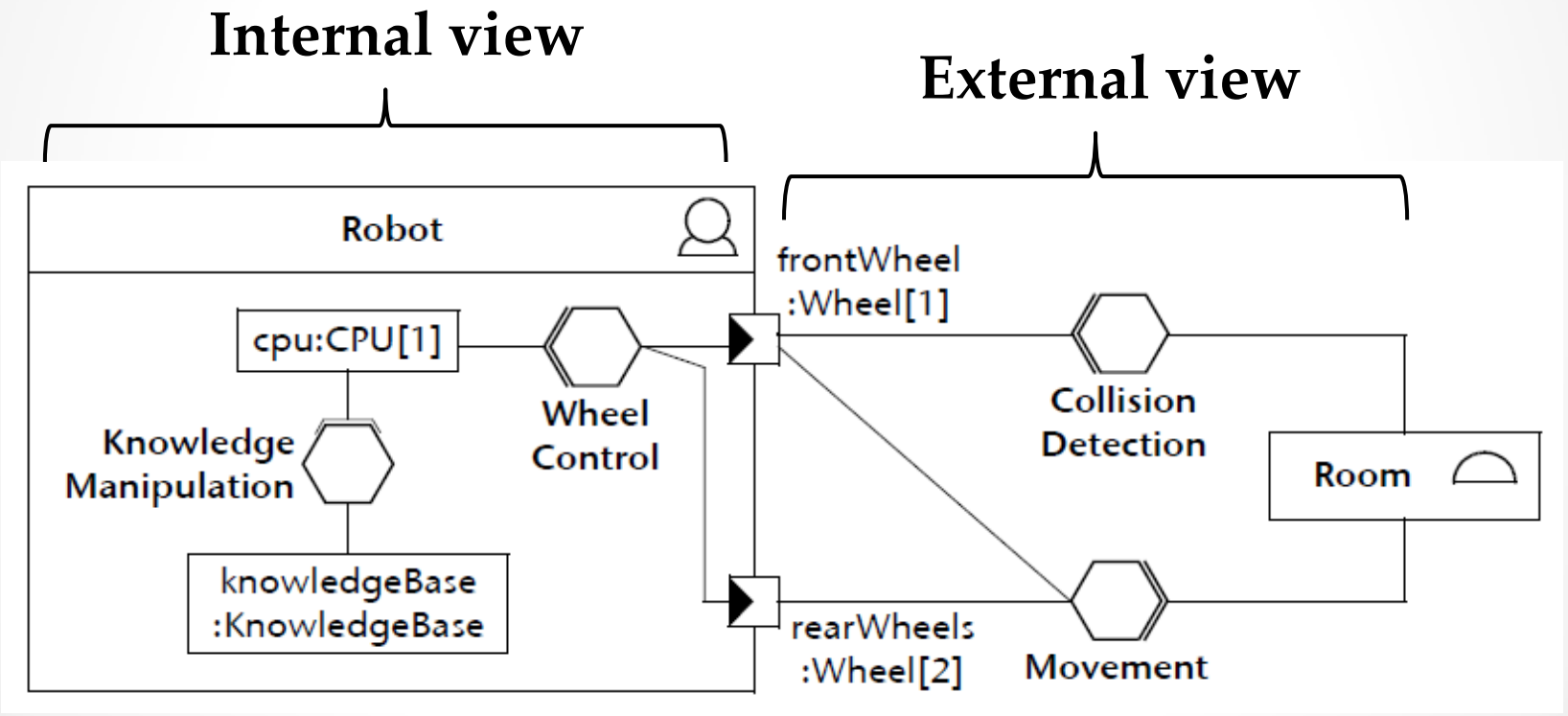
Service provision



Service usage

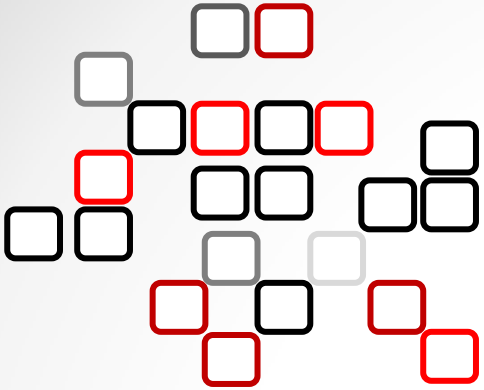


Service diagram
Internal and external view - example



Literature

- Cervenka, R. a Trancansky, I. 2007. *The Agent Modeling Language – AML: A Comprehensive Approach to Modeling Multi-Agent Systems*. Birkhäuser Verlag AG, part of Springer Science+Business Media, 355 p. ISBN 978-3-7643-8395-4.
- Agent Modeling Language: Language Specification. Ver. 09. Whitestein Technologies, 2004.
- Červenka, Trenčanský, Calisti: Modelling Social Aspects of Multi-Agent Systems: The AML approach, www.agentgroup.unimore.it/aose05/papers/43.pdf
- Červenka, Trenčanský, Calisti, Greenwood: AML: Agent Modeling Language – Toward Industry-Grade Agent-Based Modeling. LNCS 3382, Springer-Verlag Berlin Heidelberg, 2005.
- Agent Modeling Language: Toward Industry-Grade Agent-Based Modeling. Whitestein Technologies AG, 2005.



THANK YOU FOR YOUR ATTENTION!