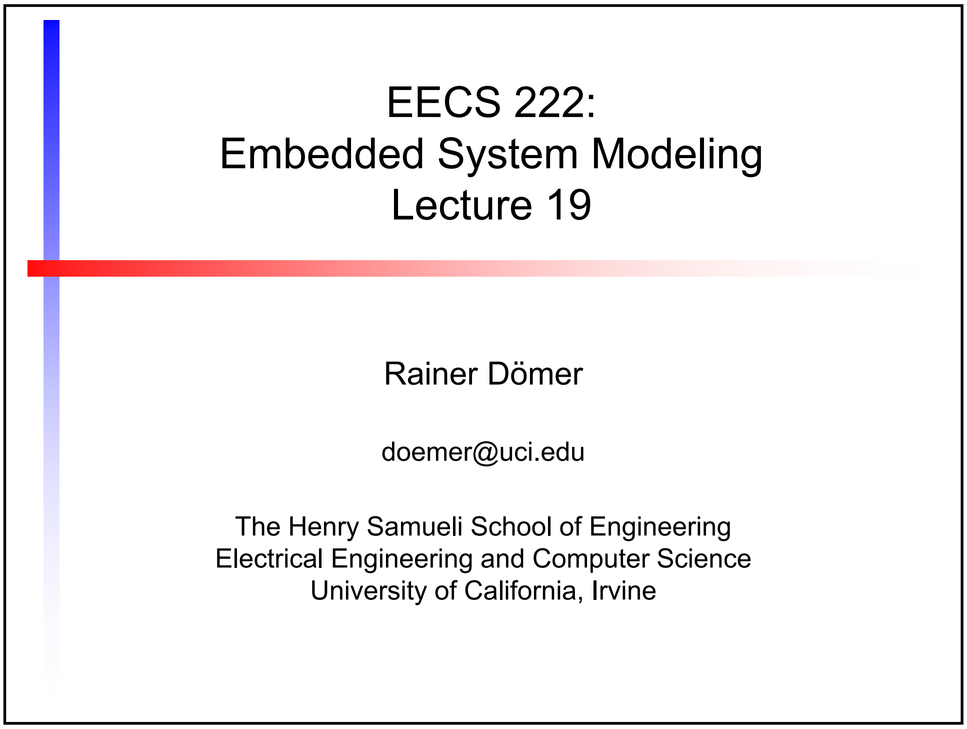
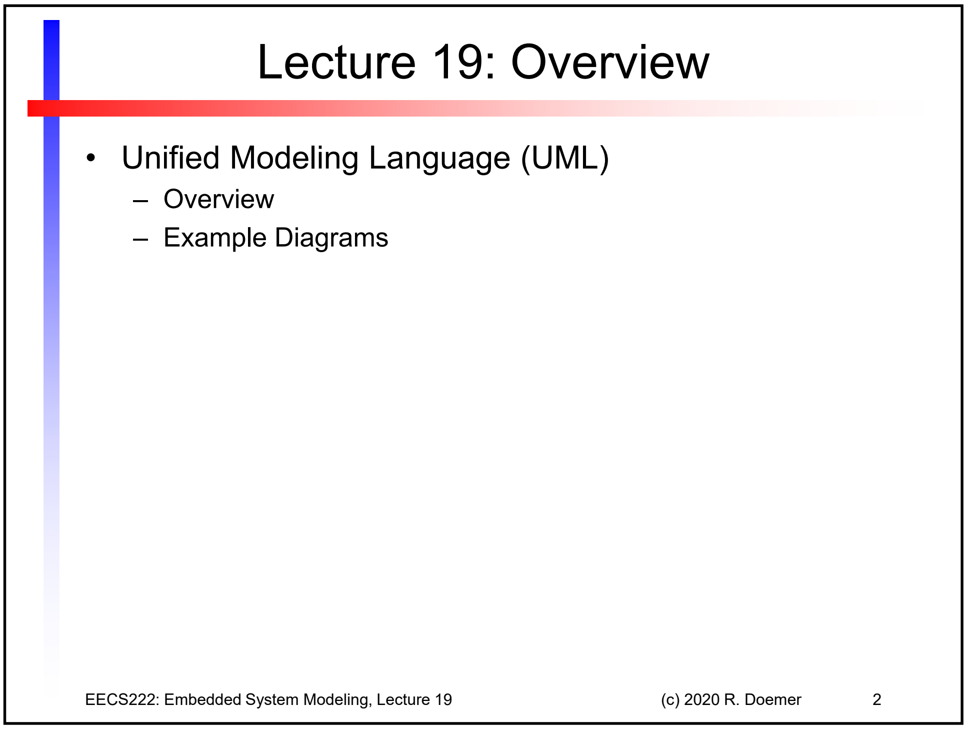


EECS 222:
Embedded System Modeling
Lecture 19

Rainer Dömer

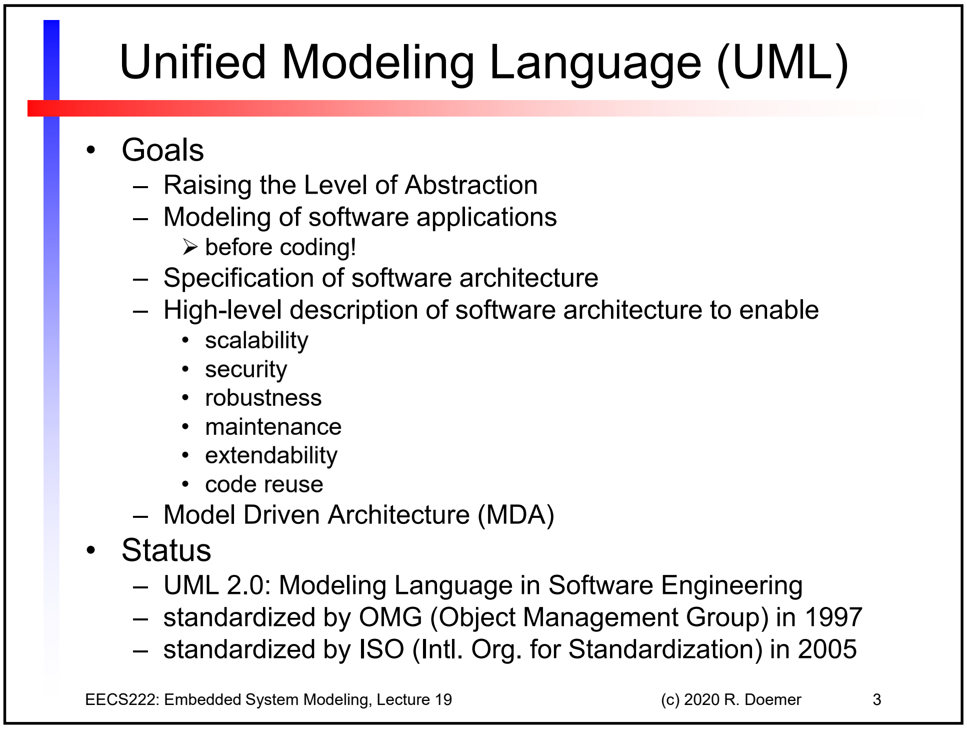
doemer@uci.edu

The Henry Samueli School of Engineering
Electrical Engineering and Computer Science
University of California, Irvine



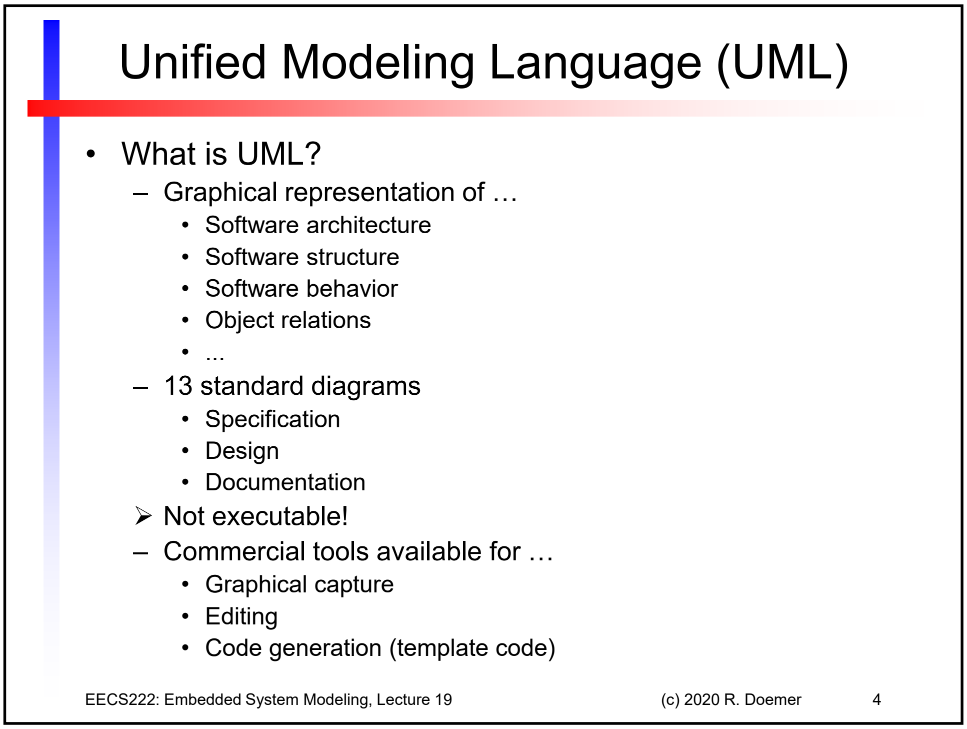
Lecture 19: Overview

- Unified Modeling Language (UML)
  - Overview
  - Example Diagrams



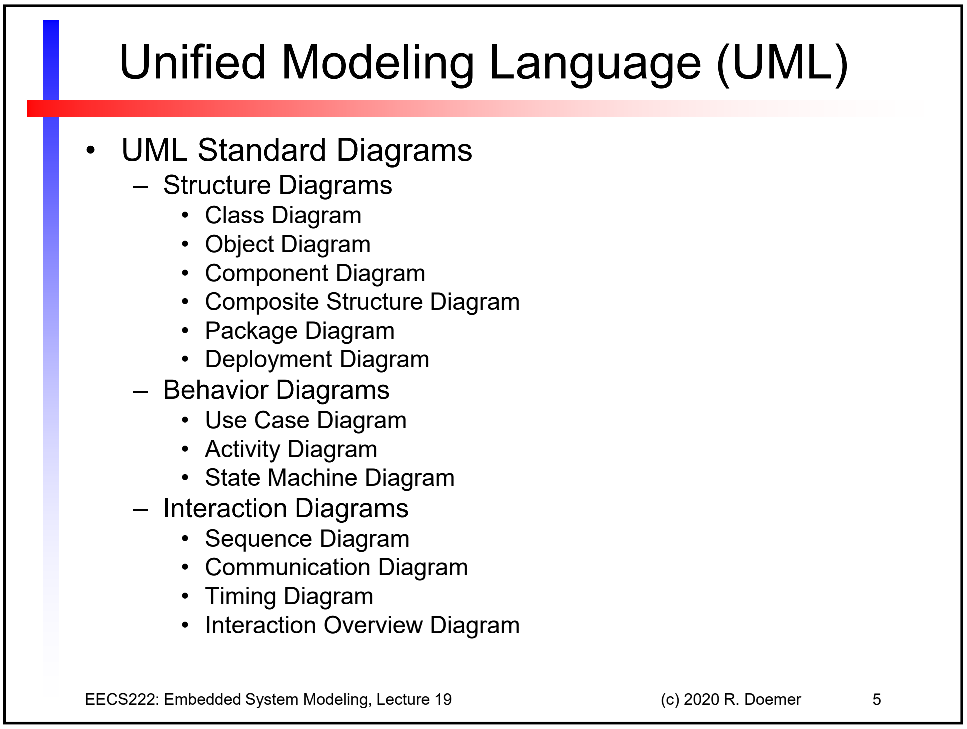
Unified Modeling Language (UML)

- Goals
  - Raising the Level of Abstraction
  - Modeling of software applications
    - ➢ before coding!
  - Specification of software architecture
  - High-level description of software architecture to enable
    - scalability
    - security
    - robustness
    - maintenance
    - extendability
    - code reuse
  - Model Driven Architecture (MDA)
- Status
  - UML 2.0: Modeling Language in Software Engineering
  - standardized by OMG (Object Management Group) in 1997
  - standardized by ISO (Intl. Org. for Standardization) in 2005



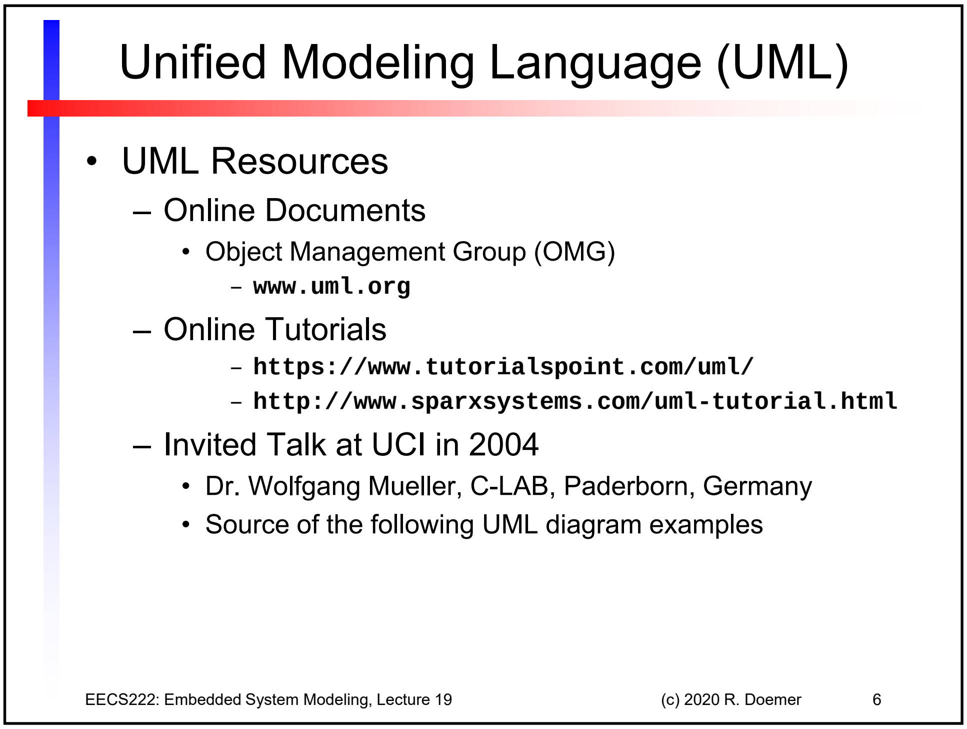
Unified Modeling Language (UML)

- What is UML?
  - Graphical representation of …
    - Software architecture
    - Software structure
    - Software behavior
    - Object relations
    - ...
  - 13 standard diagrams
    - Specification
    - Design
    - Documentation
  - ➢ Not executable!
  - Commercial tools available for …
    - Graphical capture
    - Editing
    - Code generation (template code)



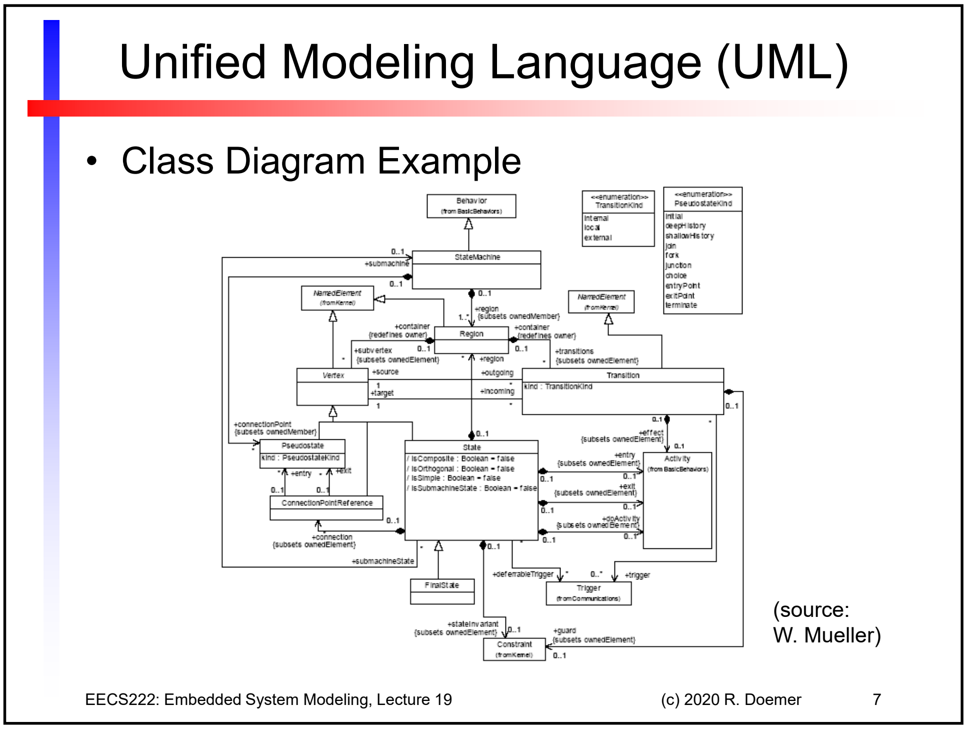
Unified Modeling Language (UML)

- UML Standard Diagrams
  - Structure Diagrams
    - Class Diagram
    - Object Diagram
    - Component Diagram
    - Composite Structure Diagram
    - Package Diagram
    - Deployment Diagram
  - Behavior Diagrams
    - Use Case Diagram
    - Activity Diagram
    - State Machine Diagram
  - Interaction Diagrams
    - Sequence Diagram
    - Communication Diagram
    - Timing Diagram
    - Interaction Overview Diagram



Unified Modeling Language (UML)

- UML Resources
  - Online Documents
    - Object Management Group (OMG)
      - `www.uml.org`
  - Online Tutorials
      - `https://www.tutorialspoint.com/uml/`
      - `http://www.sparxsystems.com/uml-tutorial.html`
  - Invited Talk at UCI in 2004
    - Dr. Wolfgang Mueller, C-LAB, Paderborn, Germany
    - Source of the following UML diagram examples

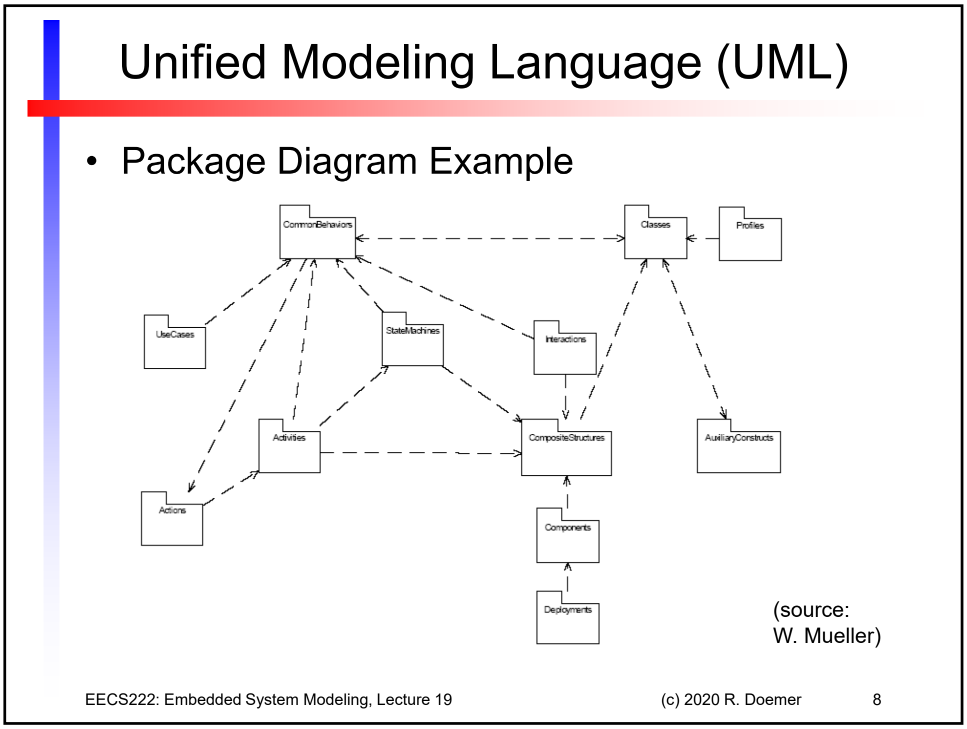


Unified Modeling Language (UML)

- Class Diagram Example

(source:
W. Mueller)

EECS222: Embedded System Modeling, Lecture 19 (c) 2020 R. Doemer 7



Unified Modeling Language (UML)

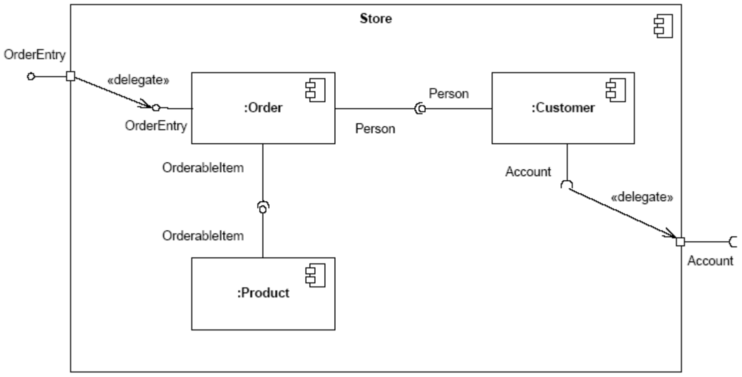
- Package Diagram Example

(source:
W. Mueller)

EECS222: Embedded System Modeling, Lecture 19 (c) 2020 R. Doemer 8

Unified Modeling Language (UML)

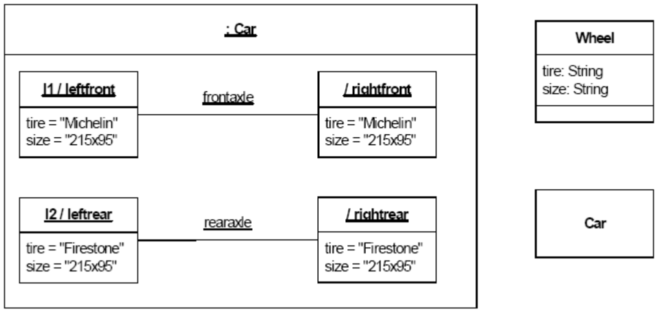
- Component Diagram Example



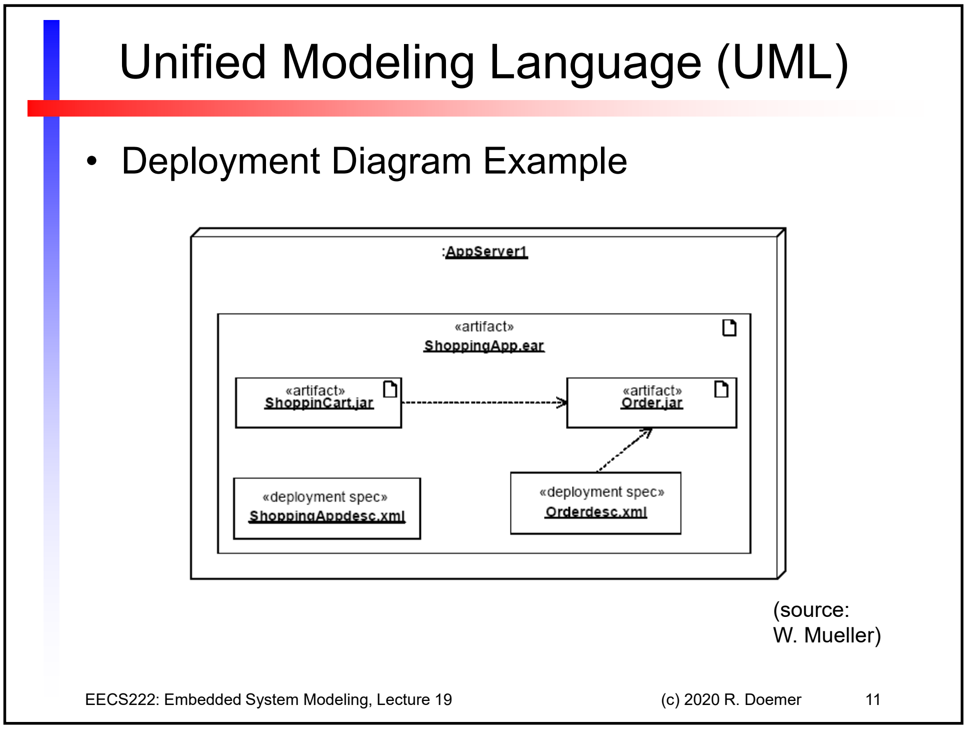
(source: W. Mueller)

Unified Modeling Language (UML)

- Composite Structure Diagram Example



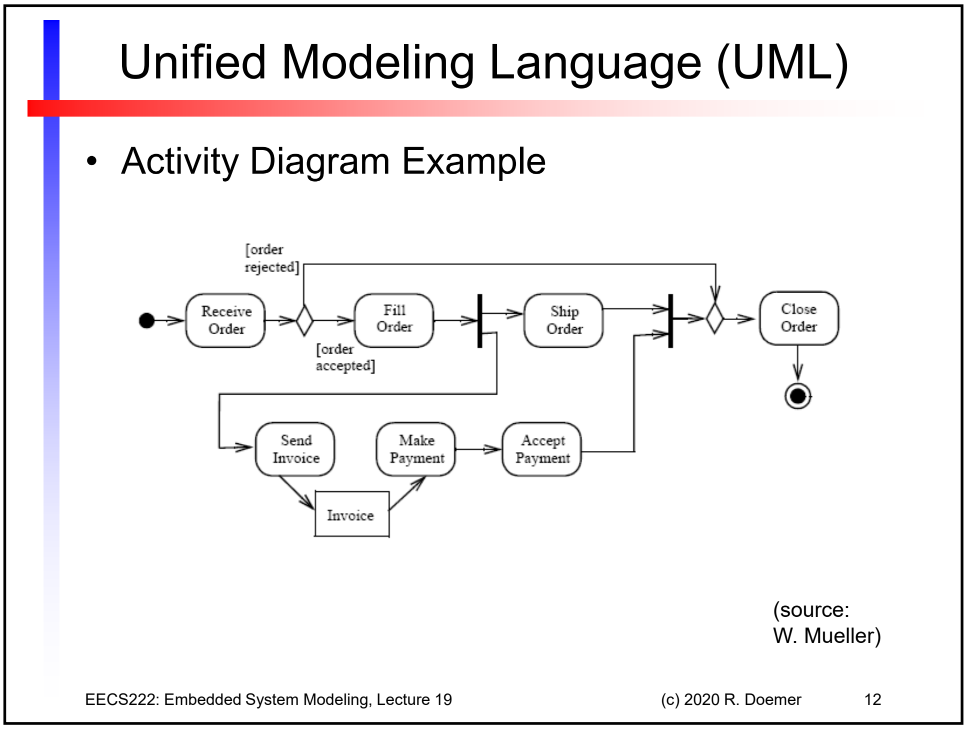
(source: W. Mueller)



Unified Modeling Language (UML)

- Deployment Diagram Example

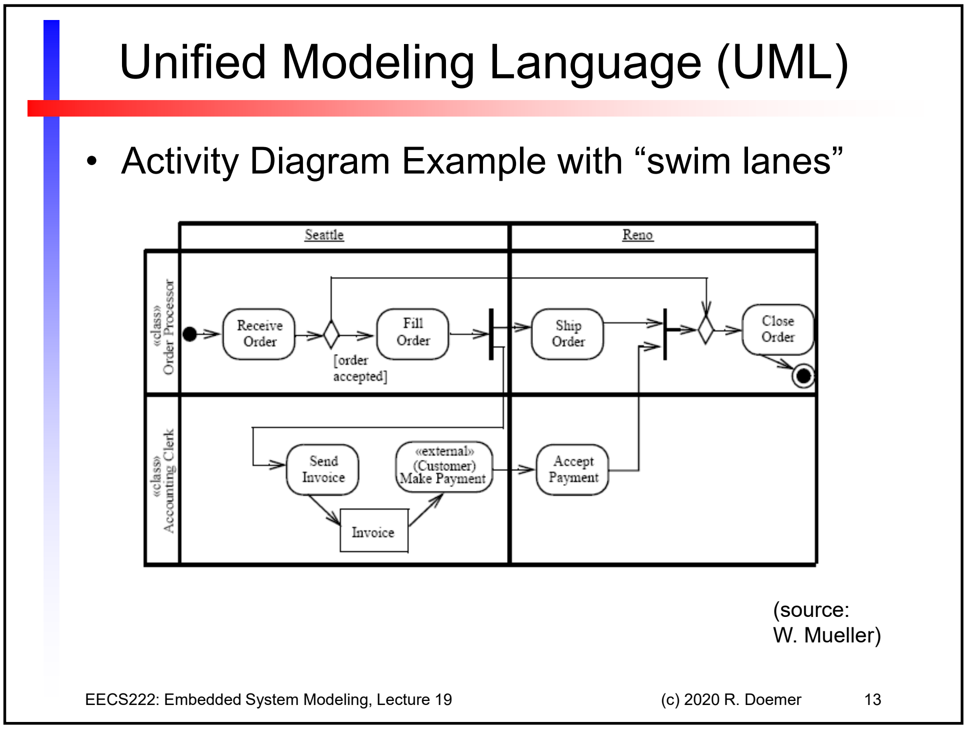
(source:
W. Mueller)



Unified Modeling Language (UML)

- Activity Diagram Example

(source:
W. Mueller)

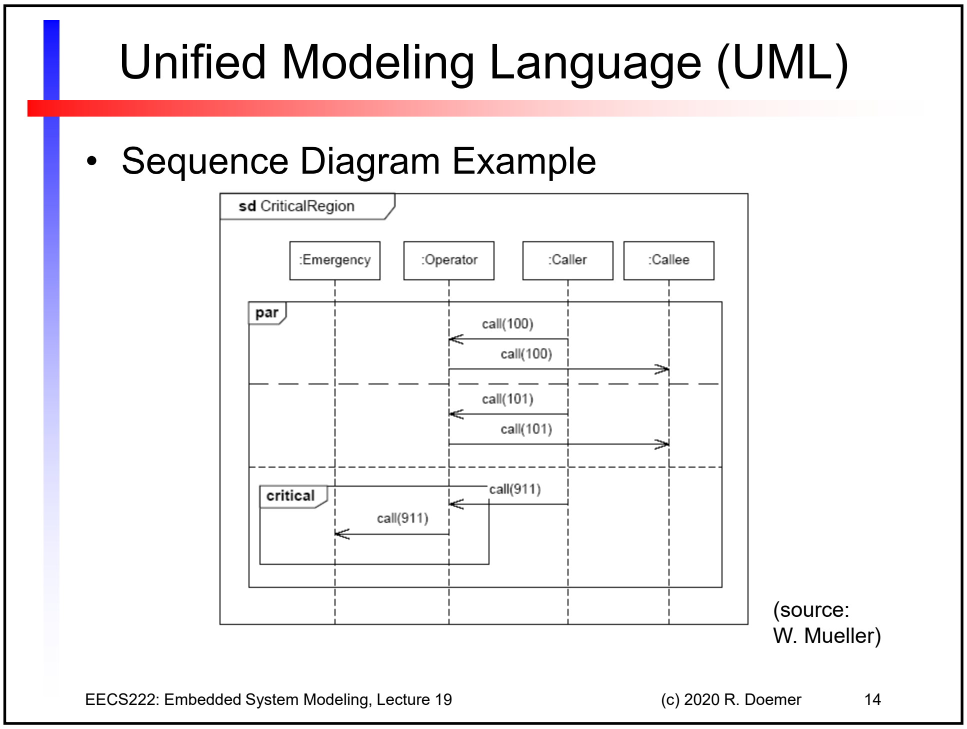


Unified Modeling Language (UML)

- Activity Diagram Example with “swim lanes”

(source: W. Mueller)

EECS222: Embedded System Modeling, Lecture 19 (c) 2020 R. Doemer 13

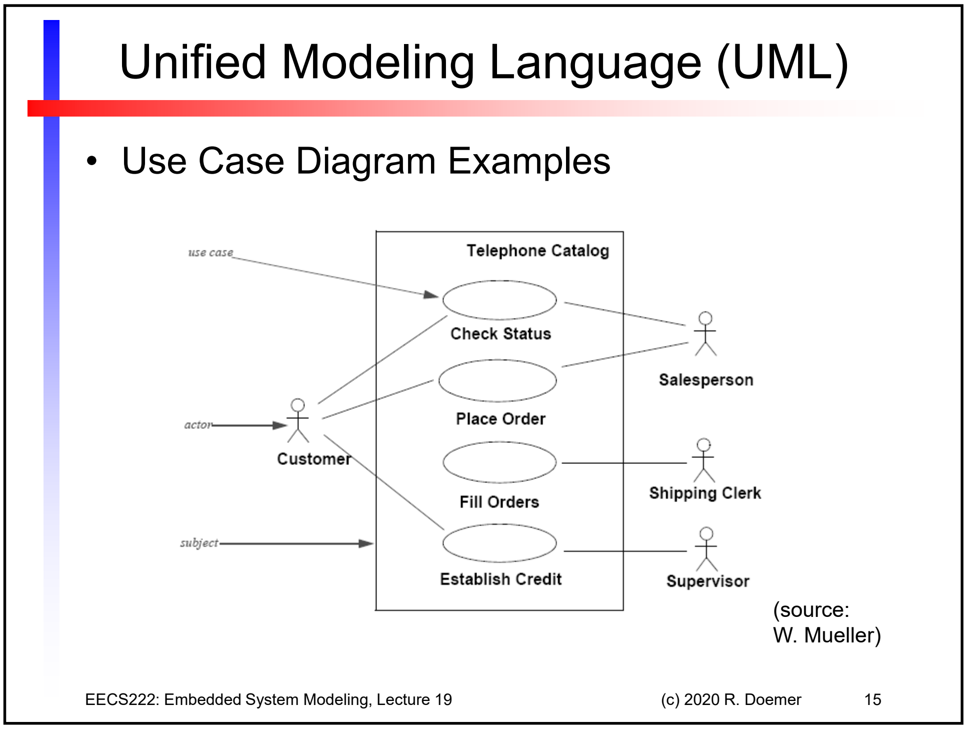


Unified Modeling Language (UML)

- Sequence Diagram Example

(source: W. Mueller)

EECS222: Embedded System Modeling, Lecture 19 (c) 2020 R. Doemer 14

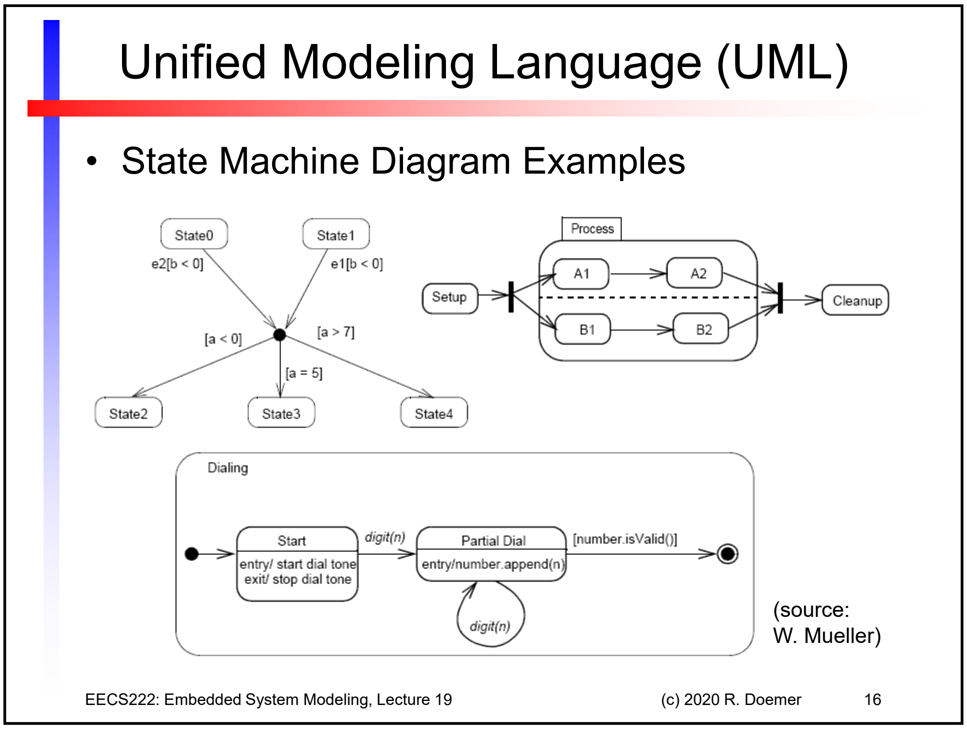


Unified Modeling Language (UML)

- Use Case Diagram Examples

(source:
W. Mueller)

EECS222: Embedded System Modeling, Lecture 19 (c) 2020 R. Doemer 15



Unified Modeling Language (UML)

- State Machine Diagram Examples

(source:
W. Mueller)

EECS222: Embedded System Modeling, Lecture 19 (c) 2020 R. Doemer 16