SE 3140

DESIGN AND MODELLING

M. Mangong Clement

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Chapter IV :

Dynamic interaction Modeling

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IV. Dynamic interaction modeling

❑ UML Overview : What is UML?

➢ A graphical language for visualizing, specifying, constructing, and documenting the artifacts of a software-intensive system.

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❑ UML Overview : What is UML?

- A standardized general-purpose modeling language in the field of object-oriented software engineering.

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❑ UML Overview : What is UML?

➢ UML Model Vs Set of diagrams of a system.

- A diagram is a partial graphic representation of a system's model
- The model also contains documentation that drives the model elements and diagrams (such as written use cases).

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❑ UML Overview : Modeling

- ➢ **UML diagrams representing views of a system model.**
- Two different views

1. **Static (or structural) view**
2. **Dynamic (or behavioral) view**

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❑ UML Overview : Modeling

1. Static (or structural) view

- This view emphasizes the static structure of the system using objects, attributes, operations, and relationships. Ex: Class diagram, Composite Structure diagram.

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❑ UML Overview : Modeling

1. Static (or structural) view

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❑ UML Overview : Modeling

2. Dynamic(or behavioral) view

- This view emphasizes the dynamic behavior of the system by showing collaborations among objects and changes to the internal states of objects. Ex: Sequence diagram, Activity diagram, State Machine diagram.

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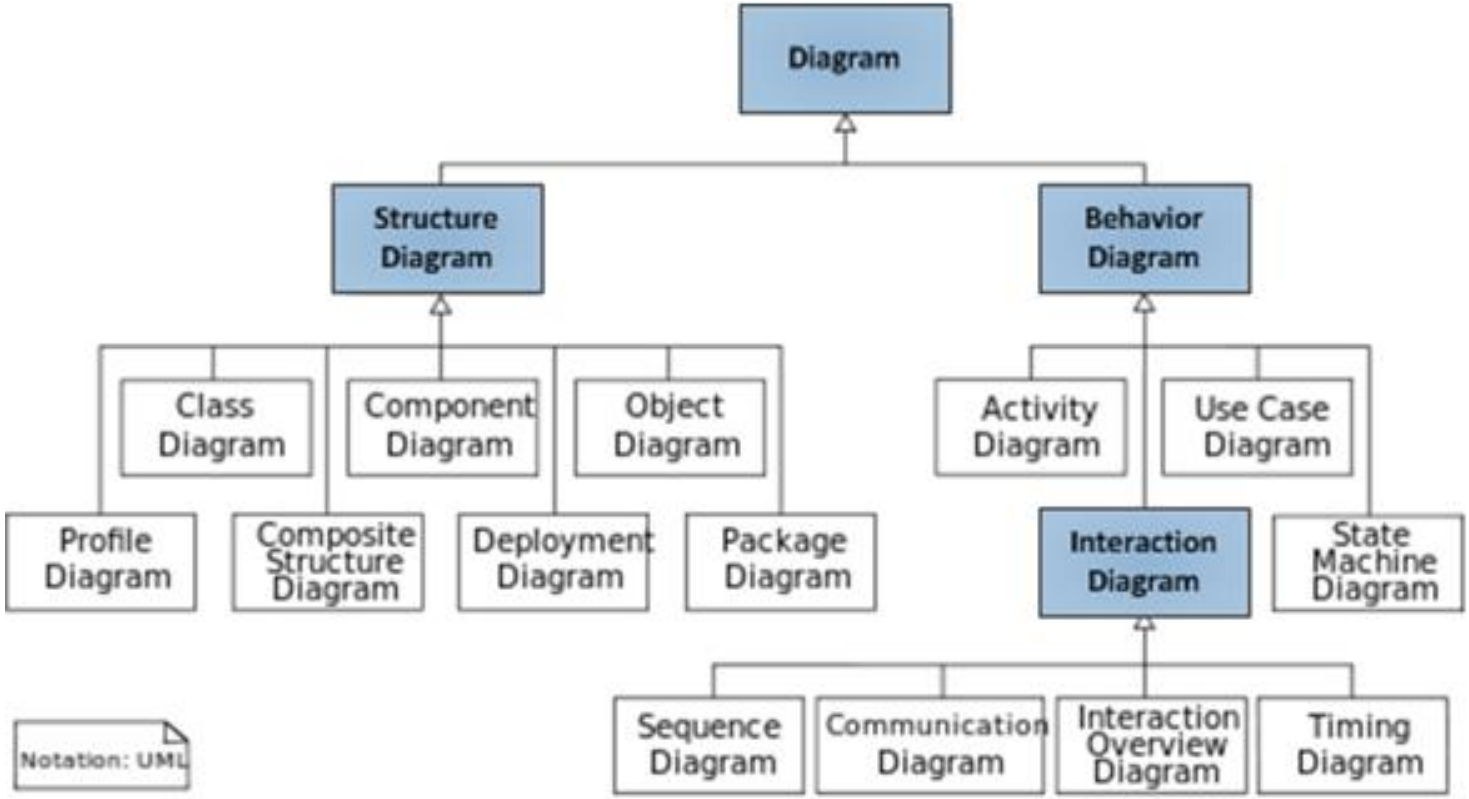
❑ UML Overview : Diagrams



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❑ UML Overview : Diagrams

- **Structure Diagram**

1. Class Diagram :

➢ Describes the structure of a system by showing the system's classes, their attributes, and the relationships among the classes.

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❑ UML Overview : Diagrams

- **Structure Diagram**

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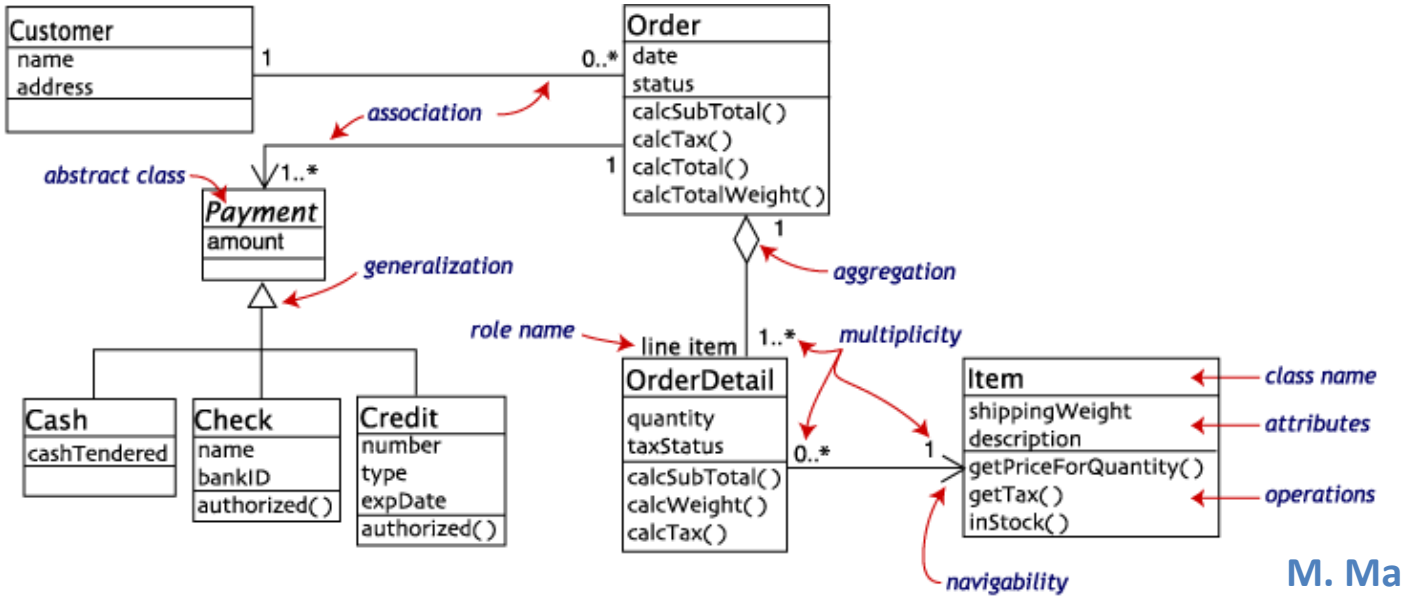
❑ UML Overview : Diagrams

- **Structure Diagram**

1. Class Diagram :Example



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❑ UML Overview : Diagrams

- **Structure Diagram**

2. Component Diagram

➢ Describes how a software system is split-up into components and shows the dependencies among these components.

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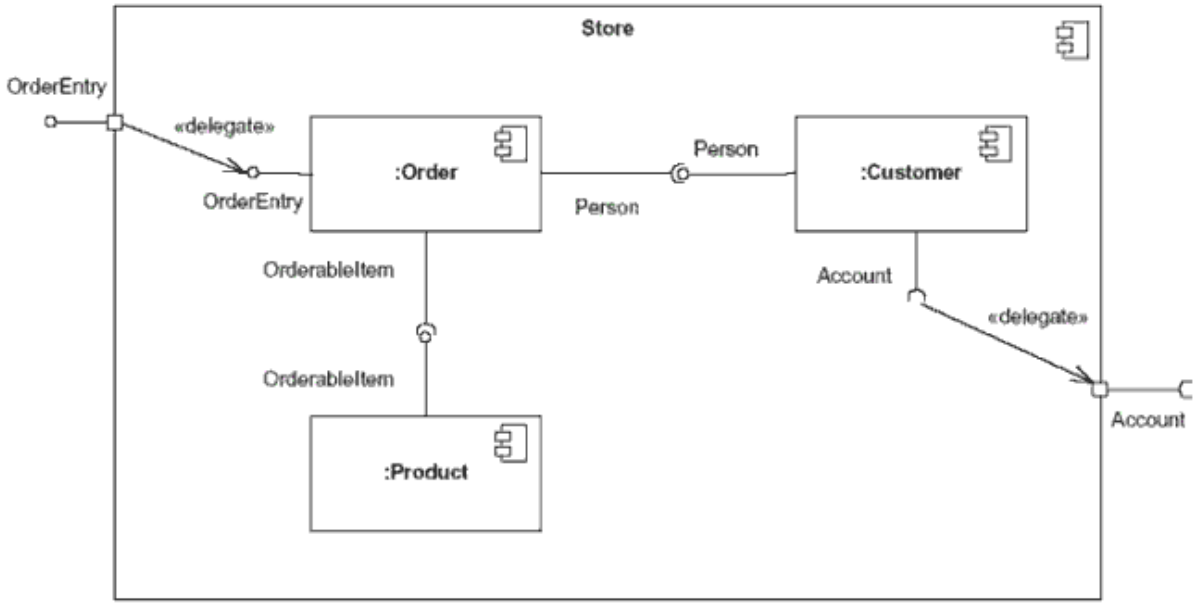
❑ UML Overview : Diagrams

- **Structure Diagram**

2. Component Diagram : Example



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❑ UML Overview : Diagrams

- **Structure Diagram**

3. Composite Structure Diagram

➢ Describes the internal structure of a class and the collaborations that this structure makes possible.

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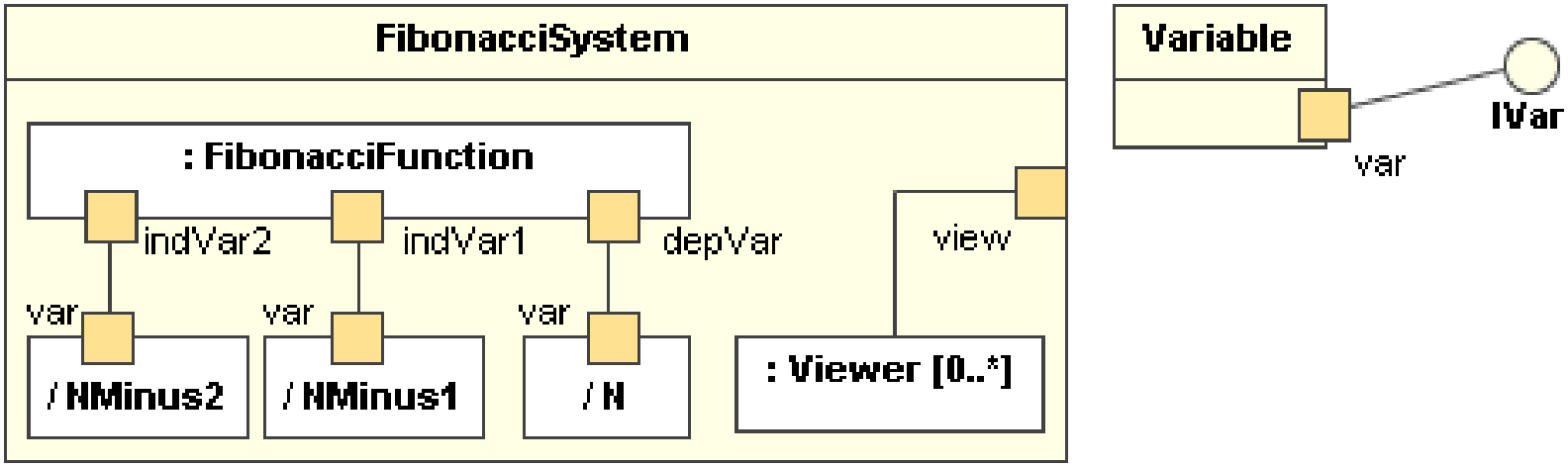
❑ UML Overview : Diagrams

- **Structure Diagram**

3. Composite Structure Diagram: Example



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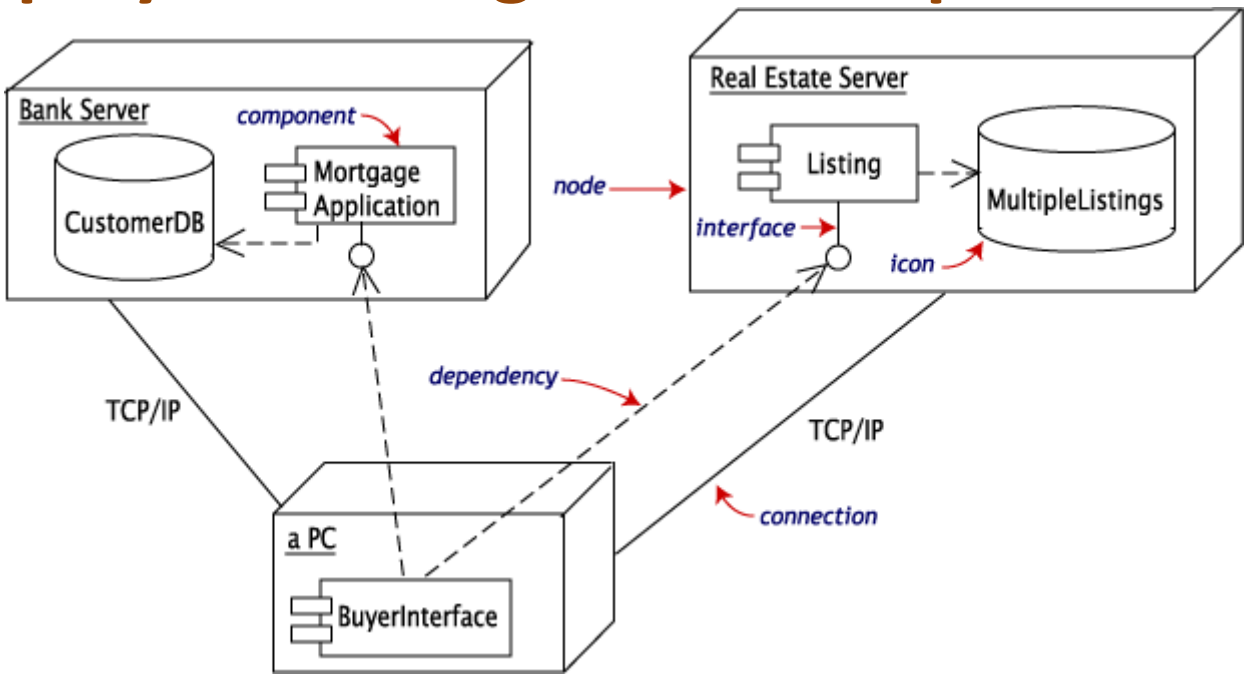
❑ UML Overview : Diagrams

- **Structure Diagram**

4. Deployment Diagram : Example



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❑ UML Overview : Diagrams

- **Structure Diagram**

5. Object Diagram

➢ Shows a complete or partial view of the structure of an example modeled system at a specific time.

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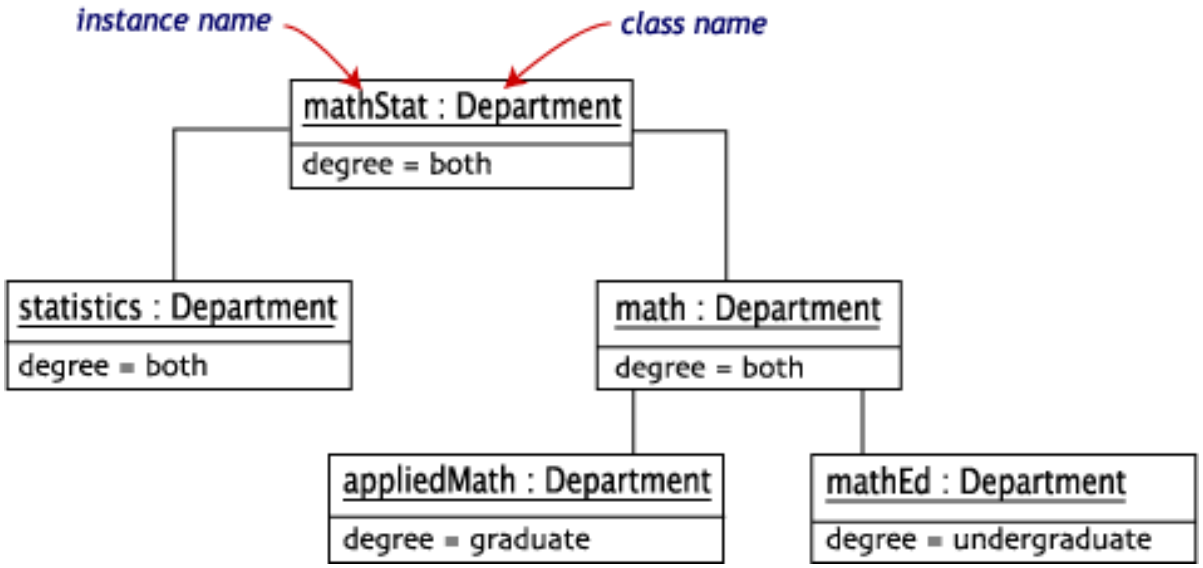
❑ UML Overview : Diagrams

- **Structure Diagram**

5. Object Diagram: Diagram



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❑ UML Overview : Diagrams

- **Structure Diagram**

6. Package Diagram

➢ Describes how a system is split-up into logical groupings by showing the dependencies among these groupings.

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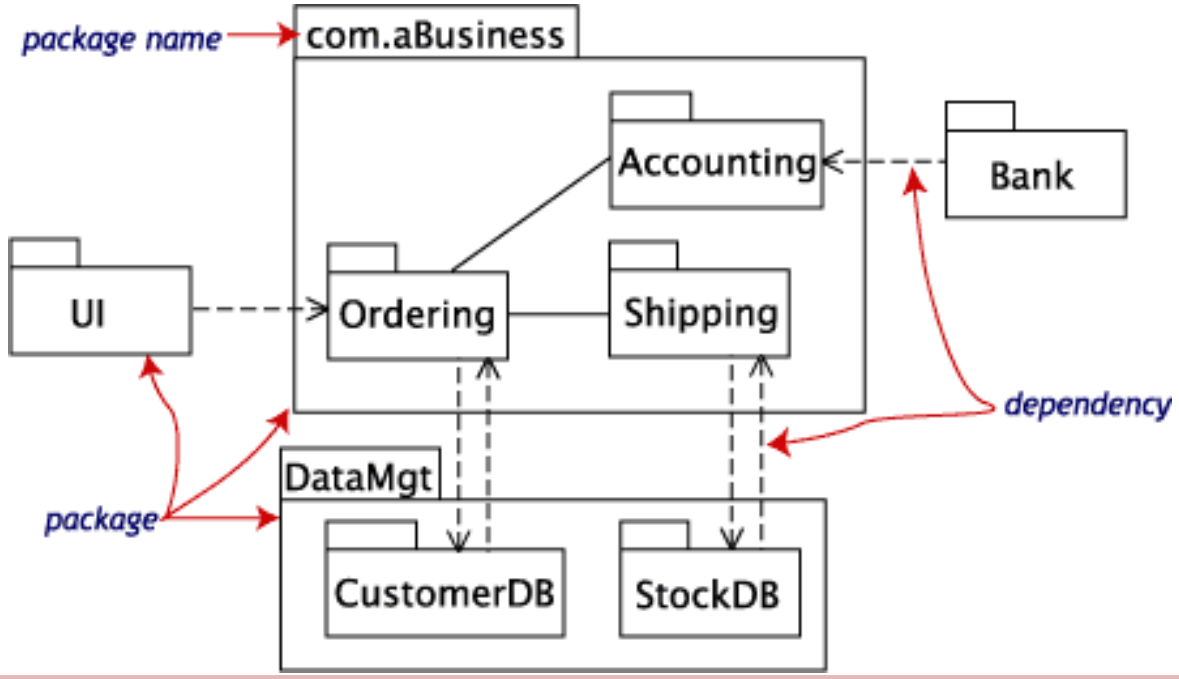
❑ UML Overview : Diagrams

- **Structure Diagram**

6. Package Diagram: Example



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❑ UML Overview : Diagrams

- **Structure Diagram**

7. Profile Diagram

➢ Operates at the metamodel level to show stereotypes as classes with the <<stereotype>> stereotype, and profiles as packages with the <<profile>> stereotype. The extension relation (solid line with closed, filled arrowhead) indicates what metamodel element a given stereotype is extending

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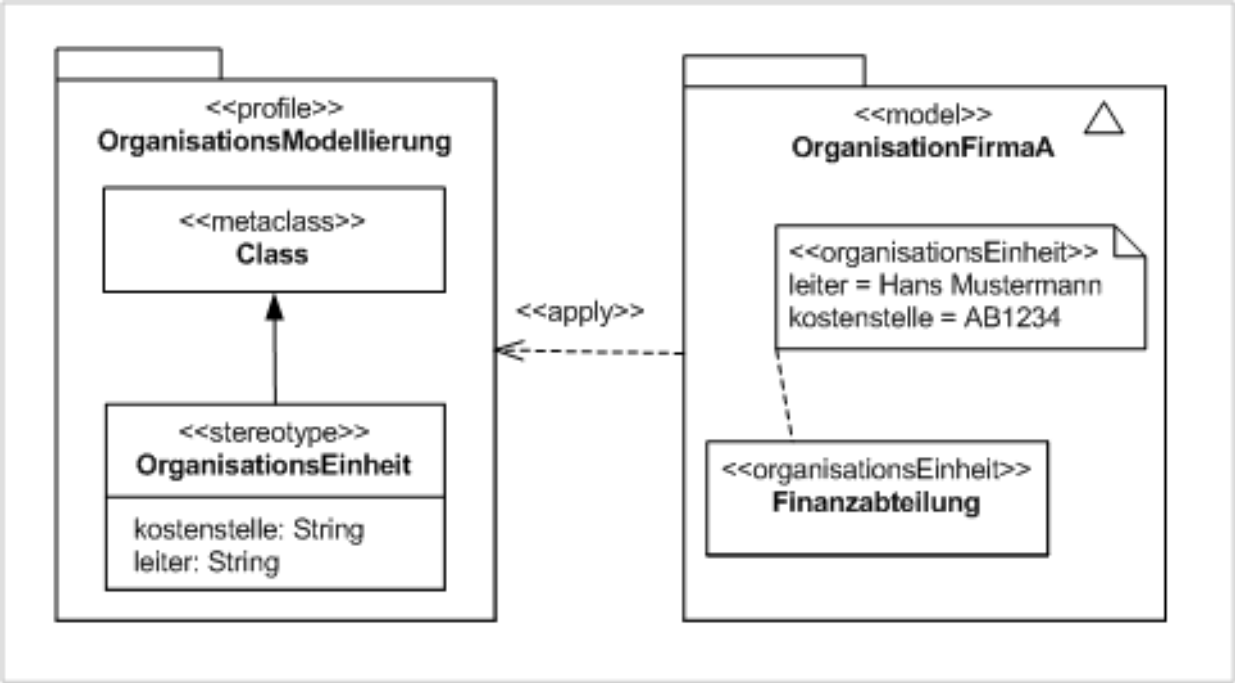
❑ UML Overview : Diagrams

- **Structure Diagram**

7. Profile Diagram: Example



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❑ UML Overview : Diagrams

- **Behavior Diagrams**

1. Activity Diagram

- ➢ Describes the business and operational step-by-step workflows of components in a system.
- ➢ An activity diagram shows the overall flow of control.

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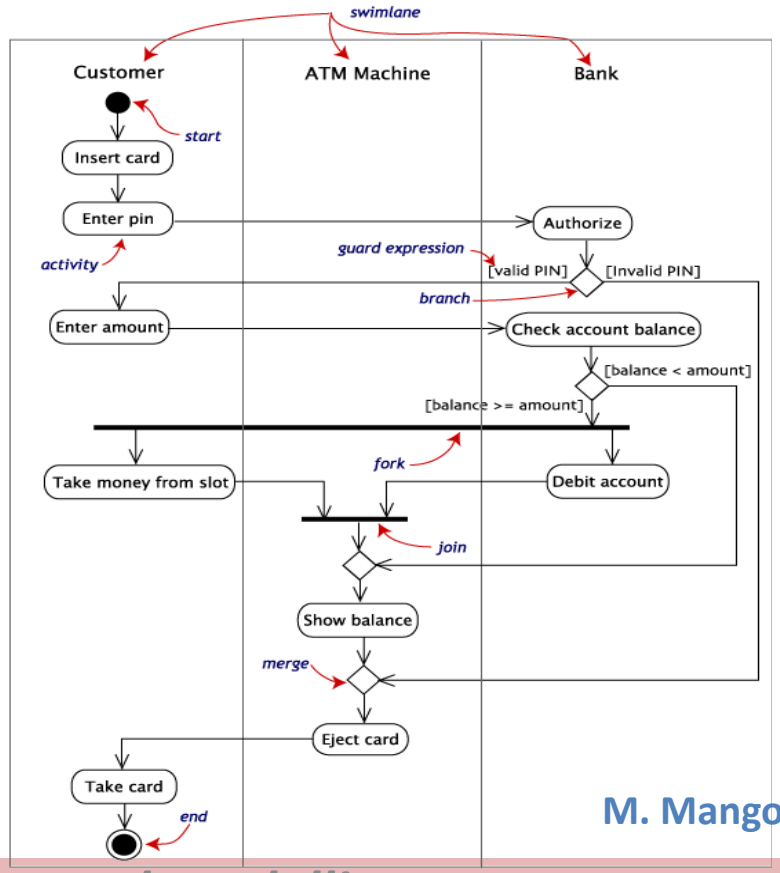
❑ UML Overview : Diagrams

- **Behavior Diagrams**

1. Activity Diagram Example



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❑ UML Overview : Diagrams

- **Behavior Diagrams**

2. State Machine Diagram

Describes the states and state transitions of the system.

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❑ UML Overview : Diagrams

- **Behavior Diagrams**

3. Use case diagram

➢ Describes the functionality provided by a system in terms of actors, their goals represented as use cases, and any dependencies among those use cases

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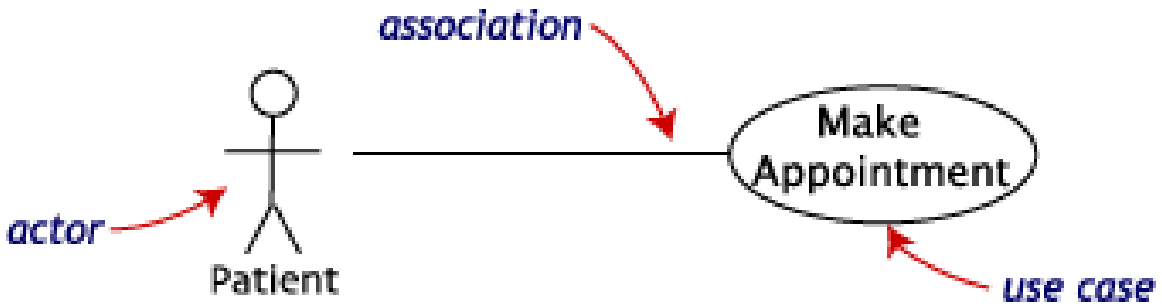
❑ UML Overview : Diagrams

- **Behavior Diagrams**

3. Use case diagram : Example 1



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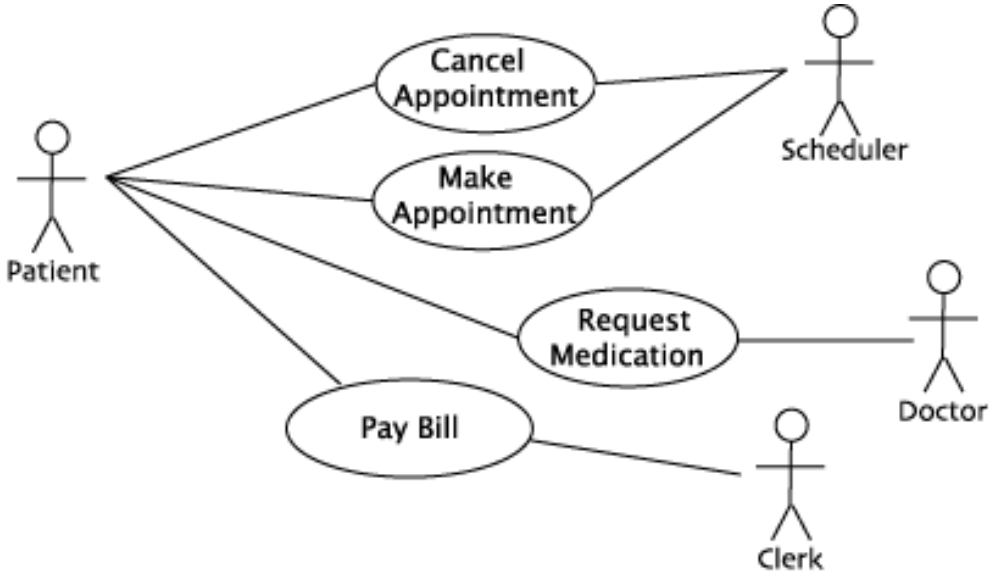
❑ UML Overview : Diagrams

- **Behavior Diagrams**

3. Use case diagram : Example 2



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❑ UML Overview : Diagrams

- **Interaction Diagrams**

1. Communication diagram

- ➢ Shows the interactions between objects or parts in terms of sequenced messages.
- ➢ They represent a combination of information taken from Class, Sequence, and Use Case Diagrams describing both the static structure and dynamic behavior of a system.

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❑ UML Overview : Diagrams

- **Interaction Diagrams**

2. Interaction Overview Diagram

- Provides an overview in which the nodes represent communication diagrams.
- They are activity diagrams in which every node, instead of being an activity, is a rectangular frame containing an interaction diagram (i.e., a communication, interaction overview, sequence, or UML timing diagram)

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❑ UML Overview : Diagrams

- **Interaction Diagrams**

3. Sequence Diagram

- ➢ Shows how objects communicate with each other in terms of a sequence of messages.
- ➢ Also indicates the lifespans of objects relative to those messages.

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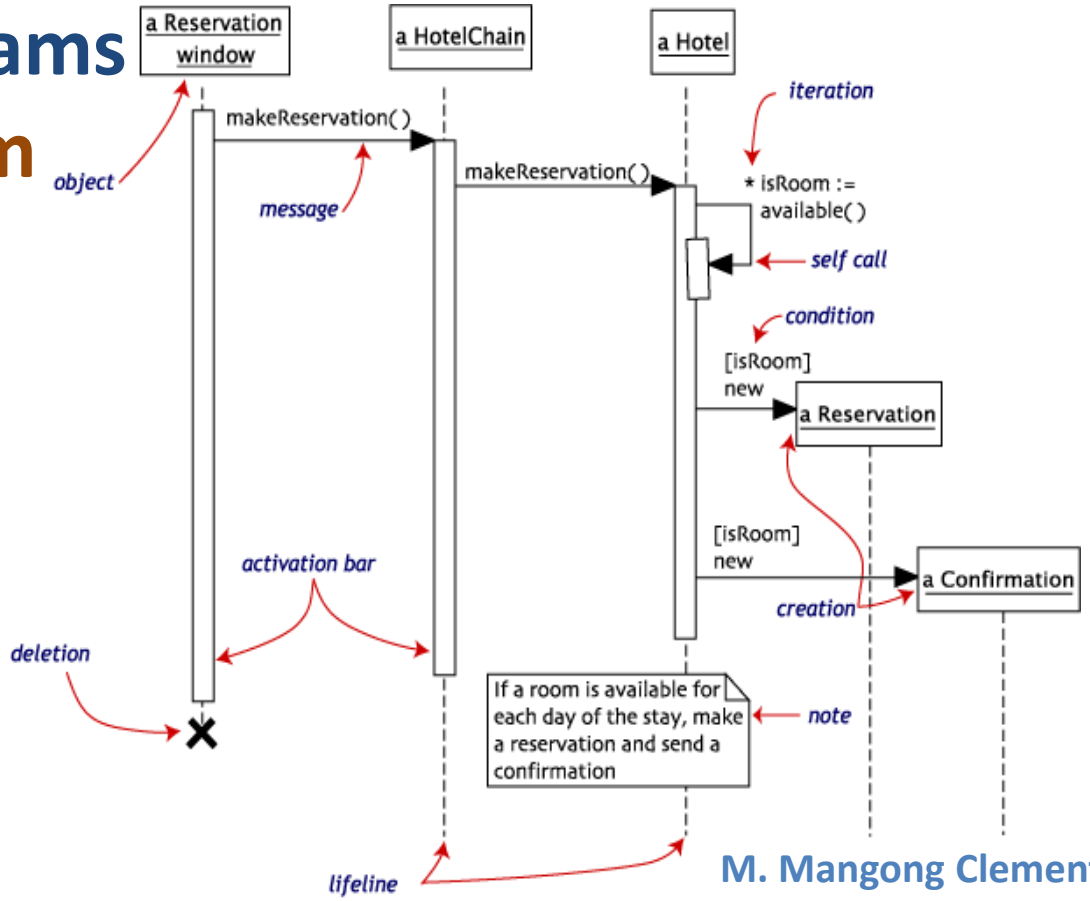
❑ UML Overview : Diagrams

- **Interaction Diagrams**

3. Sequence Diagram



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❑ UML Overview : Diagrams

- **Interaction Diagrams**

4. Timing Diagram

- A specific type of interaction diagram where the focus is on timing constraints.
- Timing diagrams model sequence of events and their effects on states and property values.
- Time flows along a horizontal axis from left to right. They can be used to show method execution profiling or concurrency scenarios.

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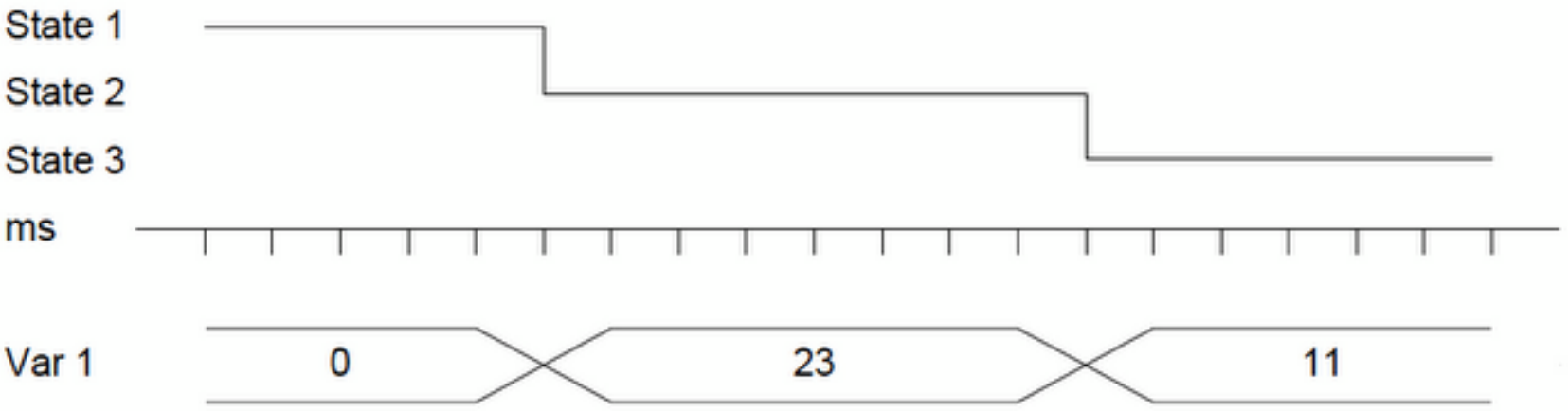
❑ UML Overview : Diagrams

- **Interaction Diagrams**

4. Timing Diagram : Example



QUESTIONS