

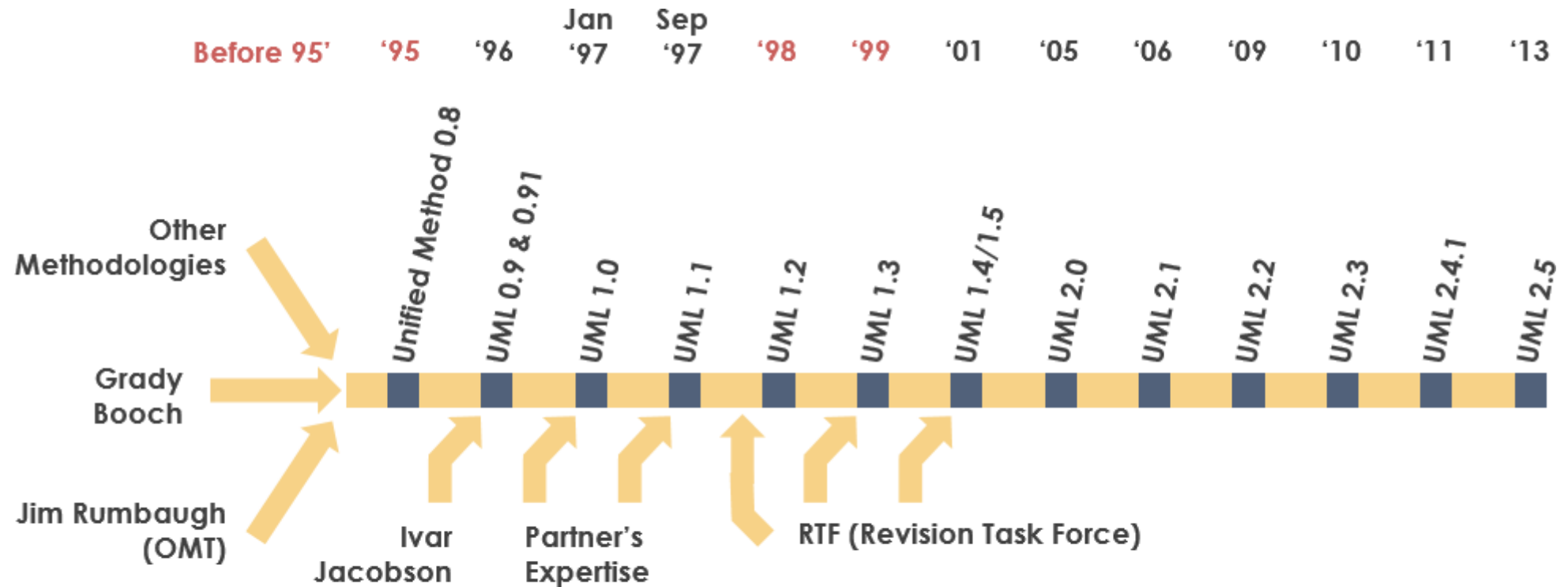
# UML

Martin Koutník

# Unified Modeling Language

- Modelovací/Vizuální jazyk
- Standart pro vizualizaci
- Chování a struktura
- OMG 1997
- UML 2.5

- Komunikace
- Srozumitelnost
- Šetřič času



Before 95' - Fragmentation ► 95' - Unification ► 98' - Standardization ► 99' - Industrialization

# UML Diagram Type

## Structural Diagrams

Composite Structure Diagram

Deployment Diagram

Package Diagram

Profile Diagram

Class Diagram

Object Diagram

Component Diagram

## Behavioral Diagrams

Activity Diagram

Use Case Diagram

State Machine Diagram

Interaction Diagram

Sequence Diagram

Communication Diagram

Interaction Overview Diagram

Timing Diagram

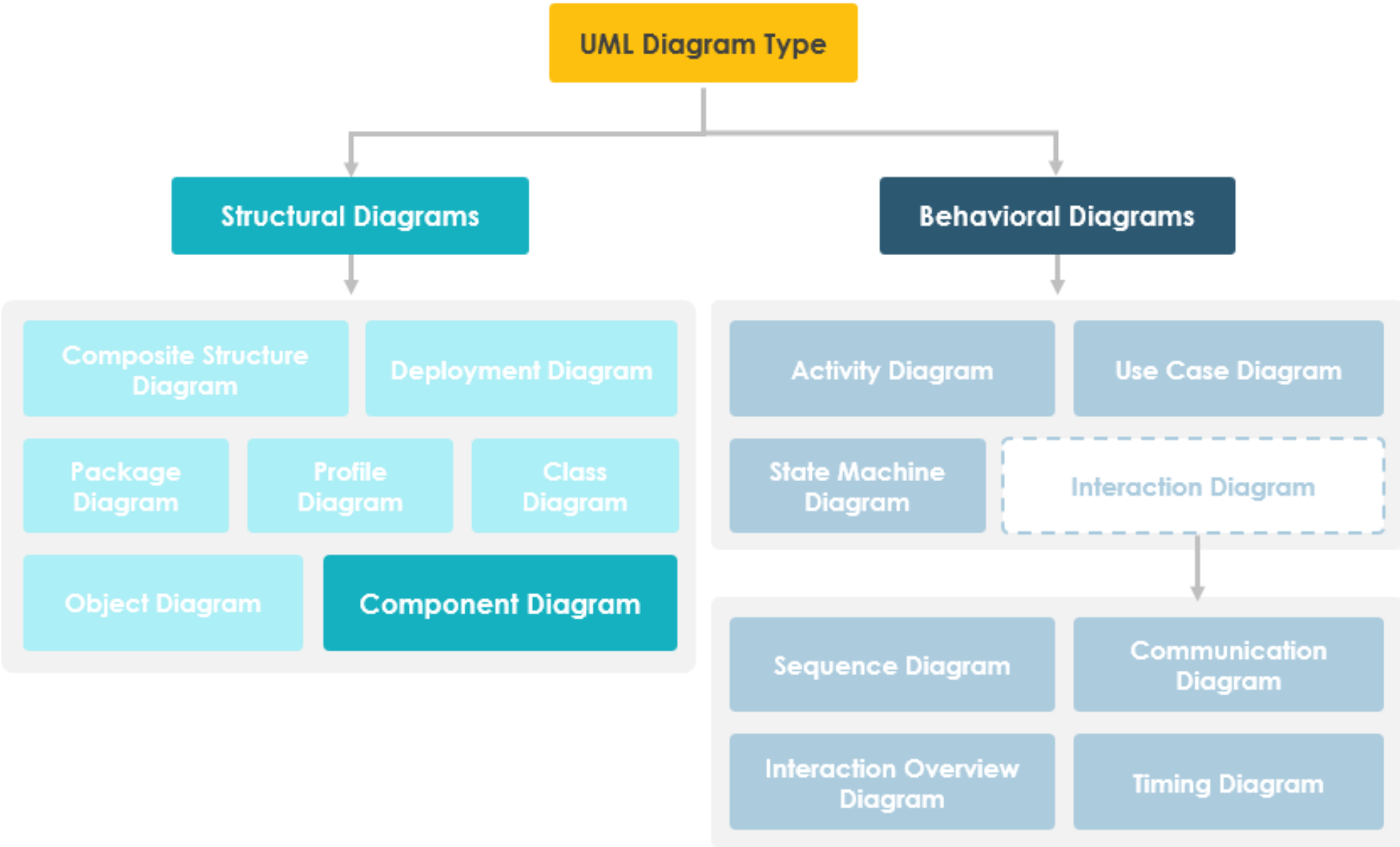
# Typy

## Structural Diagrams

- Static
- Component Diagrams
- Object Diagrams
- Class Diagrams
- Deployment Diagrams

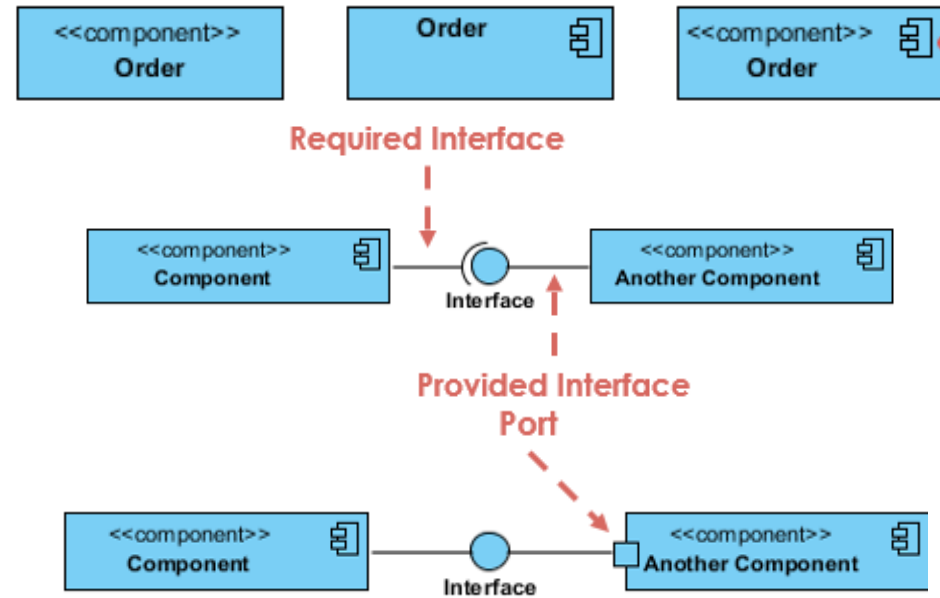
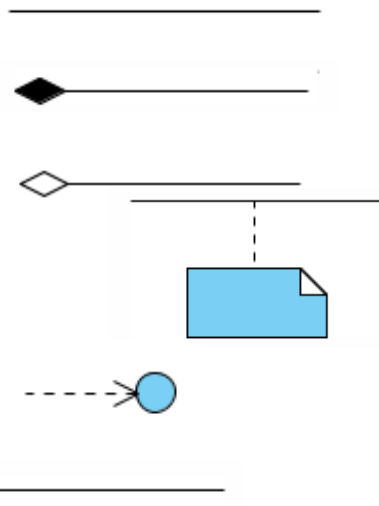
## Behavior Diagrams

- Dynamic
- Use Case Diagrams
- State Diagrams
- Activity Diagrams
- Interaction Diagrams

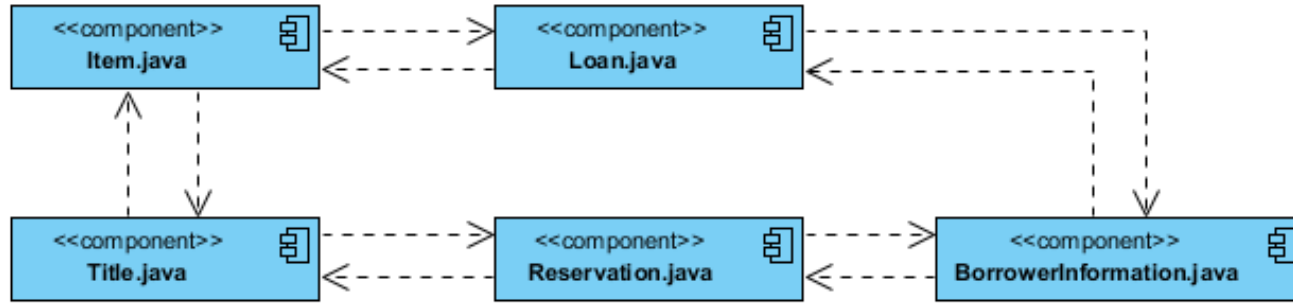


# Component Diagram

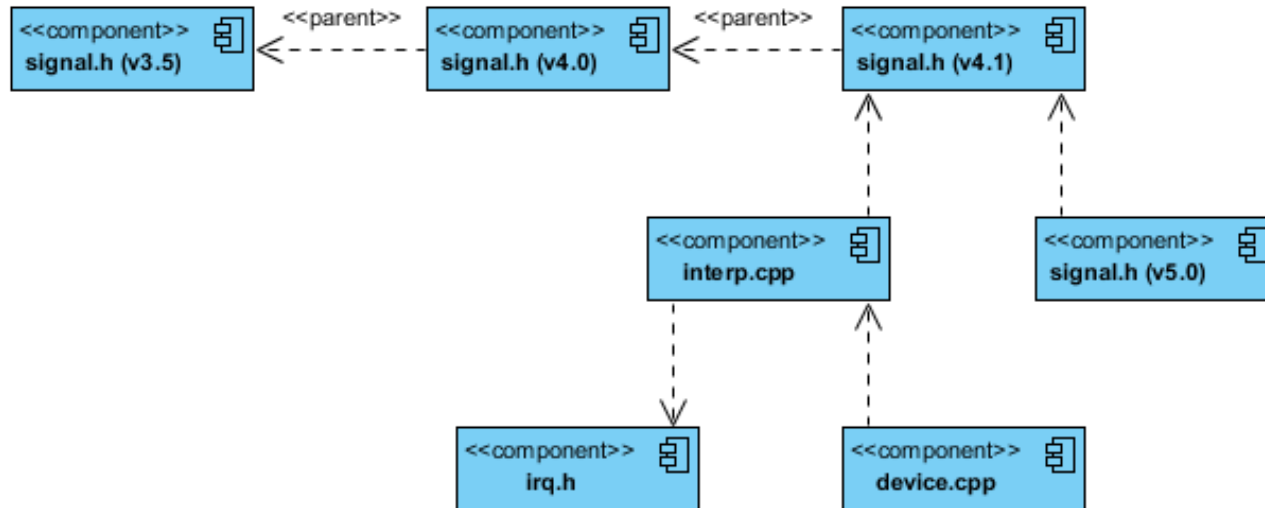
- Fyzické aspekty OOS
- Interface
- Port
- Association
- Composition
- Aggregation
- Constraint
- Dependency
- Links



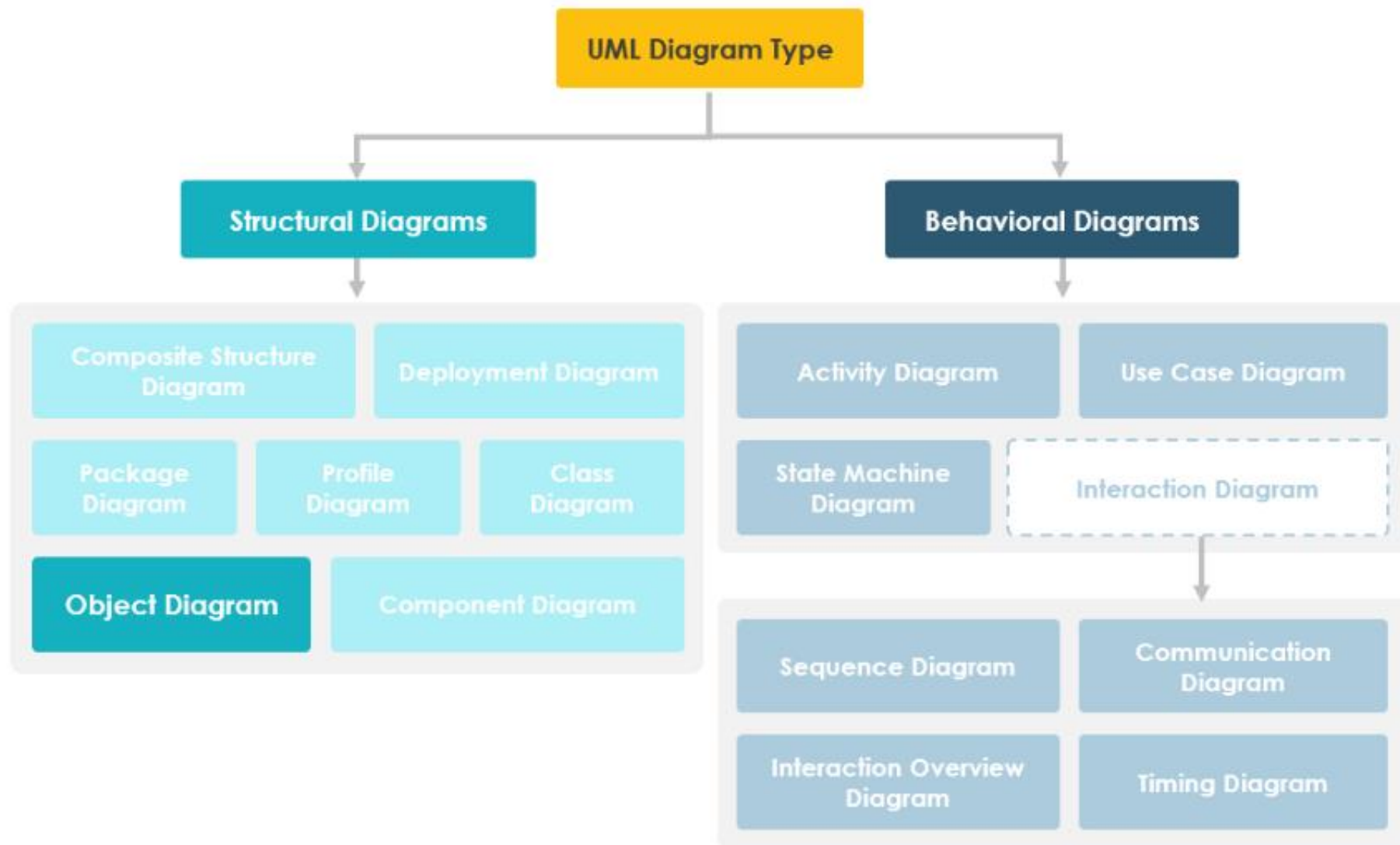
## Component Example - Java Source Code



## Component Diagram Example - C++ Code with versioning

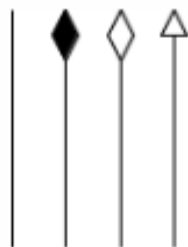
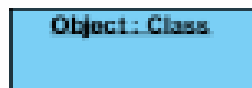


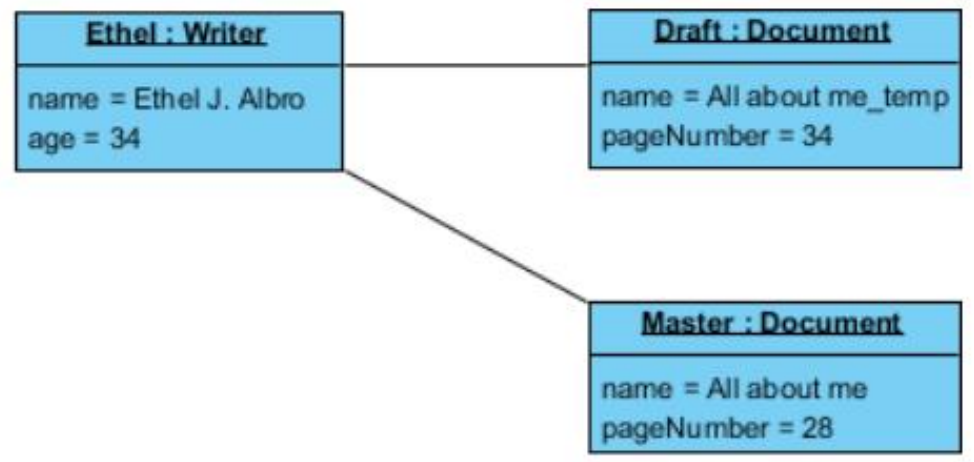
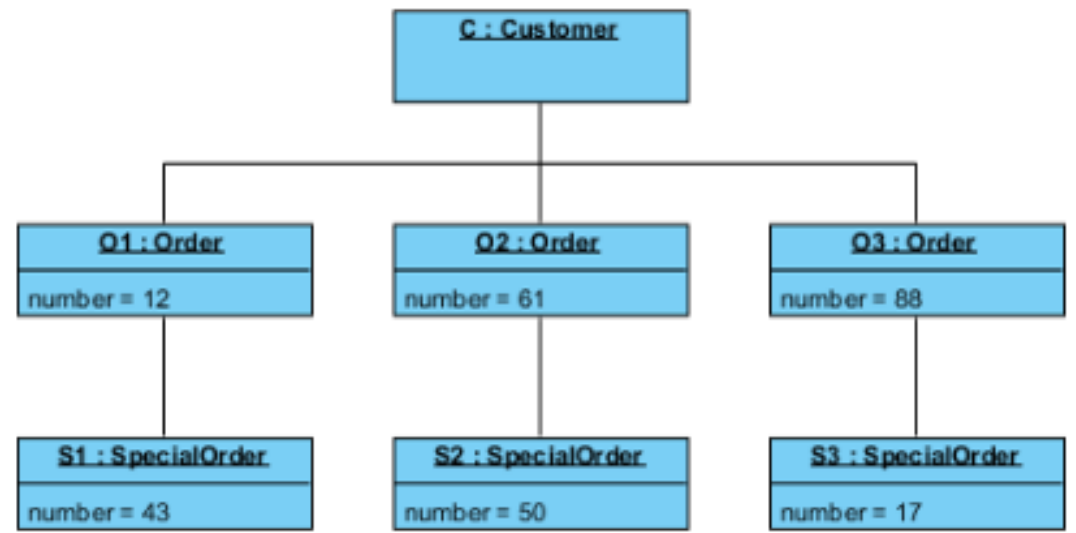
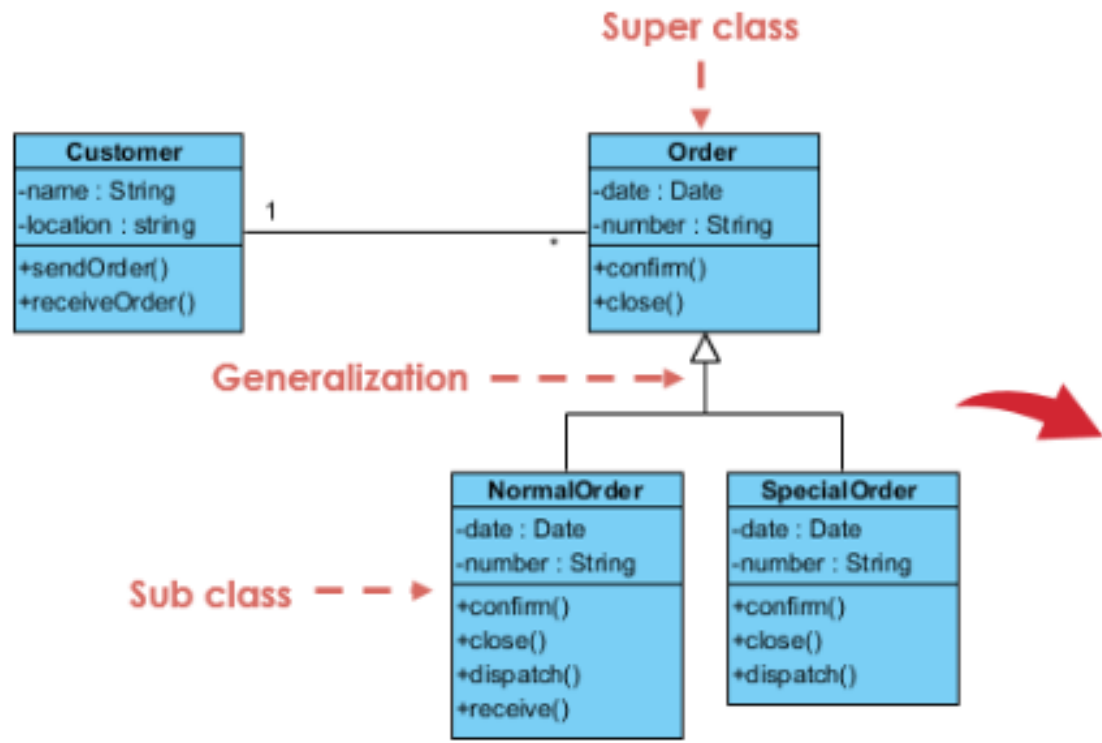


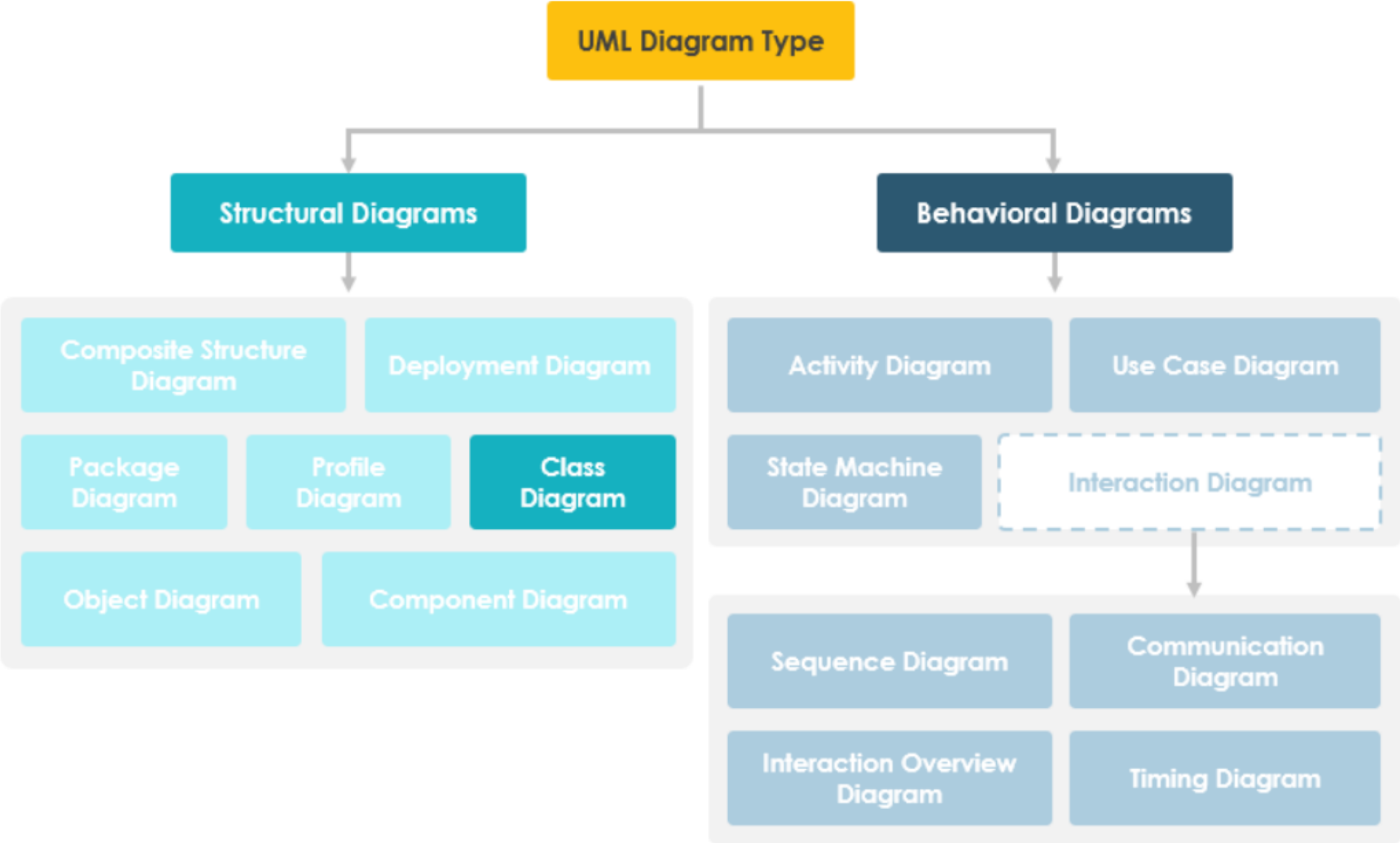


# Object Diagram

- Datová struktura
- Názvy Objektů
- Atributy Objektů
- Odkazy
- Kroky pro modelaci

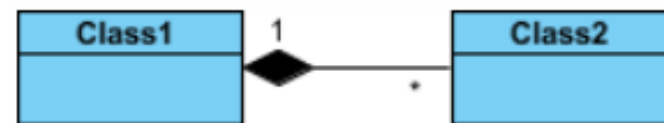
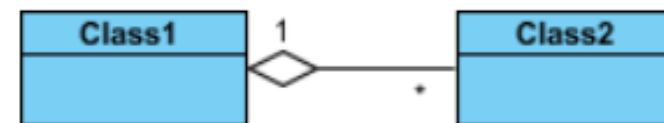
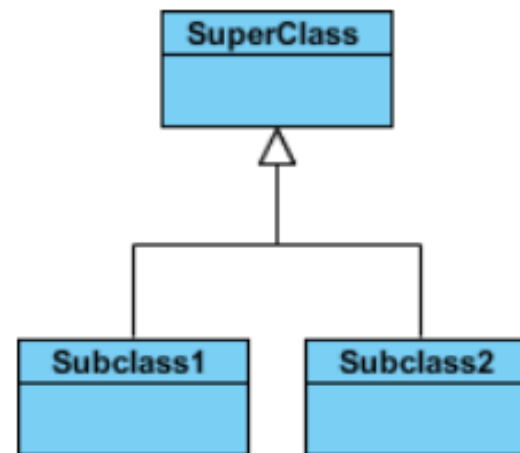






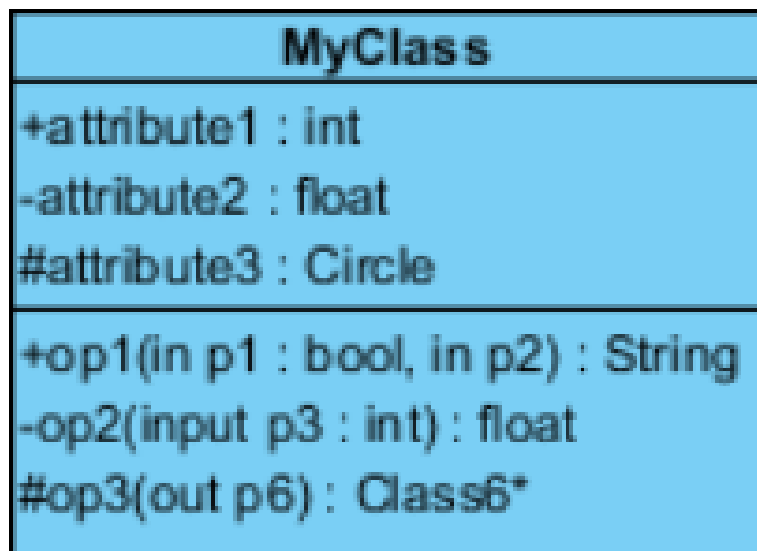
# Class Diagram

- Popis struktury
- Dědění
- Jednoduchá asociace
- Agregace
- Skládání
- Závislost

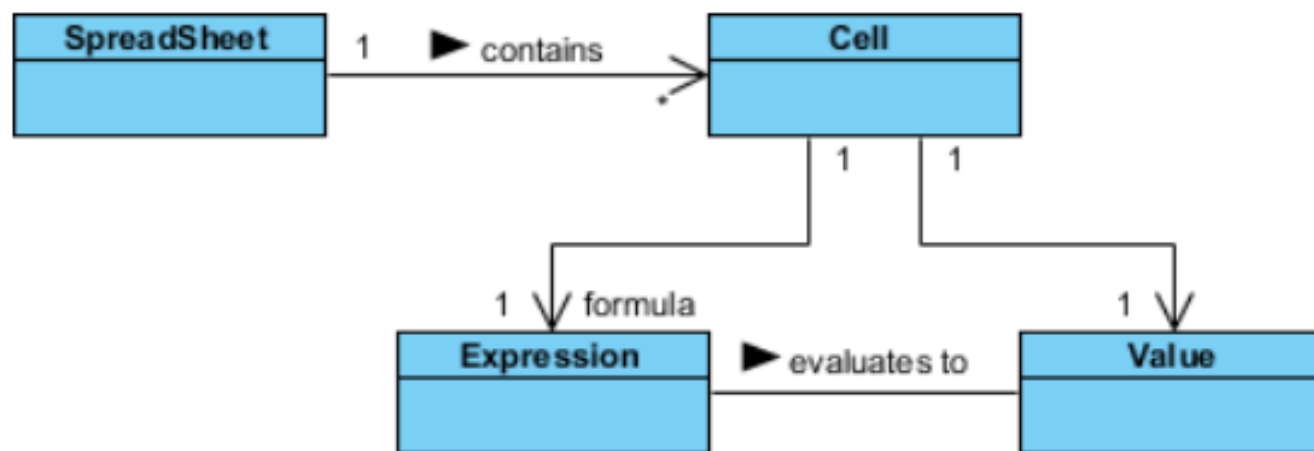


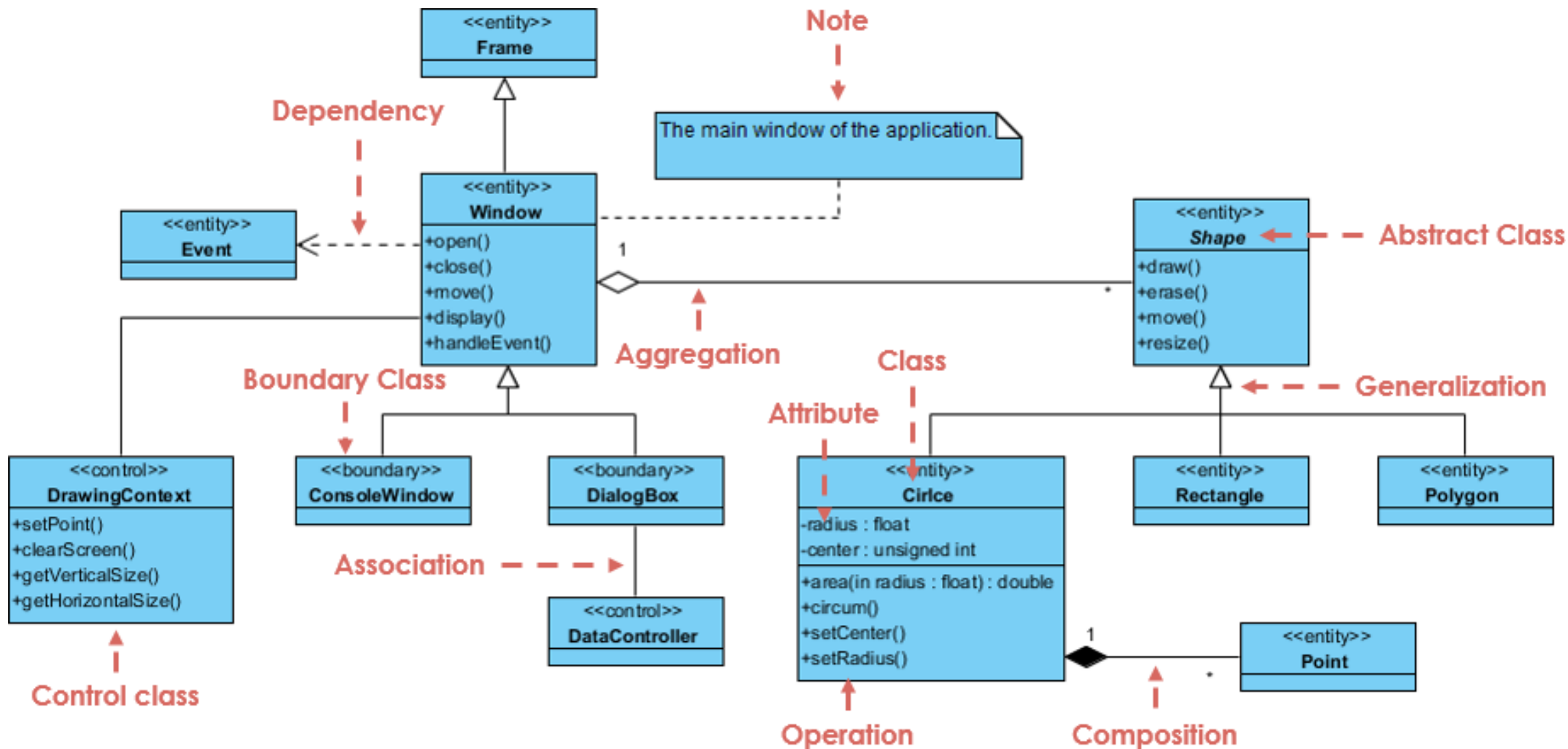
# Class Diagram

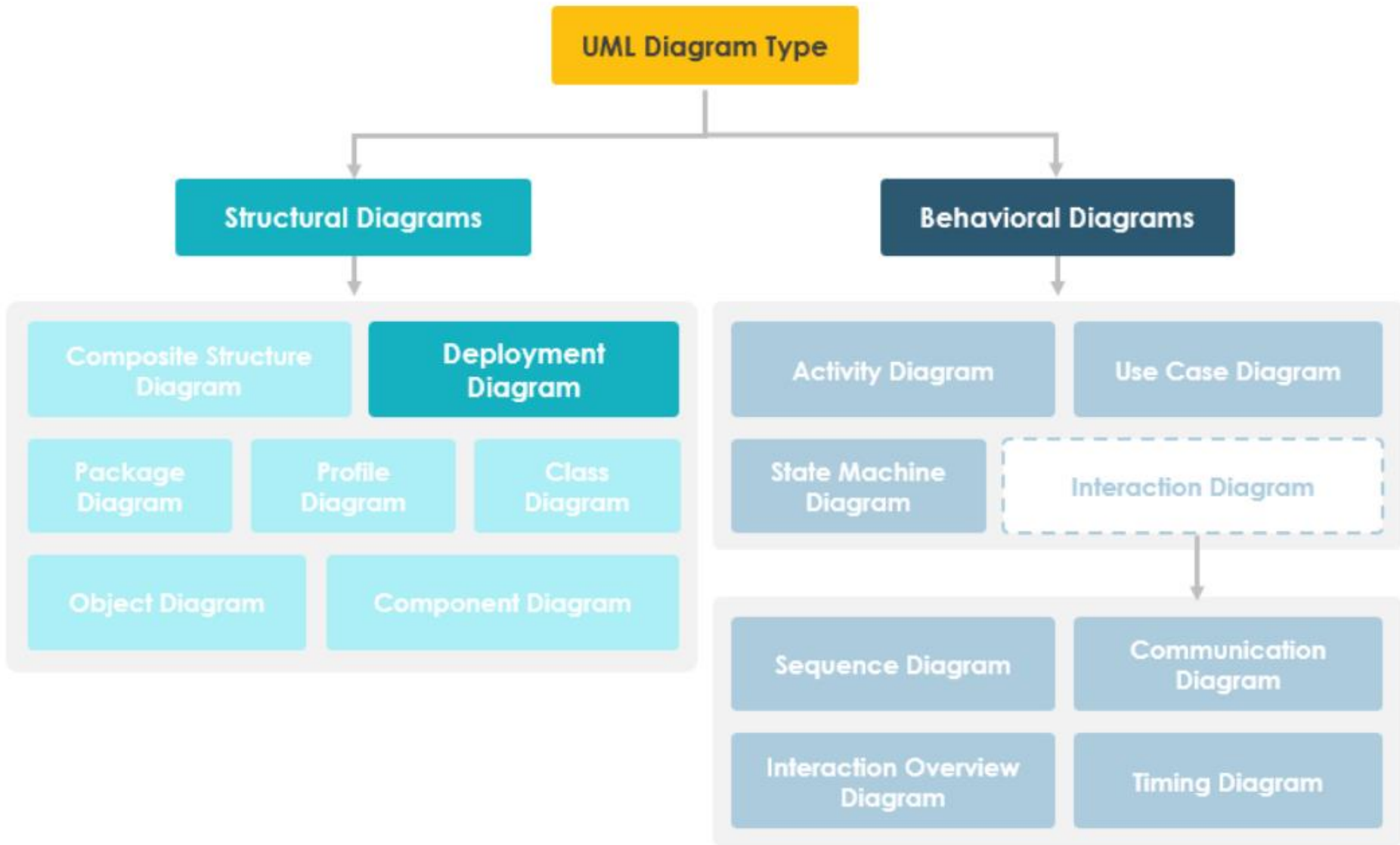
Třída



Názvy vztahů



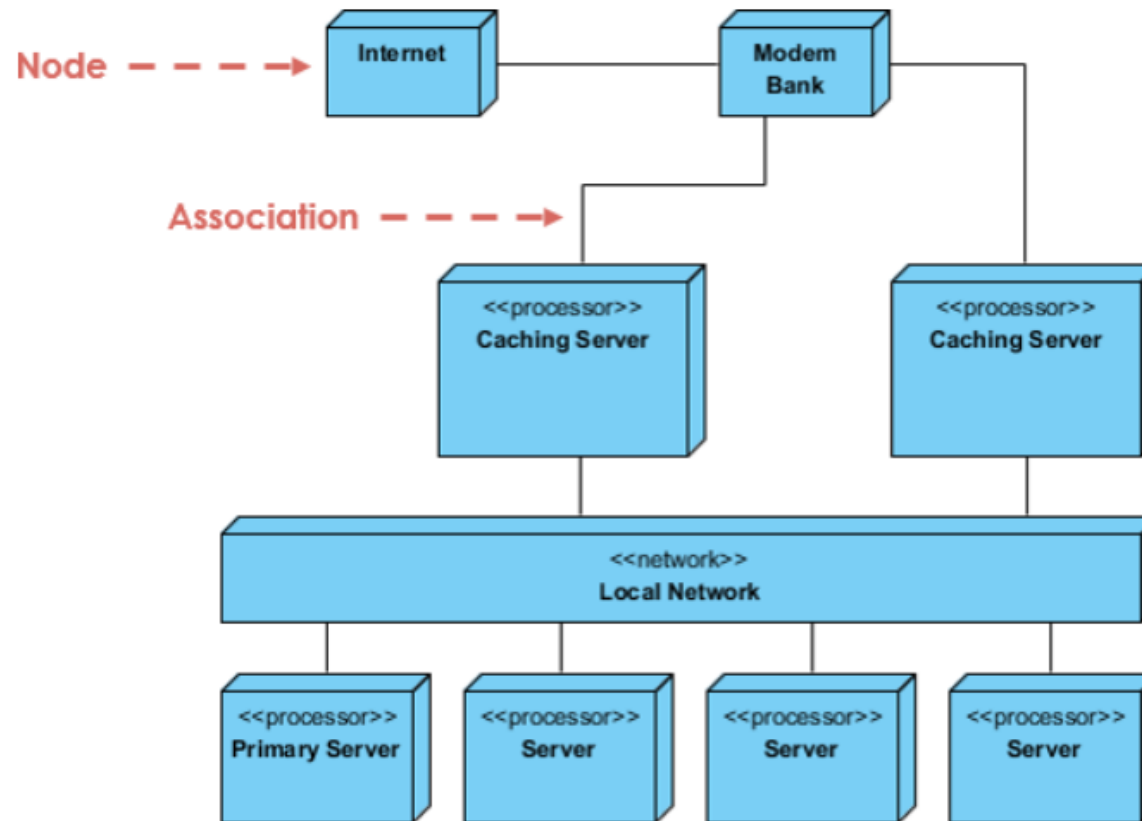


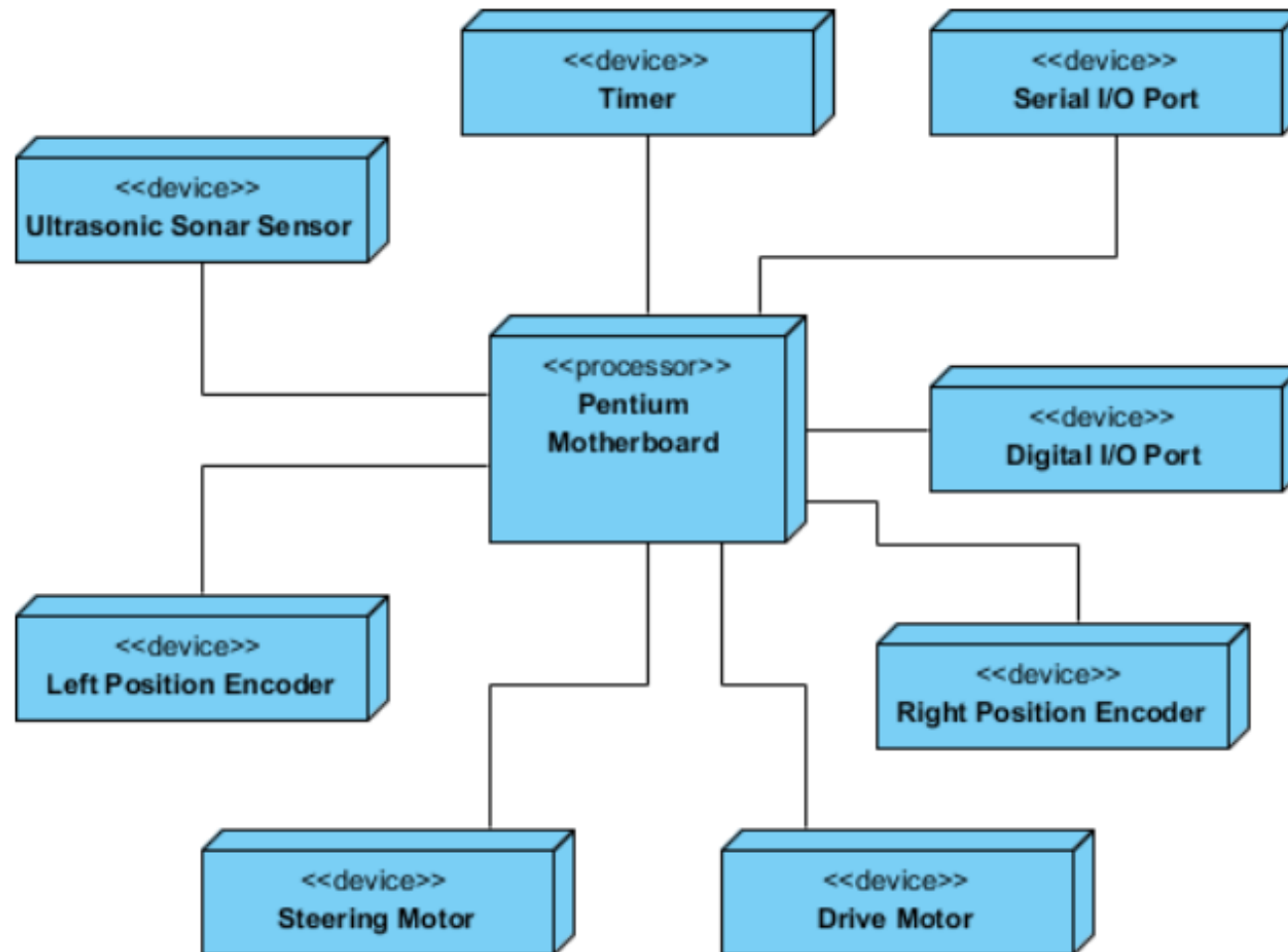


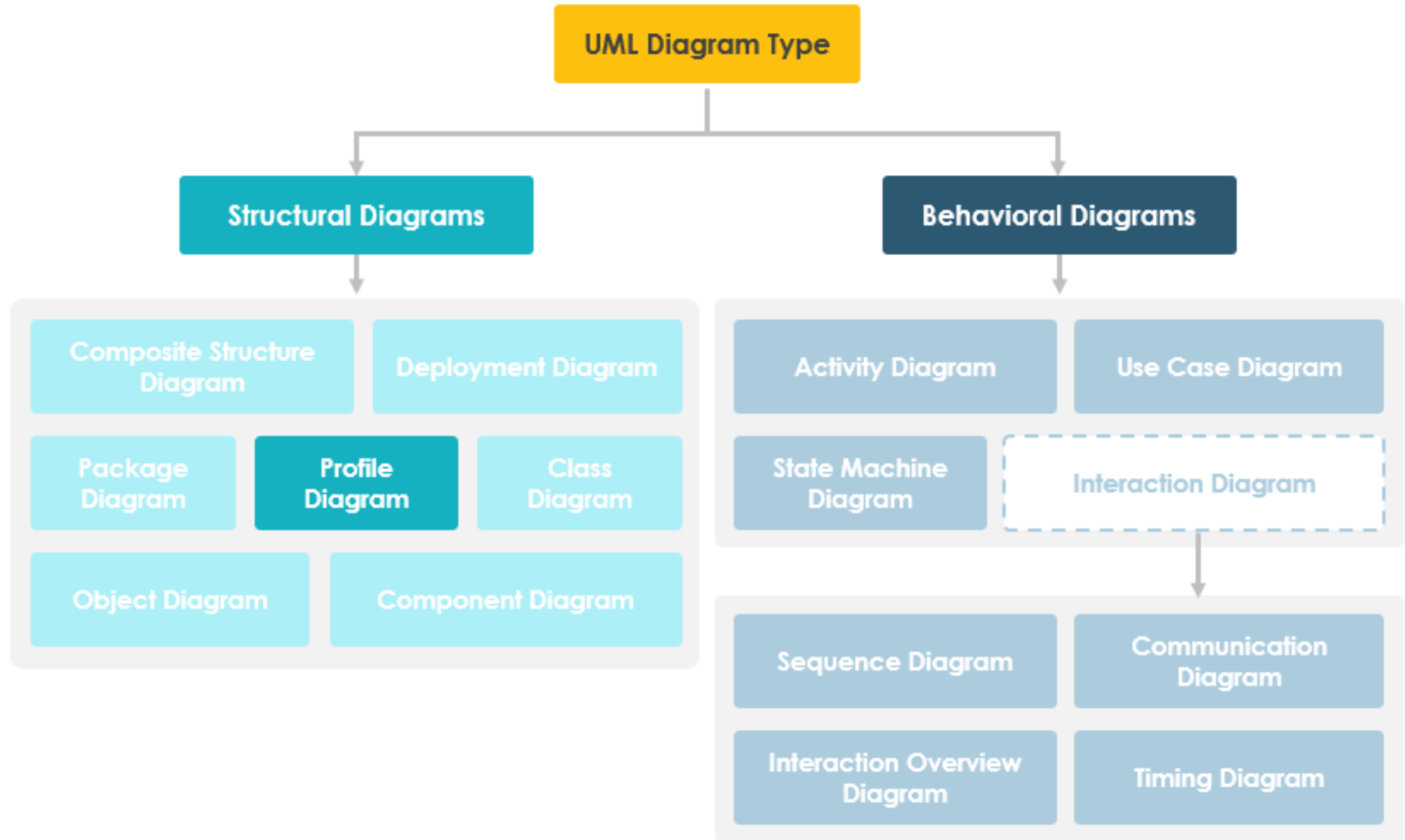


# Deployment Diagram

- Run time procesy a živé komponenty uvnitř
- Využití
- Uzly – 3D boxy

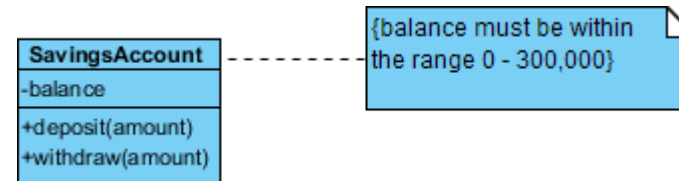
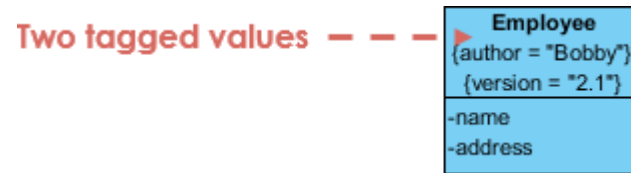


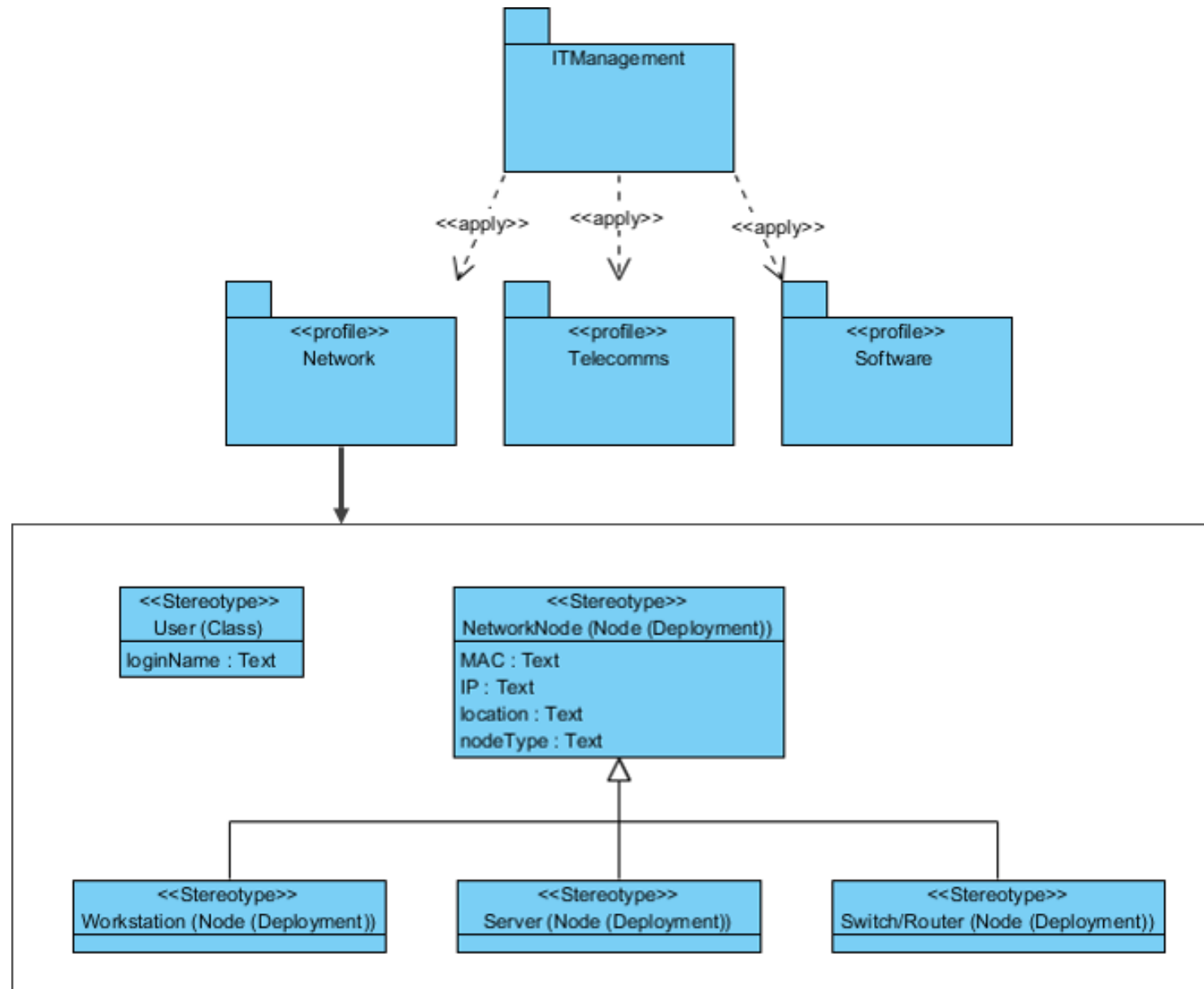


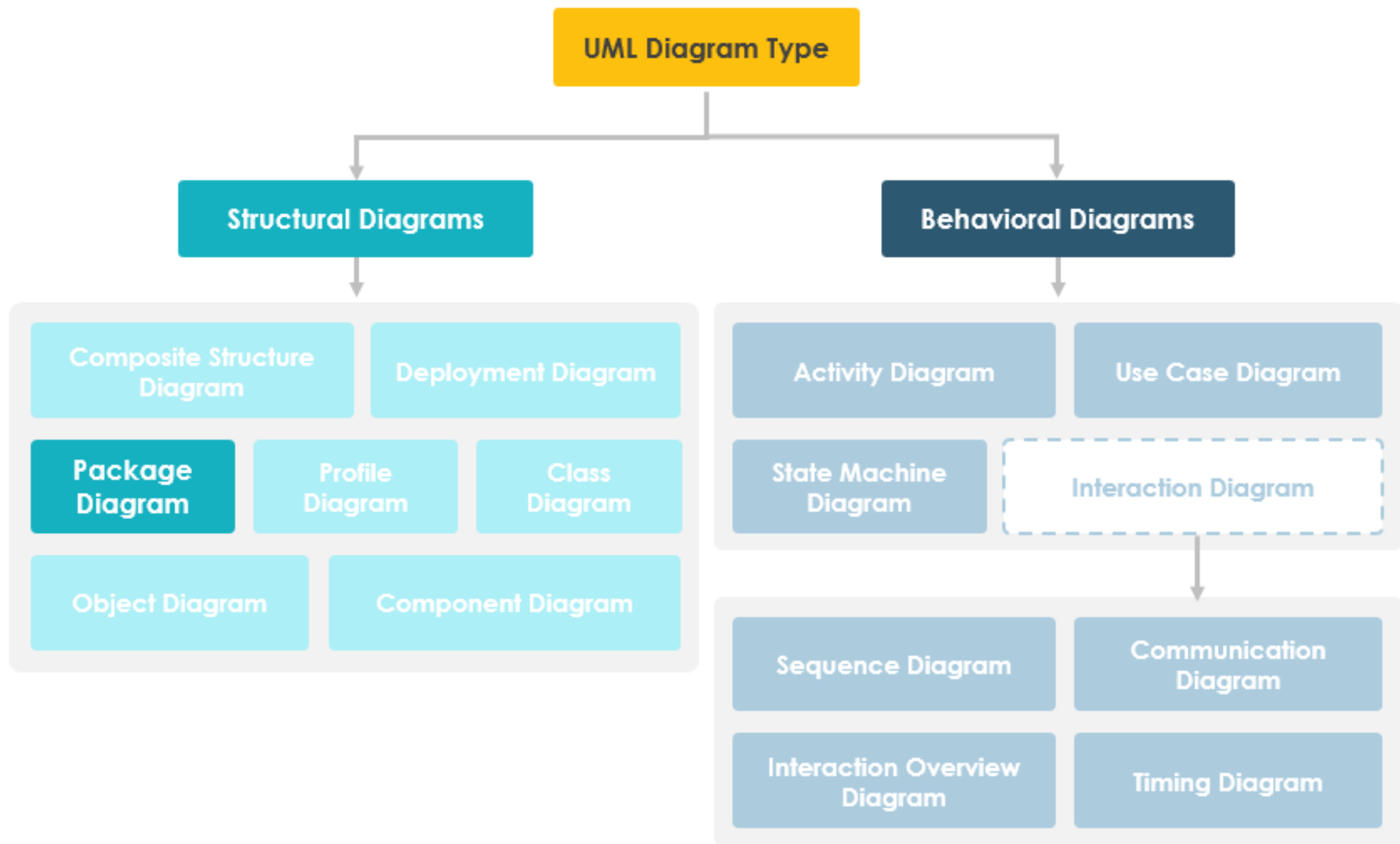


# Profile Diagram

- Stereotypes
- Tagged Values
- Constraints

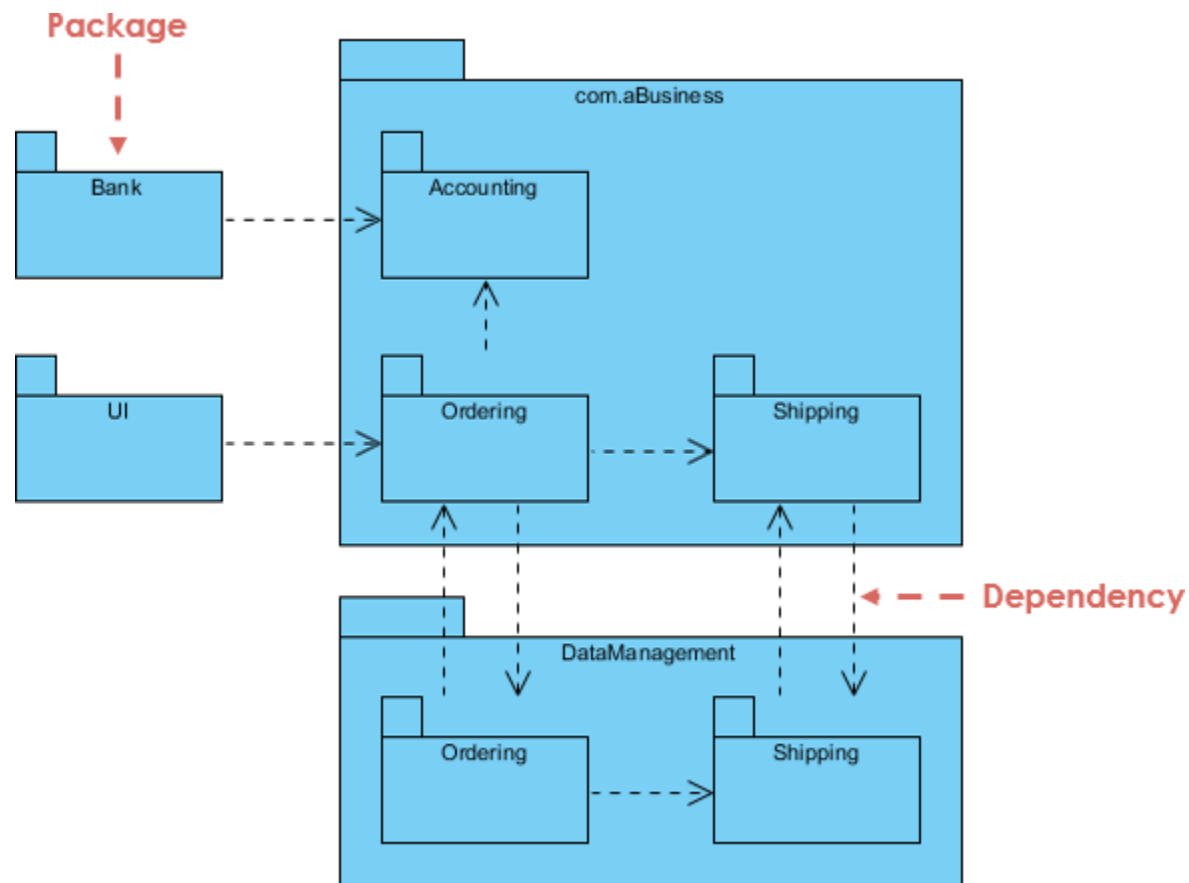






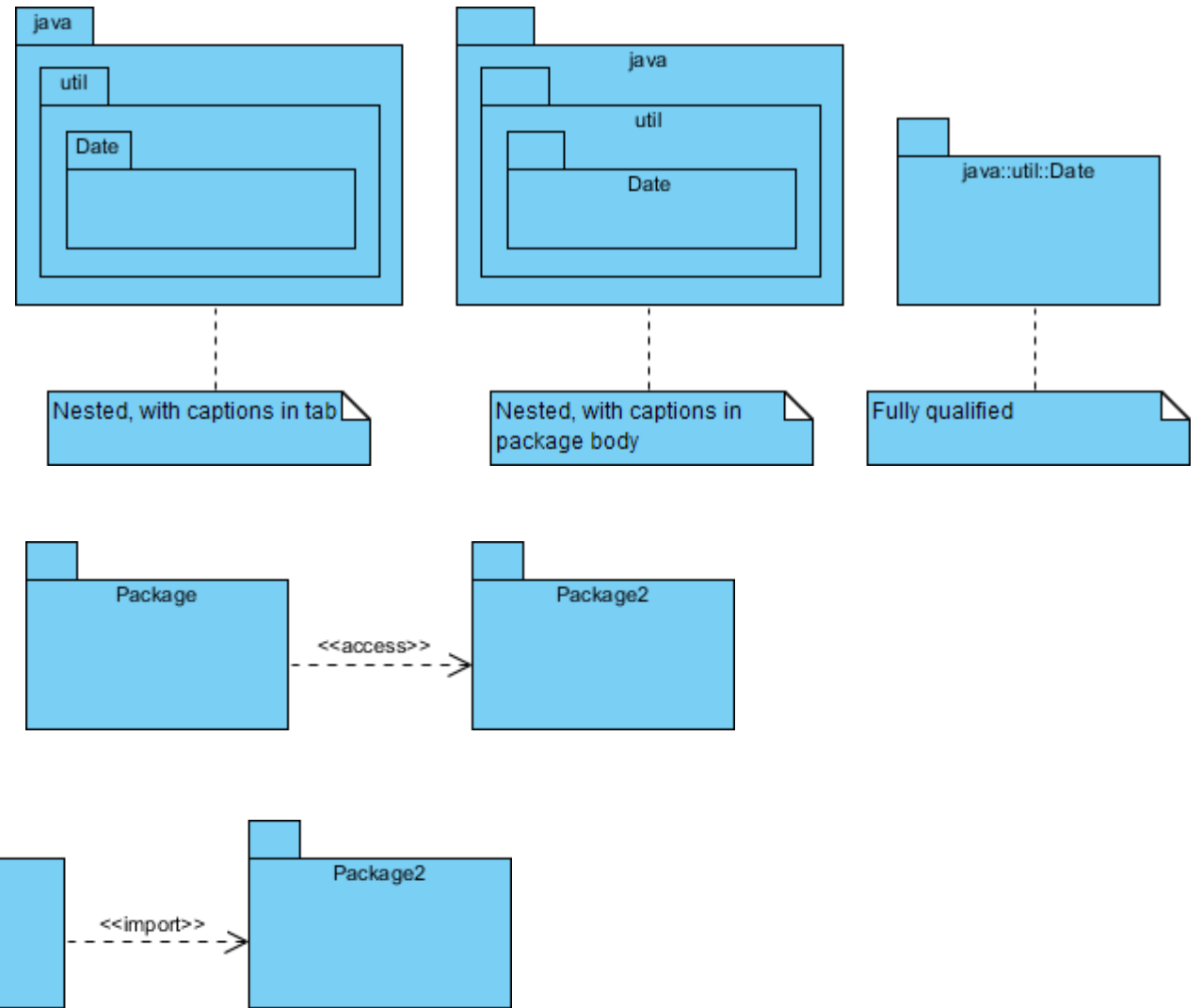
# Package Diagram

- Zorganizování velkých systémů
- Zjednodušení class diagramů
- File folders

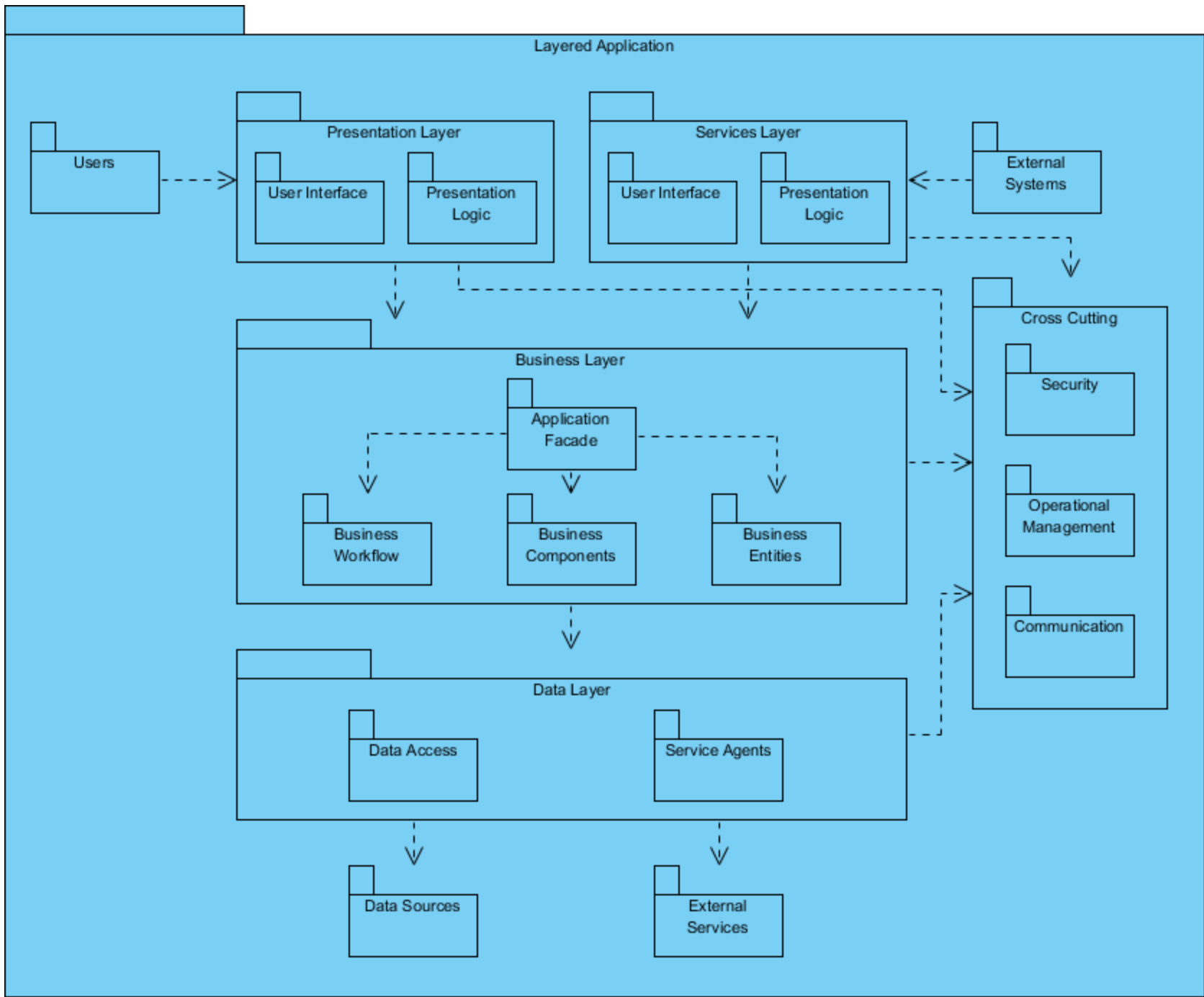


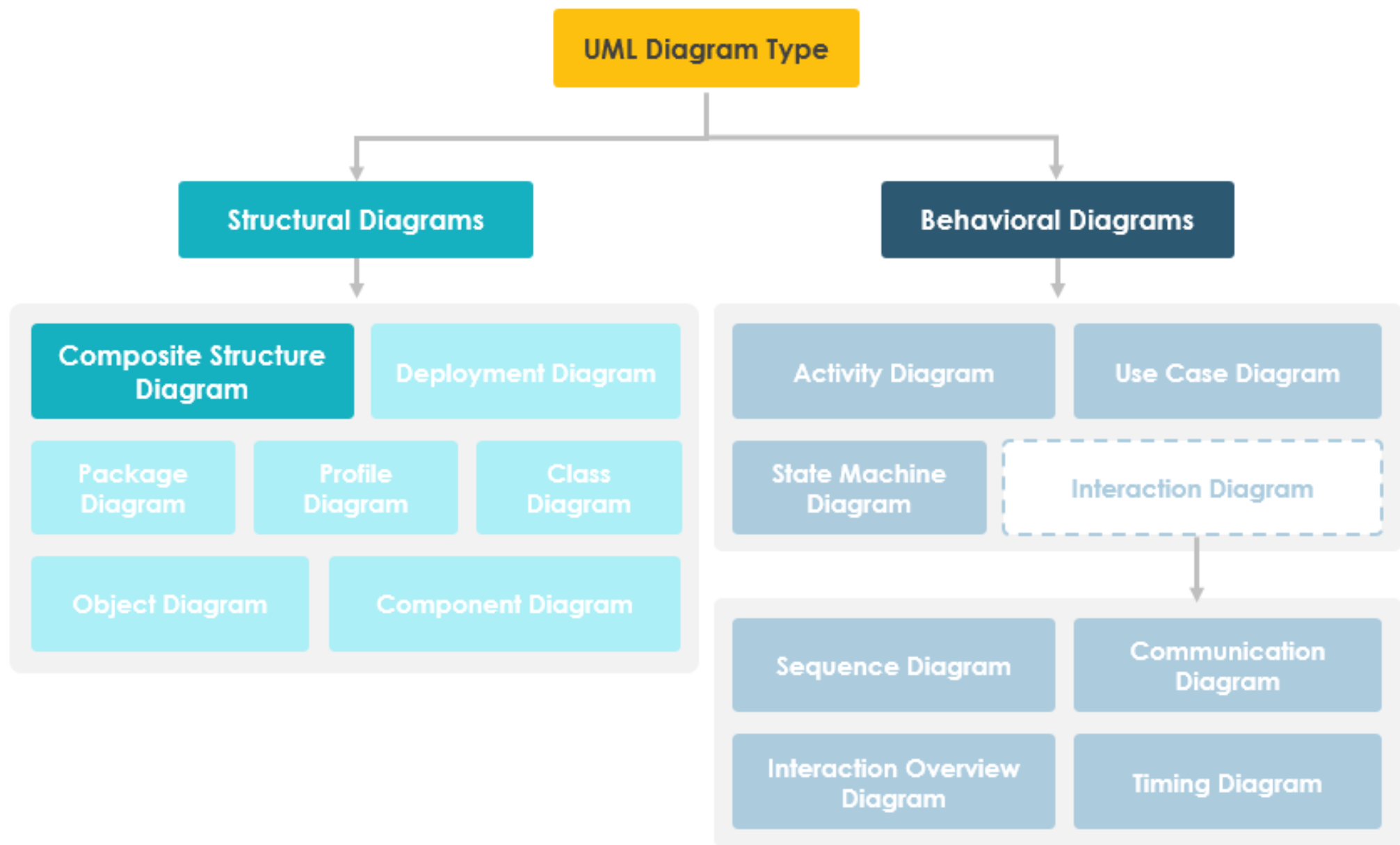
# Package Diagram

- Basic Concepts
  - Names
  - Diagrams / components
  - Dodržuje syntaxi
- Access
- Import



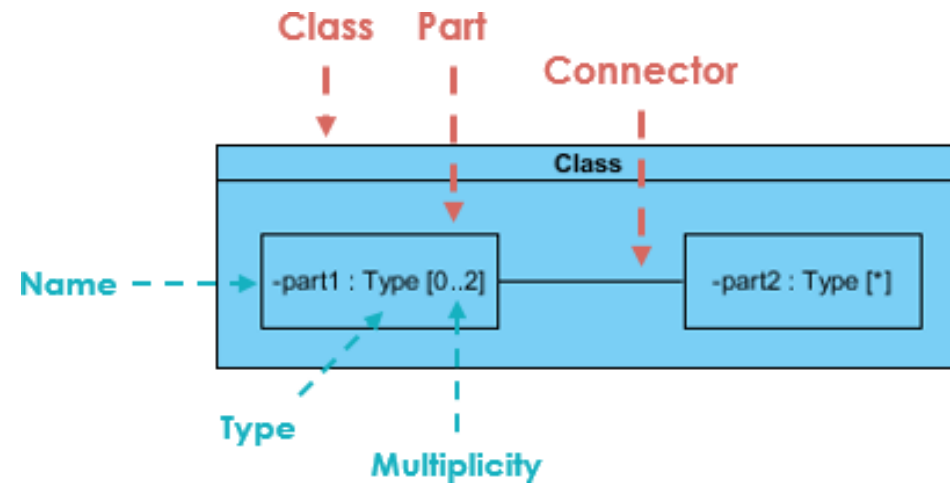






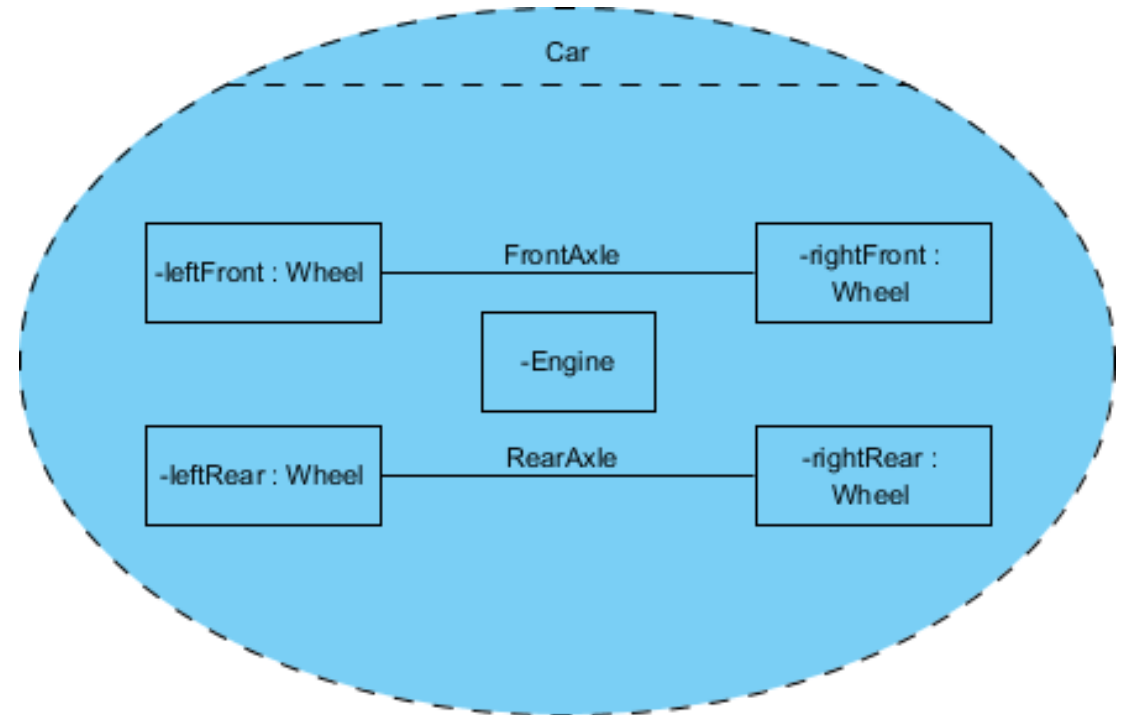
# Composite Structure Diagram

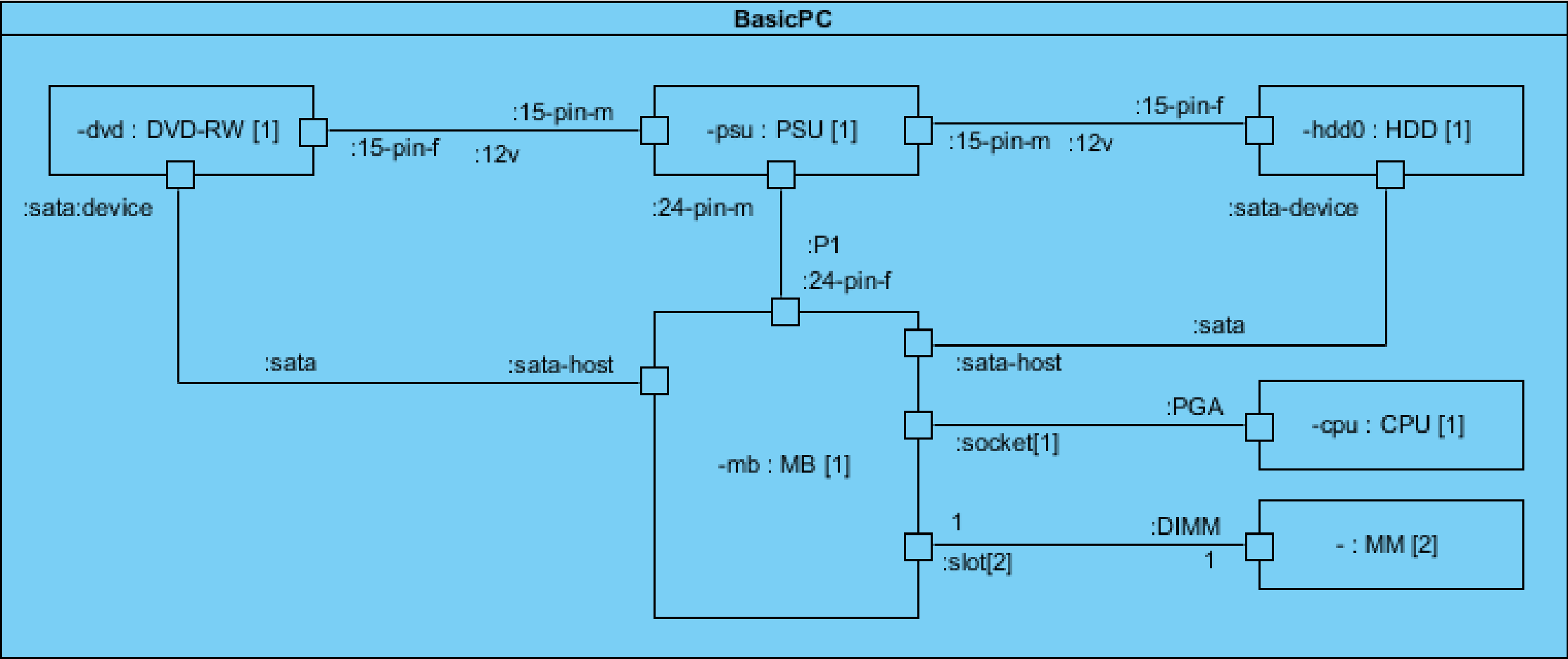
- UML 2.0
  - Classes
  - Interfaces
  - Packages
  - Relationships
- Logical view

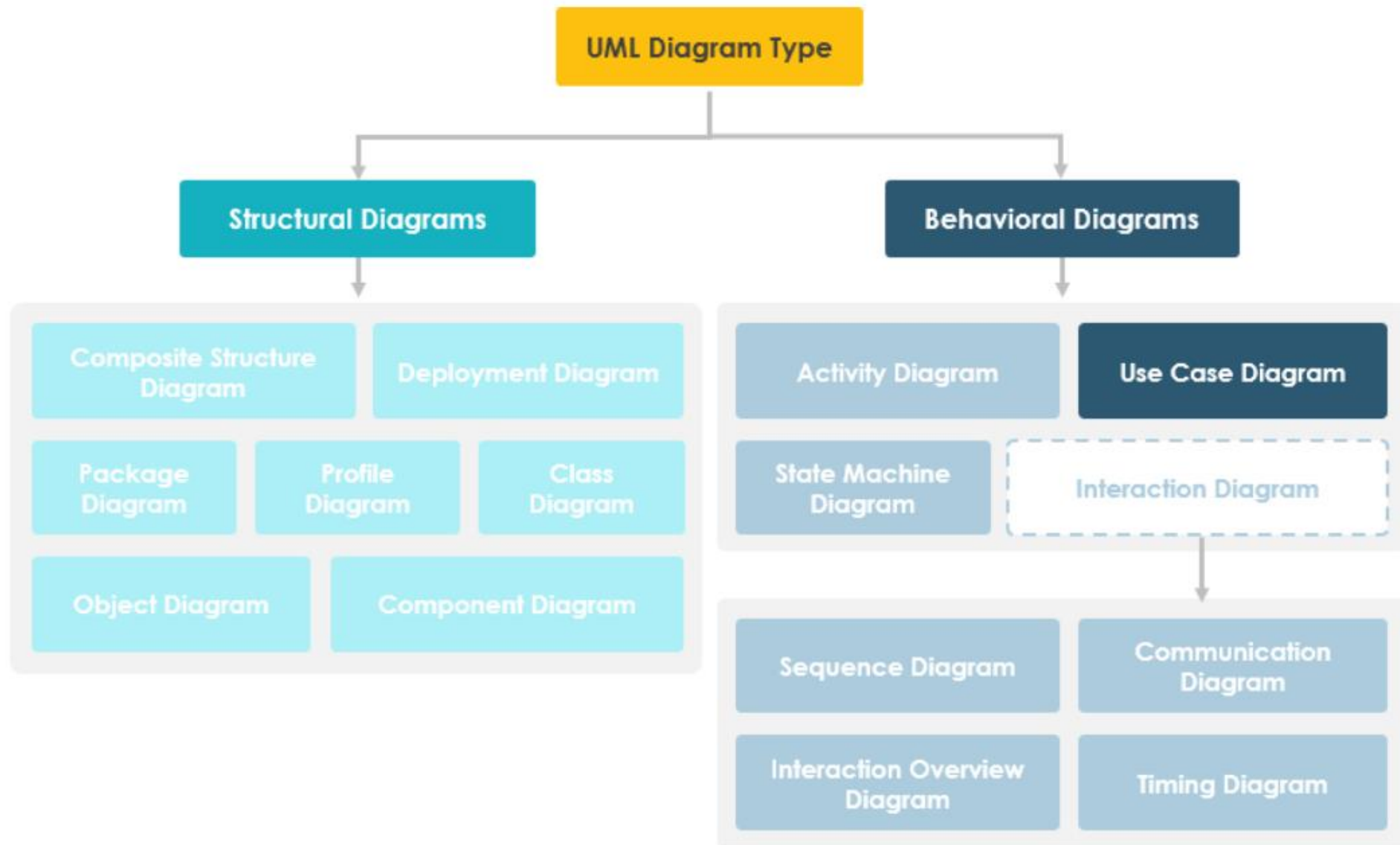


# Composite Structure Diagram

- Collaboration
- Parts
- Port
- Interface
- Connector



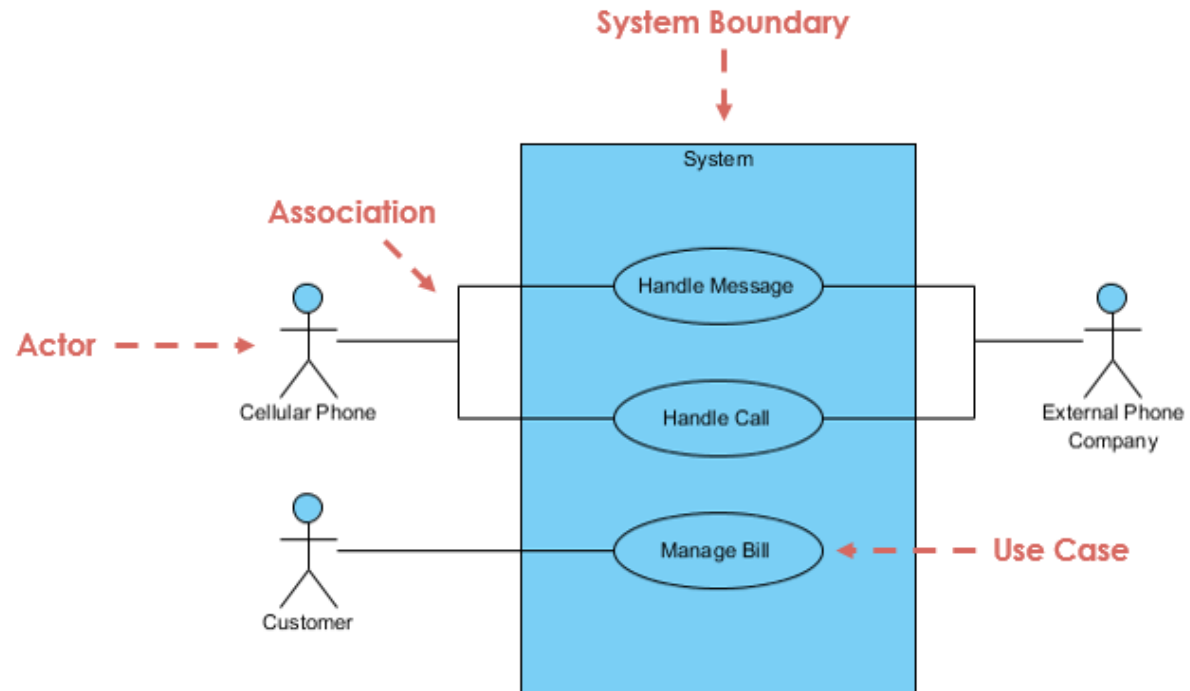




# Use Case Diagram

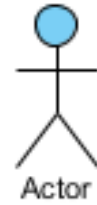
- Očekávané chování
- Neukazuje pořadí
- Shrne vztahy

- Specifikace
- Zachycení
- Validace
- Testovací případy



# Use Case Diagram

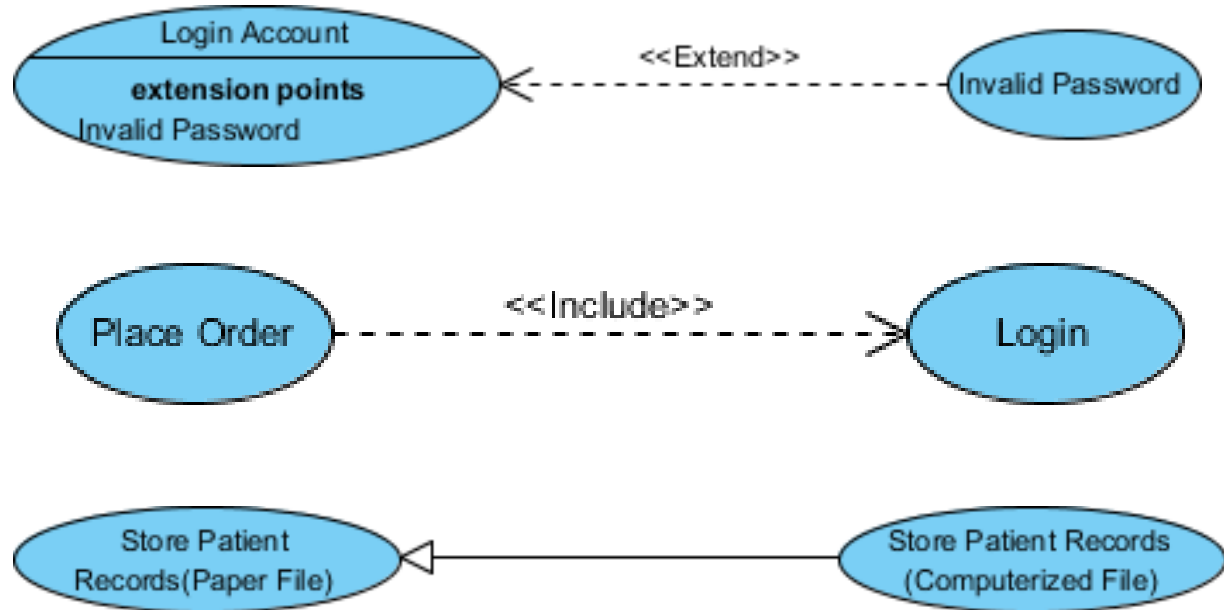
- Actor
- Use Case
- Communication link
- Boundery of system

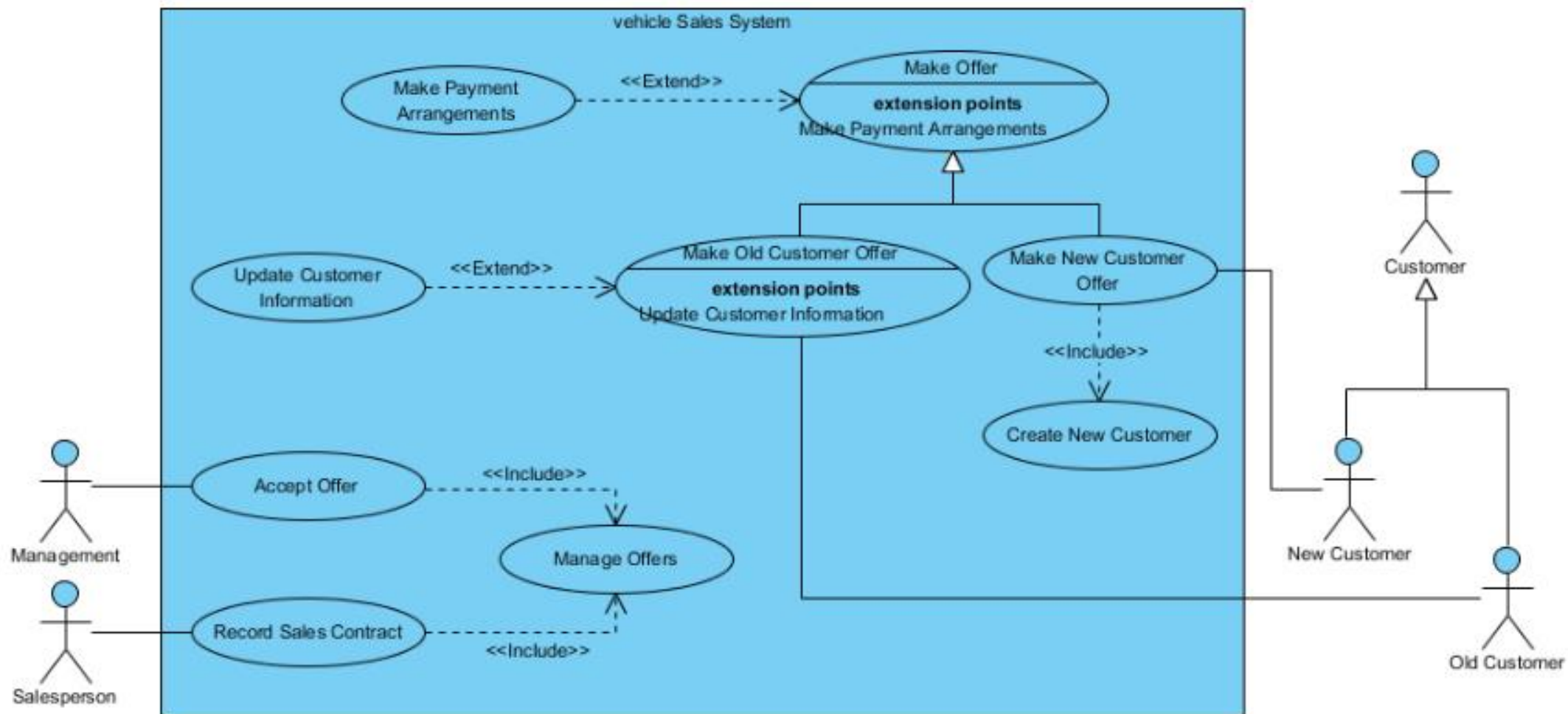


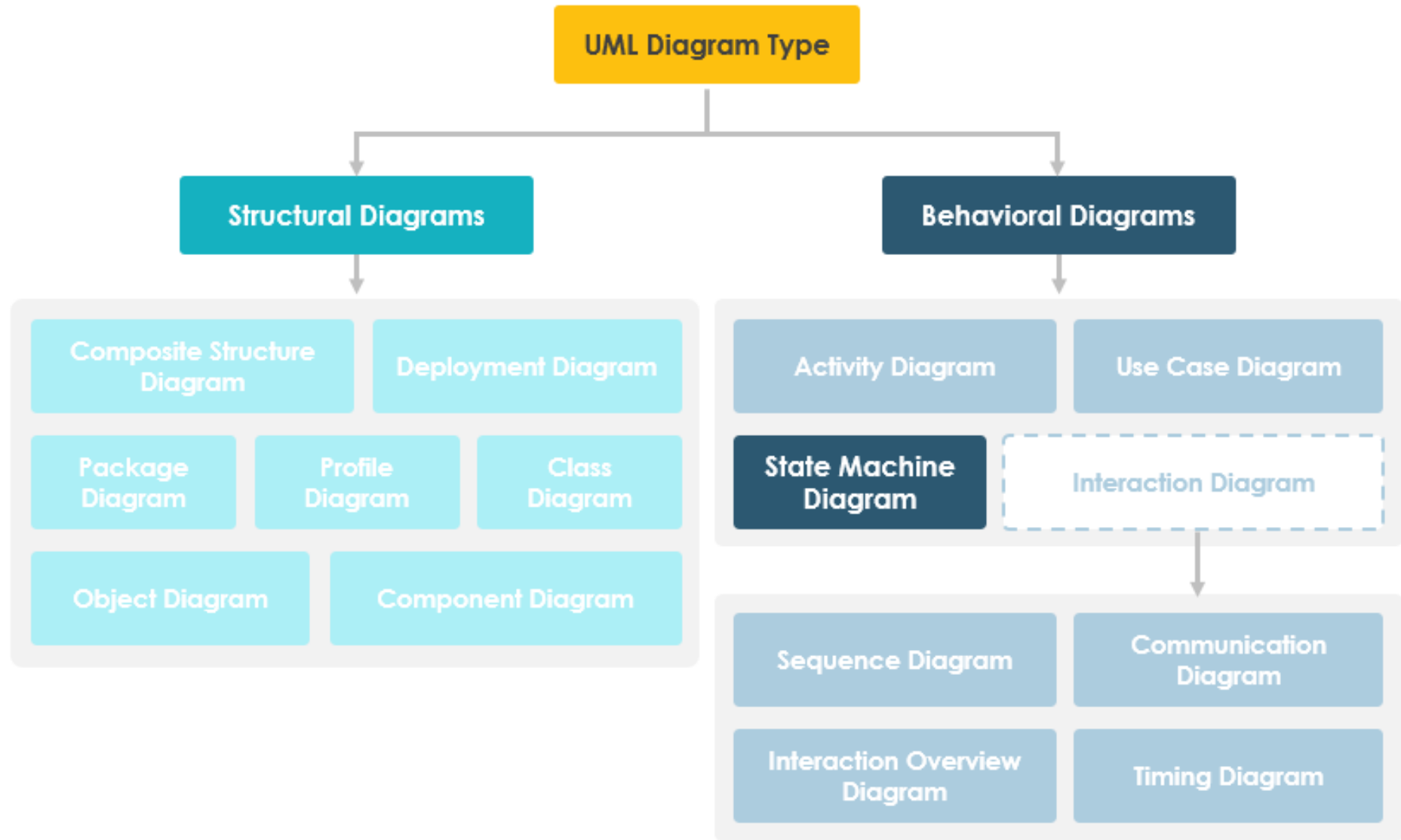


# Use Case Diagram

- Extends
- Include
- Generalization

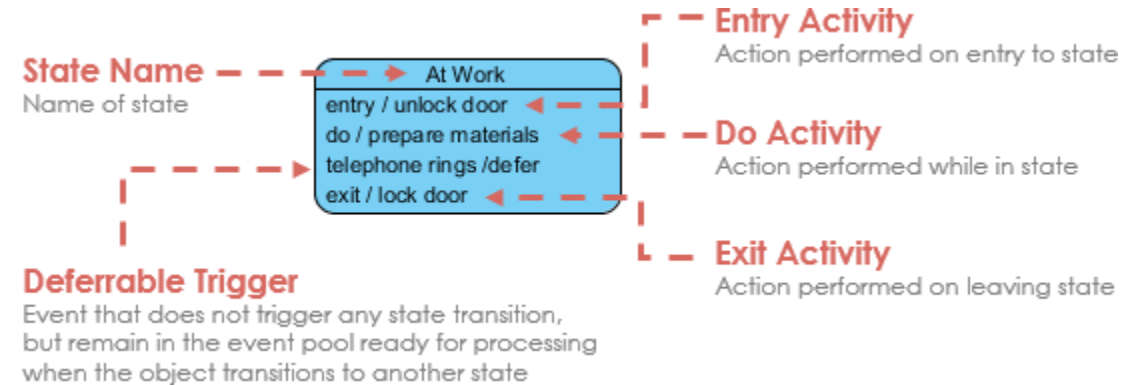






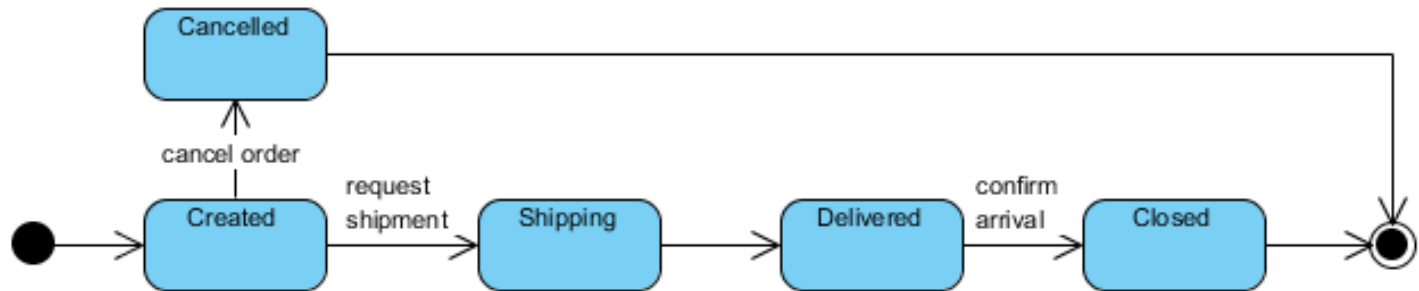
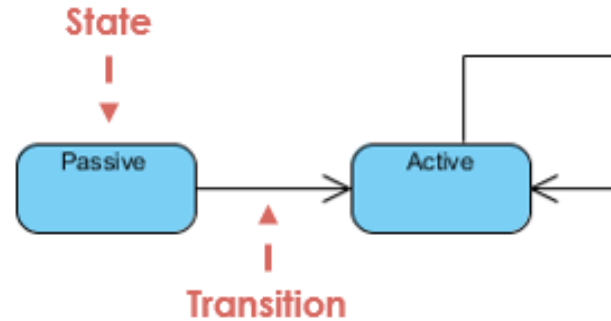
# State Machine Diagram

- Různé stavy entity
- State
  - State Name
  - Deferrable Trigger
  - Entry Activity
  - Do Activity
  - Exit Activity



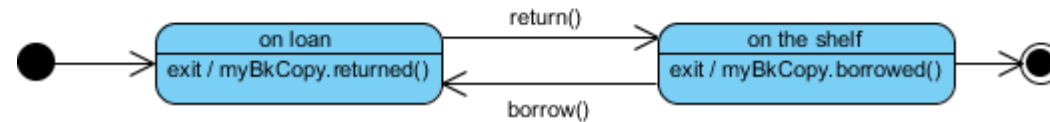
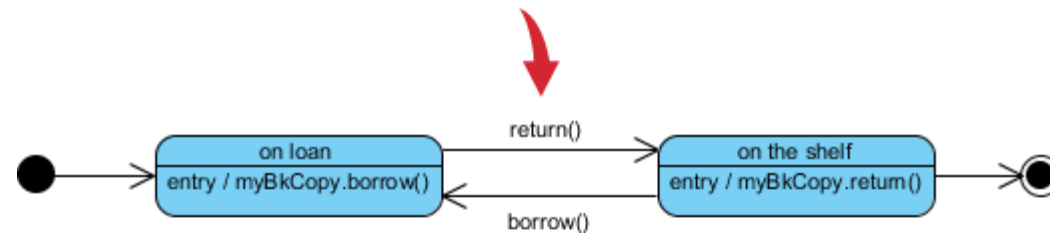
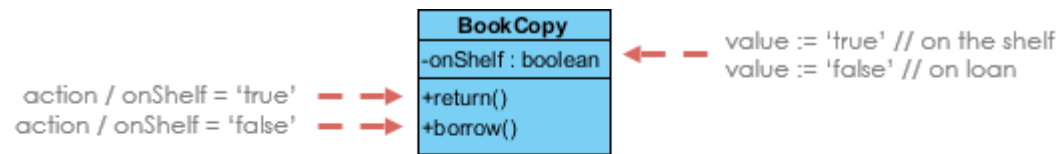
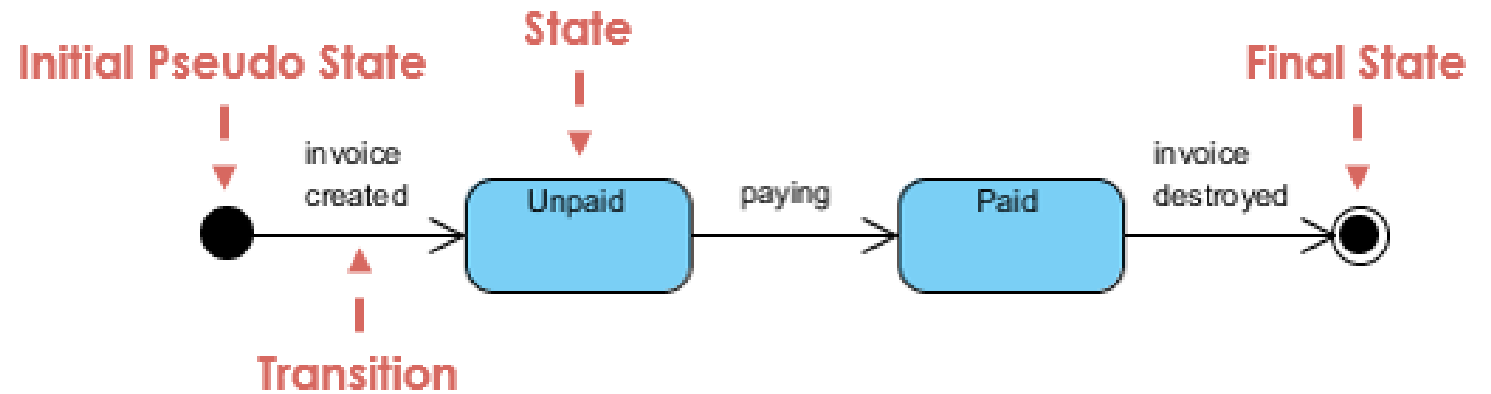
# State Machine Diagram

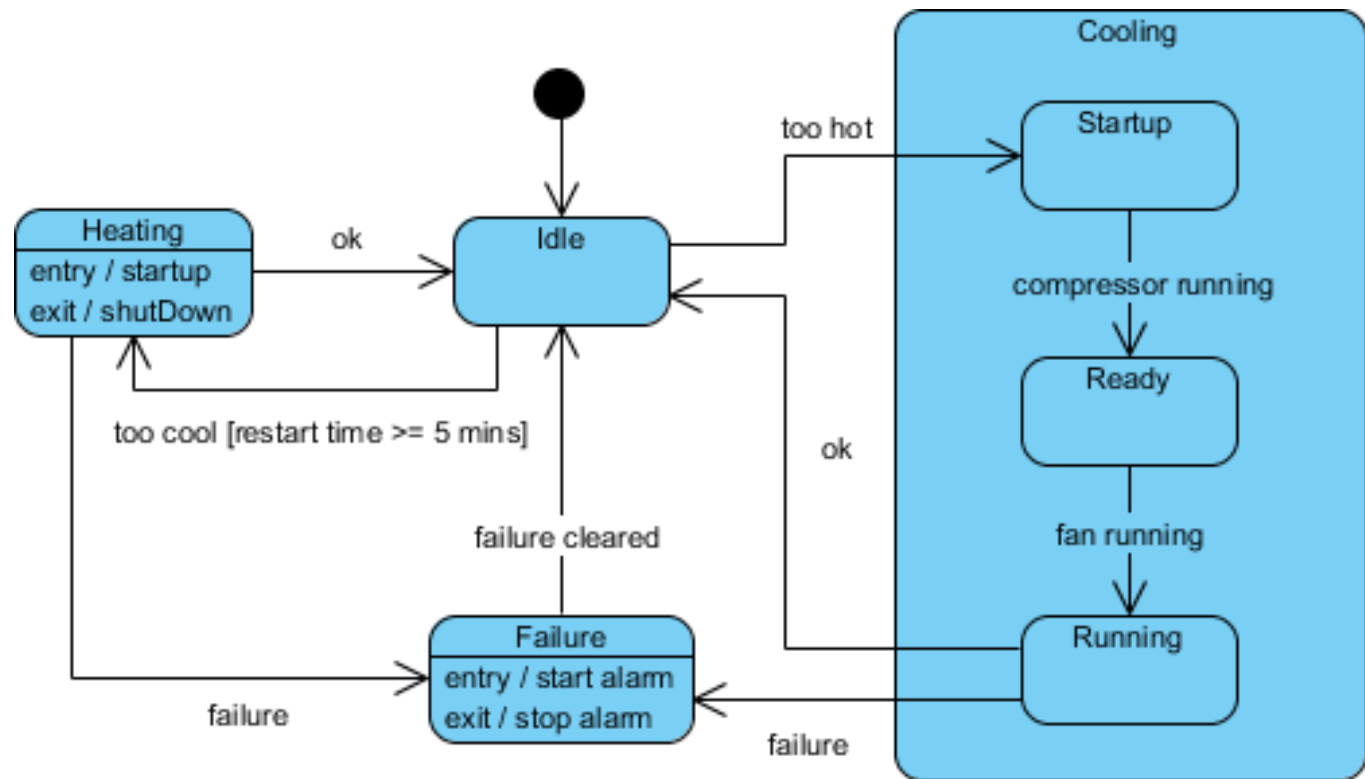
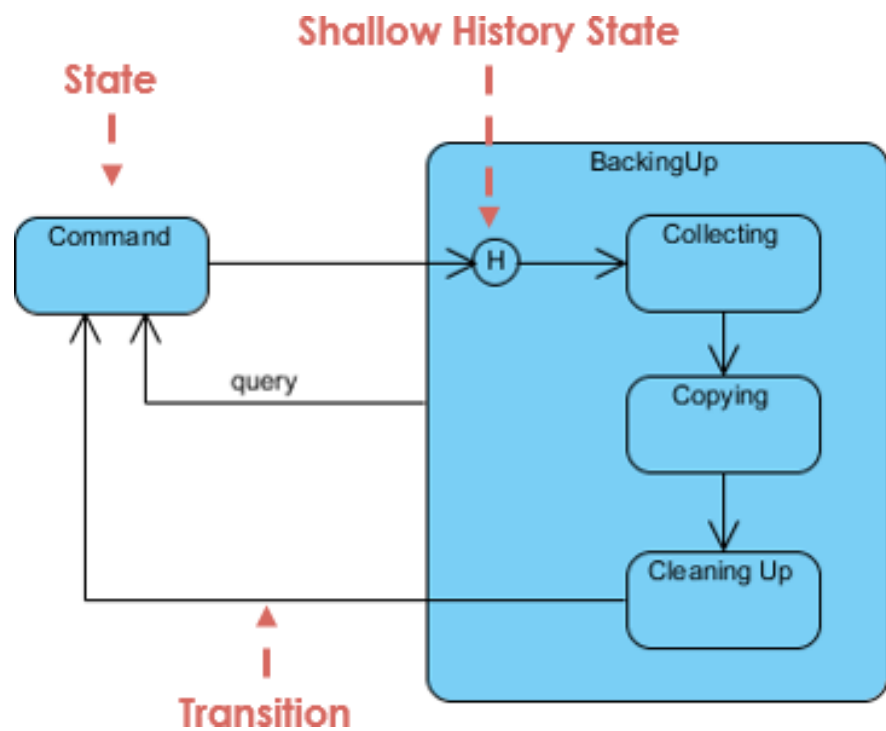
- State
- Initial and Final States
- Events
  - Signal event
  - Call event
  - Time event
  - Change event

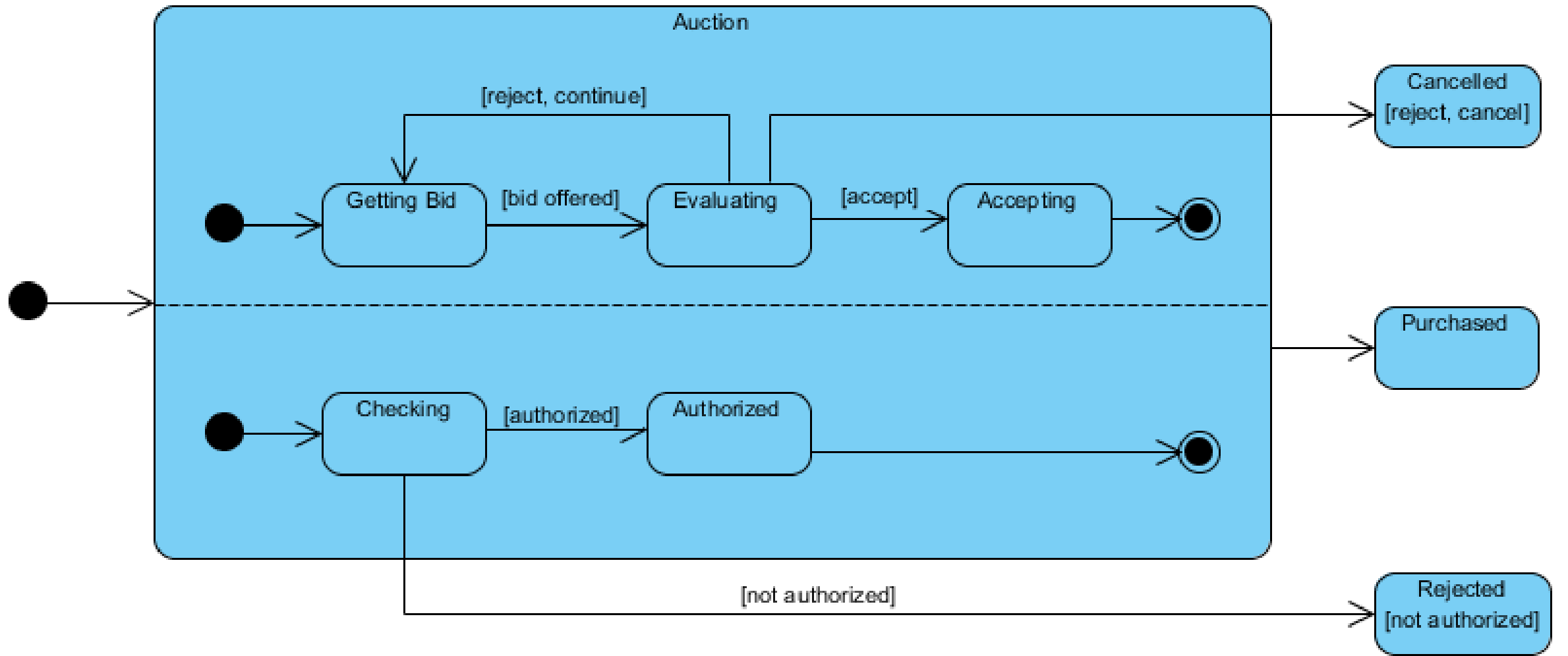


# State Machine Diagram

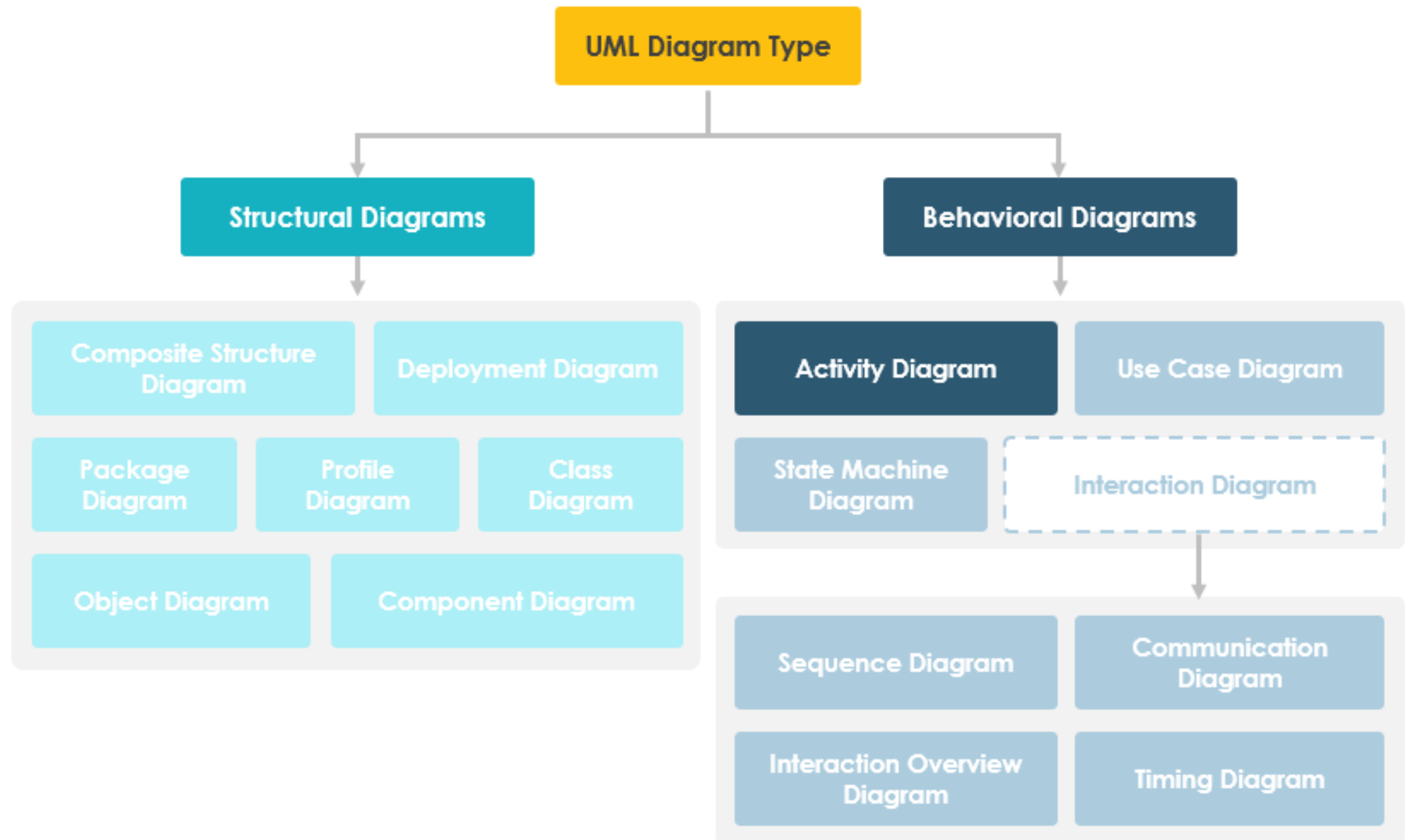
- Transition
- Actions
- Activity
- Entry / Exit Action
- Substates
- History states
- Concurrent State



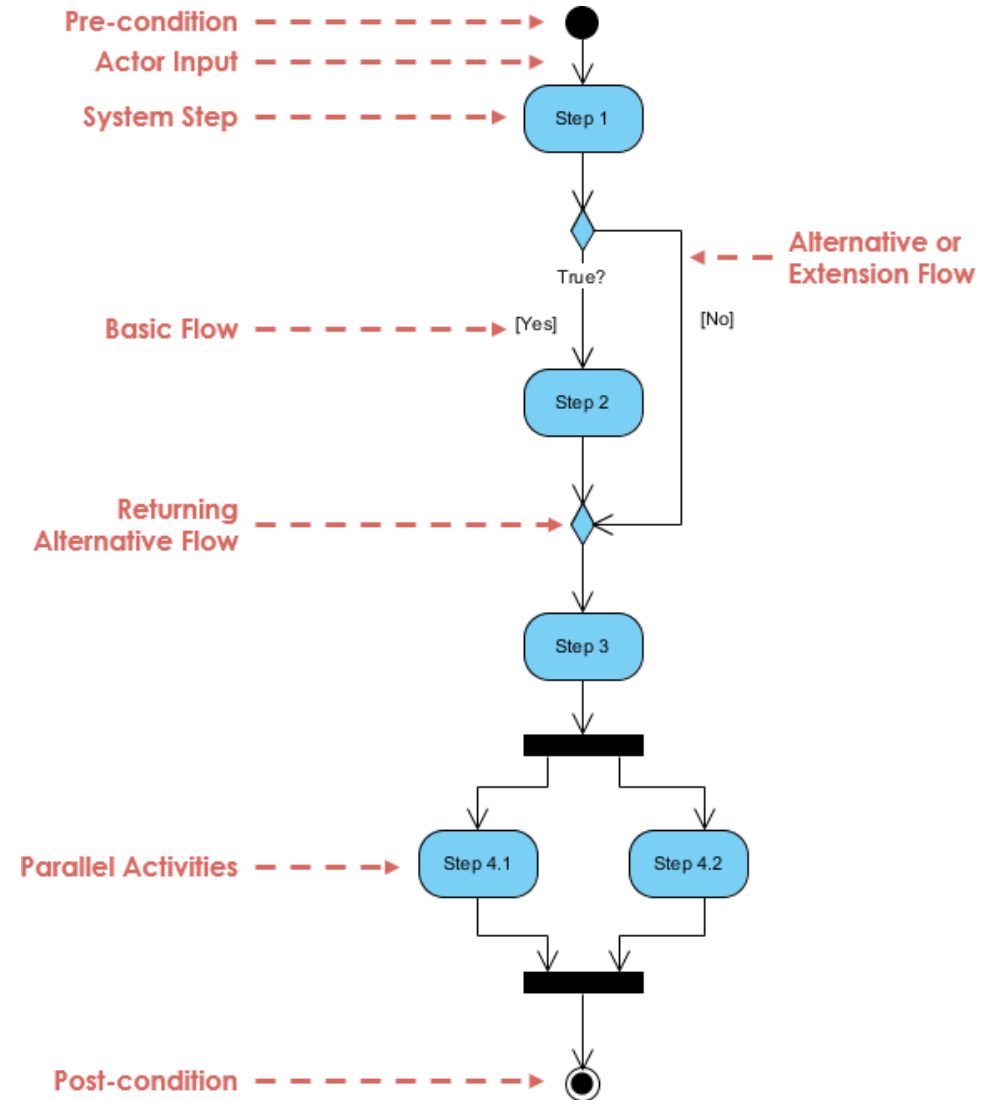






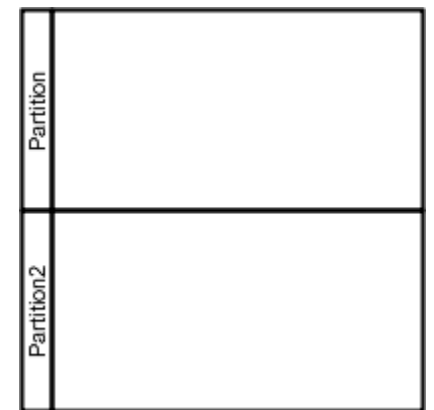
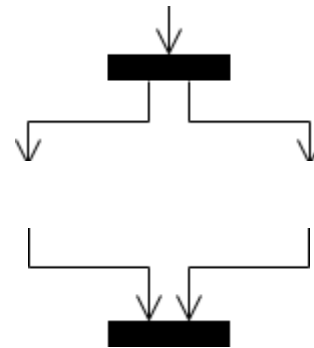
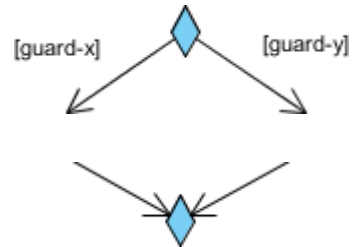
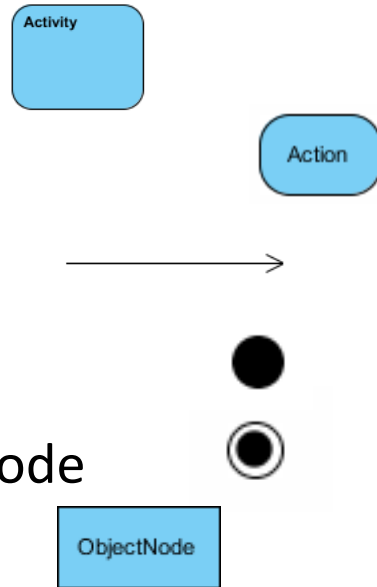


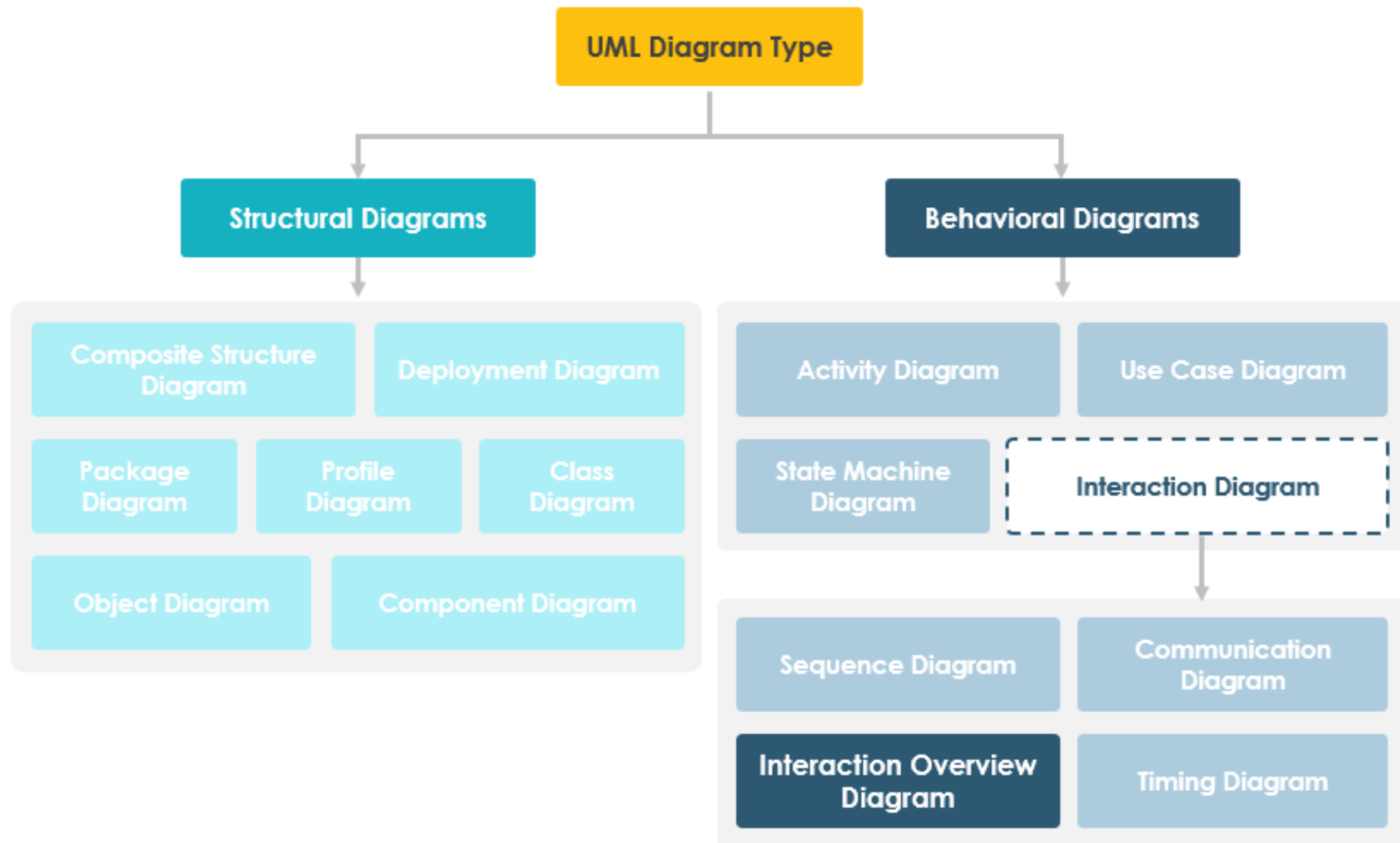
# Activity Diagram



# Activity Diagram

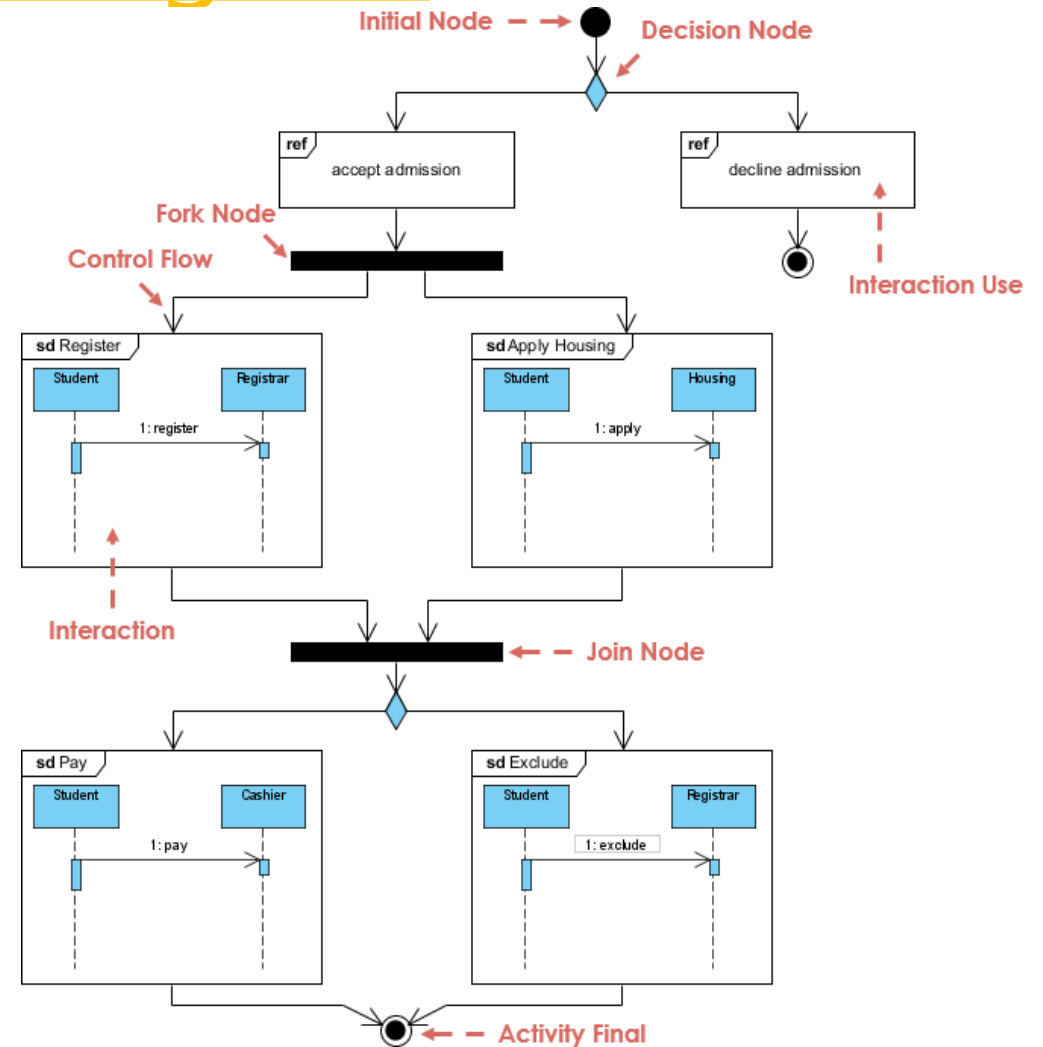
- Activity
- Action
- Control flow
- Object flow
- Initial Node
- Activity Final Node
- Object Node
- Decision Node
- Merge Node
- Fork Node
- Join Node
- Swimlane and Partion

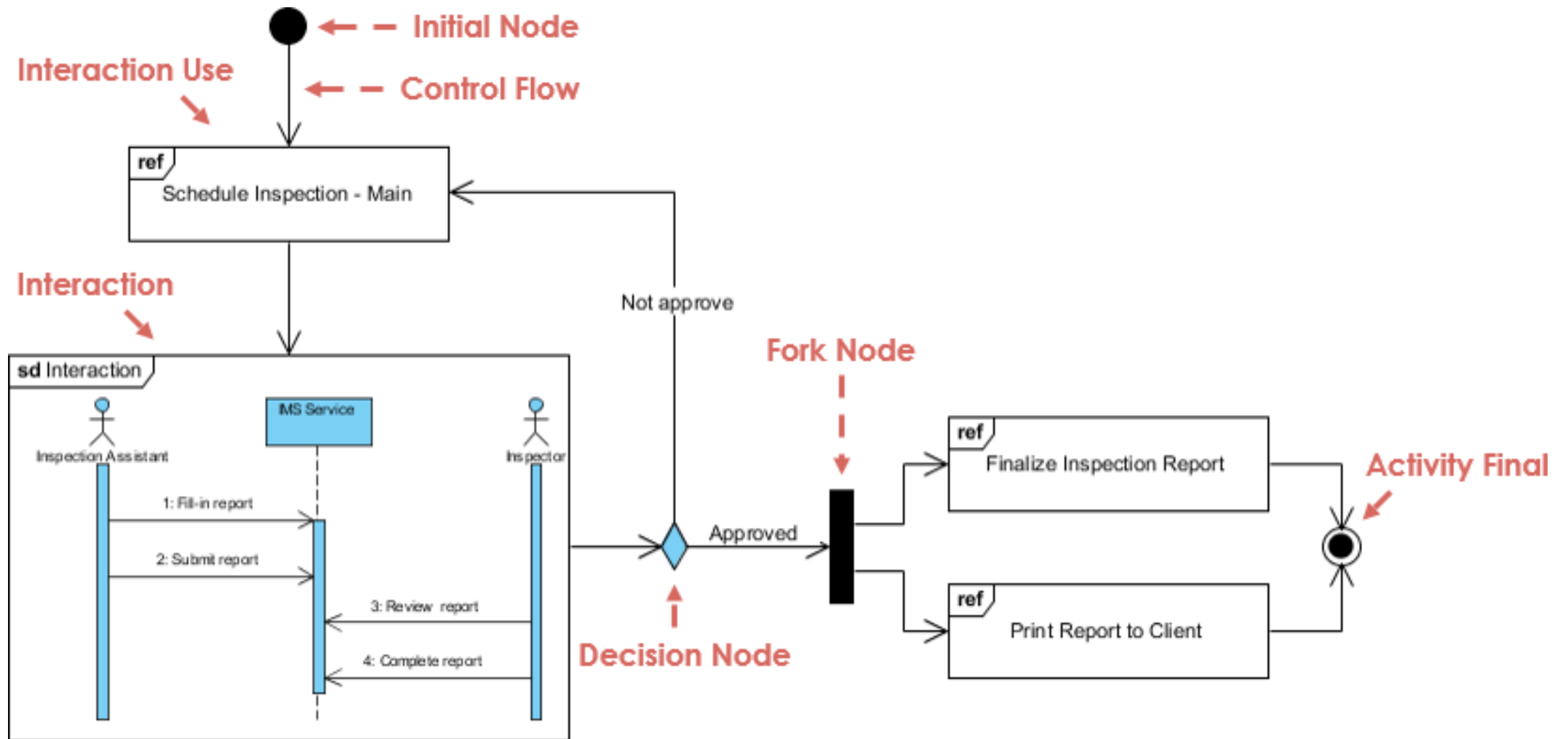


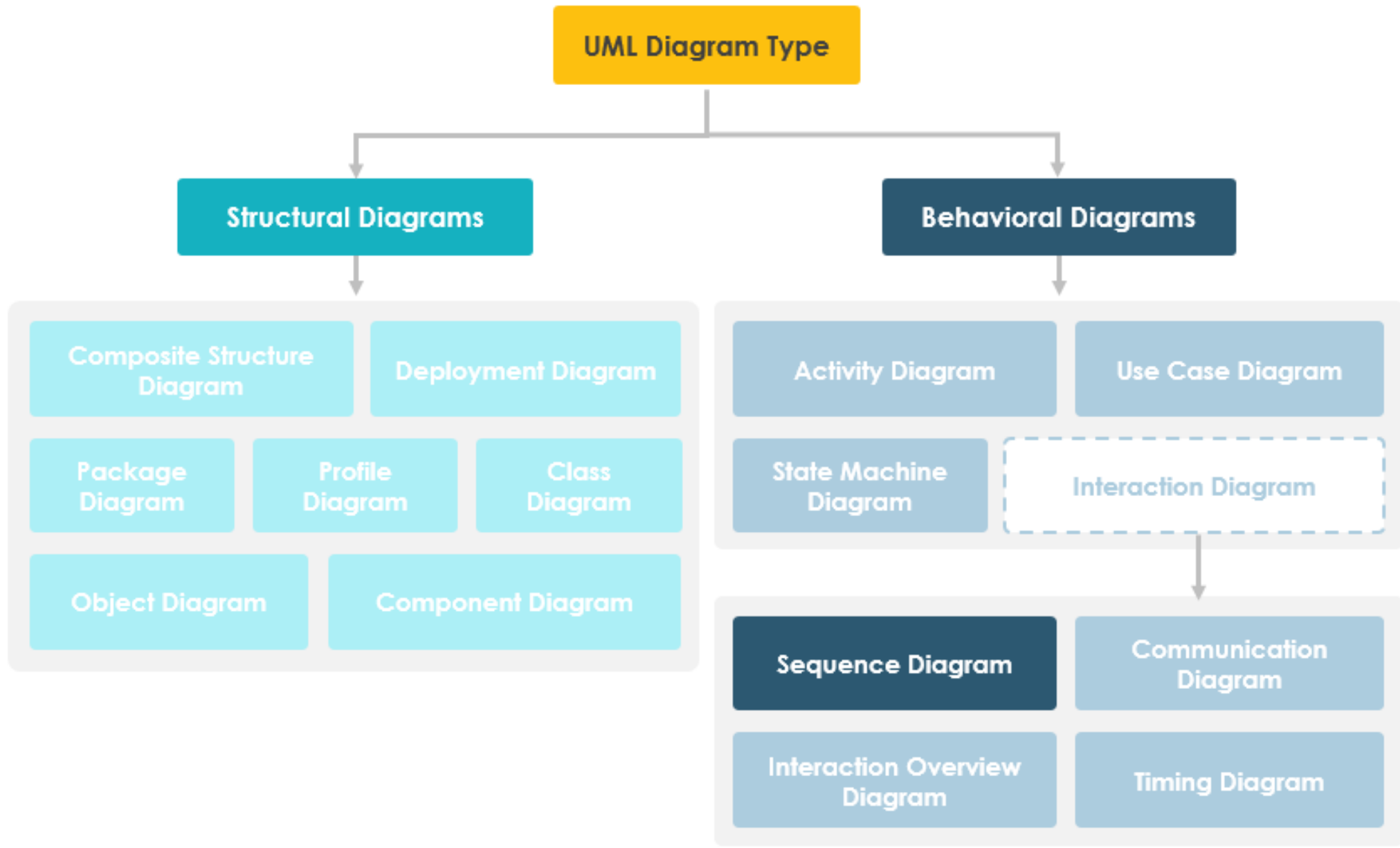


# Interaction Overview Diagram

- Interaction - sd
- Interaction use - ref

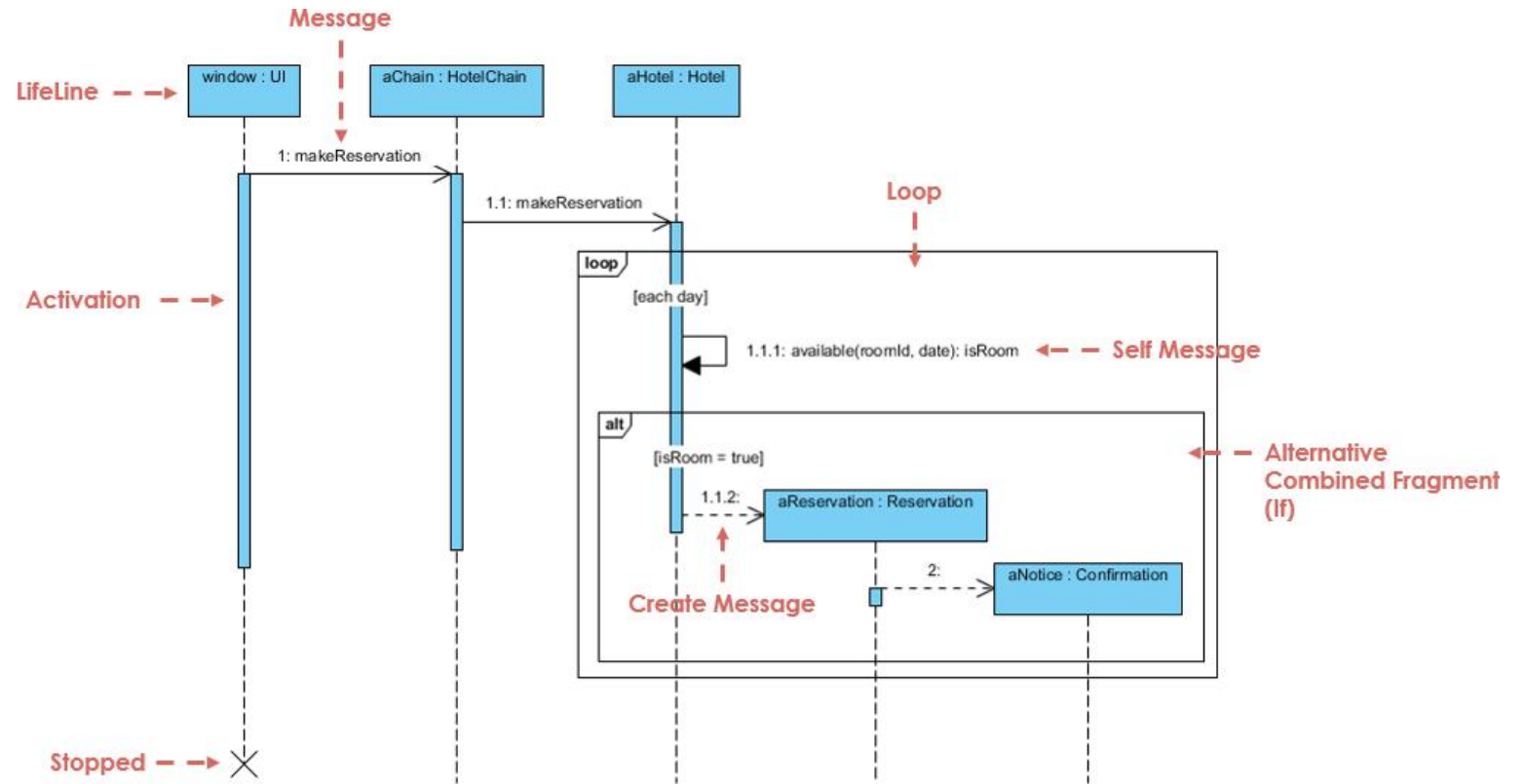






# Sequence Diagram

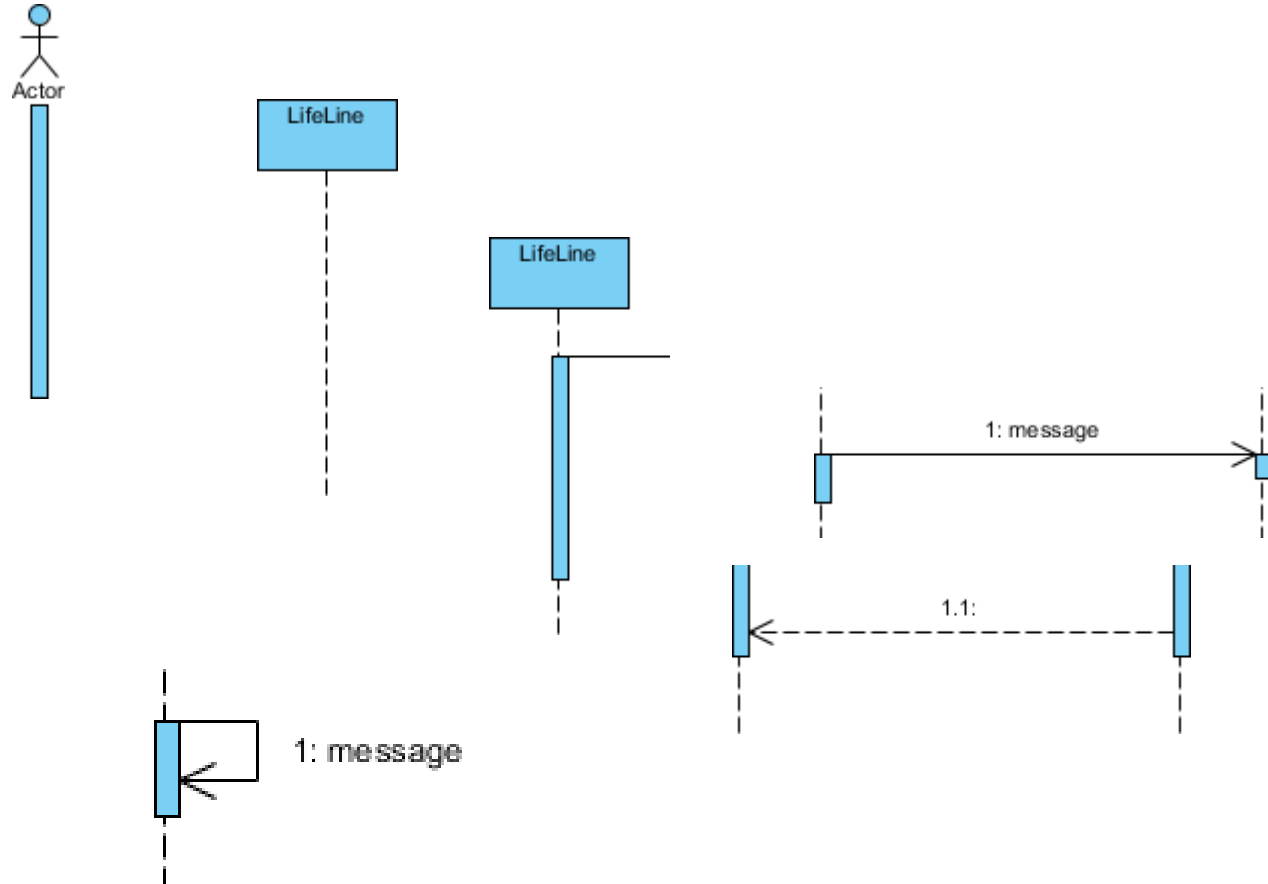
- High-level Interaction
- Object Dimension
- Time Dimension





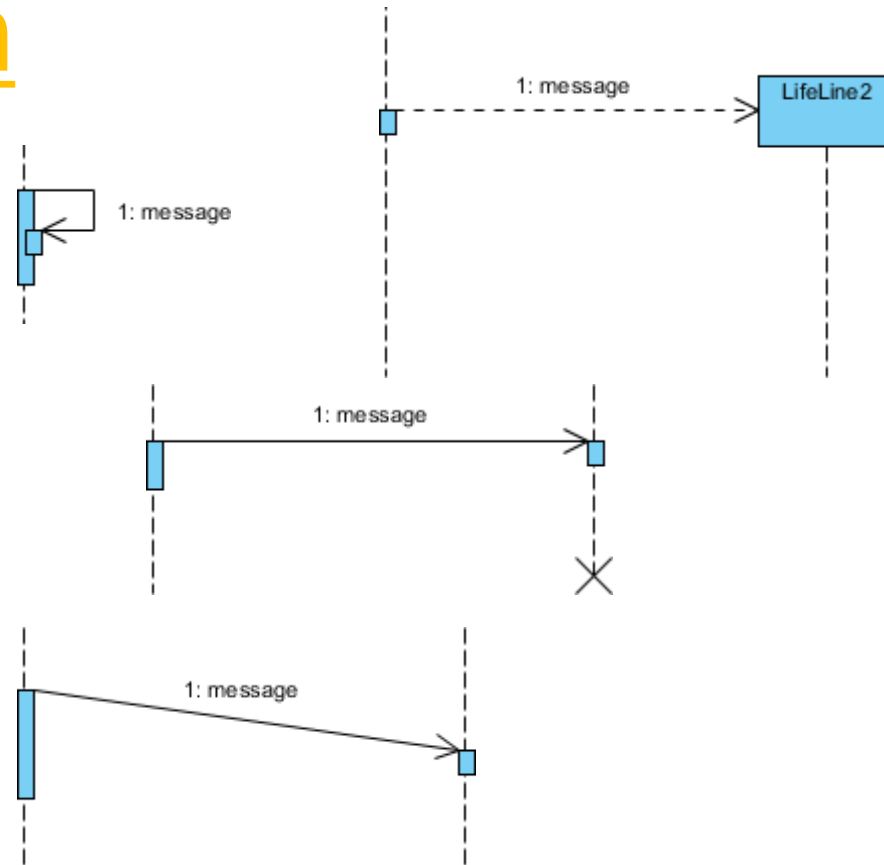
# Sequence Diagram

- Actor
- Lifeline
- Activations
- Call Message
- Return Message
- Self Message



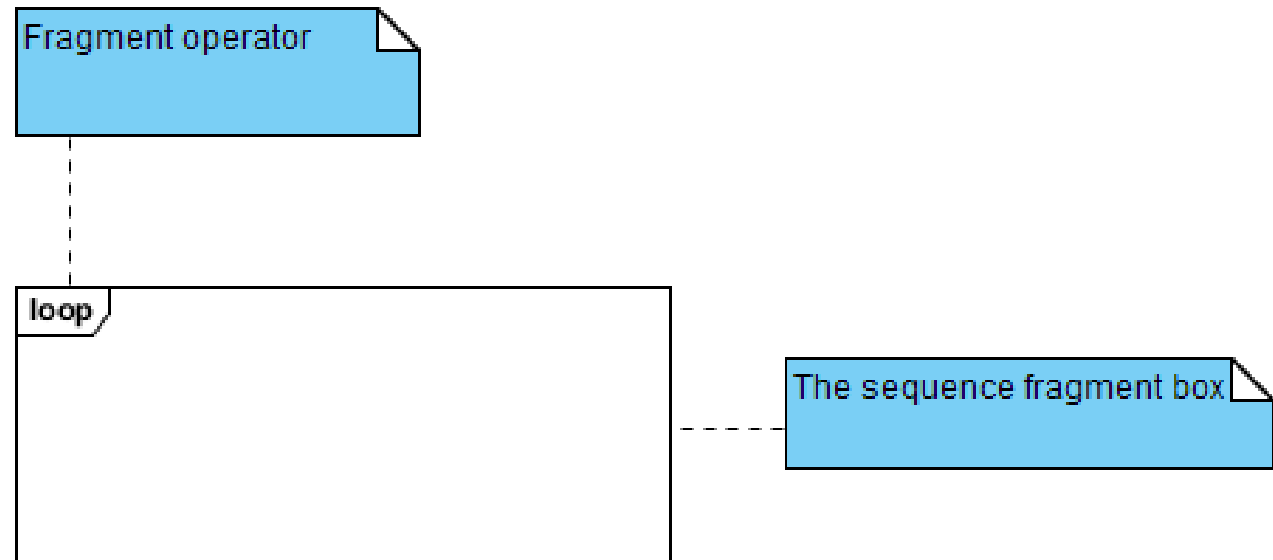
# Sequence Diagram

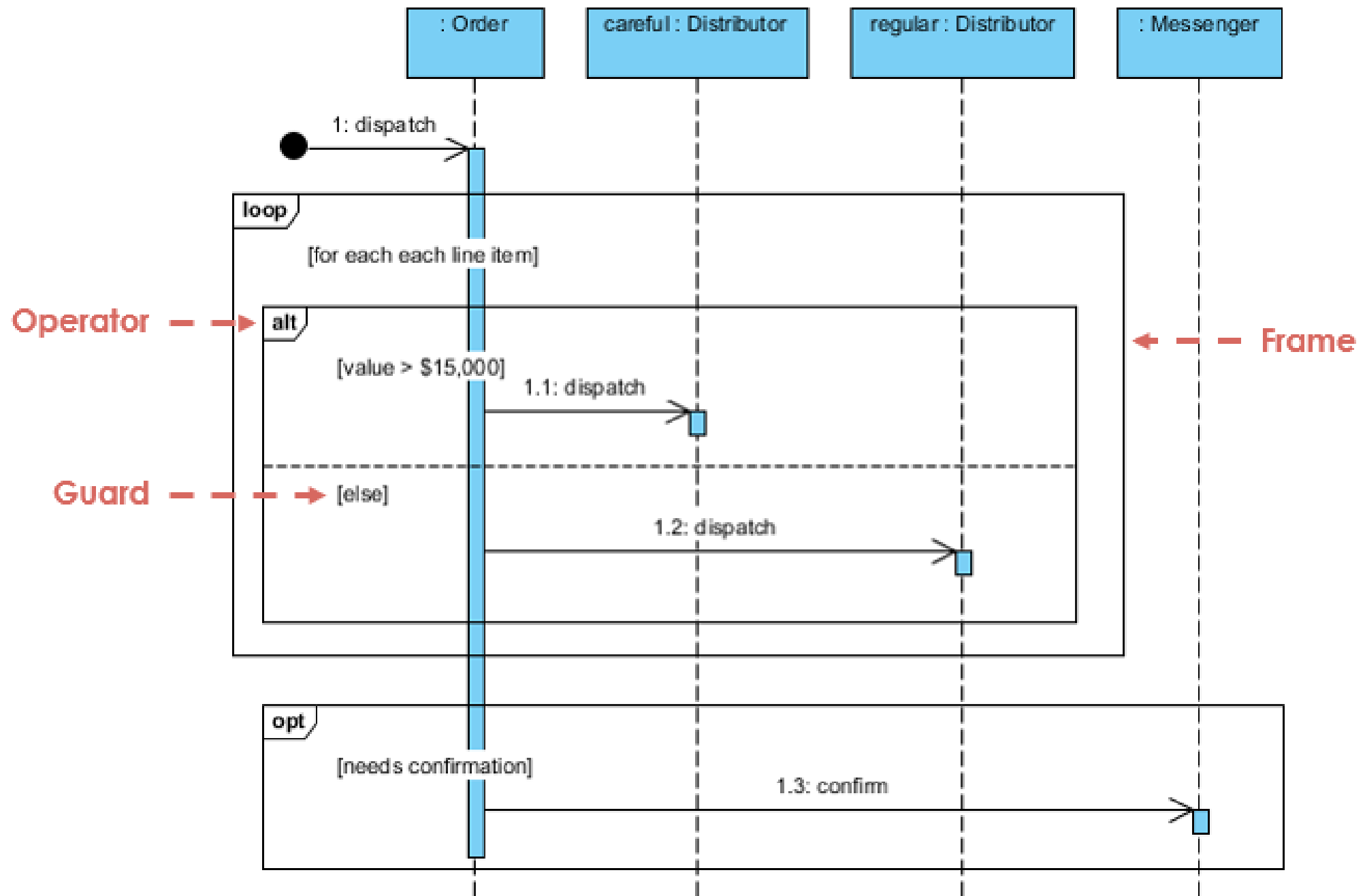
- Recursive Message
- Create Message
- Destroy Message
- Duration Message
- Note



# Sequence Diagram

- Sequence Fragments
- Alt – alternative multiple fragments
- Opt – Optional
- Par – Parallel
- Loop
- Region
- Neg – negative
- Ref – reference
- Sd – Sequence Diagram





# UML Diagram Type

## Structural Diagrams

Composite Structure Diagram

Deployment Diagram

Package Diagram

Profile Diagram

Class Diagram

Object Diagram

Component Diagram

## Behavioral Diagrams

Activity Diagram

Use Case Diagram

State Machine Diagram

Interaction Diagram

Sequence Diagram

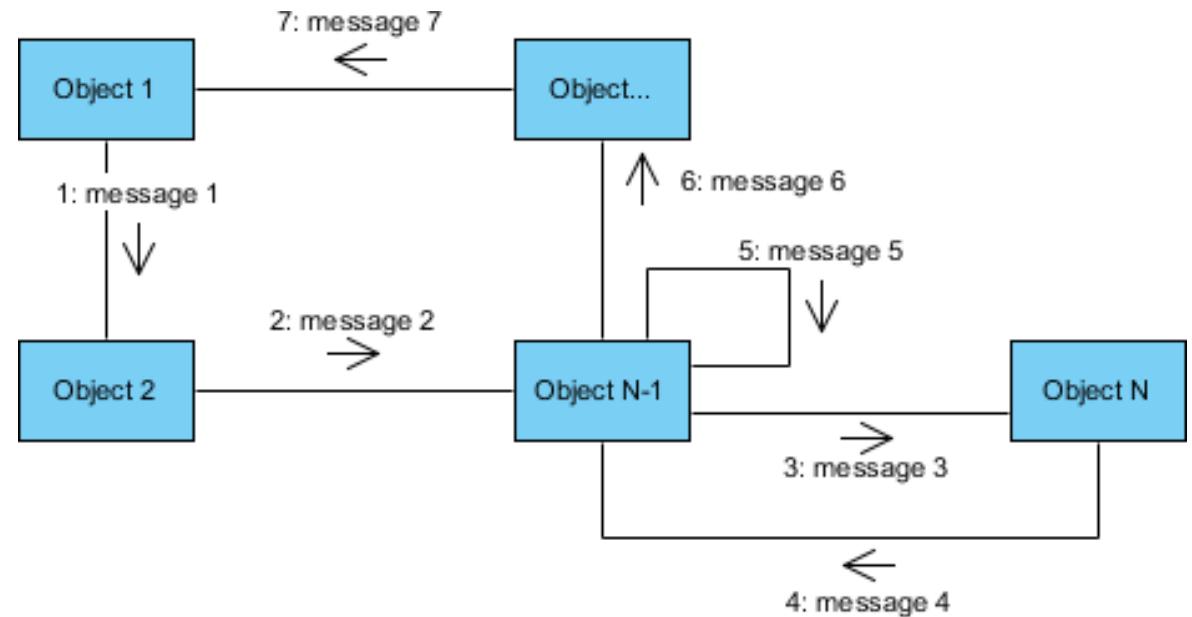
**Communication Diagram**

Interaction Overview Diagram

Timing Diagram

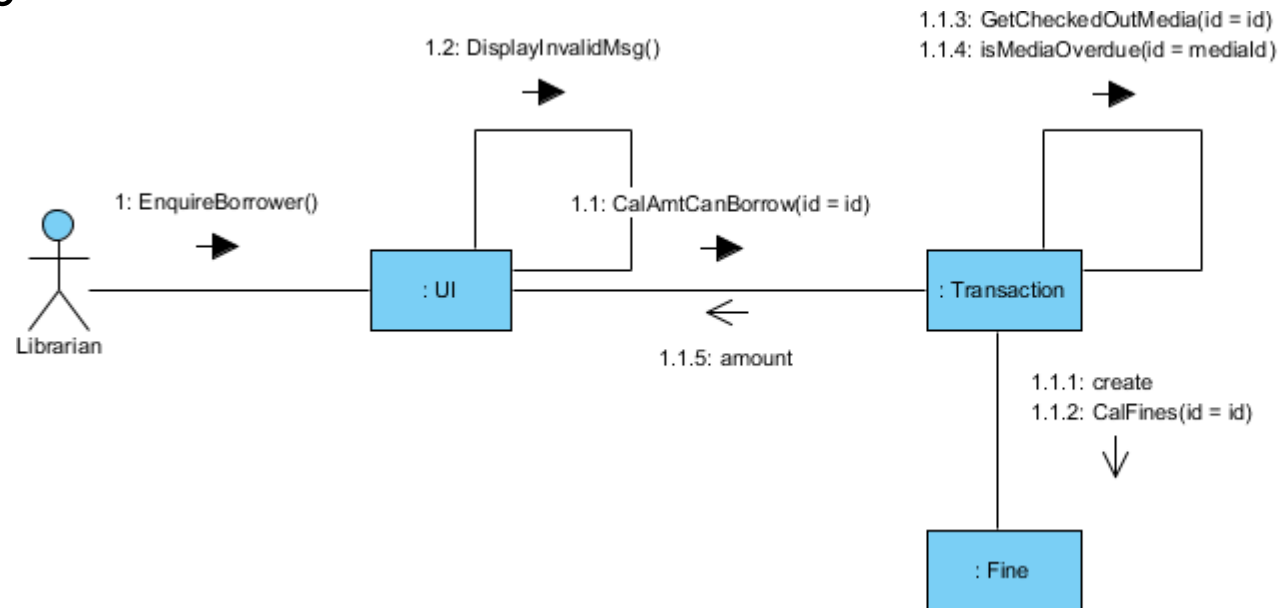
# Communication Diagram

- Interaction
- Model message
- Model mechanism
- Capture interactions
- Alternative scenarios
- Support identification



# Communication Diagram

- Objects
  - Supplier objects
  - Client objects
- Links
- Messages



1. EnquireBorrower

1.1 CalAmtCanBorrow

1.1.1 create

1.1.2 CalFines

1.1.3 GetCheckedOutMedia

1.1.4 IsMediaOverdue

1.1.5 amount

1.2 DisplayInvalidMsg

# UML Diagram Type

## Structural Diagrams

Composite Structure Diagram

Deployment Diagram

Package Diagram

Profile Diagram

Class Diagram

Object Diagram

Component Diagram

## Behavioral Diagrams

Activity Diagram

Use Case Diagram

State Machine Diagram

Interaction Diagram

Sequence Diagram

Communication Diagram

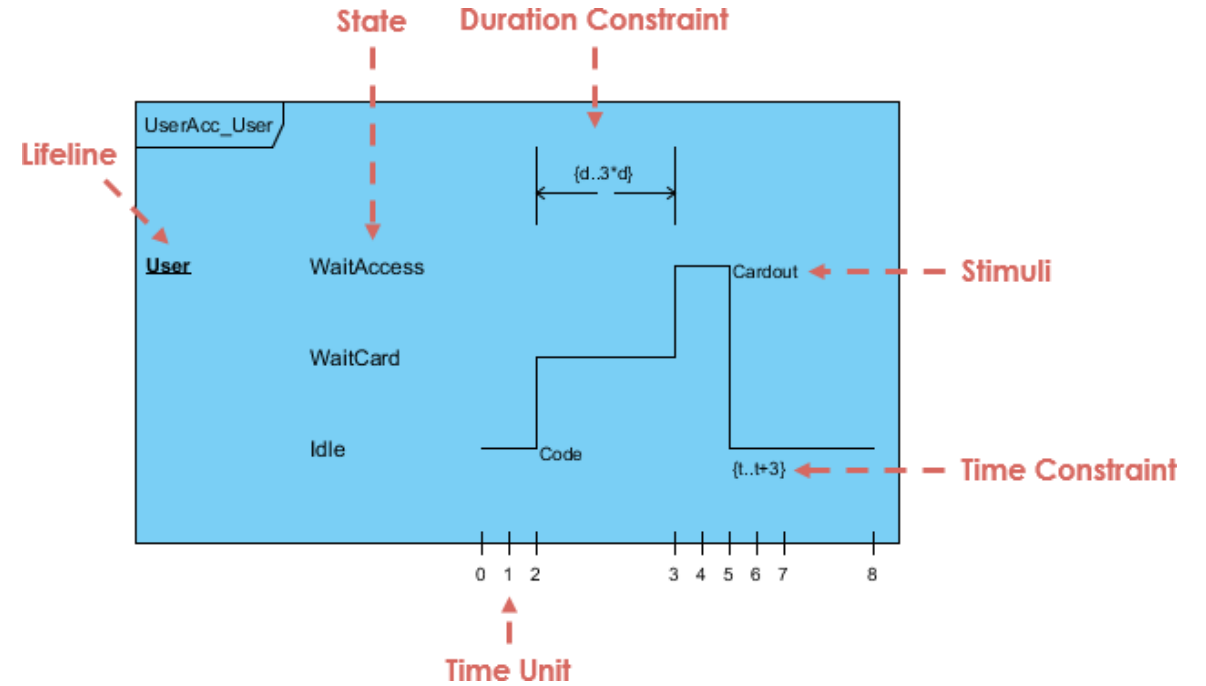
Interaction Overview Diagram

Timing Diagram

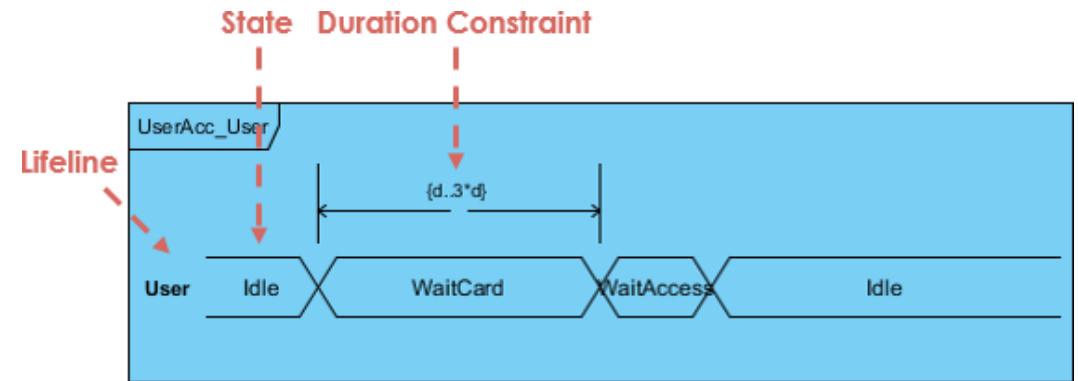


# Timing Diagram

- State Timeline Representation

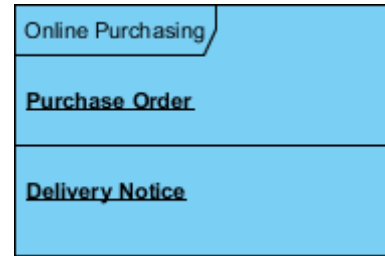


- Value lifeline Representation



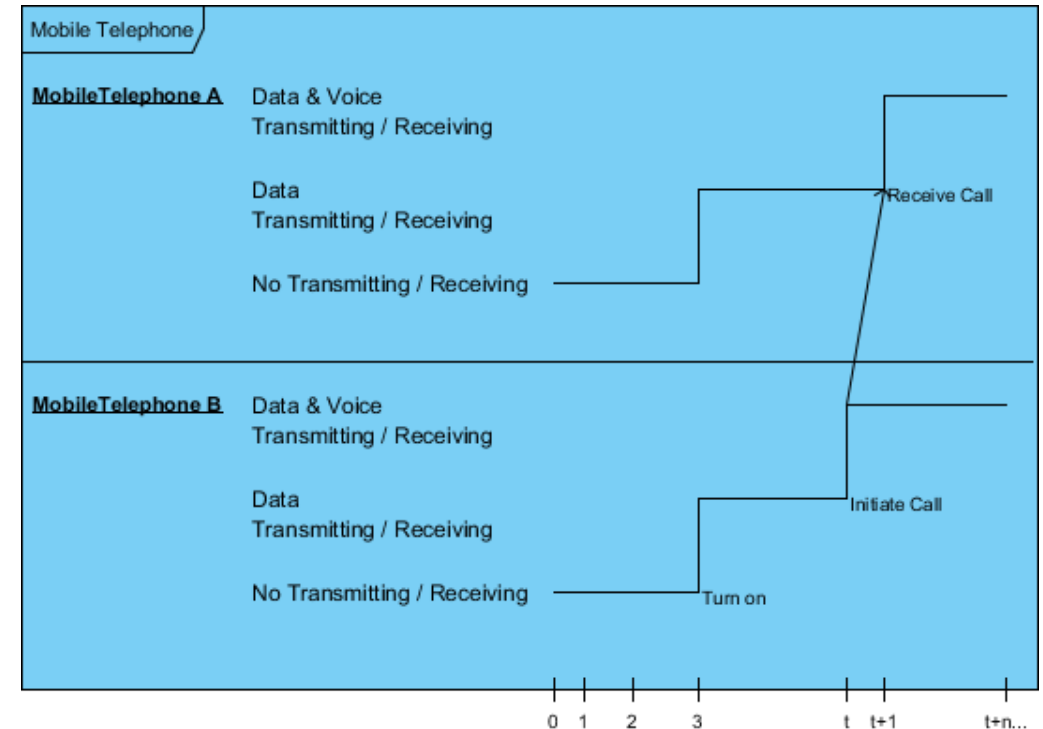
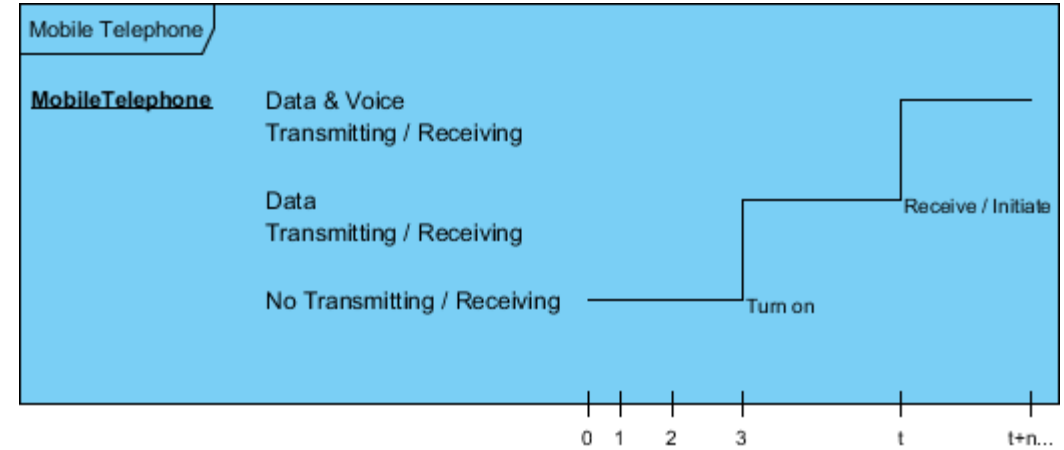
# Timing Diagram

- Lifeline



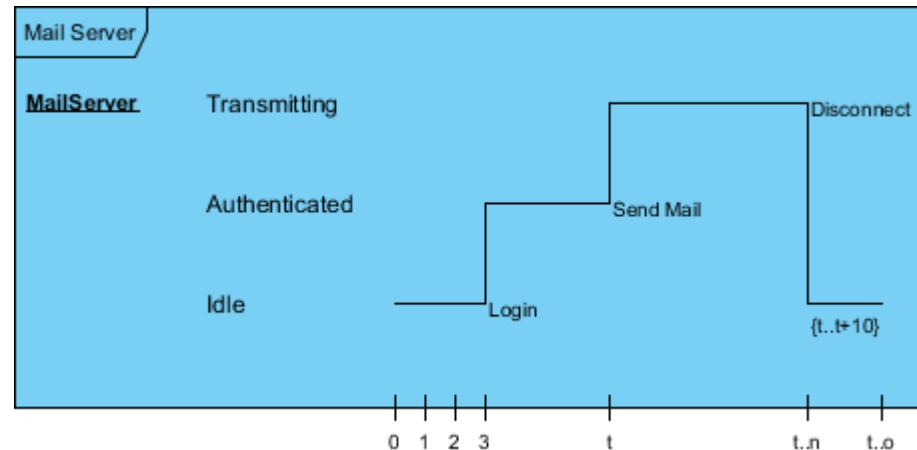
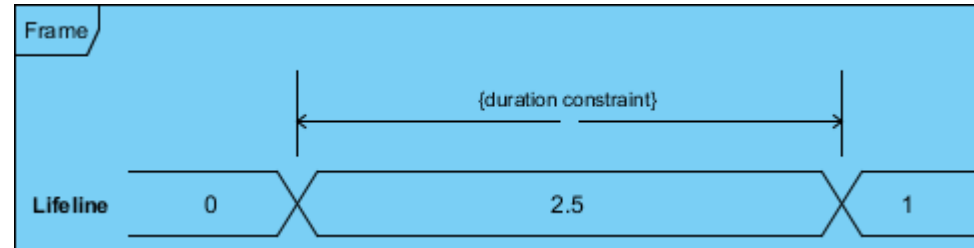
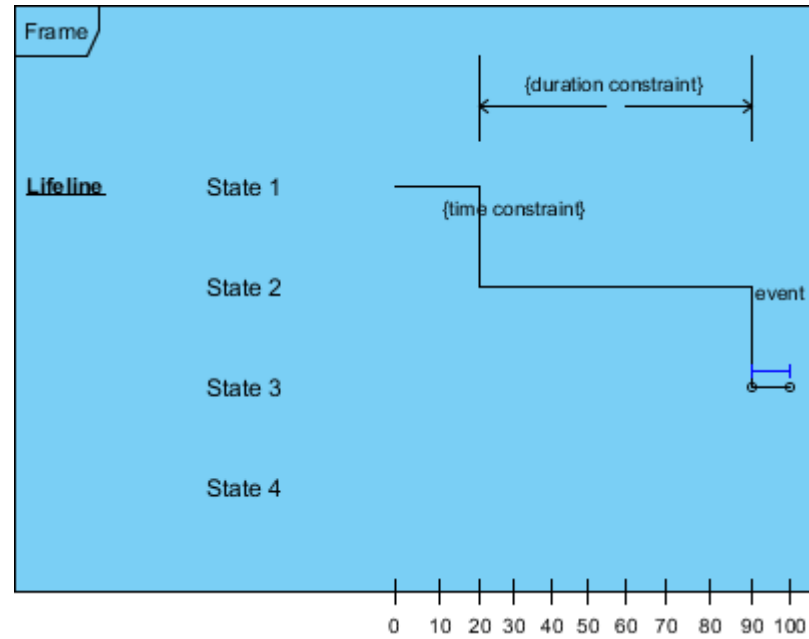
- State Timeline in Timing Diagram

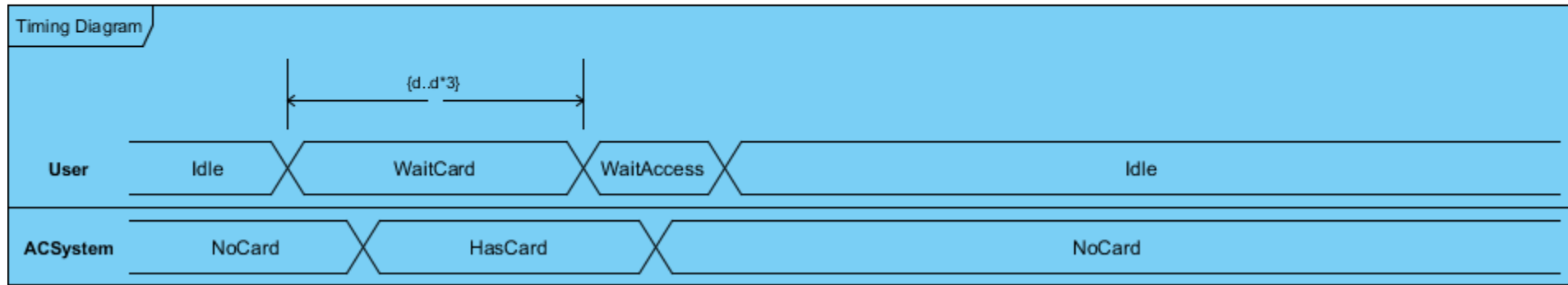
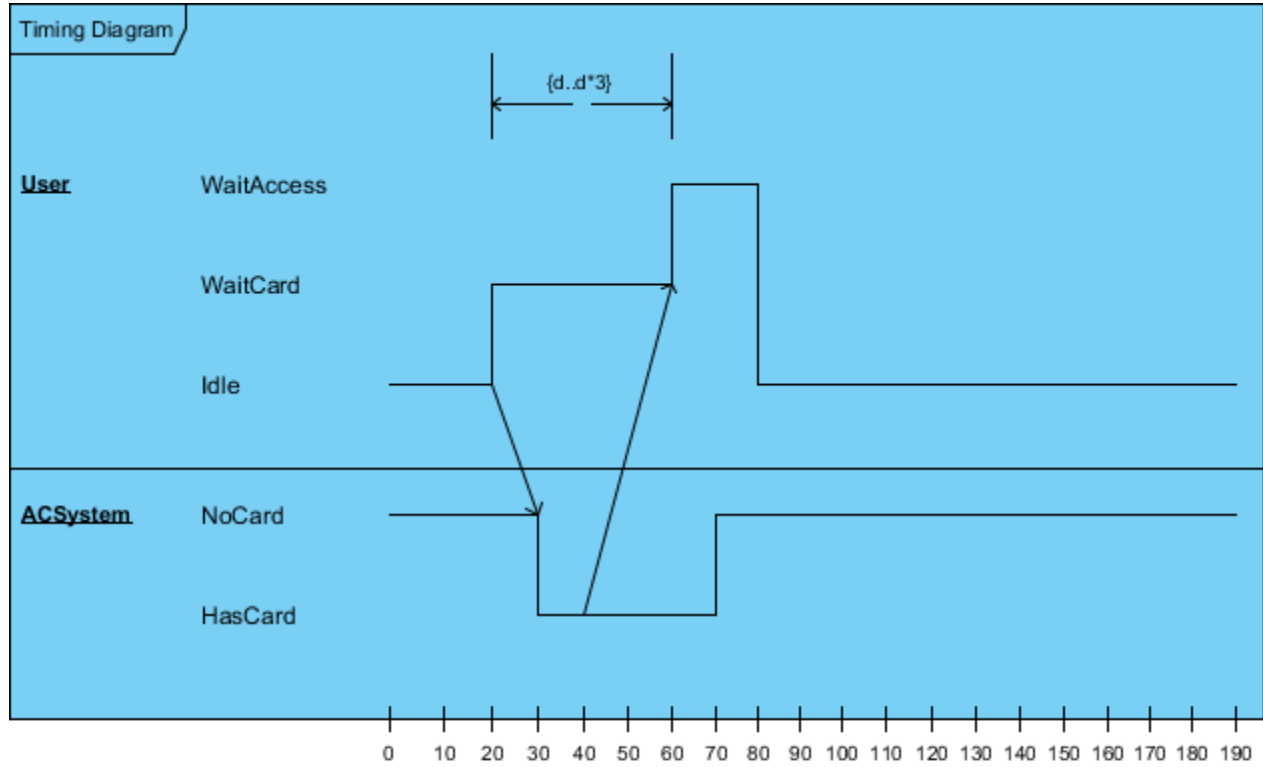
- Multiple Compartments



# Timing Diagram

- State lifeline
- Value Lifeline
- Timeline and Constrains





# Děkuju za pozornost

Martin Koutnik

# Zdroje

- <https://www.visual-paradigm.com/>
- <https://www.visual-paradigm.com/guide/>
- <https://www.visual-paradigm.com/guide/uml-unified-modeling-language/what-is-composite-structure-diagram/>
- <https://www.geeksforgeeks.org/unified-modeling-language-uml-introduction/>
- <https://www.visual-paradigm.com/guide/uml-unified-modeling-language/what-is-component-diagram/>
- [https://www.altova.com/manual/UModel/umodelbasic/umball\\_and\\_socket\\_notation.html](https://www.altova.com/manual/UModel/umodelbasic/umball_and_socket_notation.html)