

# Conception Orientée Objets

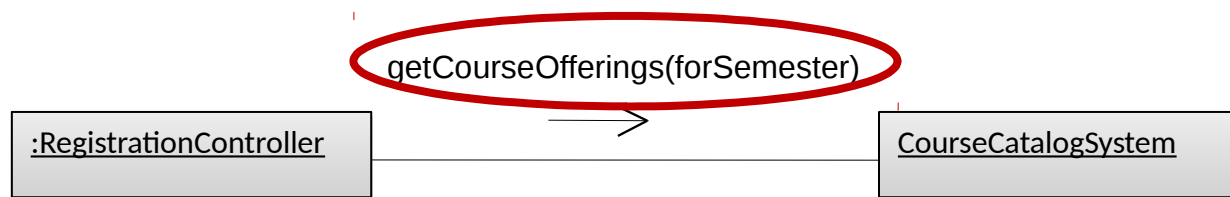
## Interactions

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# Interactions

- ❑ Objects are useless unless they can collaborate to solve a problem.
  - Each object is responsible for its own behavior and status.
  - No object can carry out every responsibility on its own.
- ❑ How do objects interact with each other?
  - They interact through messages.
  - A message shows how one object asks another object to perform some activity.



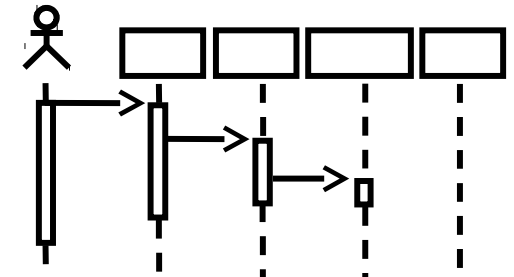
# What is an Interaction Diagram?

- ❑ Generic term that applies to several diagrams that emphasize object interactions
  - Sequence Diagram
  - Communication Diagram
- ❑ Specialized Variants
  - Timing Diagram
  - Interaction Overview Diagram
- ❑ In UML 2.0, heavily inspired from
  - Message Sequence Charts (ITU-T SDL, Z.120)
  - Live Sequence Charts (D. Harel)

# Interaction Diagrams

## □ Sequence Diagram

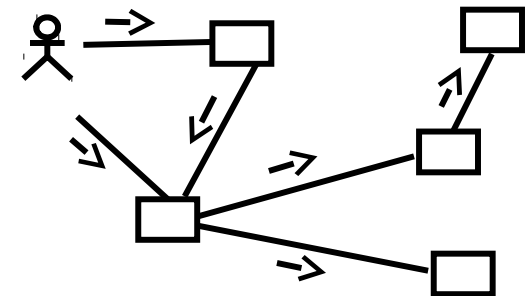
- Time oriented view of object interaction



Sequence Diagrams

## □ Communication Diagram

- Structural view of messaging objects

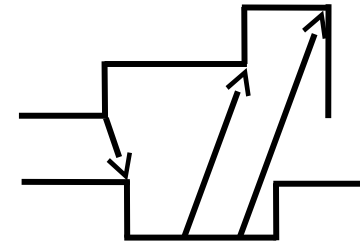


Communication Diagrams

# Interaction Diagrams

## □ Timing Diagram

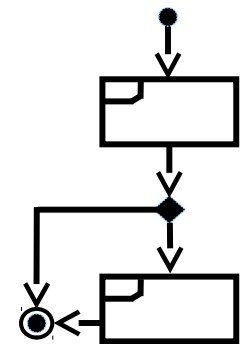
- Time constraint view of messages involved in an interaction



Timing Diagrams

## □ Interaction Overview Diagram

- High level view of interaction sets combined into logic sequence

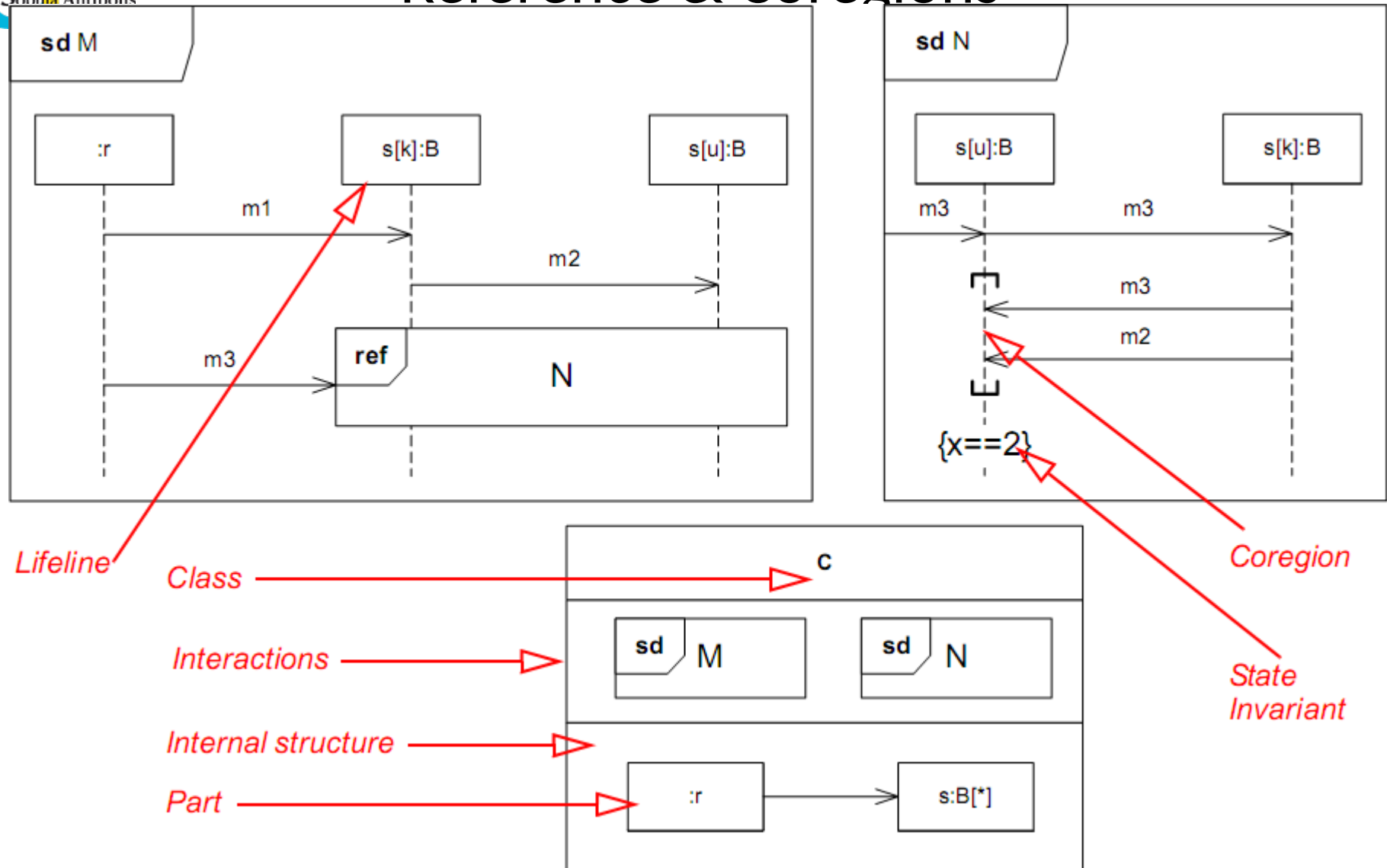


Interaction Overview  
Diagrams

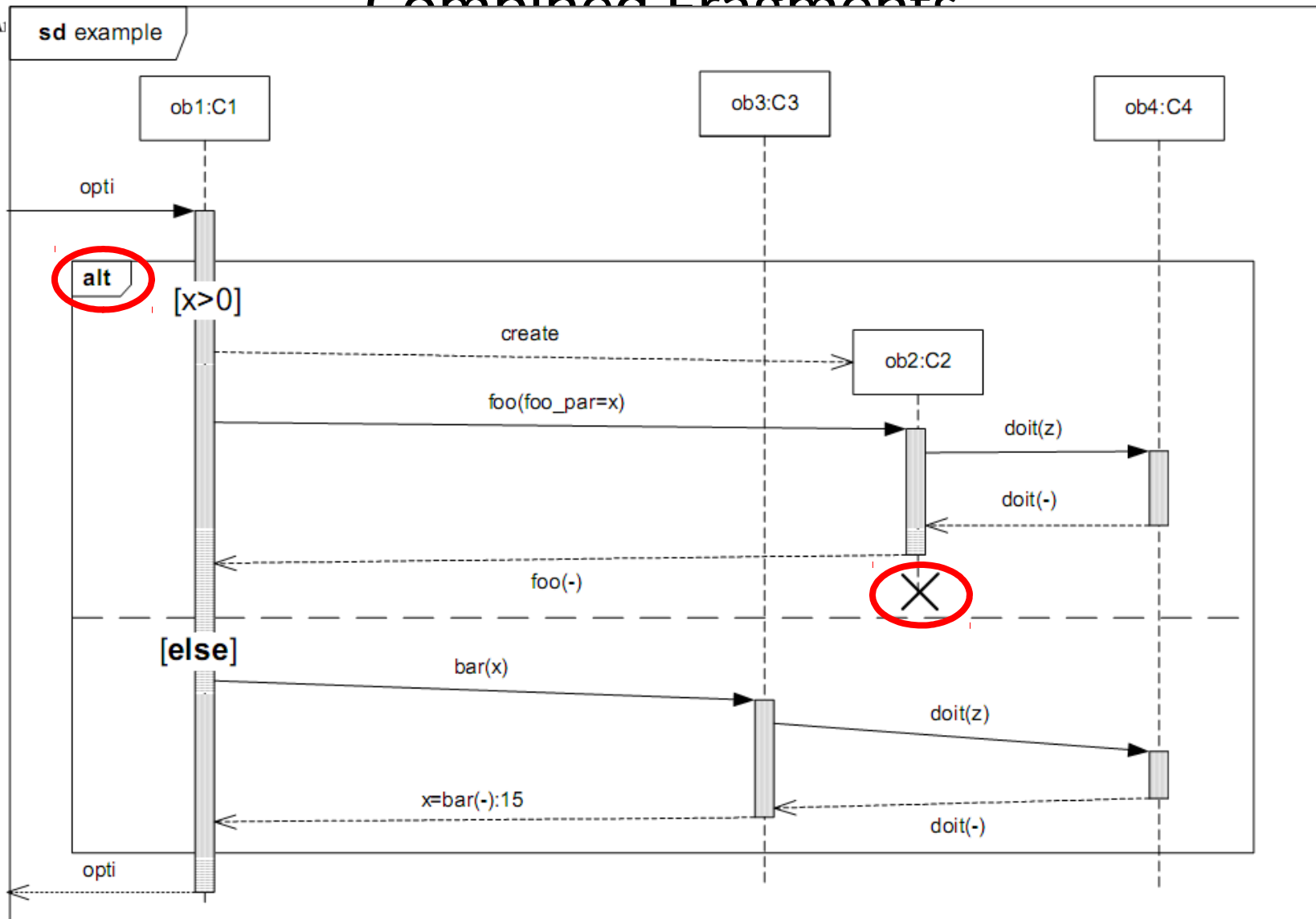
# Classes & Interactions

- Les interactions peuvent décrire
  - Un comportement interne d'une classe
  - Les interactions entre les “parts” d'une classe structurée ou d'une collaboration

# Reference & Coregions

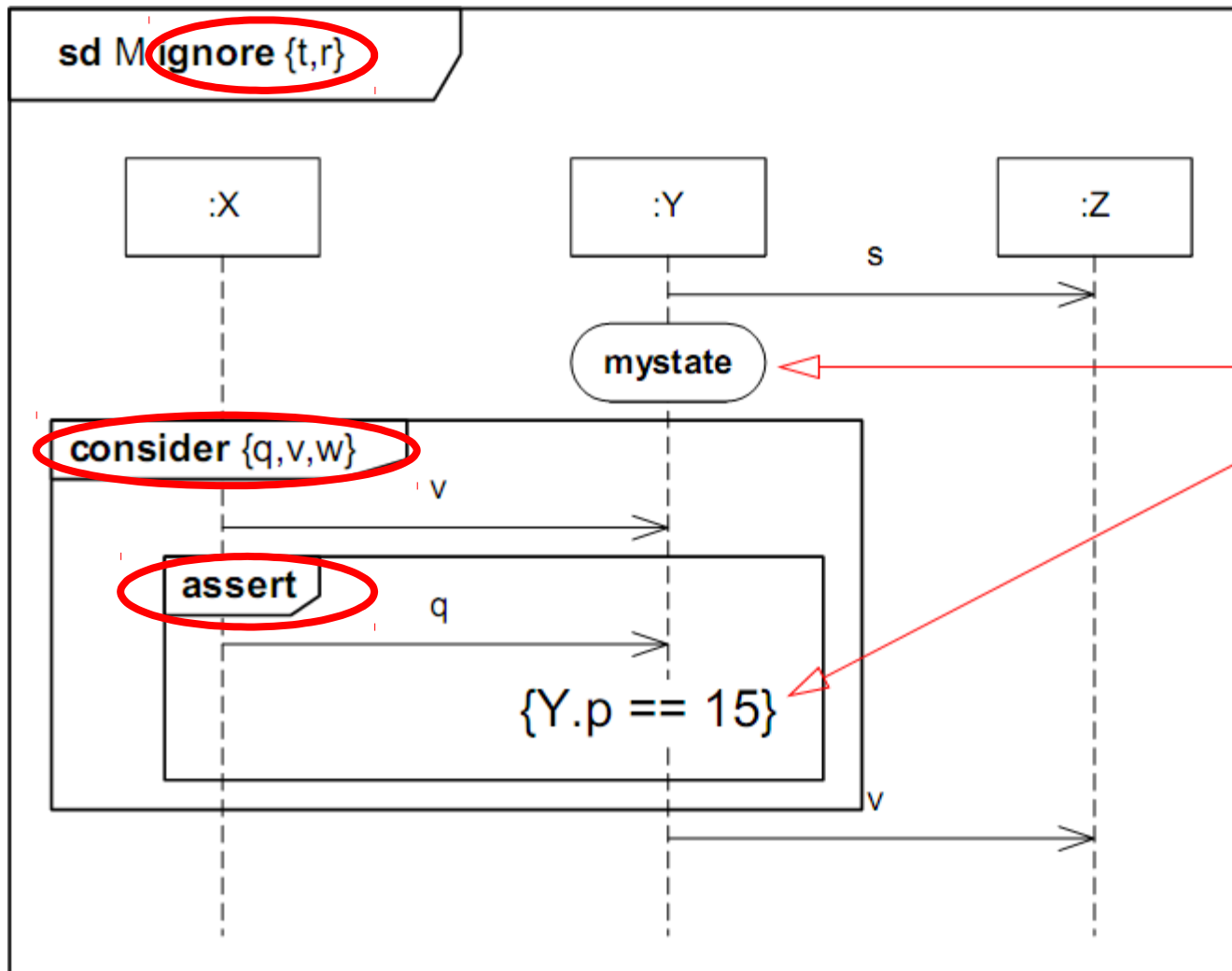


## Combined Fragments





# Consider, Assert, Ignore



# Primary Interaction Operators

- ❑ **ref** name
  - reference to a sequence diagram fragment defined elsewhere
- ❑ **opt** [condition]
  - has 1 part that may be executed based on a condition/state value
- ❑ **alt**
  - has 2 or more parts, but only one executes based on a condition/state
  - an operand fragment labeled [else] is executed if no other condition is true
- ❑ **par**
  - has 2 or more parts that execute concurrently
  - If there is only one processor the behavior could be (A then B), (B then A), or (A and B interleaving) ...
- ❑ **loop** min..max [escape]
  - Has a minimum # of executions, and optional maximum # of executions, and optional escape condition
- ❑ **break** [condition]
  - Has an optional guard. If true, the contents (if any) are executed, and the remainder of the enclosing operator is not executed

# Other Interaction Operators

## ☐ **critical**

- The sequence diagram fragment is a critical region. It is treated as atomic – no interleaving with parallel regions

## ☐ **neg**

- The sequence diagram fragment is forbidden. Either it is impossible to occur, or it is the intent of the requirements to prevent it from occurring

## ☐ **assert**

- The sequence diagram fragment is the only one possible (or legal)

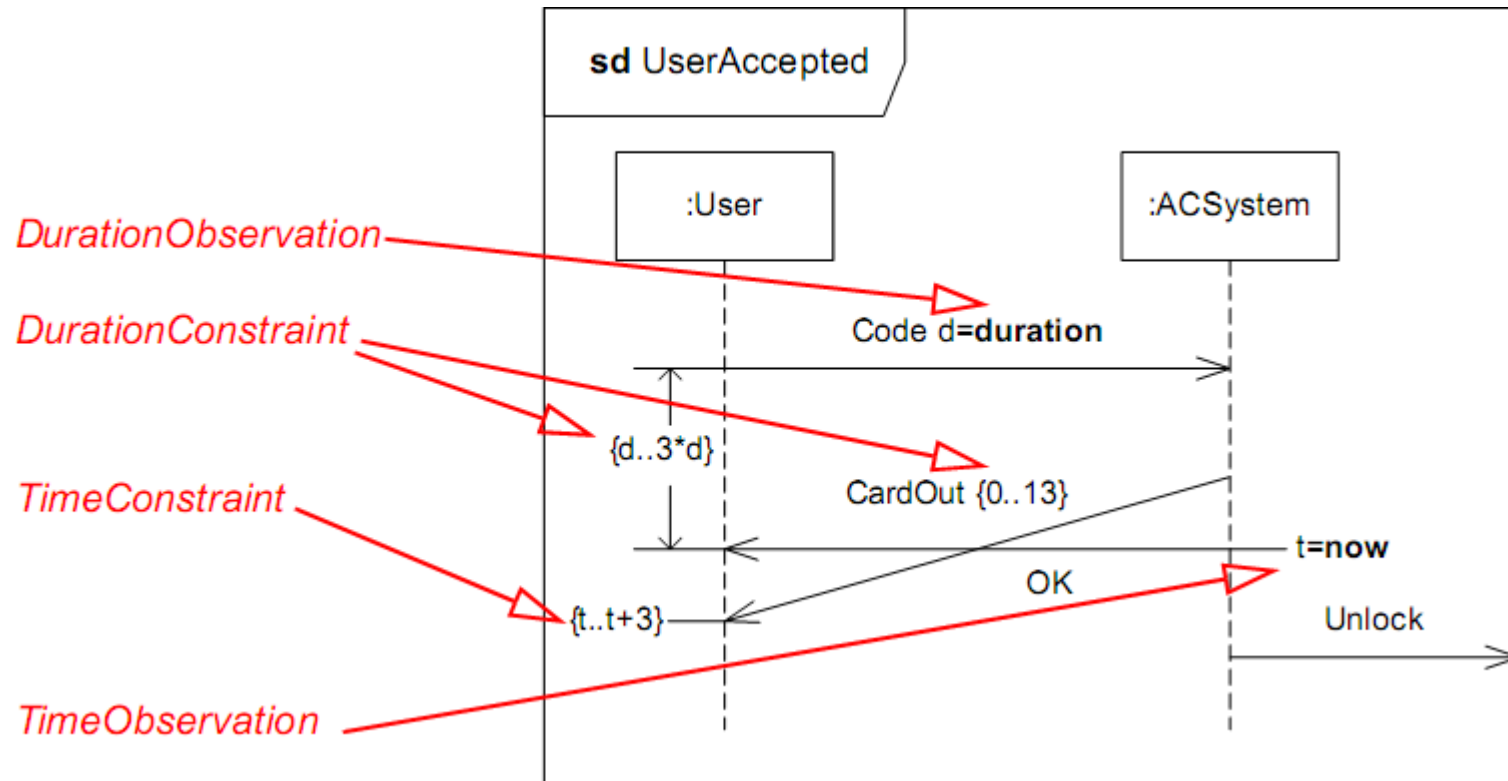
## ☐ **seq** (weak, the default) / **strict**

- Strict: The message exchange occurs in the order described
- Weak: Each lifeline may see different orders for the exchange

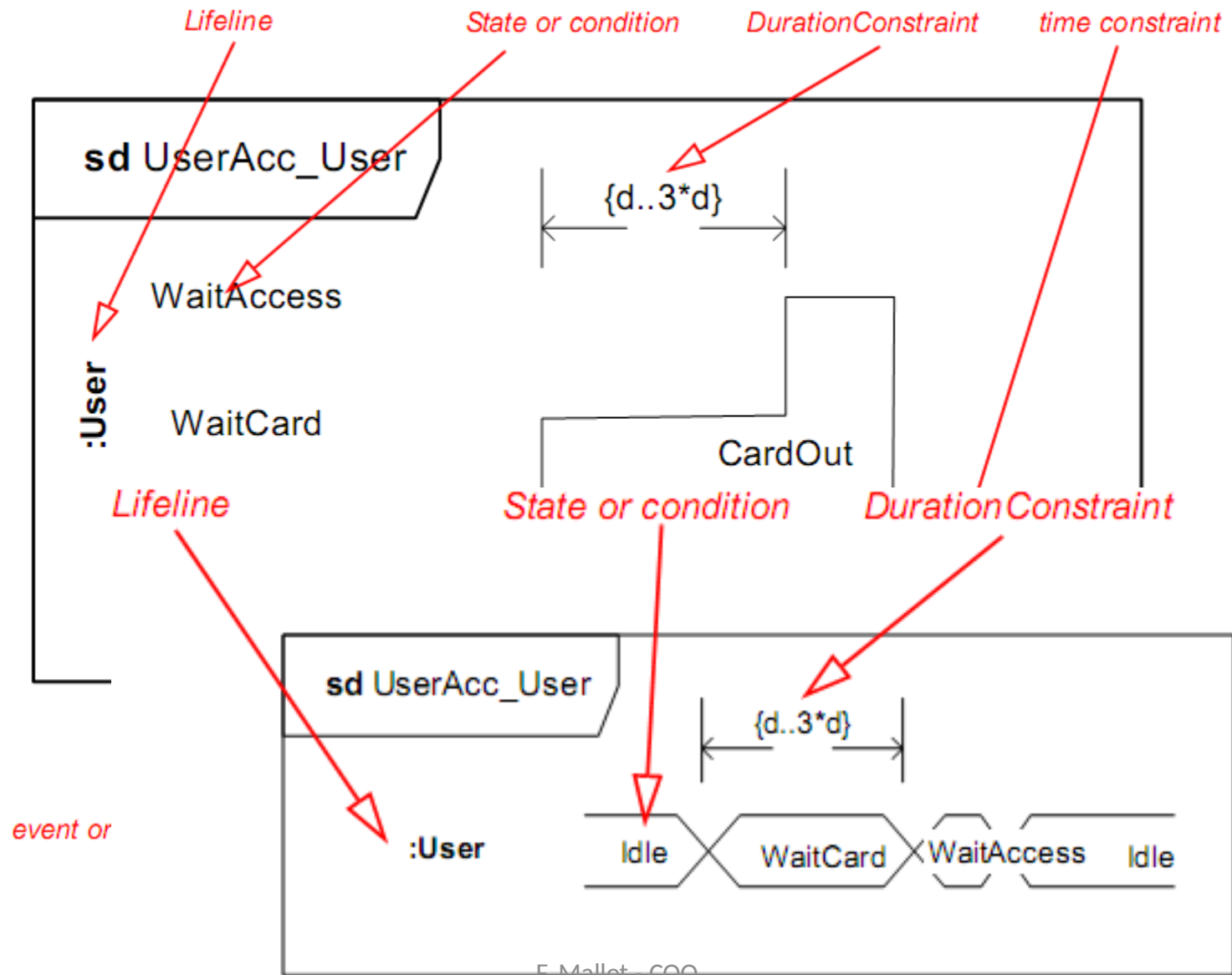
## ☐ **consider** (list of messages) / **ignore** (list of messages)

- Consider: List the messages that are relevant in this sequence fragment
- Ignored: List the messages that may arrive, but are not interesting here

# Observations & Constraints

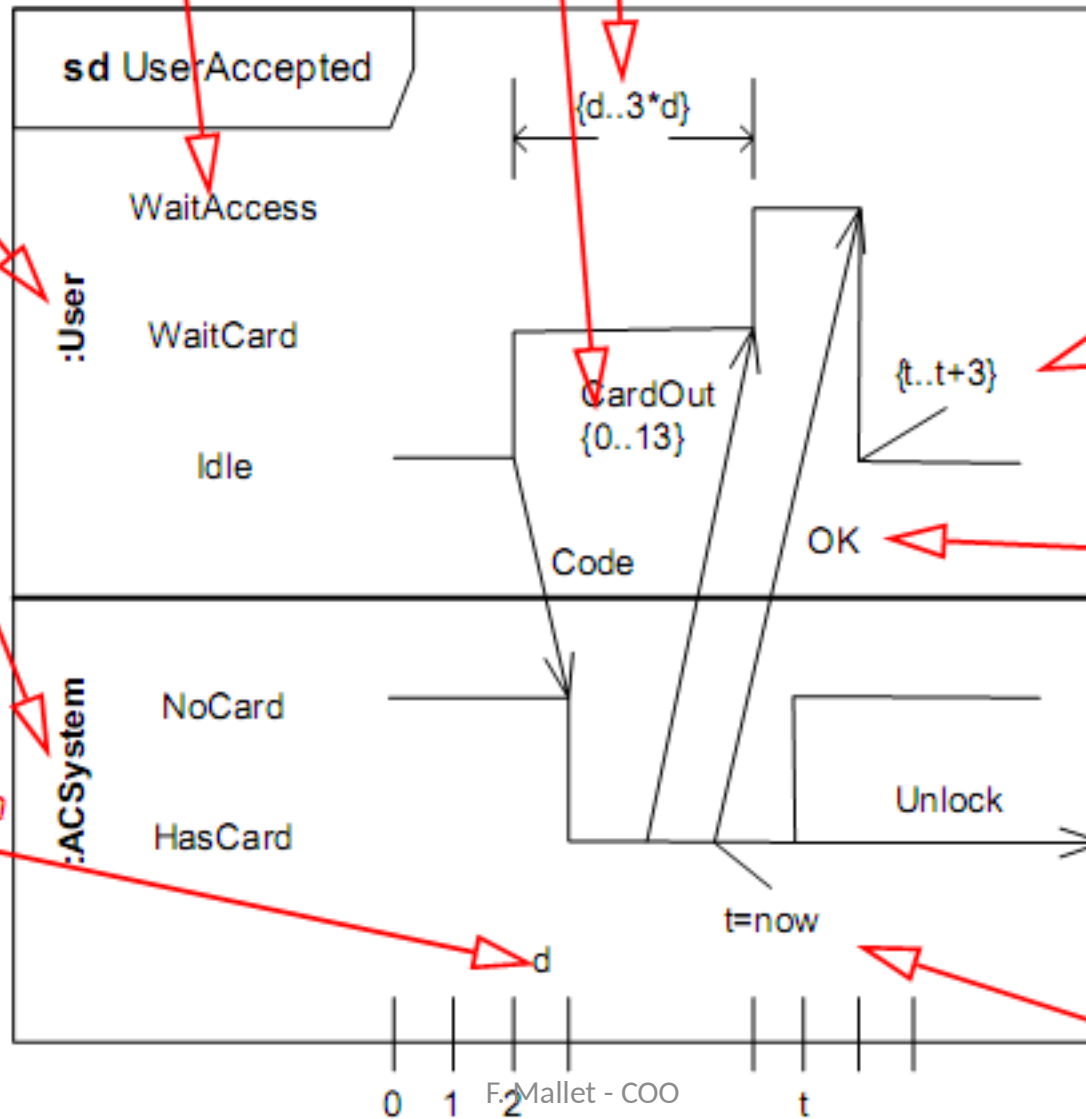


# Timing Diagrams



# Timing Diagrams

State or condition Duration Constraints



Duration Observation

Time Constraint

Message

Time Observation

# Interaction Overview Diagrams

