

# UML: Sequence Diagrams

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Dr. Sean Ho

Trinity Western University

# Steps of OO design

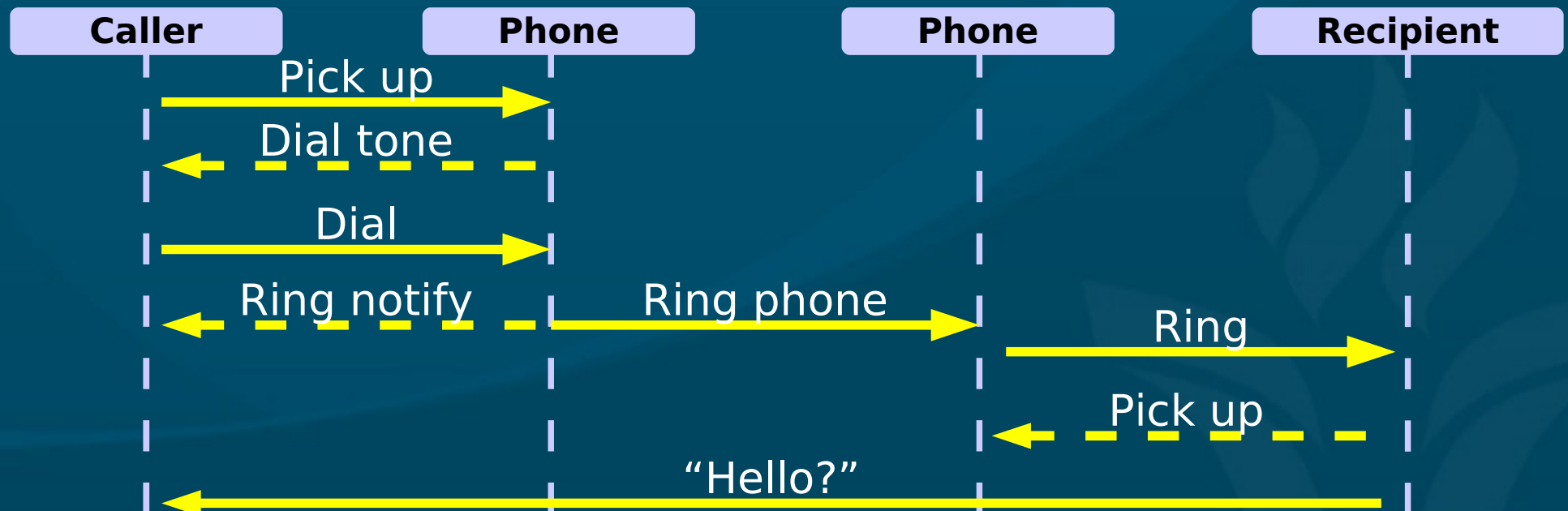
- **Requirements:** system behaviour
  - Use-cases, UI mockups
- **Design:** components / modules
  - Component diagrams, CRC diagrams
  - Sequence diagrams of messages passed
  - State of objects/components
- **Implementation:** from components to classes
  - Class diagrams, relationships
  - Inheritance, composition, etc.

# UML diagrams for design

- UML is just a description of several commonly-used diagrams useful for design:
- Collaboration diagrams (CRC)
- Class diagrams
- Use-case diagrams
- Sequence diagrams
- State diagrams
- Activity diagrams
- Component diagrams

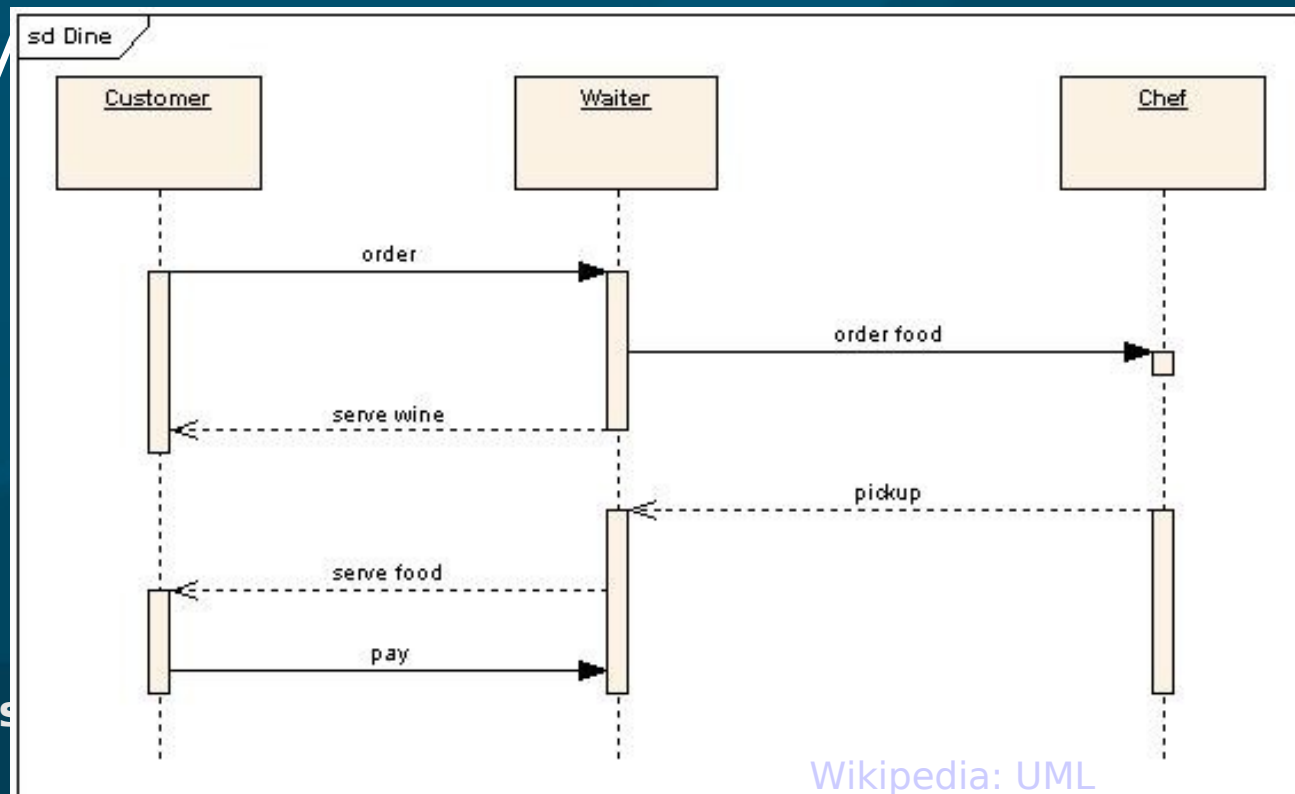
# Sequence diagrams

- Describes **behaviour** via **messages** passed
  - **Lower-level** than use-cases
- Each object / actor / component has a **lifeline**
- **Messages**: horiz. **arrow**. **Activities**: vertical **box**



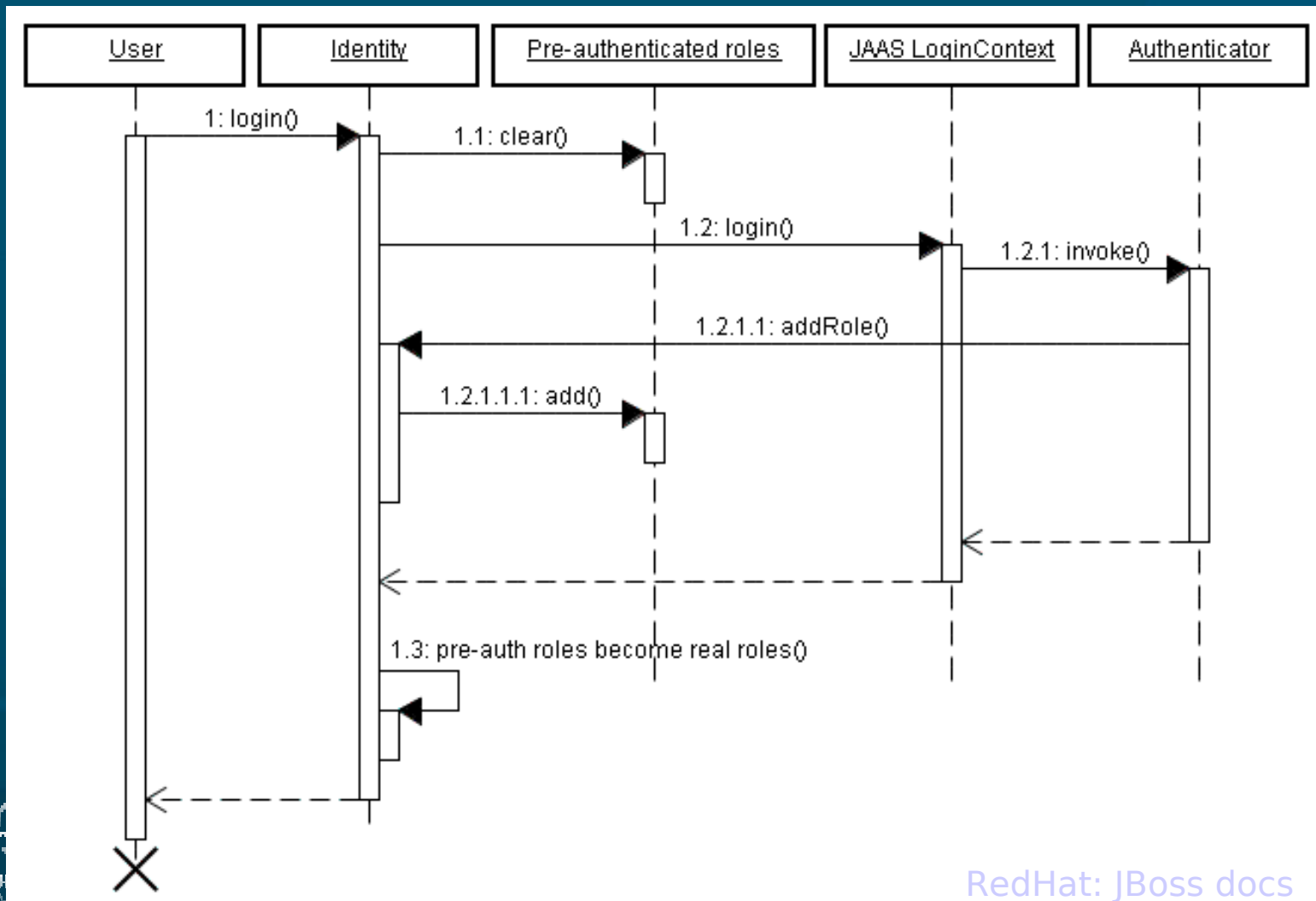
# Activity lifecycle

- Each vertical box represents an **activity** performed by the actor / object / component
- The vertical length is the **duration** of the activity
- **Messages** may trigger activities to start
- When an activity completes, it may trigger a **return** message (**dotted**)



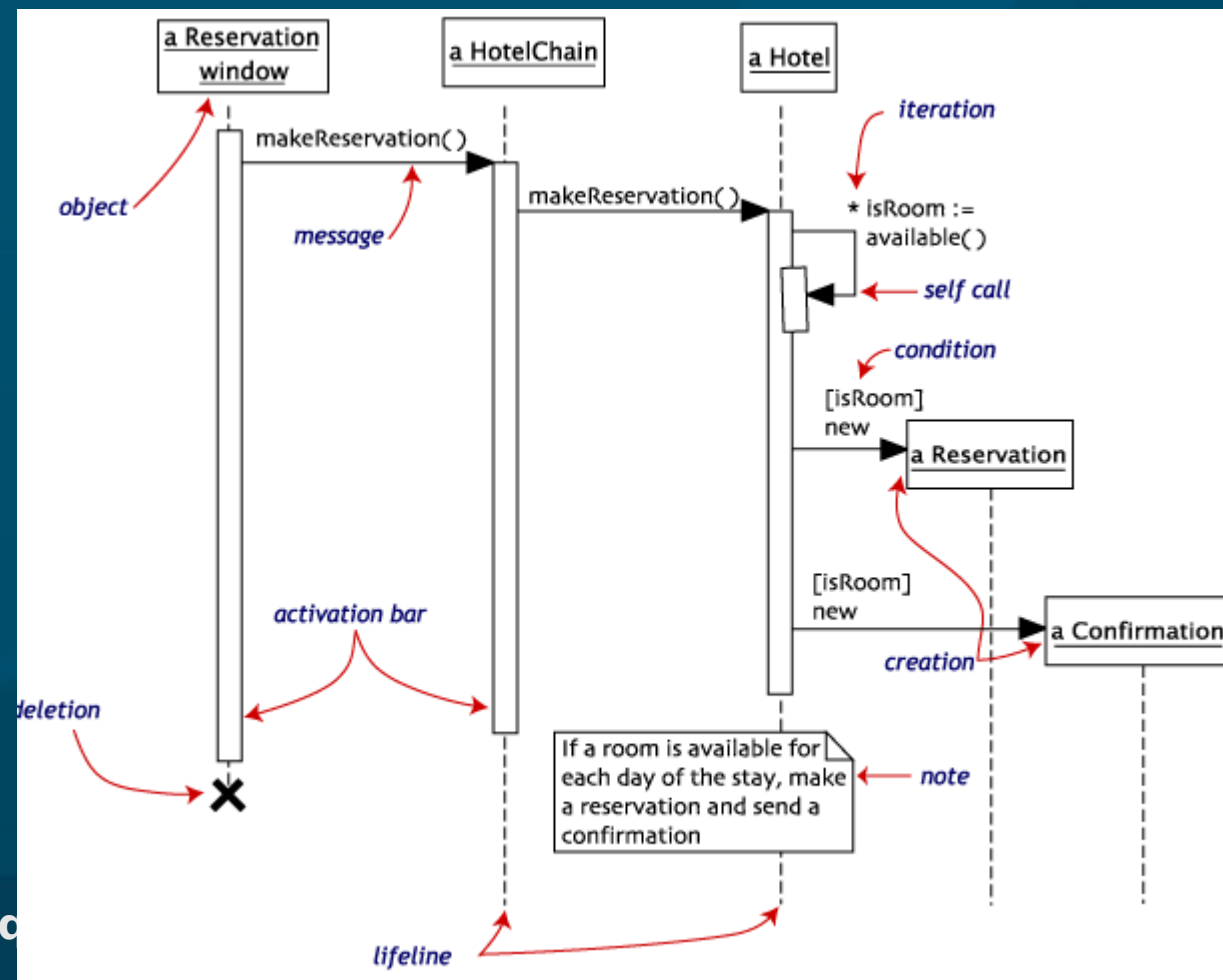
# Object lifecycle

- When an object **dies**, an 'X' marks the end of its lifeline:



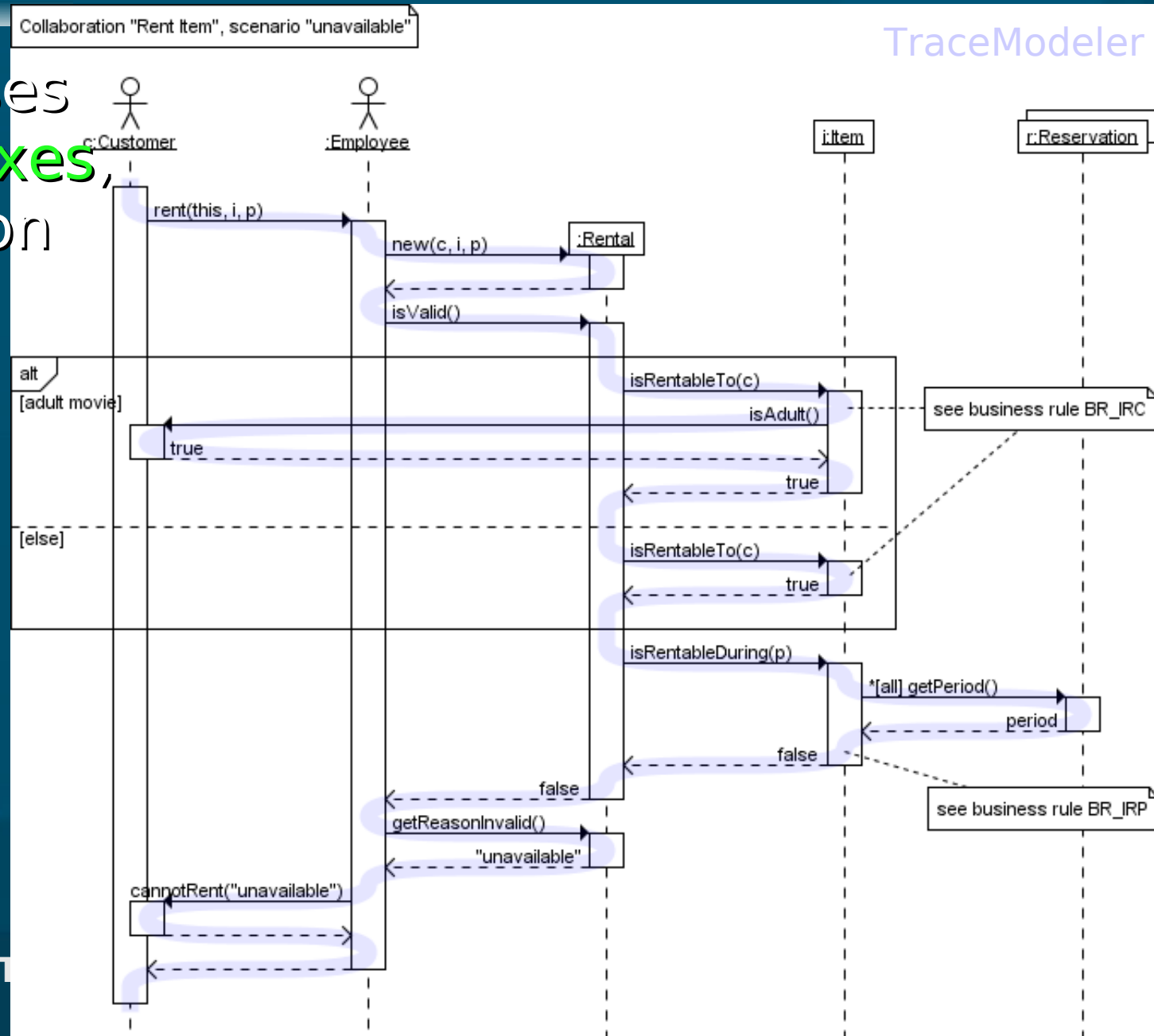
# Self-called messages

- An object may send a message to **itself**:
  - Arrow **loops** back to itself
- A message may also be sent **multiple** times:
- Usually put loops in a **shaded box**



# If/else clauses

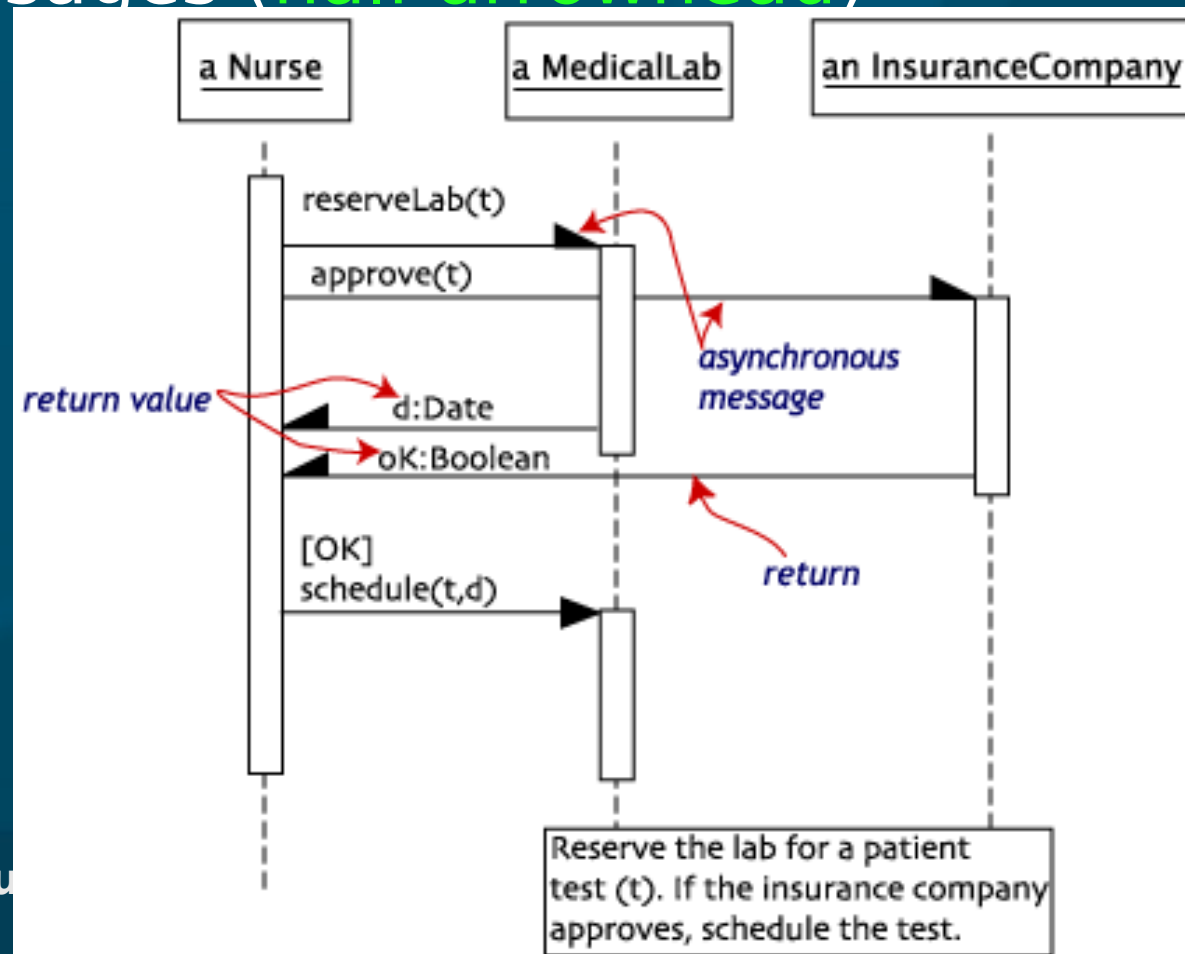
- Put both cases in dotted boxes, with condition





# Asynchronous communication

- Synchronous messages (full arrowhead) require recipient to be listening right then
- Asynchronous messages (half arrowhead) can be read by recipient at a later time
  - Phone call vs. postal mail
  - Chat vs. email



# UML Software Tools

- Eclipse UML2Tools plug-in (in Model Dev. Tools)
  - Help → Install New... → Add ...  
Paste URLs for MDT and EMF
  - Other plug-ins (M2T) can auto-generate code from your diagrams!
- Dia: free **diagram** editor (not specifically UML)
- IBM Rational Modeler
  - free version of commercial **Rhapsody** prod.
  - Complex but complete UML modelling tool
- Or draw your own by **hand!**