

Interaction Diagrams

PB007 Software Engineering I

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Interaction diagrams model the cooperation of classes/objects/actors for the implementation of use cases (or parts of them).

We distinguish 4 main types, each of which gives a view of a different aspect of the interaction:

- 1. Sekvenčný diagram (sequence diagram)** captures the communication between classes/objects with an emphasis on the temporal sequence when passing messages.
- 2. Komunikačný diagram (communication diagram)** captures communication with an emphasis on relationships between classes/objects.



3. **Časový diagram (timing diagram)** model time constraints of the interactions of objects in real time.

4. **Diagram prehľadu interakcií (interaction overview diagram)** is a special case of activity diagram, which shows a top view of the connections between the complex sub-interactions.



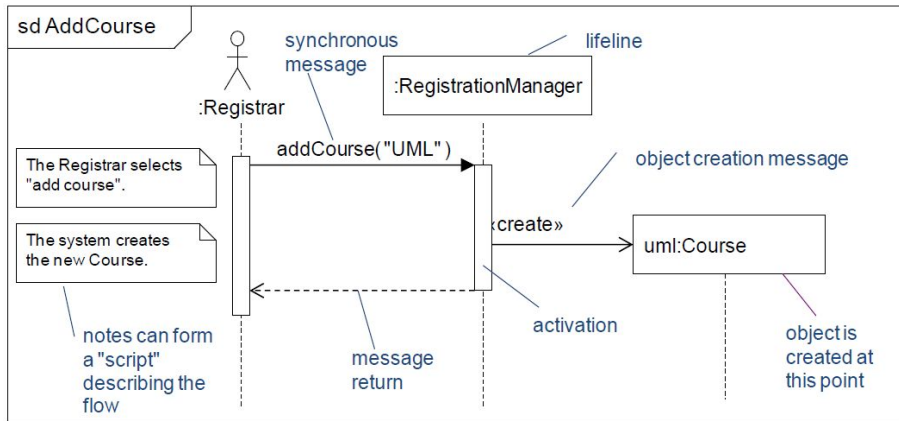
Sequence diagrams show the interaction as a time-ordered sequences of messages between objects/classes/actors.

Basic elements:

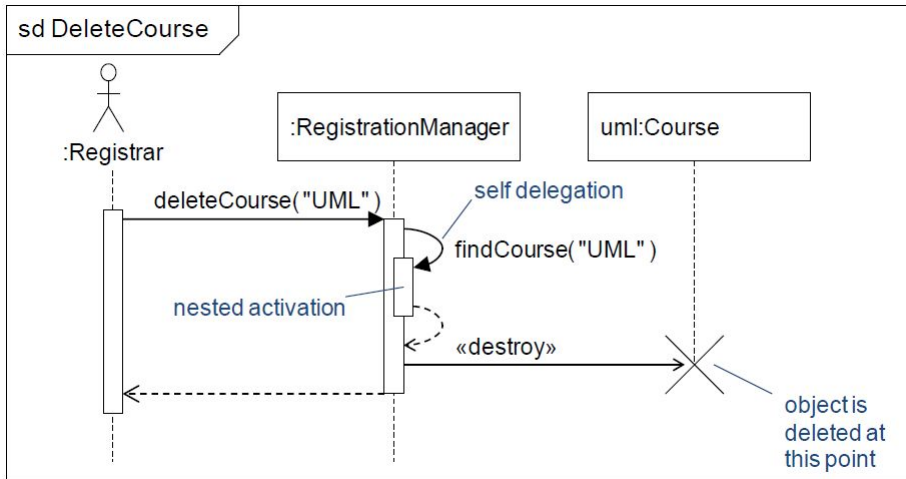
- Actors, classes, objects
- Lifelines
- Activations (focus of control)
- Messages
- Combined Fragments



Sequence diagram - Example



Sequence diagram - Example II



Sequence diagram - Combined Fragments

Combined fragments divide the sequence diagram in more areas with different behavior.

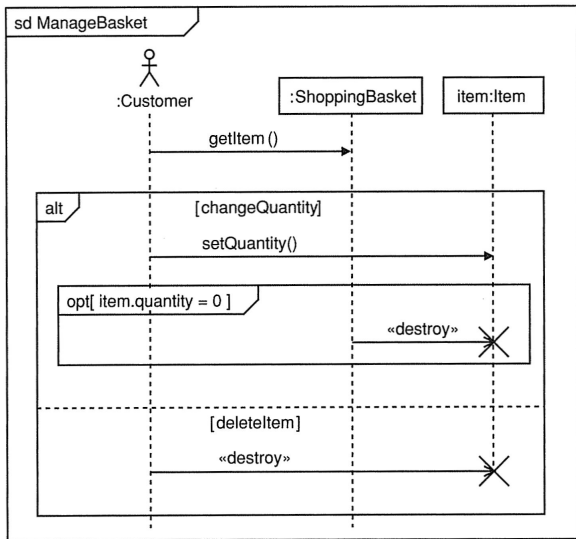
Each combined fragment is marked with an *operator*, one or more *operands*, and *condition(s)*.

The most important operators are:

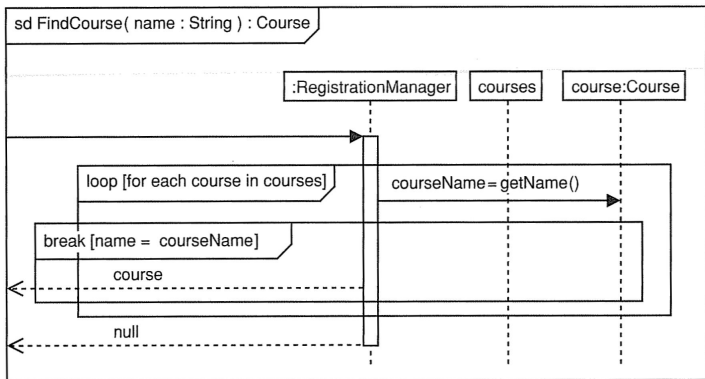
- **opt (option)** - has one operand, which is triggered only if the defined condition is met
- **alt (alternatives)** - the operand whose condition is evaluated to true will be launched.
- **loop** - repeated execution of the operand
- **break** - operand is executed if it meets any conditions and terminates the execution cycle



Sequence diagram - Combined Fragments II



Sequence diagram - Combined Fragments III



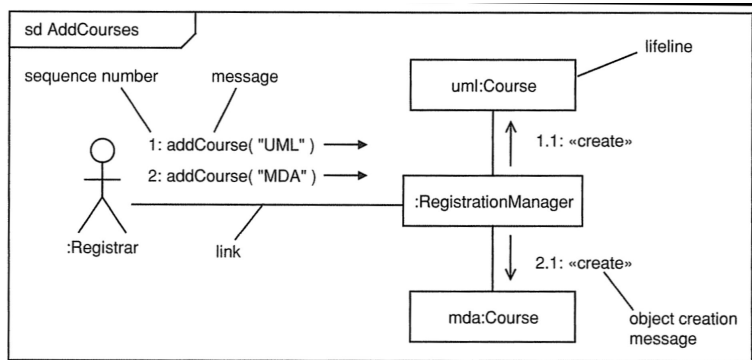
Communication Diagrams capture the interactions of objects/classes that communicate with each other.

The basic elements:

- Actors, classes, objects
- connections (links)
- Messages



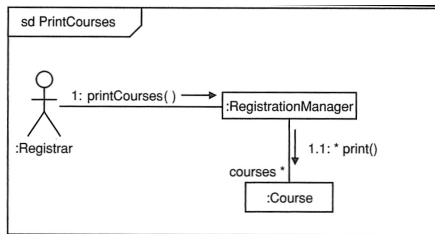
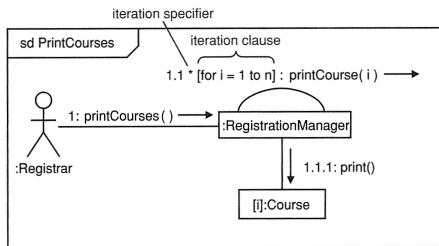
Communication Diagram - Example



Communication Diagram - Iterations

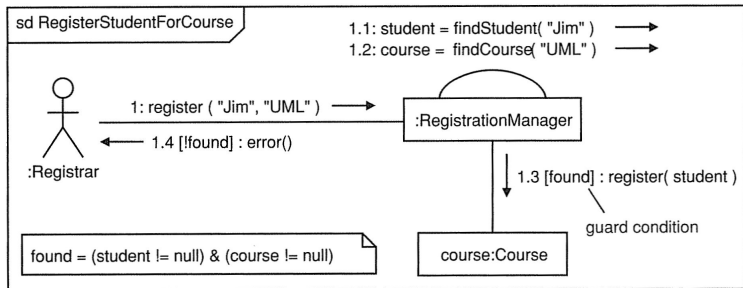
Iterations are expressed in communication diagram using the iteration expression.

Syntax: * [loop min, max [condition]]



Communication Diagram - Branching

Branching in the communication diagram is obtained by adding guarding conditions to communications. The message is sent only in case that the condition evaluates to true.



Tasks

- Open the use case model and the classes and for each use case look at the objects that are involved in the various functionalities
- Select the 5 most interesting (sufficiently complex) use cases
- Model 2 of them (the simpler ones) by means of a communication diagram
- Model the remaining 3 by means of sequence diagrams
- when modelling the interaction diagrams, update the class diagram with operations that might be necessary
- OPTIONAL TASK: For the next week you can also try to develop a sequence diagram from last year's exam and then get the feedback next time (see IS for Week 10 for the link to the exam paper).
- Upload the **PDF report** into folder (**Week 10**).
Deadline: 07.12.15 23:59 (Groups 2,3)



Customization of PDF Reports

