Software component interactions and sequence diagrams

Nigel Goddard

School of Informatics
University of Edinburgh
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We have not discussed dynamic aspects of design: what operations should our classes have, and what should they do?
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Complementary: but in this course, we only consider 1. For 2, UML provides an enhanced variant on the FSMs you saw last year.

For more info, do SEOC next year, and/or read the recommended texts.
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Some of this is easy. Hard parts are usually when several objects have to collaborate and it isn’t clear which should take overall responsibility.
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UML has two sorts, *sequence* and *communication* diagrams – the differences are subtle, and we’ll only talk about sequence diagrams.
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Simple :-}
A collaboration

aMember : BookBorrower

theLibraryMember : LibraryMember

theBook : Book

theCopy : Copy
aMember : BookBorrower

borrow(theCopy)

okToBorrow

borrow

borrowed
Showing more detail
Creation/deletion in sequence diagram

:UTO

get\(\text{Name}()\)

n=getName()

new DirectorOfStudies (n)

destroy()

:Lecturer

:DirectorOfStudies
In designing an interaction, your first aim is obviously to design *some* collection of operations that can work together to achieve the aim.

Next, consider:

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What is a good interaction pattern?

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- **maintainability**: which aspects might change, and how hard will it be to change the interaction accordingly?
What is a good interaction pattern?

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Next, consider:

► conceptual coherence: does it make sense for this class to have that operation?
► maintainability: which aspects might change, and how hard will it be to change the interaction accordingly?
► performance: is all the work being done necessary?
Designing interactions

Problems?
Law of Demeter

in response to a message \( m \), an object \( O \) should send messages \textit{only} to the following objects:

1. \( O \) itself
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2. objects which are sent as arguments to the message \( m \)
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2. objects which are sent as arguments to the message $m$
3. objects which $O$ creates as part of its reaction to $m$
4. objects which are *directly* accessible from $O$, that is, using values of attributes of $O$. 
More complex sequence diagrams

We’ve only discussed very simple sequence diagrams. UML provides notation for reusing pieces of interactions, conditional or iterative behaviour, asynchronous messages, etc. etc.
Reading

Suggested: The original paper on CRC cards, a technique for designing interactions: *A Laboratory for Object-Oriented Thinking*, by Kent Beck and Ward Cunningham. See web page.
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A at checkout
B at update
C at commit (checkin)
D at more than one of the above
E at none of the above

Answer: D
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