Transition to design

- System sequence diagram
  - An analysis model for identifying the messages (events) actors send to the system
- System behaviors and contracts
- Sequence diagram
  - A design model. One sequence diagram for each contract (or use case).
- Collaboration diagram
  - Semantically equivalent to sequence diagram

System sequence diagram (I)

- Draw system sequence diagram.
  - Concentrate in the use case on events that external actor generates. These will be the external trigger for system actions.
- Translate the expanded use case into a real use case
  - UI decision
  - Database

System sequence diagram (II)

System events and operations

Another SSD example

How to make a SSD
Naming system events and operations

• “strive for the highest level or ultimate goal in naming the operation”

Contracts

• A contract is a document that describes what an operation commits to achieve
• Declarative in style; *what* rather than *how*.
• Expressed in pre- and post-conditions and invariants.
• Contracts should be written for each system operations.

Contract sections

How to make a contract
From use case to contract

Post-conditions
- Related to conceptual model
  - Instances created, association formed, and attributes modified are from the conceptual model
- Post-conditions are better phrased as passive past tense sentences
  - A SalesLineItem was created vs. Create a SalesLineItem

Pre-conditions
- State of the system at the beginning of the operation
  - Thing that are important to test in software at some point during execution of the operation
  - Things that will not be tested, but upon which the success of the operation hinges.

Contract style
- Start with operation name, then responsibilities, next post-conditions, and pre-conditions last.
- Followed by notes and exceptions

Contract examples (I)

Contract examples (II)
**Contract examples (III)**

**Real use case (I)**

**Real use cases (II)**

**Collaboration diagram**

- **Elements**
  - Objects
  - Links
  - Messages

**Sequence diagram**

- **Elements**
  - Objects with life line
  - Messages

**Comparison**

- Collaboration and sequence diagrams are semantically equivalent
- Collaboration is good at showing objects are statically connected.
  - It is similar to the conceptual diagram derived during analysis and class diagram derived during design.
- Sequence diagram is good at showing the order in which things occur.
- Both models quickly lose their advantage for expressing complex conditional and looping logic.
Further Readings

- Larman 1st ed., Chapters 13-17
- Fowler/Distilled, Chapter 4.