UML Diagram Types

Dynamic Models
- activity diagrams
- statechart diagrams
- *interaction diagrams*
  - *sequence diagrams*
  - *collaboration diagrams*
- use case diagrams

Structural Models
- class diagrams
- object diagrams
- packages

Architectural Models
- component diagrams
- deployment diagrams

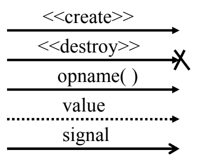
Interaction

def'n: behavior that comprises a set of messages exchanged among a set of objects within a context to accomplish a purpose
- represents the dynamic behavior of *objects*
- can model flow of control within operation, class, component, use case, or system
- time order: sequence diagram
- structural order: collaboration diagram

Message

def'n: specification of a communication between objects that conveys information with the expectation that activity will ensue
- receipt of message is occurrence of event

Convention
- create
- destroy
- call
- return
- signal



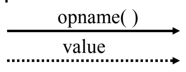
Call and Return

Call *def'n*: invoke an operation on an object

- object may send message to self (local invocation)
- object *pointed to* owns operation

Return *def'n*: return a value to caller

Convention

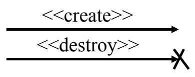


Create and Destroy

Create *def'n*: create an object

Destroy *def'n*: destroy an object (an object may destroy itself)

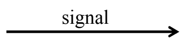
Convention



Signal

def'n: named object that is dispatched asynchronously by one object and received by another

Convention



Message Naming

Typical Form

- sequence number:operation(argument)

Examples

- 2: clickAt(p)
- 2.1: x := findAt(p,q)
  - *x* is implied returned value
- D5: ejectHatch(3)
  - *fifth* message of root process *D* calling operation *ejectHatch* with argument *3*

Interaction Diagram

def'n: interaction, consisting of a set of objects and their relationships, including messages dispatched among them

- comprised of object, links, and messages
- context is a scenario that illustrates behavior
- may model one particular flow of control of use case

Sequence Diagram

def'n: interaction diagram that emphasizes time ordering of messages

- has close relationship to use case diagram
- x axis
  - objects
  - object that initiates to left
  - increasingly more subordinate to right
- y axis
  - messages ordered in increasing time from top to bottom

Collaboration Diagram

def'n: interaction diagram that emphasizes the structural organization of the objects that send and receive messages

- has close relationship to object diagram
- vertices: representing objects
- arcs: representing links and/or messages passing between objects

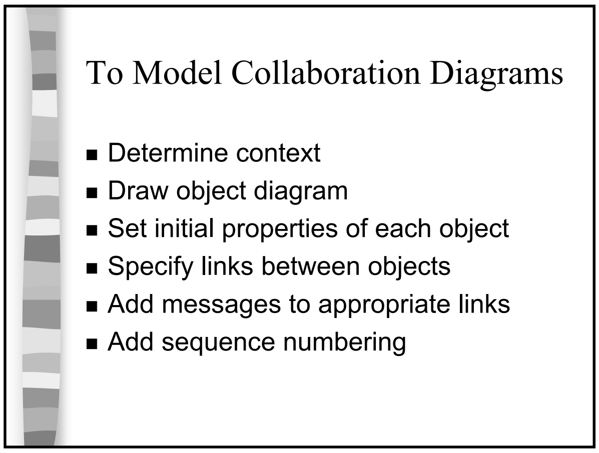
Sequence vs. Collaboration Diagram

Semantically equivalent, except:

- Sequence diagrams have:
  - object lifelines: vertical dashed line representing life of object
  - focus of control: tall, thin rectangle showing period of time which an object is performing an action
- Collaboration diagrams have:
  - path: indicates that one object is linked to another
  - sequence number: indicate time ordering of message

To Model Sequence Diagrams

- Determine context
- Identify objects and layout from L to R
- Set lifeline of each object
- Lay out messages within lifelines
- Adorn with focus of control



To Model Collaboration Diagrams

- Determine context
- Draw object diagram
- Set initial properties of each object
- Specify links between objects
- Add messages to appropriate links
- Add sequence numbering