Dimensions of Design

- Can view design in multiple ways
  - Structural
  - Behavioral
  - Information
- Different views for object-oriented versus procedural programming

Procedural Dimensions

- Information – (abstract) data types
- Structural – procedures and their call structure (modular structure chart)
- Behavioral – definition of tasks performed

Object-Oriented Dimensions

- Information – classes and implementing data structures
- Structural – relationships between classes (Class Diagrams)
- Behavioral – descriptions of scenarios in system

Scenarios

- “A sketch of a plot”
- Description of behavior of a method
- Want to document intended behavior for major scenarios (scenarios for constructors usually uninformative)
- Similar to pseudo-code for a method
Design Notations

- Class diagram
  - Shows static structure of relationships among classes
- Message-trace diagram
  - Show interaction between objects
  - Like diagrammed pseudo-code

Message-Trace Diagram

Focus of Control

- Show time period that object has “control”

Example Diagram

Pseudocode

Object: Circulation
Method: checkout(book, patron_id)

If book in Catalog and patron_id in Patron List then
  create new CheckedOut(book, patron_id) object
  insert into list
else
  return

Use-Case Diagram

- Show how system fits into application domain
- Actors - external entities that interact with system
- Use-case - description of system behavior from user point of view
- Scenario - particular instance of use-case
Example Use-Case

Use-Case and Design

- Use-case diagrams used in analysis (before design)
- Elaborate on use-cases by written description
- Response to use-case shown by message-trace diagram

Showing Trace of Use-Case