Relationships

def'n: descriptive method to describe collaboration between elements/classes

- dependencies: *using* relationship among classes
- generalizations: link generalized classes to their specialization
- associations: structural relationships among objects

Dependency

- typically defines arguments for op's
- change in specification of one thing may affect another thing, but not necessarily the reverse

Convention

- dashed directed line
- points toward thing depended upon
- may have name, but not often

Generalization

def'n: relationship between a general thing and a more specific kind of thing

- superclass:subclass as parent:child
- child is substitutable for parent, but not reverse
- child inherits properties of parent (attributes, operations)
- typically has additional attributes and operations
- child operation with same name overrides parent operation (polymorphism)

Generalization con't

Convention

- solid directed line with large open arrowhead
- points to parent
- class may have 0, 1, more parents
- names seldom used

Generalization con't

Other generalization definitions

- *root/base class*: no parents and ≥ 1 child
- *leaf class*: no children
- *single inheritance*: 1 parent
- *multiple inheritance*: > 1 parent
- *abstract (italics):* used for conceptual abstraction, although no actual object will ever exist

Association

- *def'n*: one object is connected to another by a structural relationship
- aids navigation
- binary association: connects exactly two classes
- n-ary: connect more than two classes

Convention

- solid line
- can have self-loops

Association con't

Adornments are allowed/encouraged

- name
  - describe nature of relationship
  - may have direction triangle
  - placed near middle of association
- role
  - word describing nature of relationship
  - typically not used with name (redundant)
  - placed at end(s) of association

Association con't

- multiplicity
  - quantification of association

Convention

- 1, 0..1, 0..*, 1..*, 3, (3,9)

Association con't

- Aggregation
  - whole/part relationship
  - one class consists of smaller things

Convention

- adorn association with open diamond at whole end

- Composition
  - strong ownership form of aggregation
  - parts created after parent, but once created live and die with it
  - parent responsible for destruction of parts

Convention

- black diamond

Hints and Tips

- dependencies, generalizations, associations with multiplicities are most common
- start with simple associations (no dependencies, generalizations)
- specify multiplicity, role names