Generalization, Dependency and Constraints in Class Diagram

Classes and Relationships

- Relationships among classes
  - Association
  - Weak Aggregation
  - Strong Aggregation
  - Generalization
  - Dependency
  - Constraints

Inheritance (IS_A)

- Generalization / Specialization relationships
  - Say, we model Daisy IS_A Flower
  - Daisy will inherit the properties of Flower, and have some more of its own
  - Flower is the Generalization
  - Daisy is the Specialization
  - Depicted as:

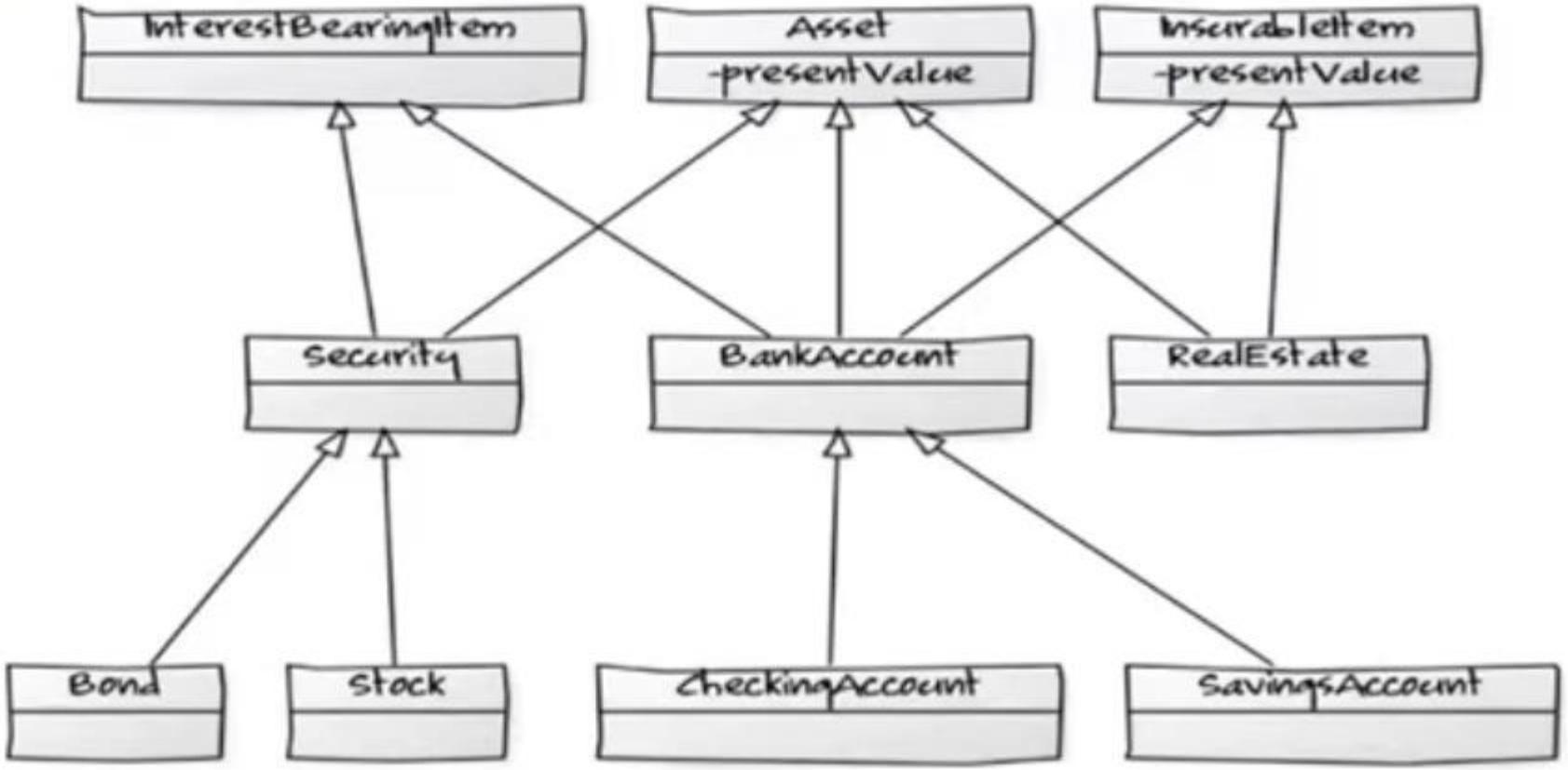
- Semantically most interesting
- Can *delegate* behavior to related objects
- Comes in a number of flavors
  - Single / Multilevel / Hierarchical Inheritance
  - Multiple Inheritance
  - Hybrid Inheritance

Generalization

- A generalization is shown as a line with a hollow triangle as an arrowhead

Source: *UML 2.5 Diagrams Overview*: http://www.uml-diagrams.org/uml-25-diagrams.html (10-Aug-16)

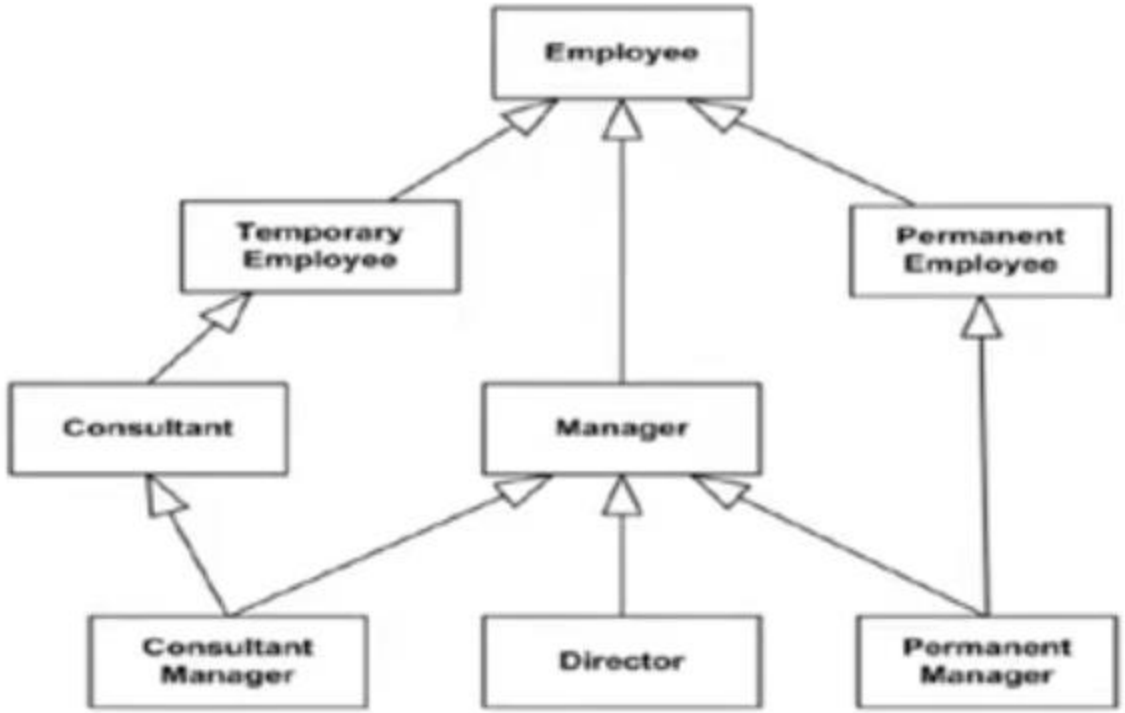
Generalization - Multiple Inheritance



- More than one superclass for a subclass
- RealEstate IS_A Asset, InsurableItem

Generalization - Multiple Inheritance

- Multiple inheritance is implicitly allowed by UML standard, while the standard provides no definition of what it is



Multiple inheritance for Consultant Manager and Permanent Manager – both inherit from two classes

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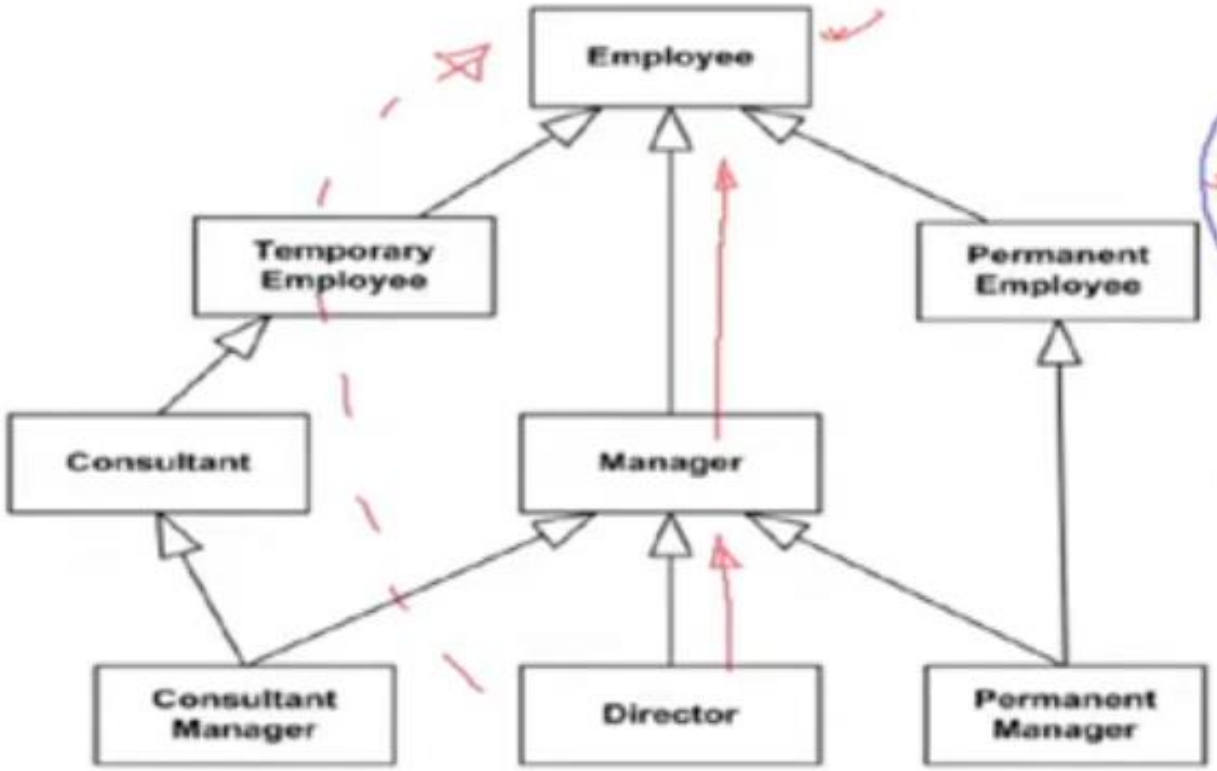
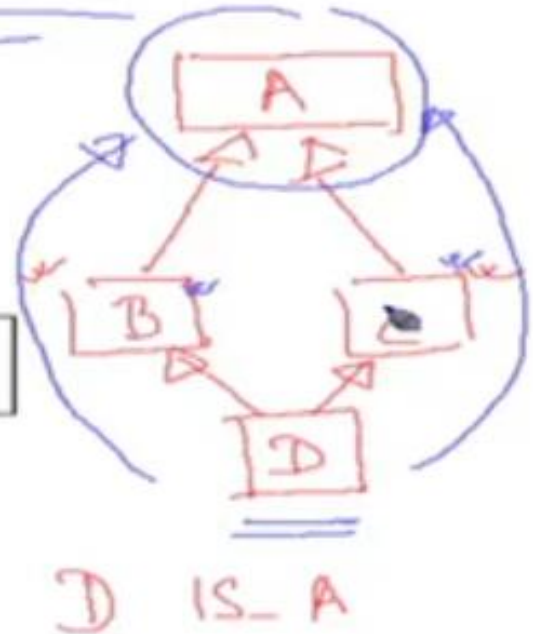




Multiple inheritance for Consultant Manager and Permanent Manager – both inherit from two classes

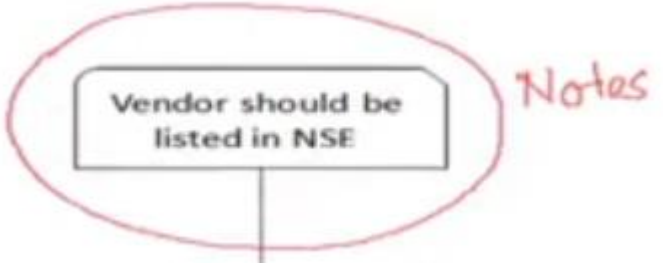
Dependency

- Dependency is a directed relationship which is used to show that some UML element or a set of elements requires, needs or depends on other model elements for specification or implementation

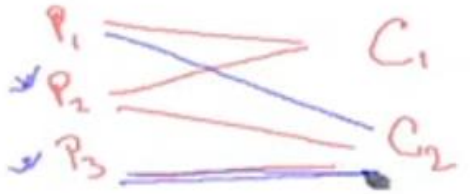
Class SearchController depends on (requires) SiteSearch interface

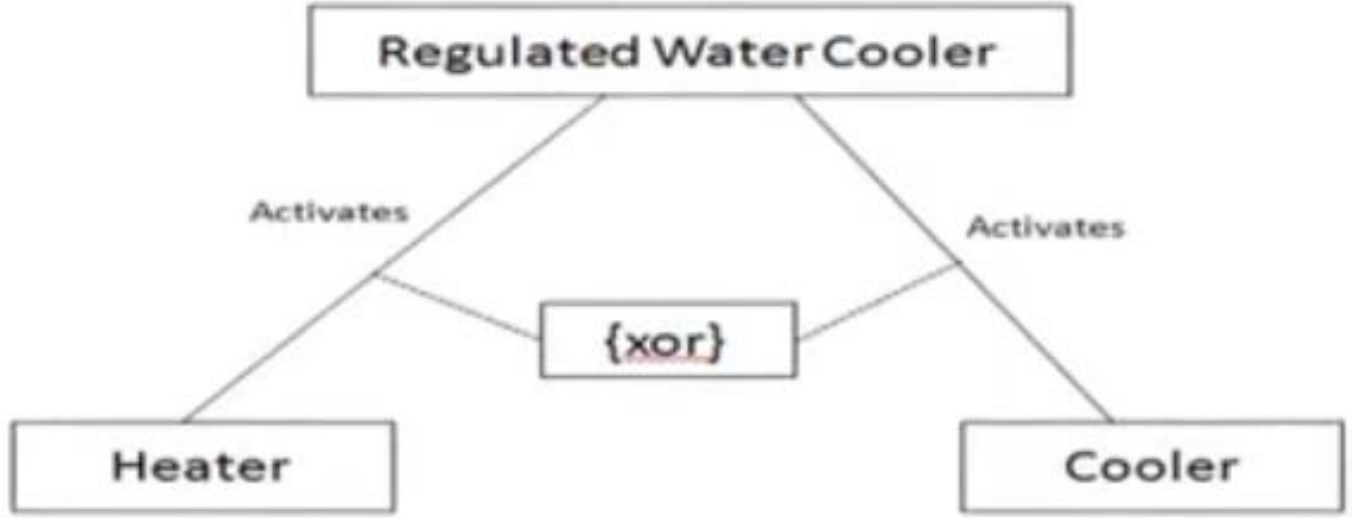
Source: *UML 2.5 Diagrams Overview*: http://www.uml-diagrams.org/uml-25-diagrams.html (17-Aug-16)

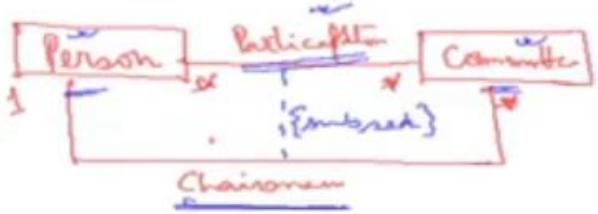
Constraints



Constraint on Vendor List

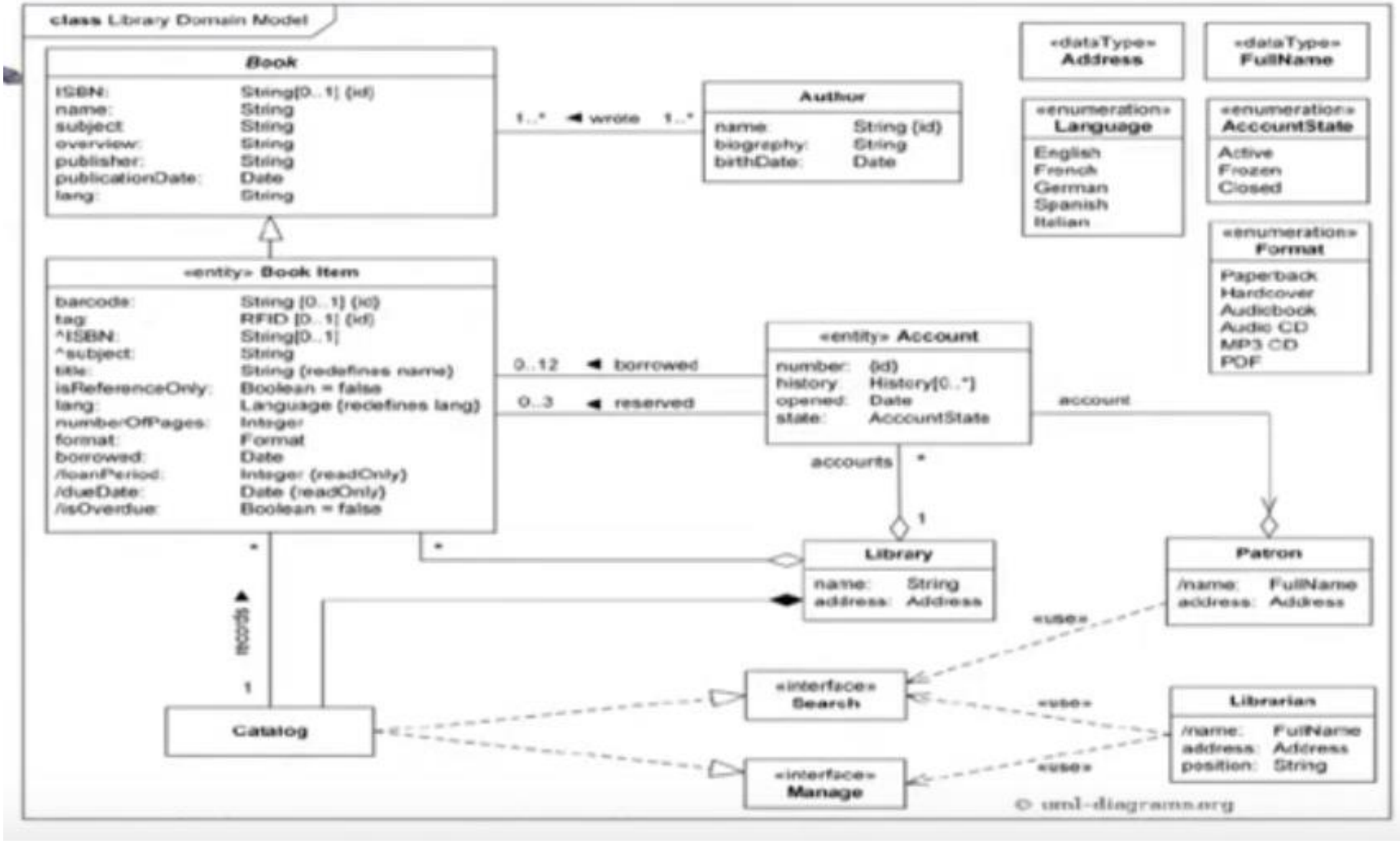




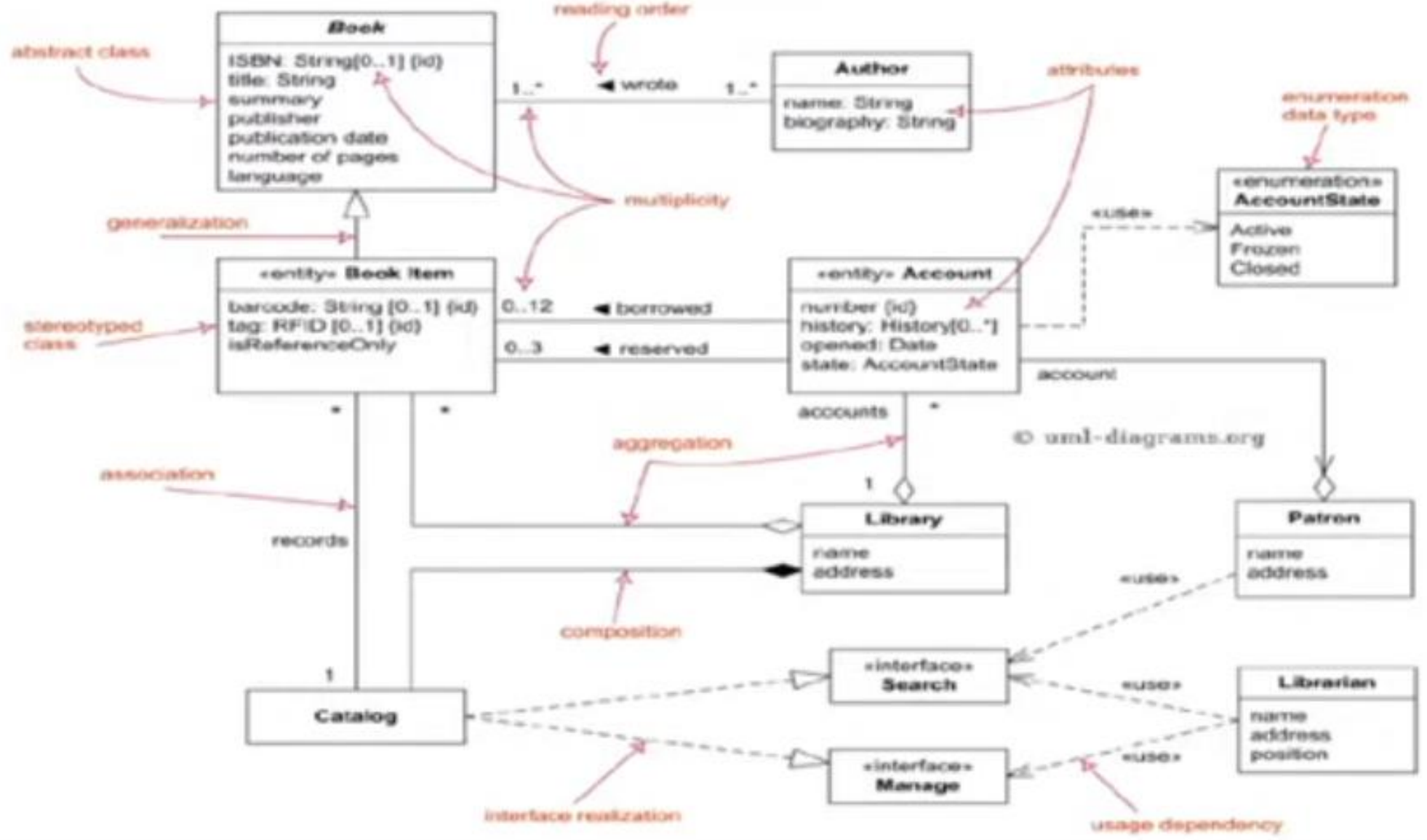


Constraint on Activation of Heater and Cooler

Domain Model for Library Management System

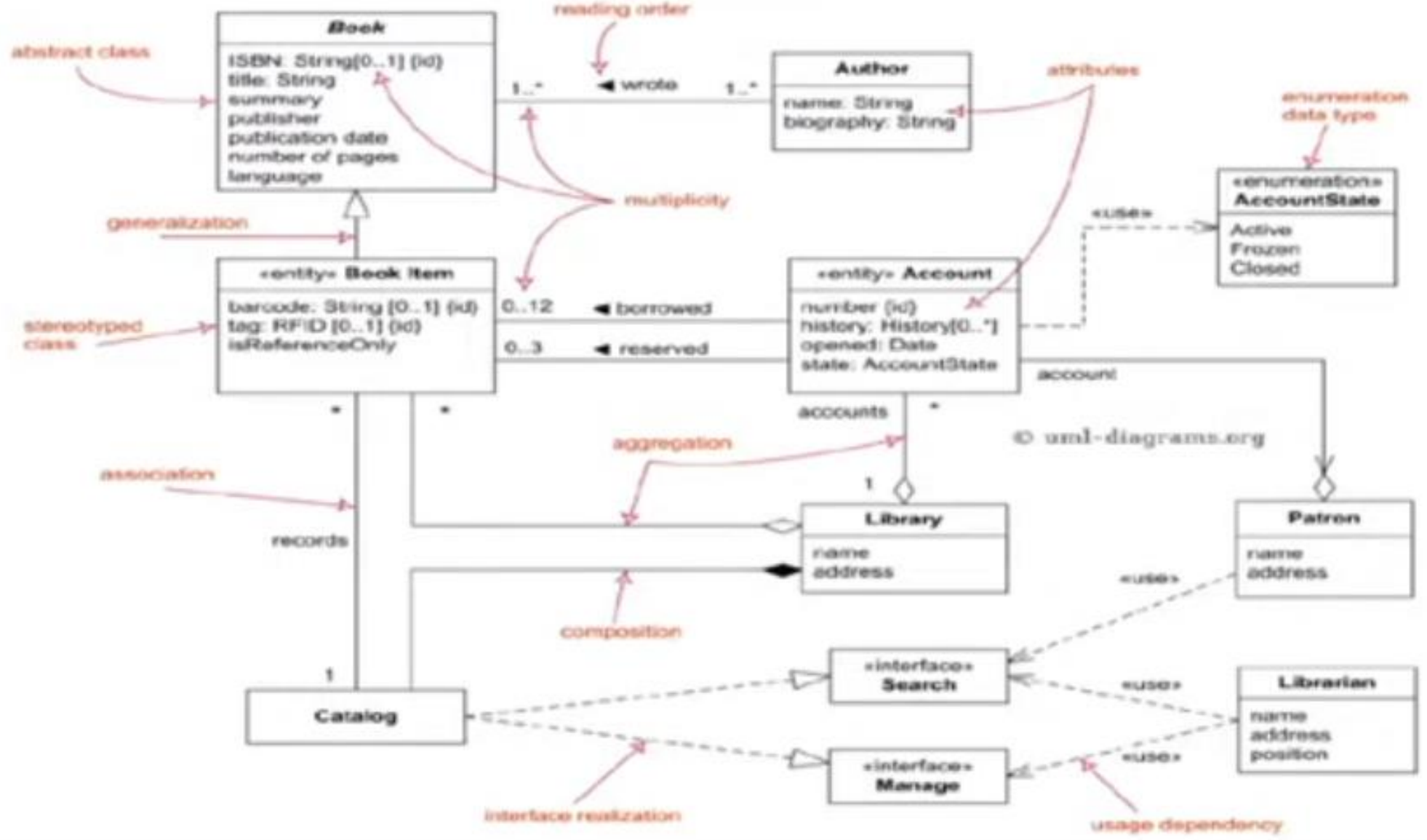


Domain Model for Library Management System



Domain diagram overview - classes, interfaces, associations, usage, realization, multiplicity.

Domain Model for Library Management System



Domain diagram overview - classes, interfaces, associations, usage, realization, multiplicity.

Summary

- Discussed Generalization, Dependency and Constraint relationships

Reference

- Source: NPTEL **Object-Oriented Analysis and Design, by**

Prof. Partha Pratim Das Prof. Samiran Chattopadhyay Prof. Kausik Datta

IIT Kharagpur

- https://nptel.ac.in/courses/106105153