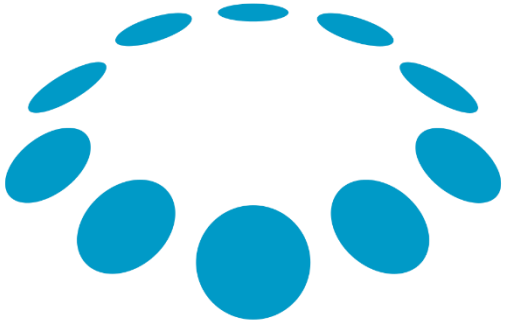
Advanced Software Development 1 - UML

Dr. Eliahu Khalastchi

2017



המסלול האקדמי
המכללה למינהל

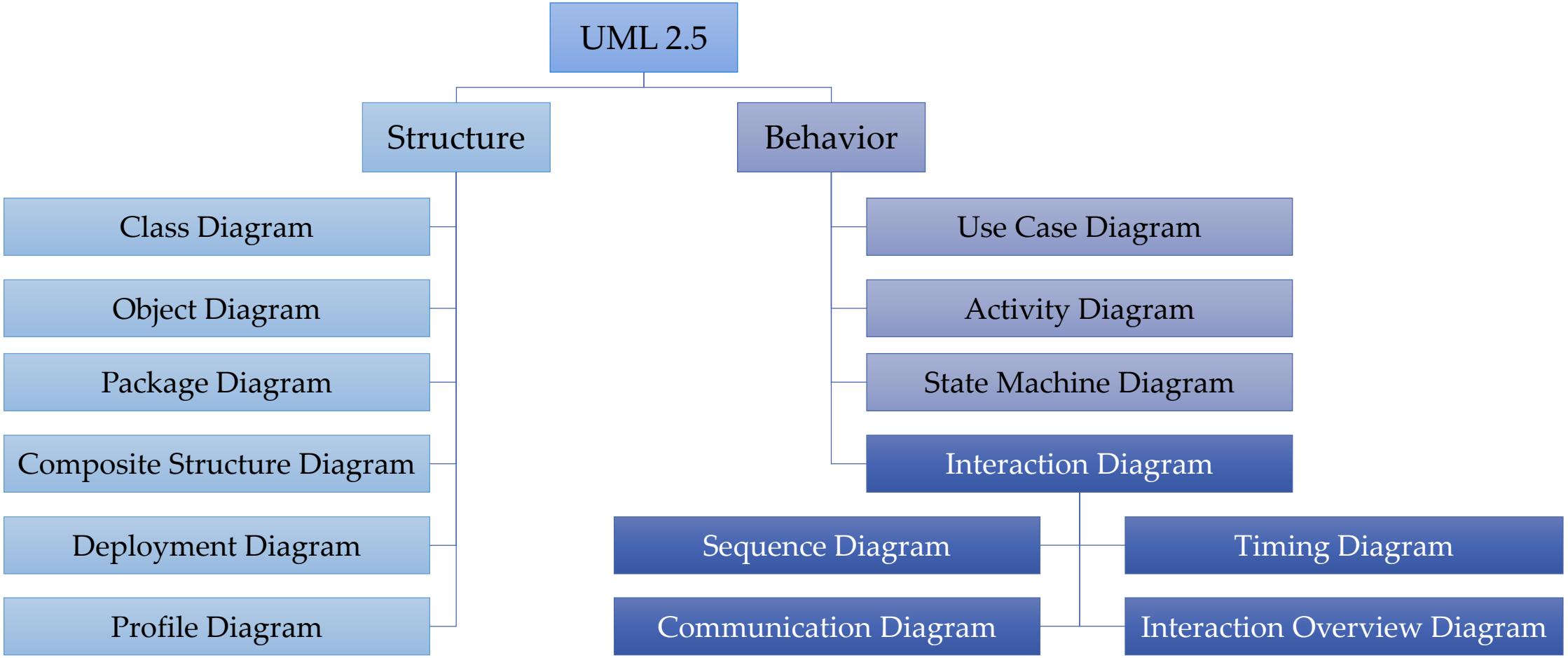
UML

Unified Modeling Language

Classification of UML Diagrams

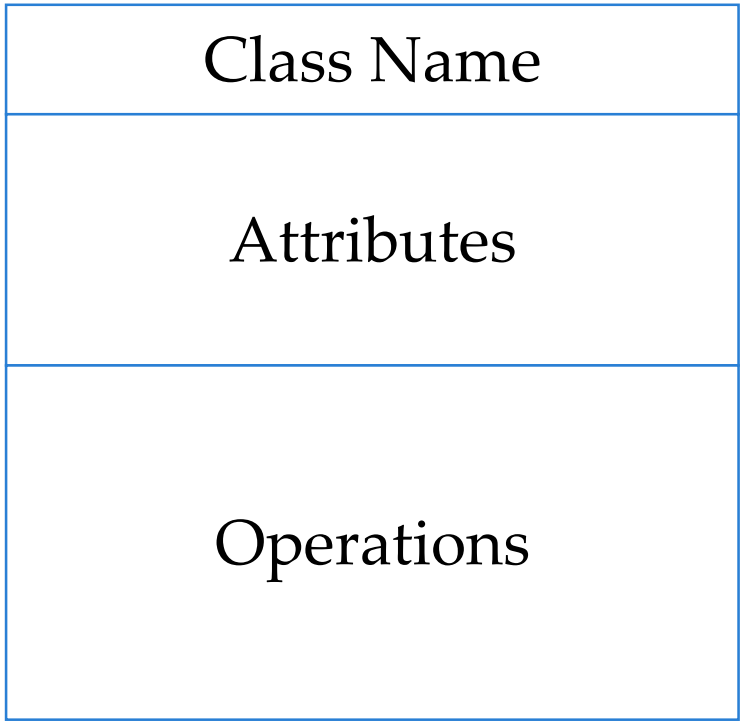
- UML specification defines two major kinds of UML diagrams:
  - Structure diagrams
    - show the static structure of the system
    - its parts on different abstraction and implementation levels
    - how they are related to each other
  - Behavior diagrams
    - show the dynamic behavior of the objects in a system,
    - which can be described as a series of changes to the system over time

Classification of UML Diagrams



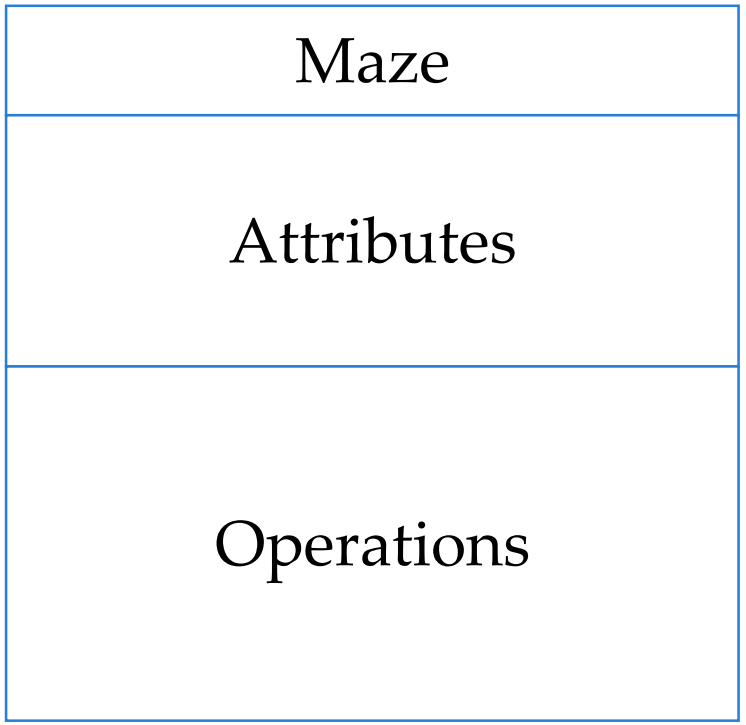
Class Diagram

Class Diagram – a class

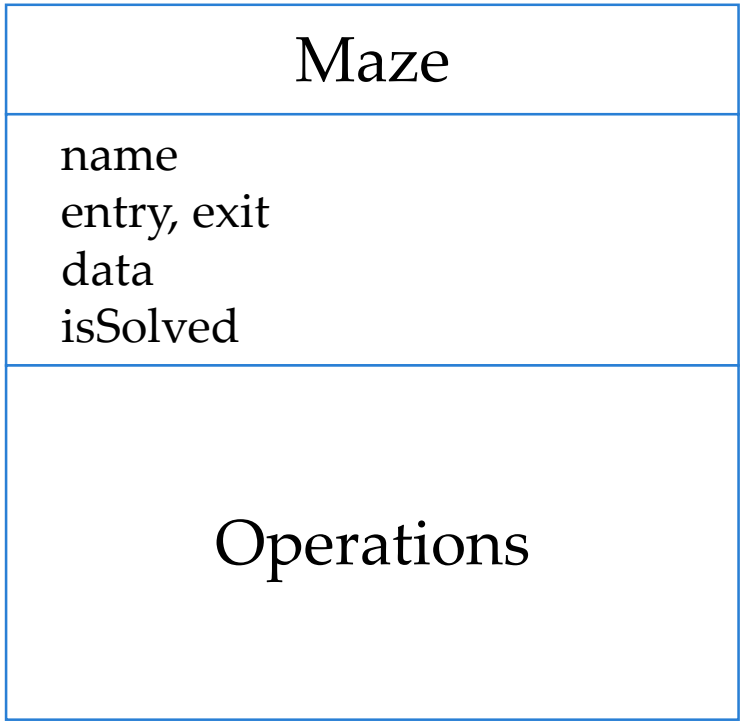


Class Diagram – a class

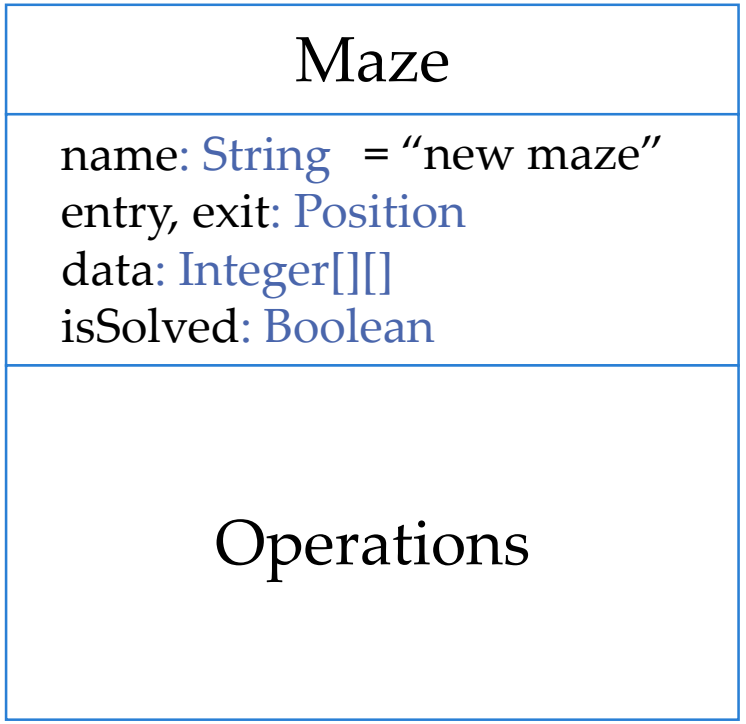
Singular
Uppercase



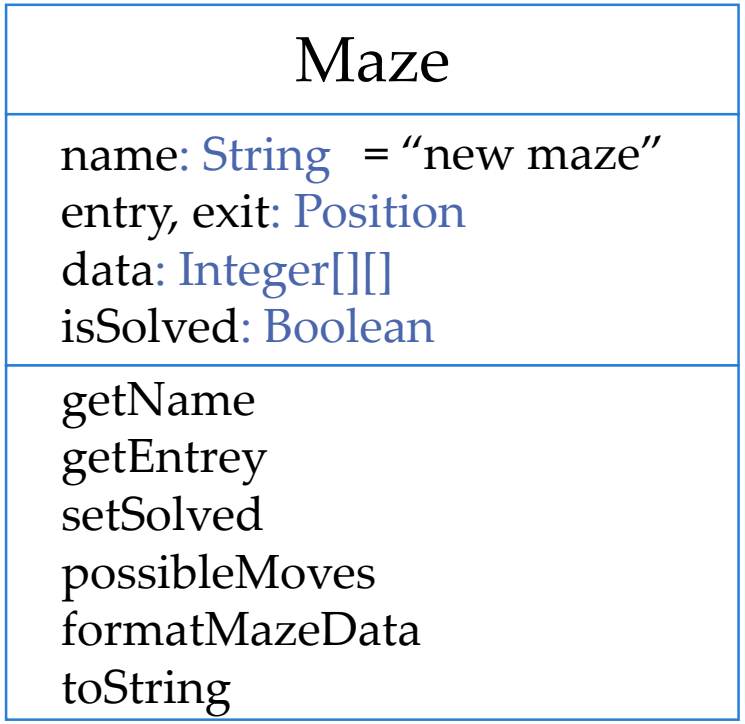
Class Diagram – a class



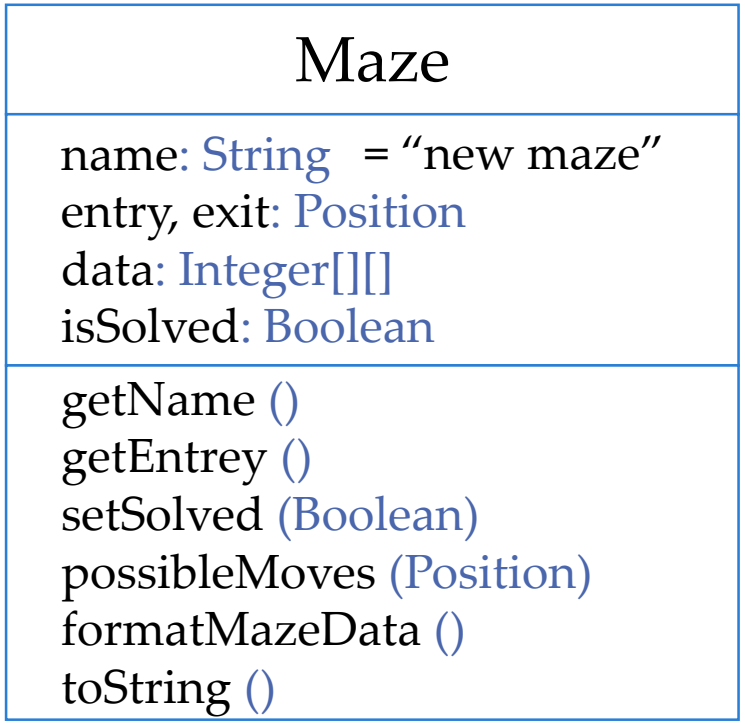
Class Diagram – a class



Class Diagram – a class



Class Diagram – a class

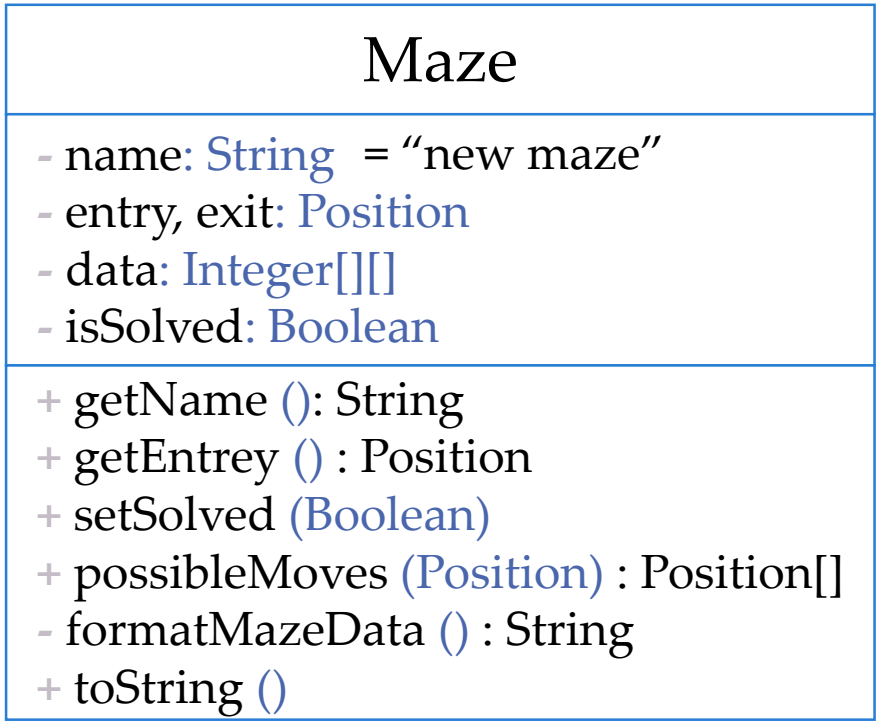


Class Diagram – a class

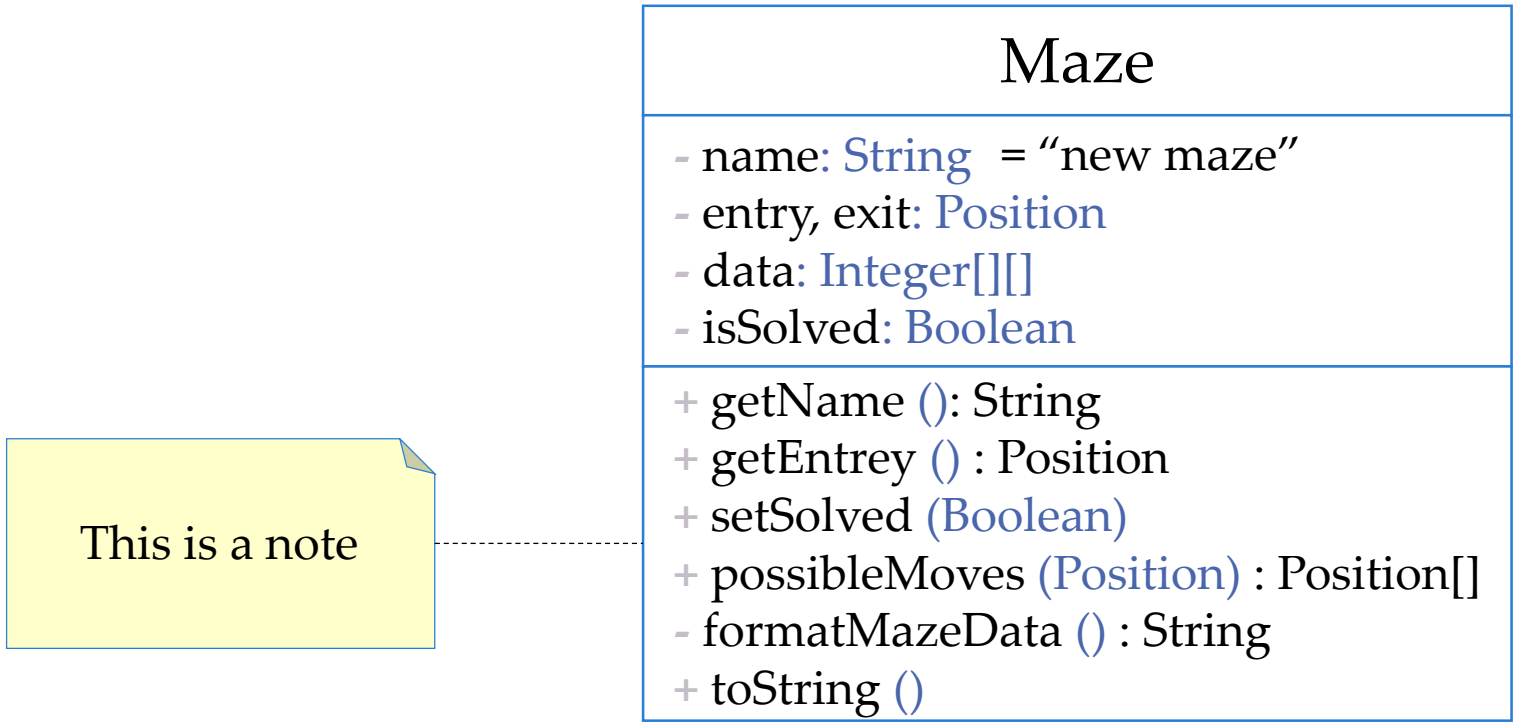
Maze
name: String = “new maze” entry, exit: Position data: Integer[][] isSolved: Boolean
getName (): String getEntrey () : Position setSolved (Boolean) possibleMoves (Position) : Position[] formatMazeData () : String toString ()

Class Diagram – a class

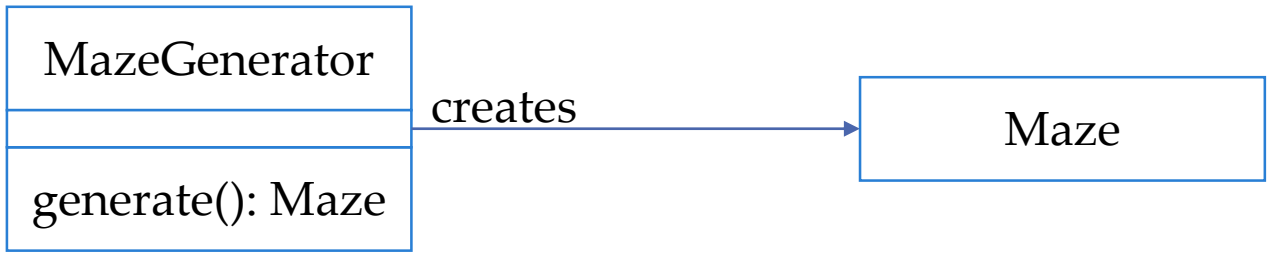
+	Public
-	Private
#	Protected
/	Derived
~	Package



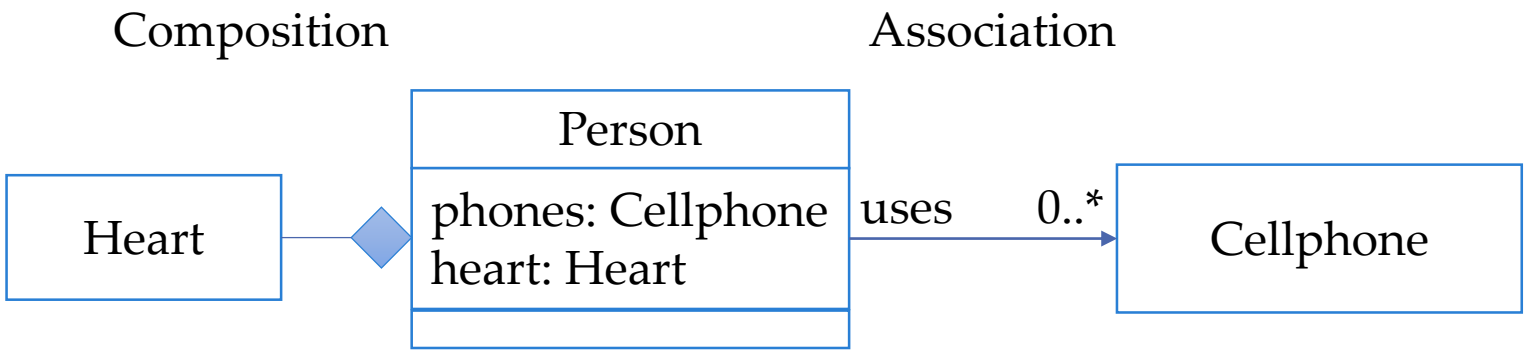
Class Diagram – a class



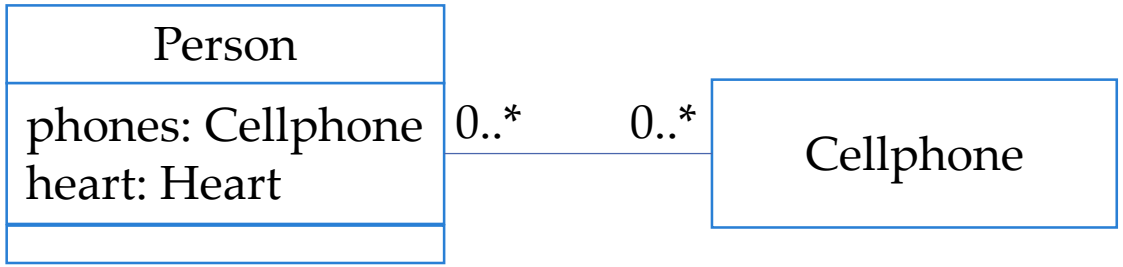
Class Diagram – association



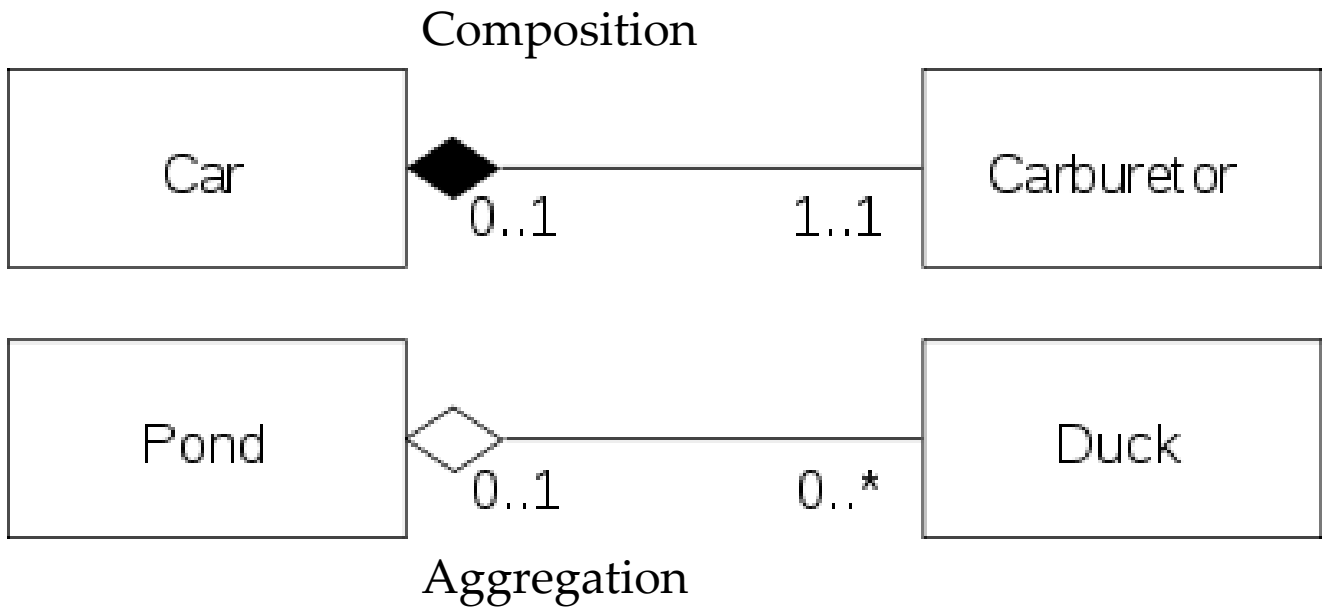
Class Diagram – association



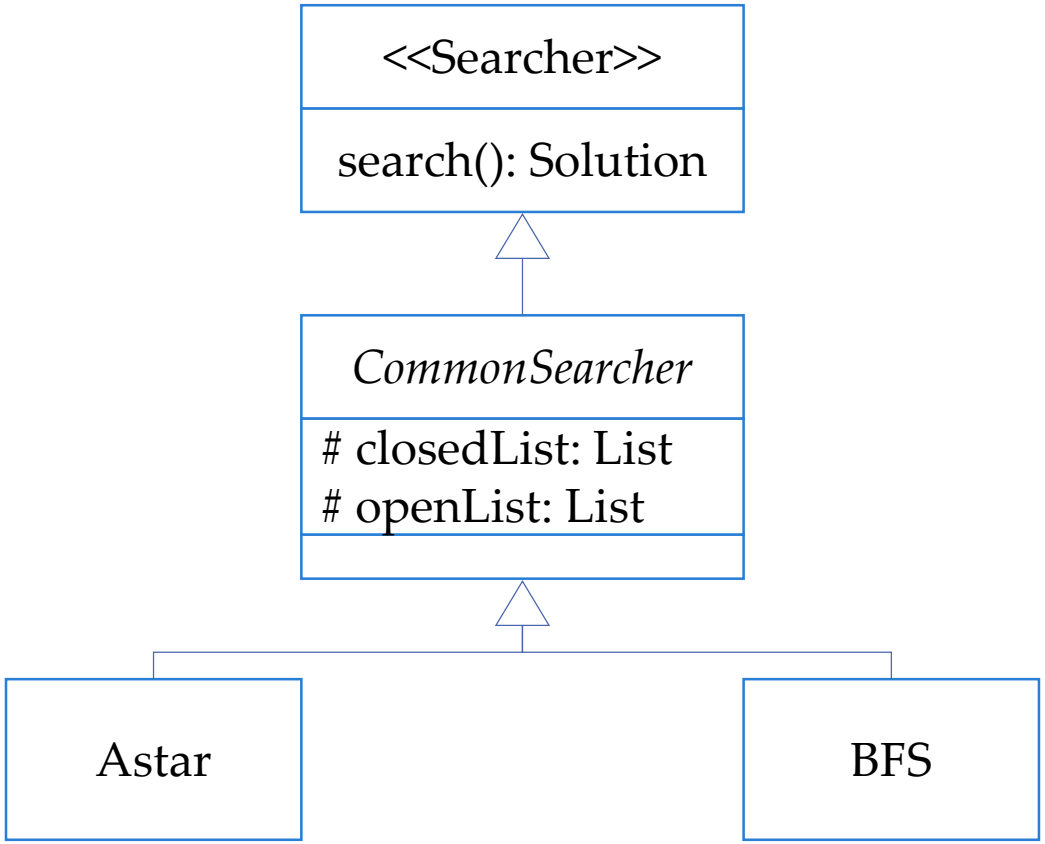
Class Diagram – association



Class Diagram – Composition vs. Aggregation



Class Diagram – Generalization



Object Diagram

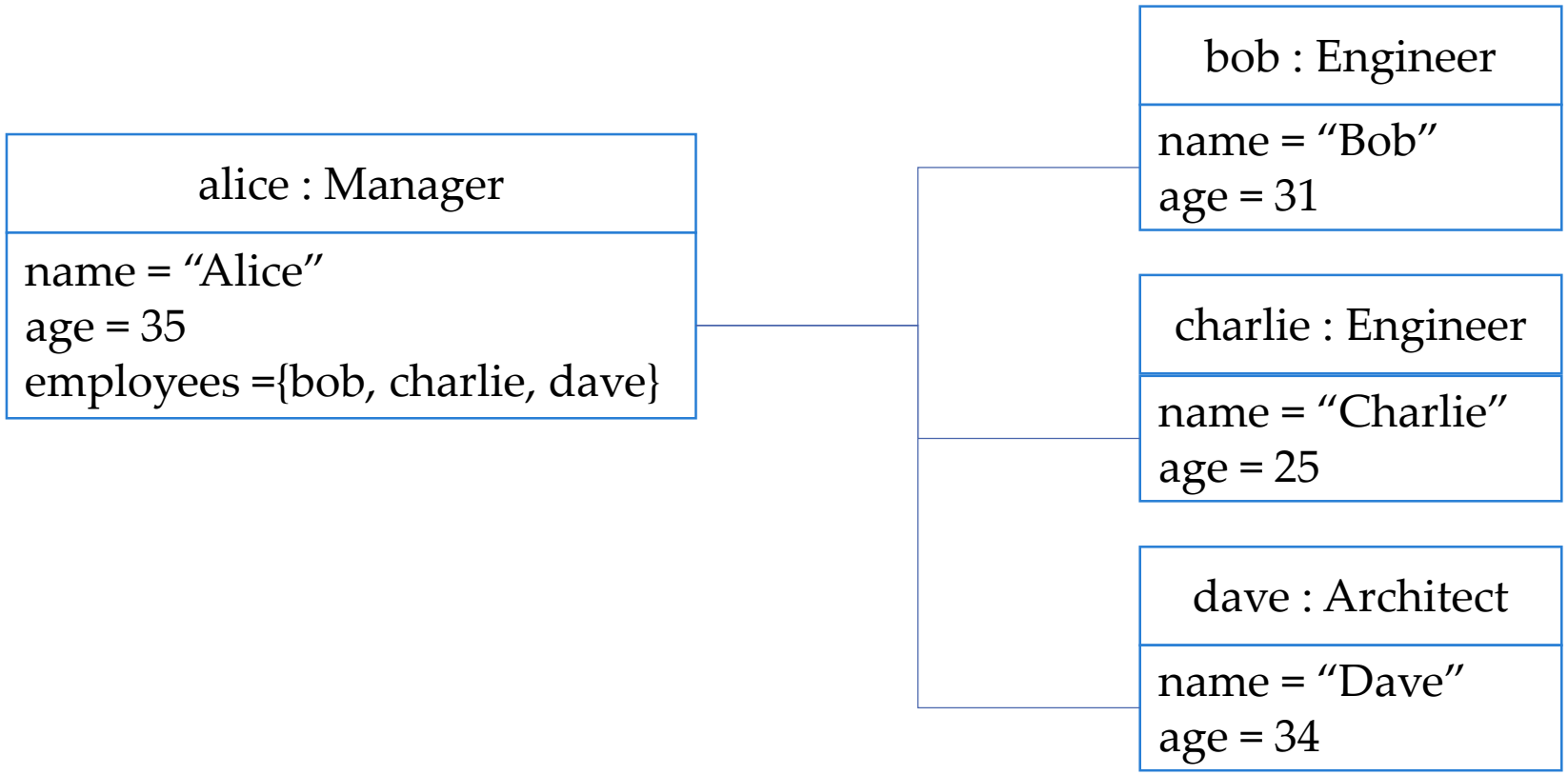
Object Diagram

- An object diagram is a graph of instances
- Which includes objects and data values
- An object diagram is an instance of a class diagram
  - it shows a snapshot of the detailed state of a system at a point in time

- The use of object diagrams is fairly limited
  - namely to show examples of data structure

- Since UML 2.4, considered obsolete…

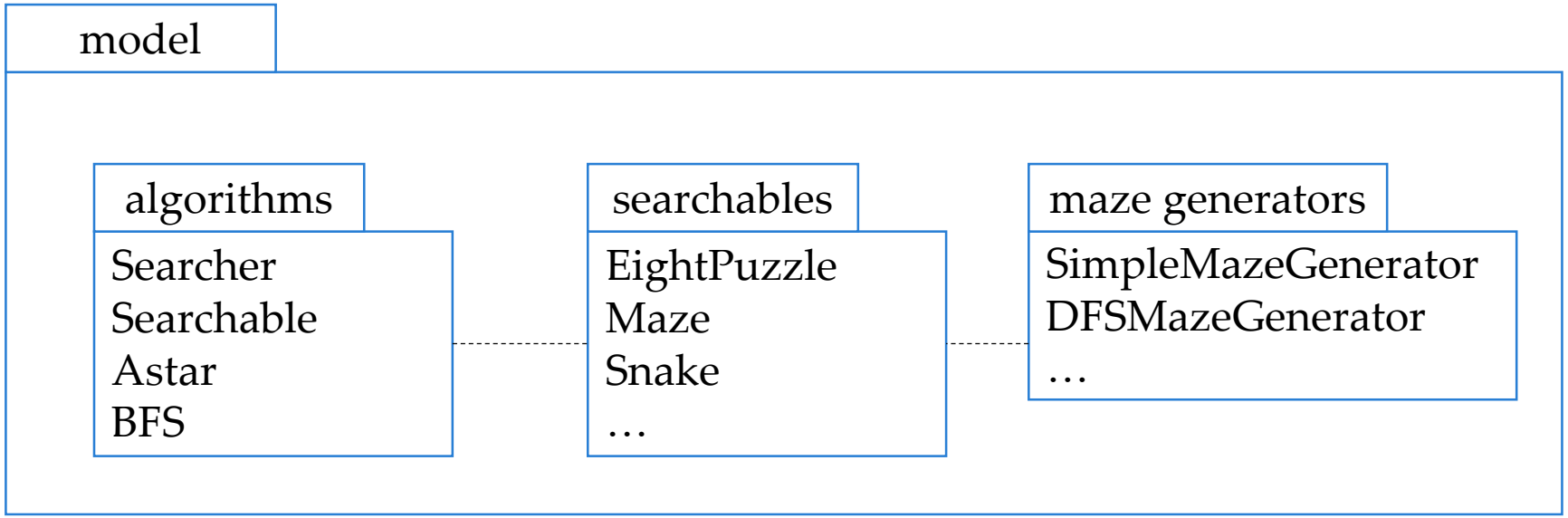
Object Diagram



Package Diagram

Package diagrams

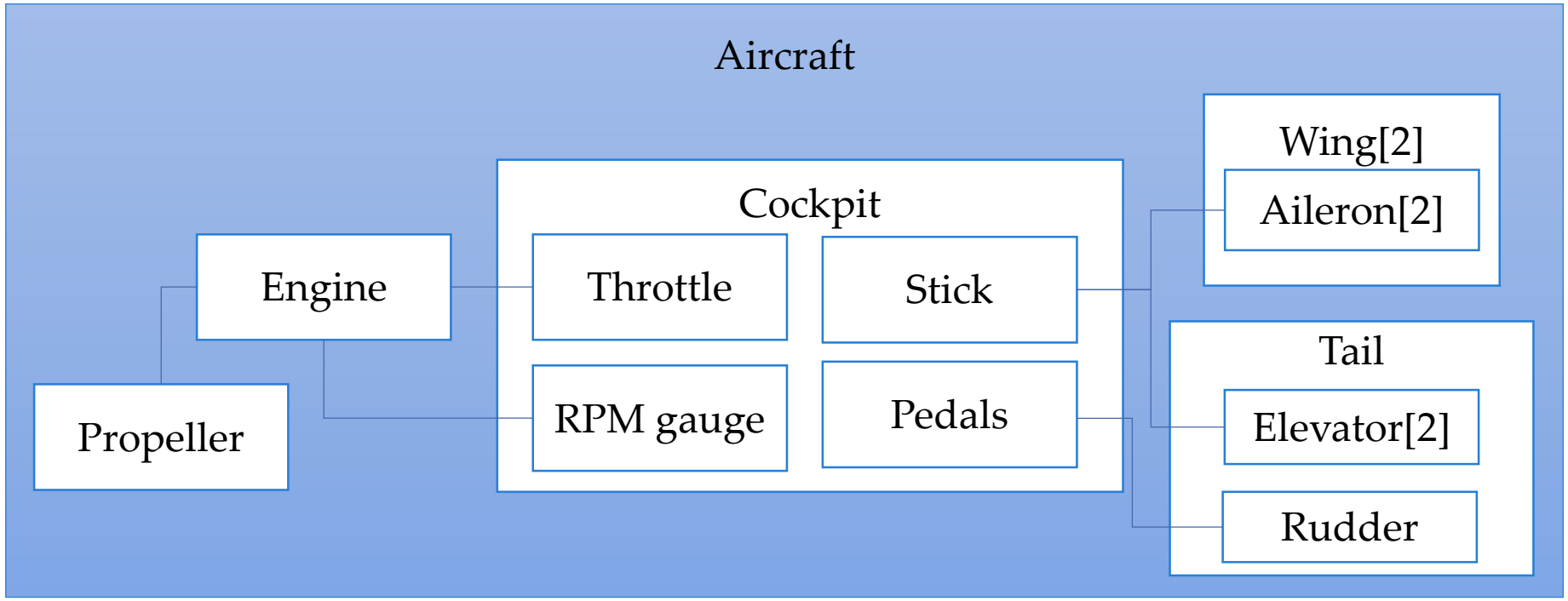
- Depicts the dependencies between the packages that make up a model
- Simplify complex class diagrams



Composite Structure Diagram

Composite Structure Diagram

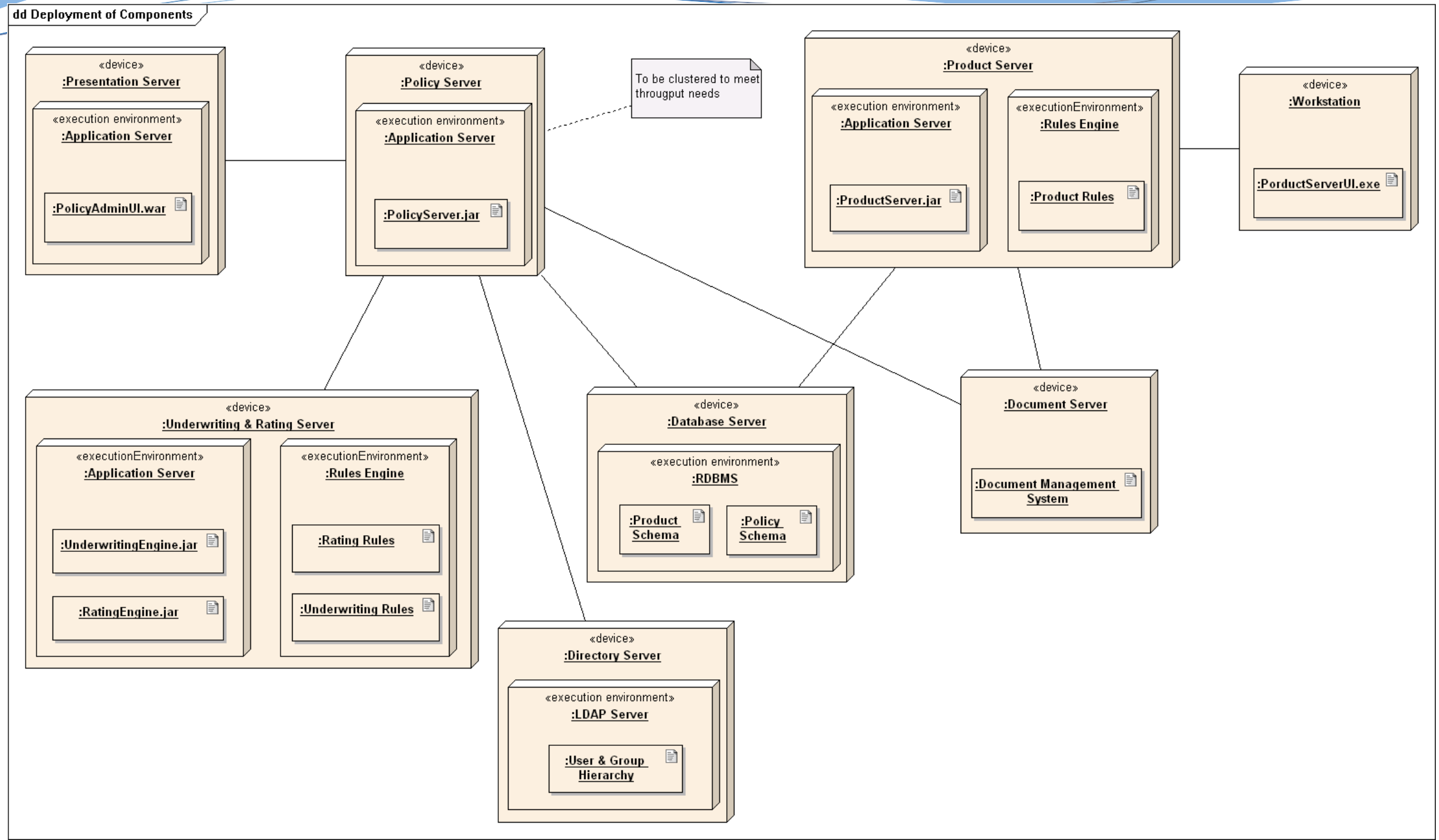
- Shows the internal structure of a class
- and the collaborations that this structure makes possible



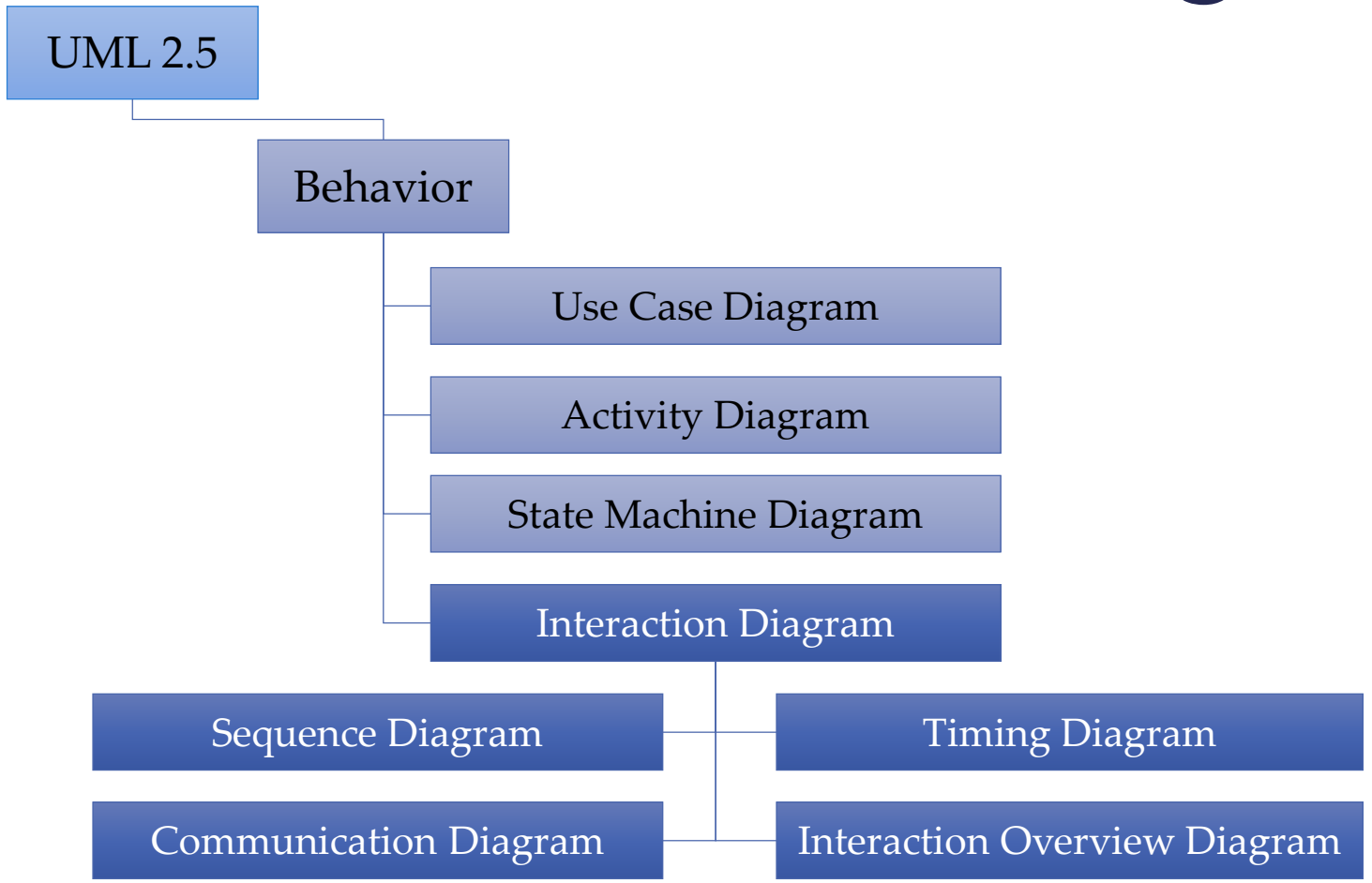
Deployment Diagram

Deployment Diagram

- Models the physical deployment of artifacts on nodes
  - Device Nodes
  - Execution Environment Nodes

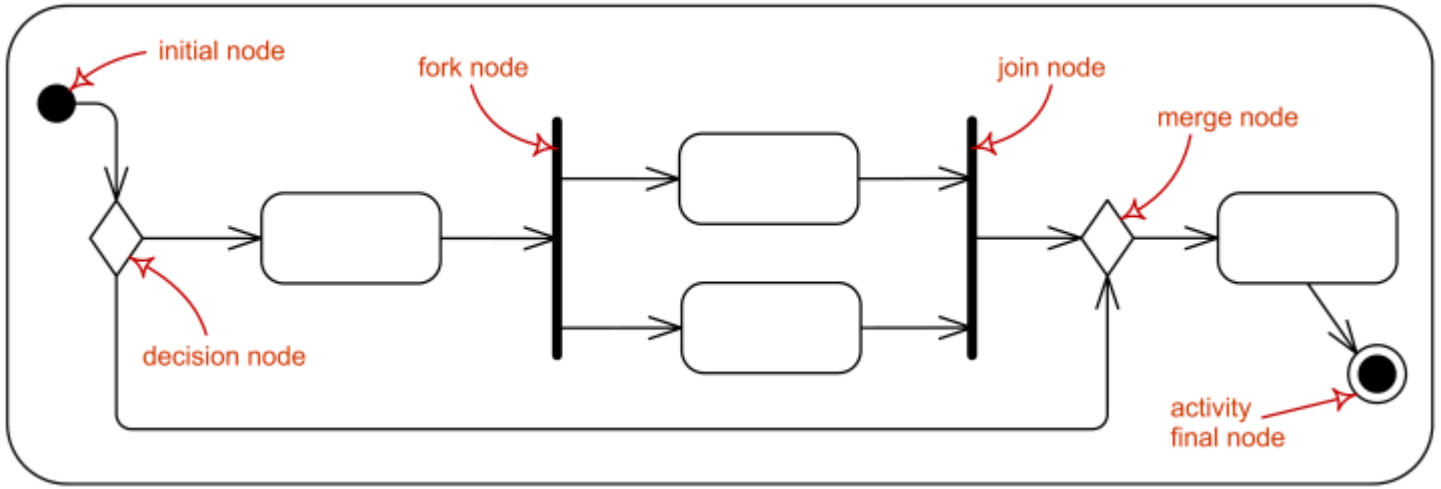

dd Deployment of Components
«device»
:Presentation Server
«execution environment»
:Application Server
:PolicyAdminUI.war
«device»
:Policy Server
«execution environment»
:Application Server
:PolicyServer.jar
To be clustered to meet througput needs
«device»
:Product Server
«execution environment»
:Application Server
:ProductServer.jar
«executionEnvironment»
:Rules Engine
:Product Rules
«device»
:Workstation
:PorductServerUI.exe
«device»
:Underwriting & Rating Server
«executionEnvironment»
:Application Server
:UnderwritingEngine.jar
:RatingEngine.jar
«executionEnvironment»
:Rules Engine
:Rating Rules
:Underwriting Rules
«device»
:Database Server
«execution environment»
:RDBMS
:Product Schema
:Policy Schema
«device»
:Document Server
:Document Management System
«device»
:Directory Server
«execution environment»
:LDAP Server
:User & Group Hierarchy

Classification of UML Diagrams

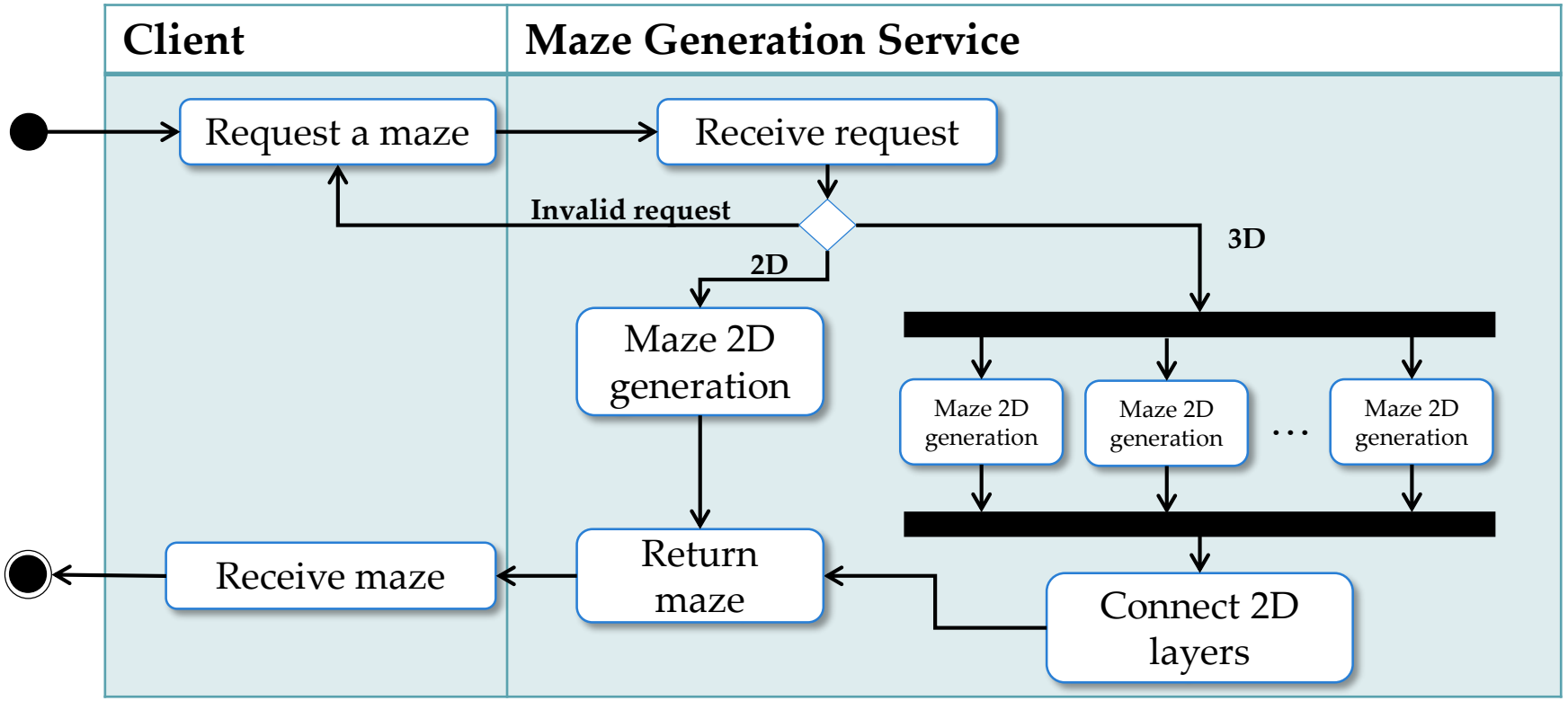


Activity Diagram

- Graphical representations of workflows
  - of stepwise activities and actions
  - with support for choice, iteration and concurrency

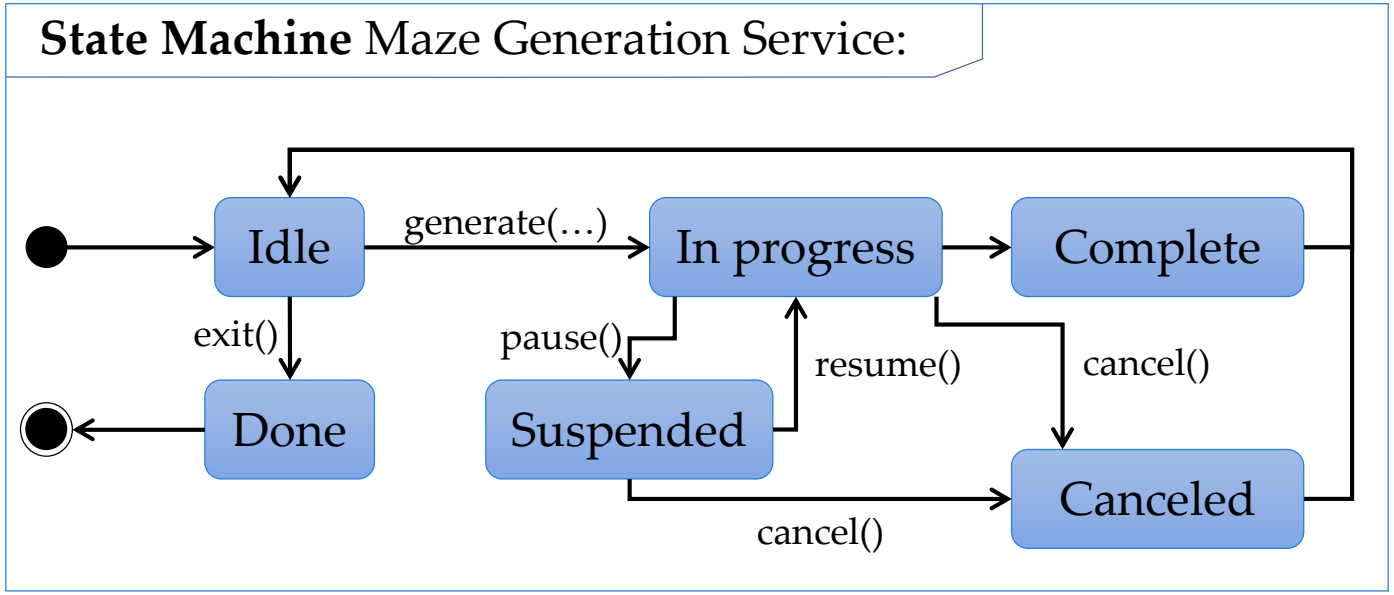


Activity Diagram Example



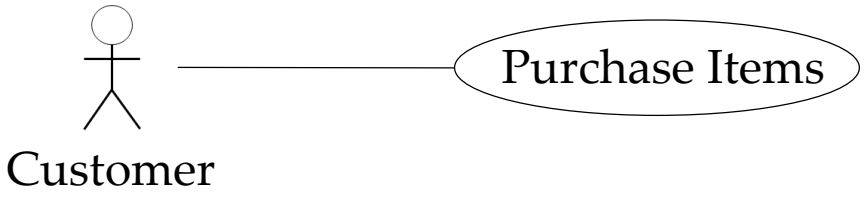
State Machine Diagram

- Describes state transitions
- Can describe many systems, from computer programs to business processes



Sequence Diagrams

Assume the following use case



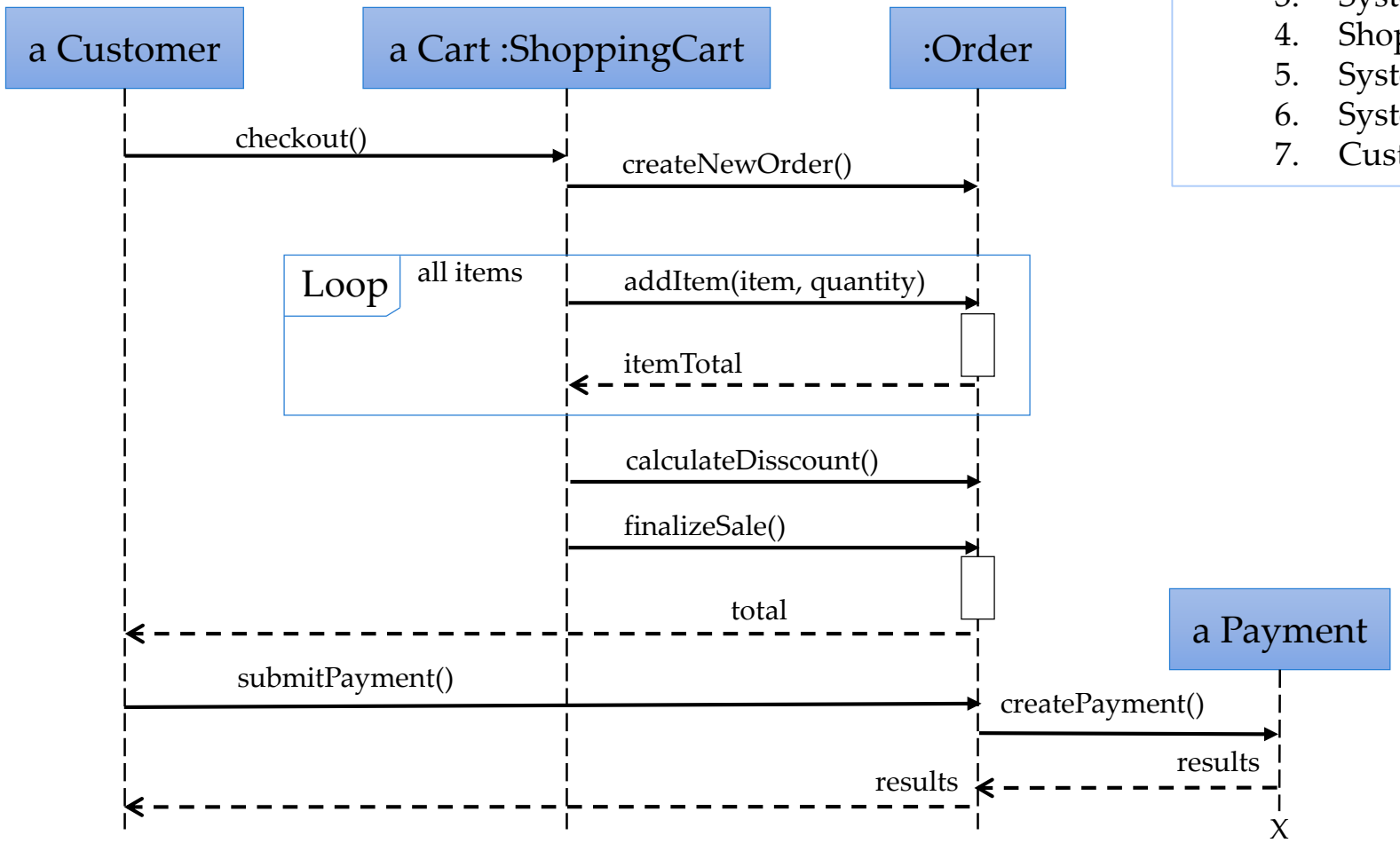
Title: Purchase Items
Actor: Customer
Scenario:

1. Customer checkouts a shopping cart
2. System creates an order
3. System adds items from the shopping cart to the order
4. Shopping cart displays the total for each item
5. System calculates discount
6. System calculates the total sum for payment
7. Customer submits the payment

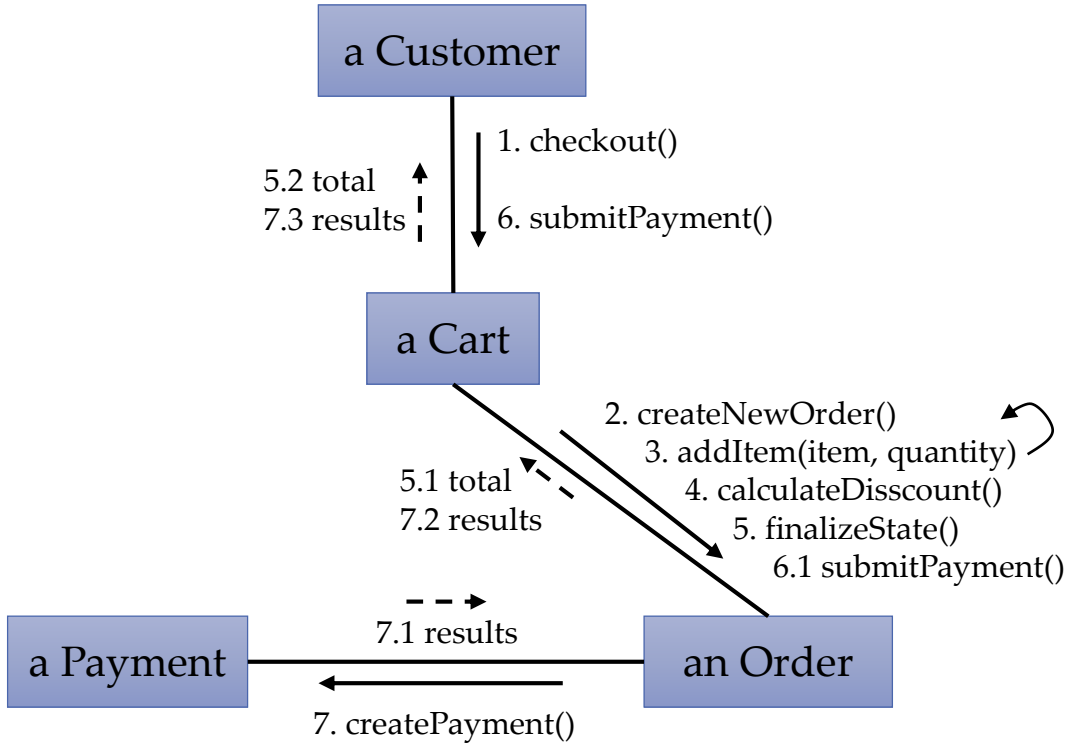
A Sequence Diagram

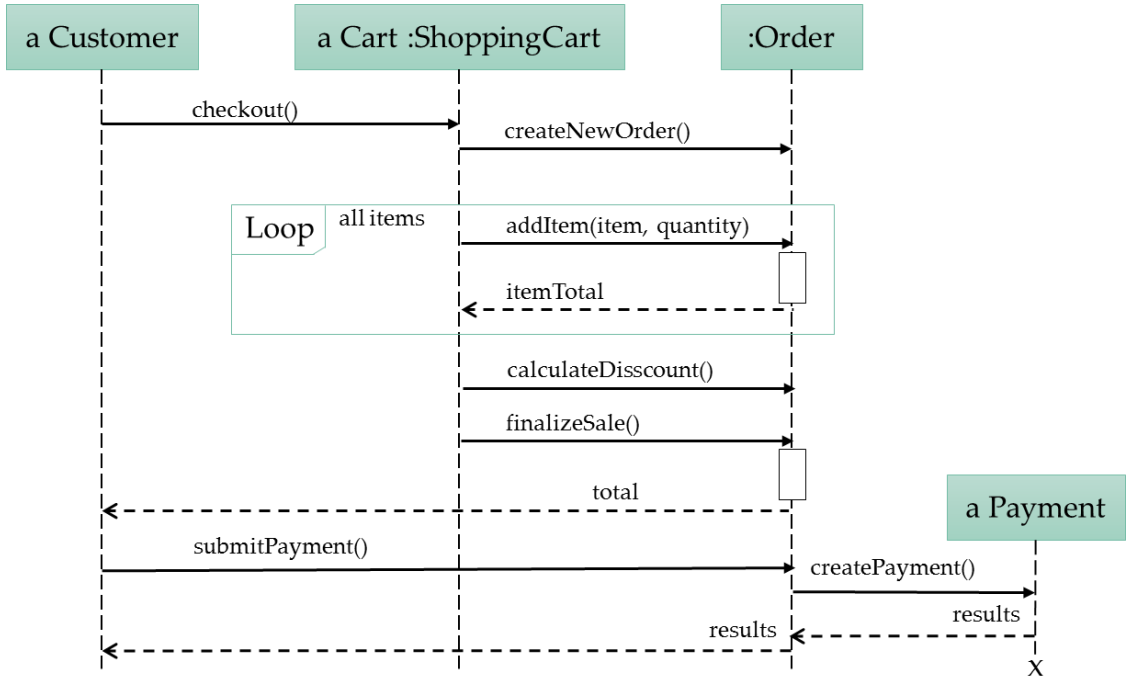
Title: Purchase Items
Actor: Customer
Scenario:

1. Customer checkouts a shopping cart
2. System creates an order
3. System adds items from the shopping cart to the order
4. Shopping cart displays the total for each item
5. System calculates discount
6. System calculates the total sum for payment
7. Customer submits the payment

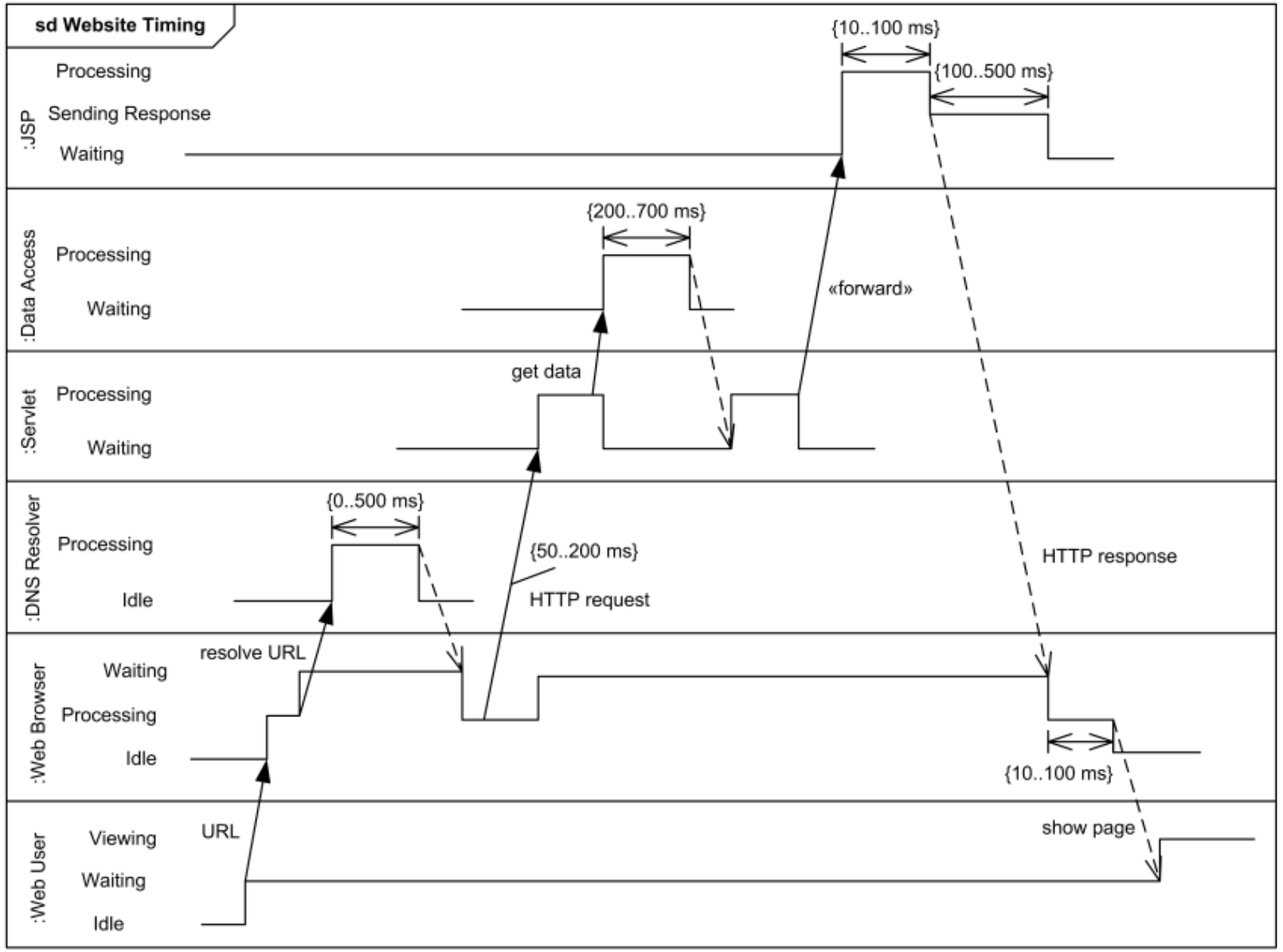


Communication Diagram vs. Sequence Diagram



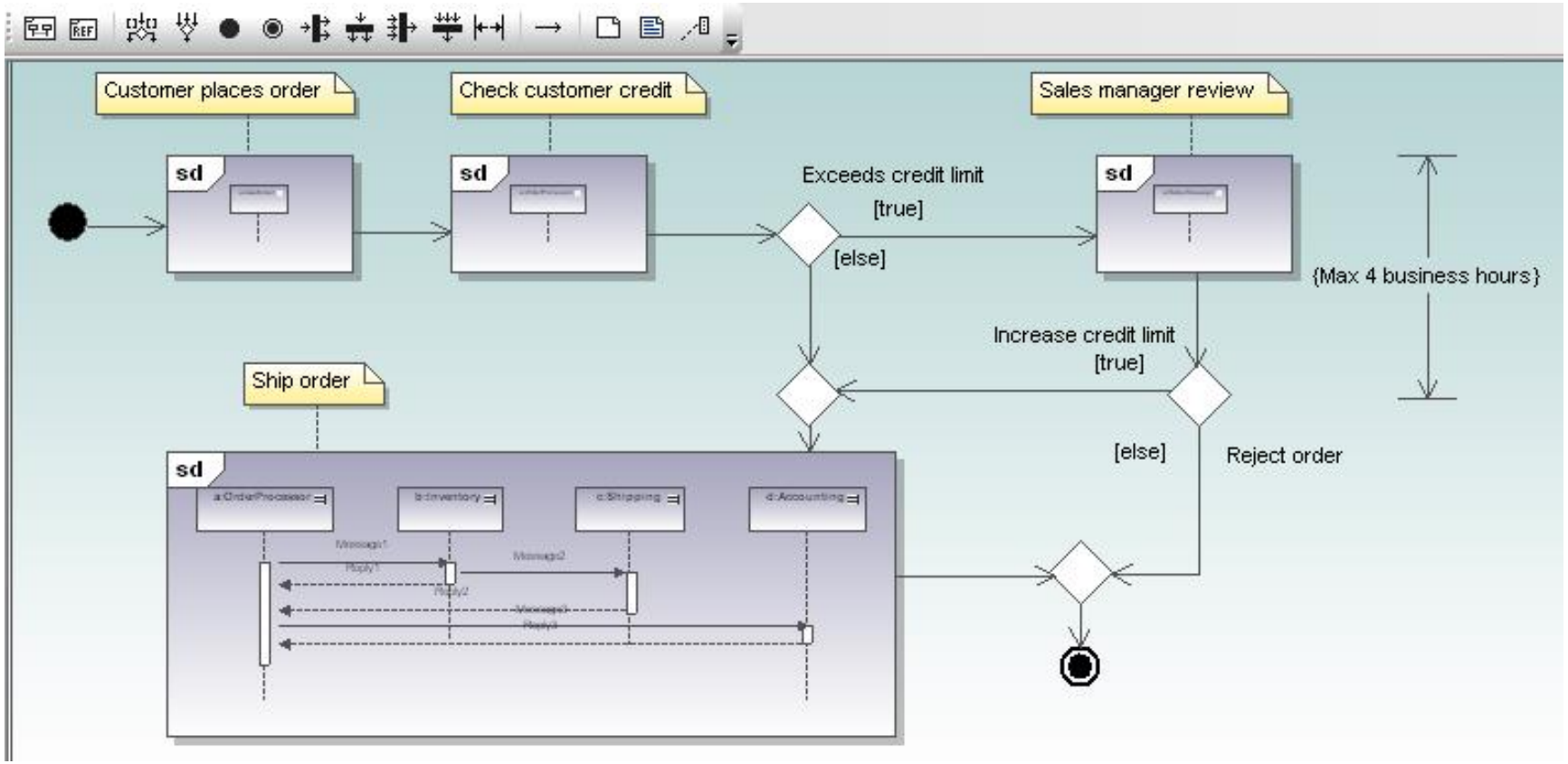


Timing Diagram



http://www.uml-diagrams.org/

Interaction Overview Diagram



http://www.altova.com/umodel/interaction-diagrams.html