

# Object oriented analysis and design

Module 6: Others UML Diagrams

# Objectives

- Demonstrate how to read and interpret a:
  - State machine diagram
  - Component diagram
  - Deployment diagram

# Where Are We?

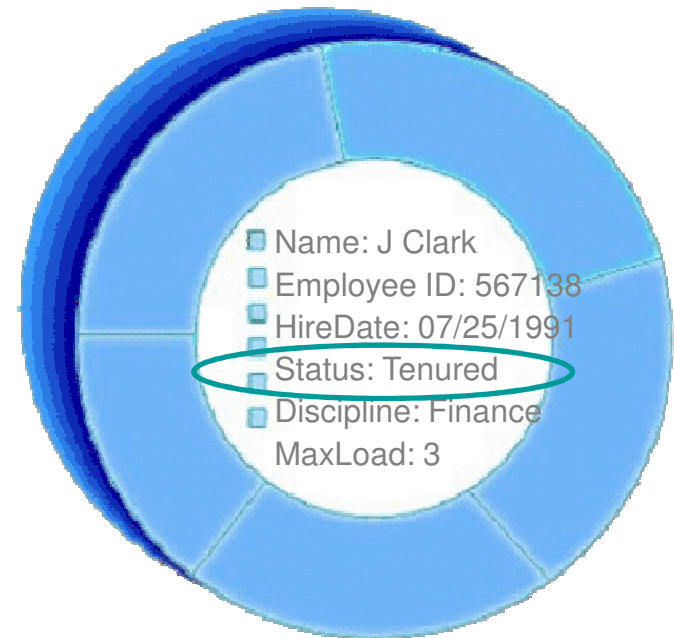
- State machine diagrams
- Component diagrams
- Deployment diagrams

# Review: An Object Has State

- State is a condition or situation during the life of an object, which satisfies some condition, performs some activity, or waits for some event.
- The state of an object normally changes over time.



Name: J Clark  
Employee ID: 567138  
Date Hired: July 25, 1991  
Status: Tenured  
Discipline: Finance  
Maximum Course Load: 3 classes



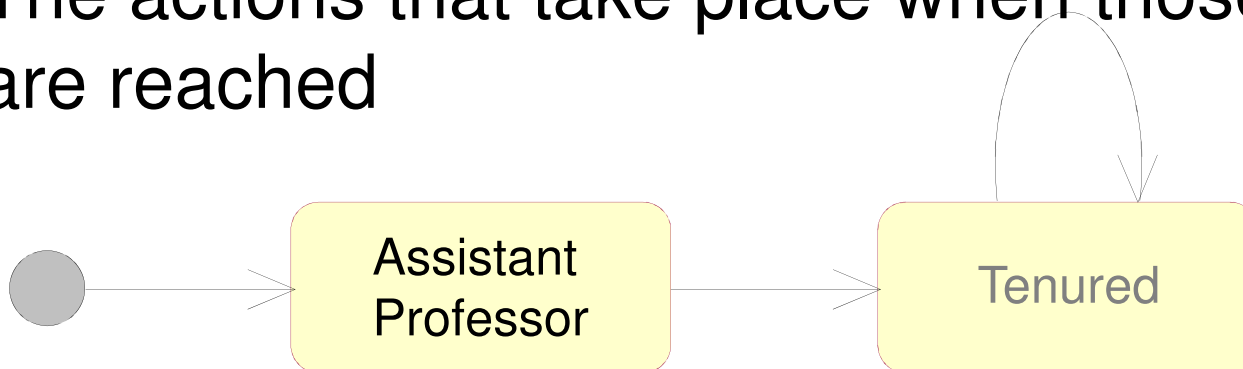
Professor Clark

# Example: Professor

- There are a sequence of events before an instructor becomes a University professor.
  - Assistant professor (achieves tenure by producing a number of quality publications)
  - Tenure/Associate professor
  - Professor (based on seniority)

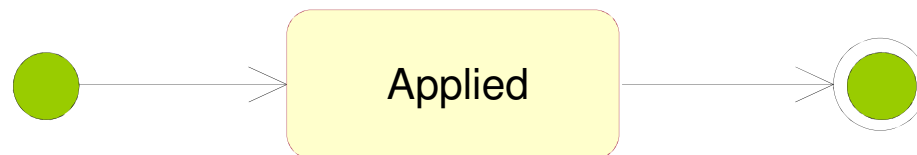
# What Are State Machine Diagrams?

- A state machine diagram models dynamic behavior.
- It specifies the sequence of states in which an object can exist:
  - The events and conditions that cause the object to reach those states
  - The actions that take place when those states are reached



# Special States

- The initial state is the state entered when an object is created.
  - An initial state is mandatory.
  - Only one initial state is permitted.
  - The initial state is represented as a solid circle.
- A final state indicates the end of life for an object.
  - A final state is optional.
  - A final state is indicated by a bull's eye.
  - More than one final state may exist.



# What Are Events?

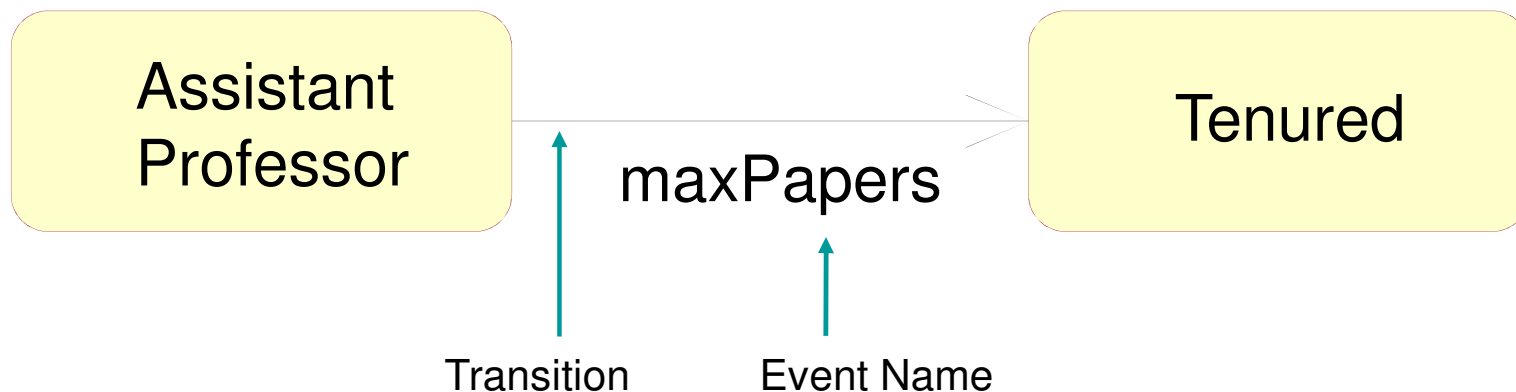
- An event is the specification of a significant occurrence that has a location in time and space.
  - An event is an occurrence of a stimulus that can trigger a state transition.
  - Example:
    - Successful publication of numerous papers



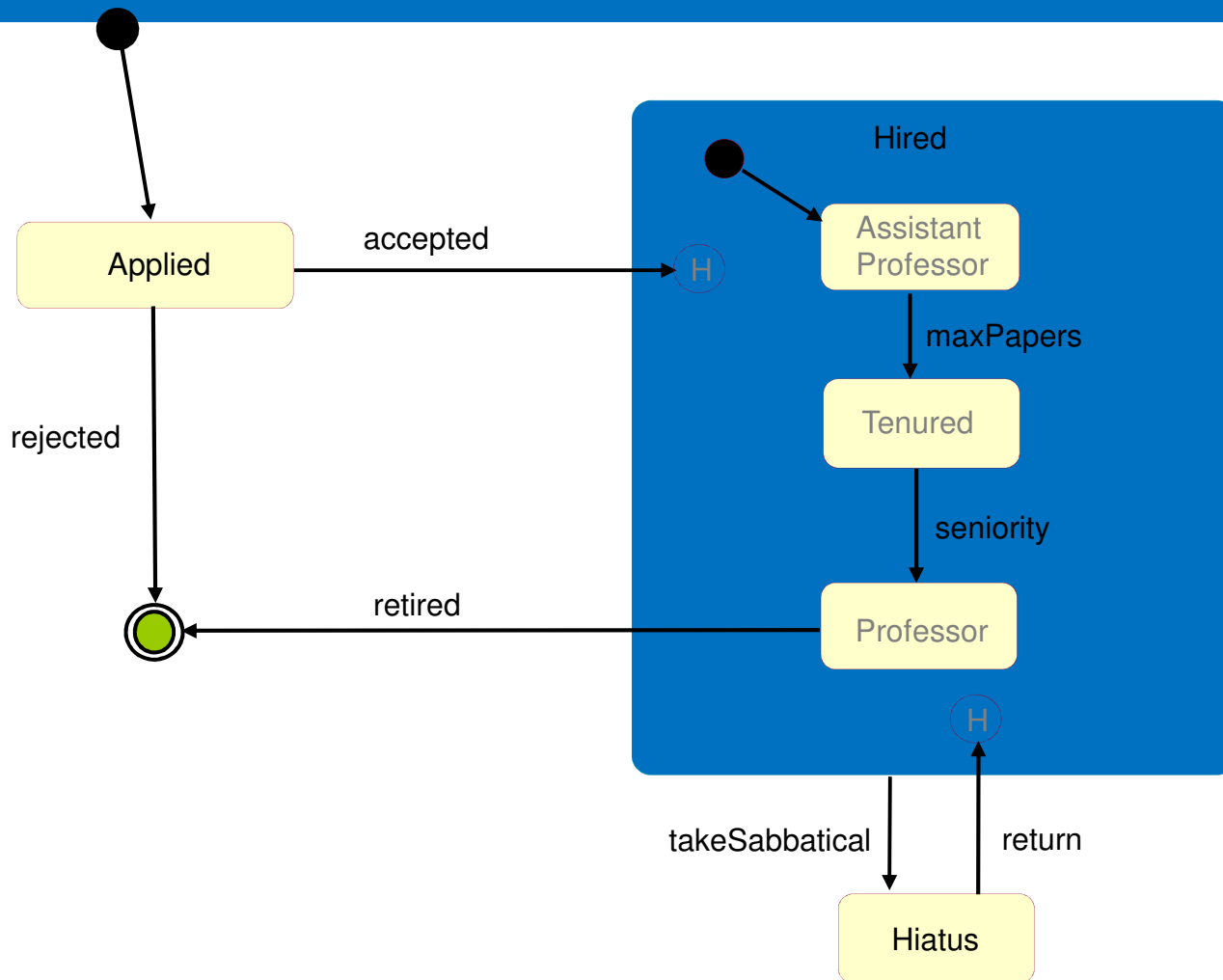


# What Are Transitions?

- A transition is a change from an originating state to a successor state as a result of some stimulus.
  - The successor state could possibly be the originating state.
- A transition may take place in response to an event.
- Transitions can be labeled with event names.

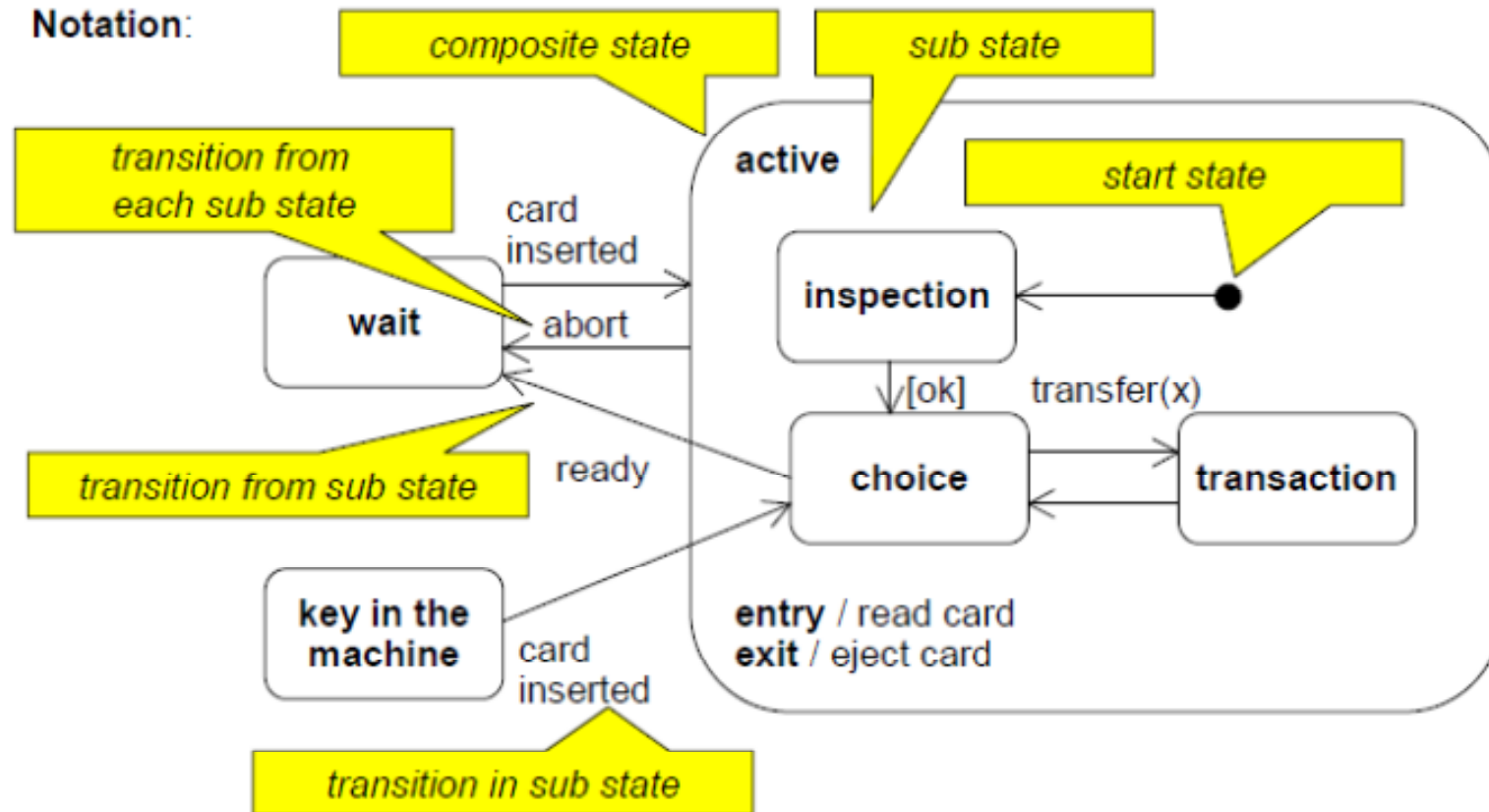


# Example: State Machine



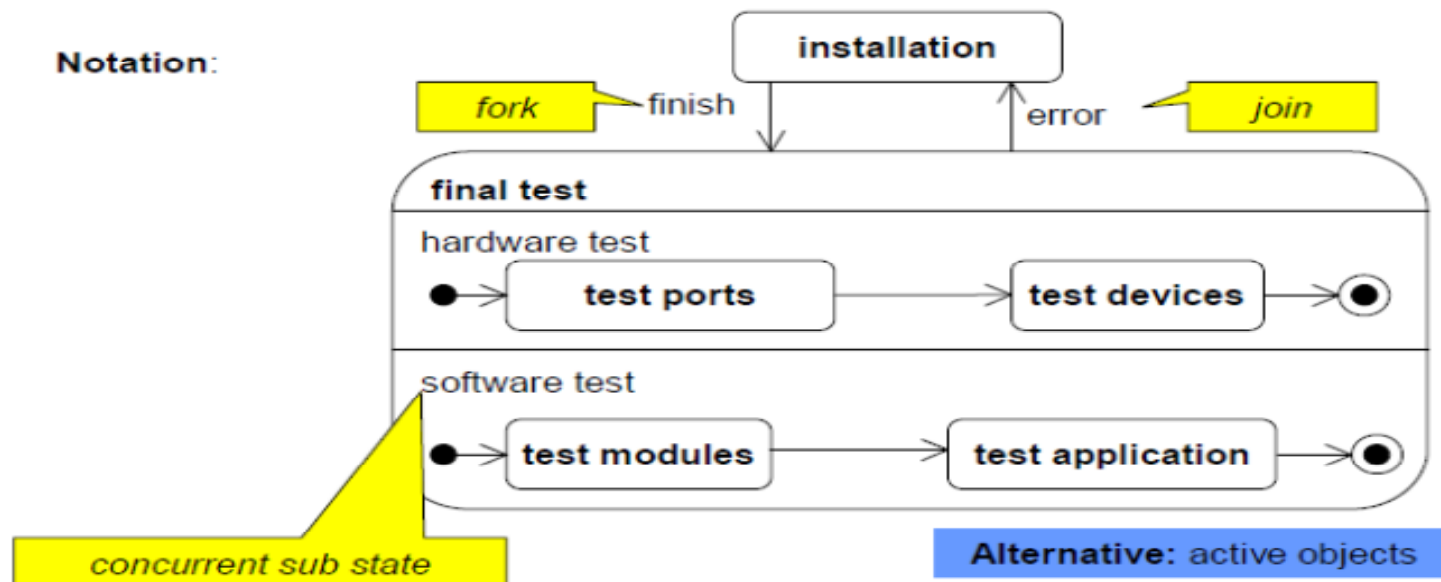
# Composite States

Notation:

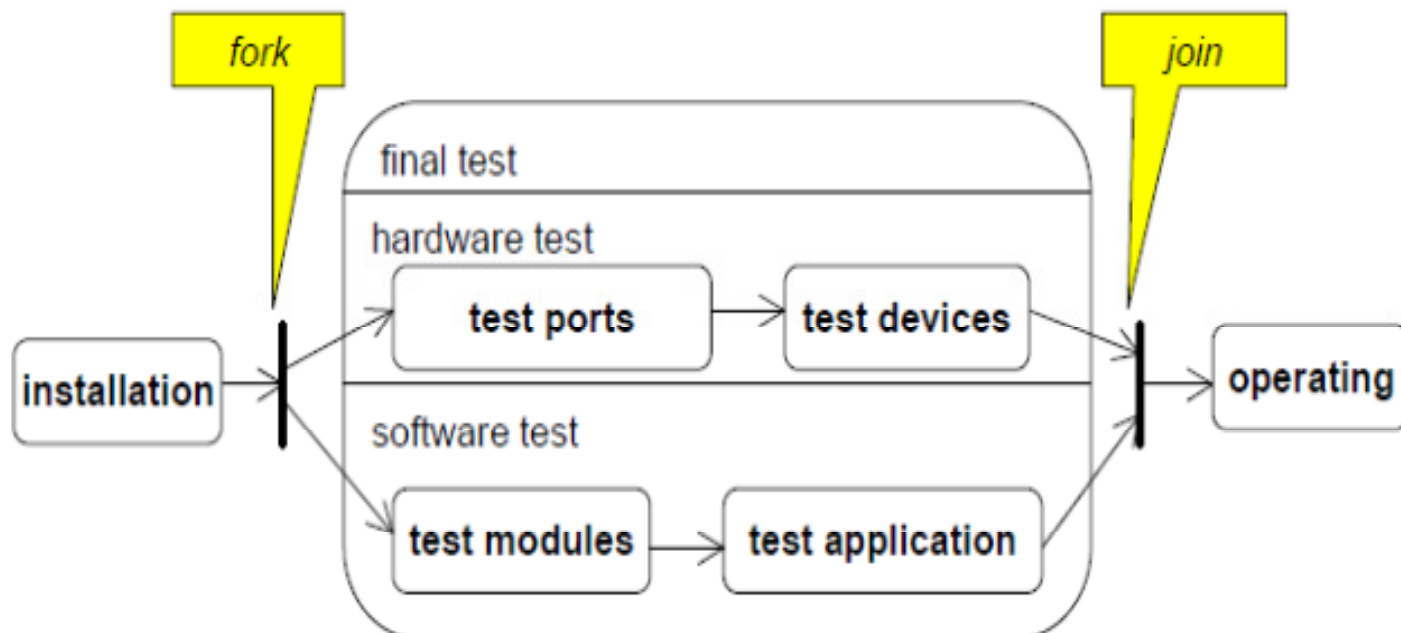


# Concurrent Sub States

- In a state several sequences of sub states described by own state machines can be performed concurrently.



# Concurrent Sub States: Alternative

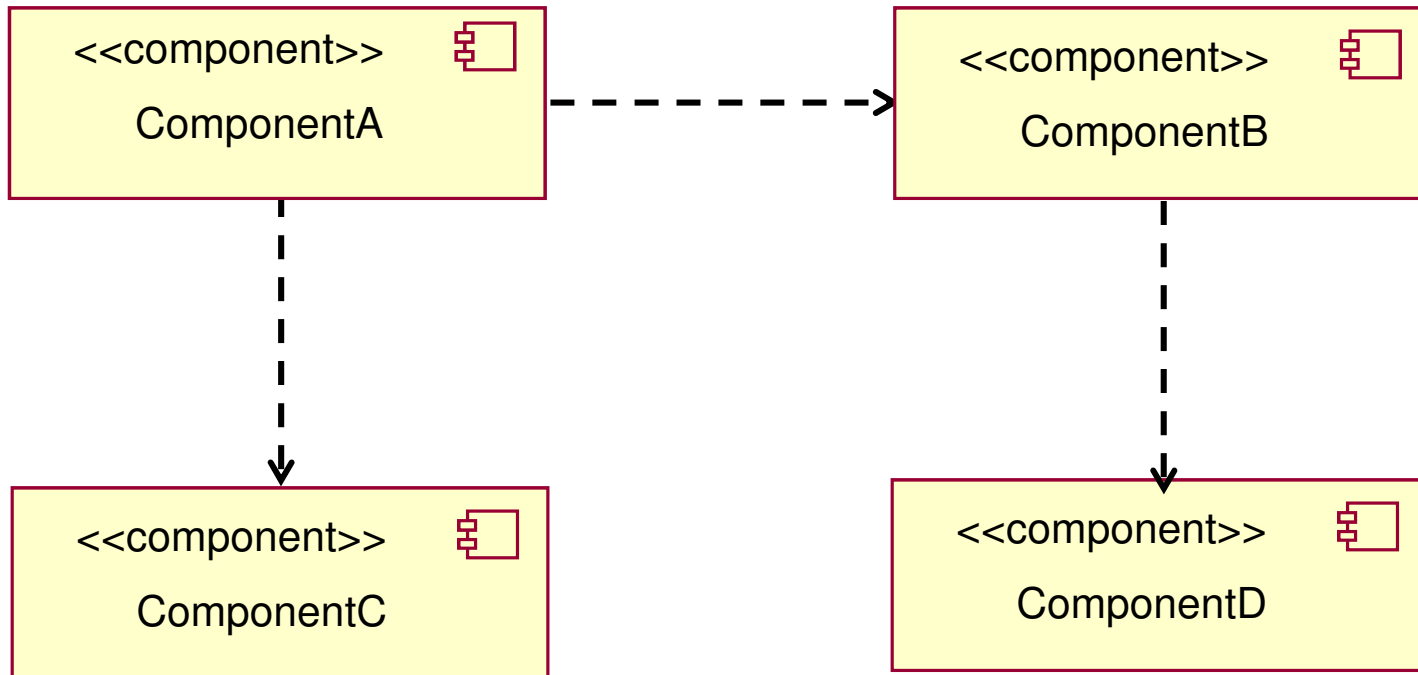


# Where Are We?

- State machine diagrams
- **Component diagrams**
- Deployment diagrams

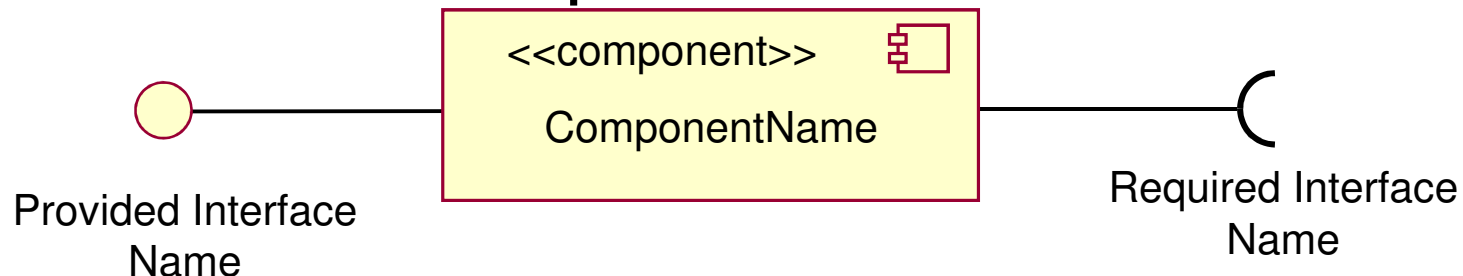
# What Is a Component Diagram?

- A diagram that shows the organizations and dependencies among components



# What Is a Component?

- A modular part of a system that hides its implementation behind a set of external interfaces.
  - Part of a logical or physical system
- It conforms to and provides the physical realization of a set of interfaces.
- It specifies the physical dependency to interfaces it requires.





# Where Are We?

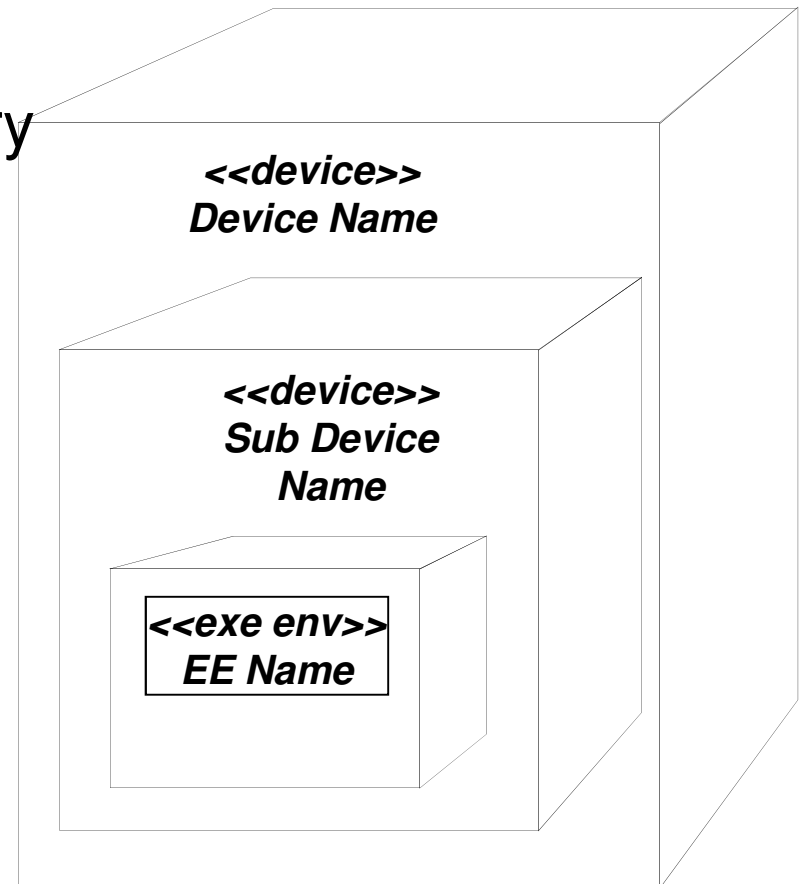
- State machine diagrams
- Component diagrams
- **Deployment diagrams**

# What Is a Deployment Diagram?

- The deployment diagram shows:
  - Configuration of processing nodes at run-time
  - Communication links between these nodes
  - Deployed artifacts that reside on them

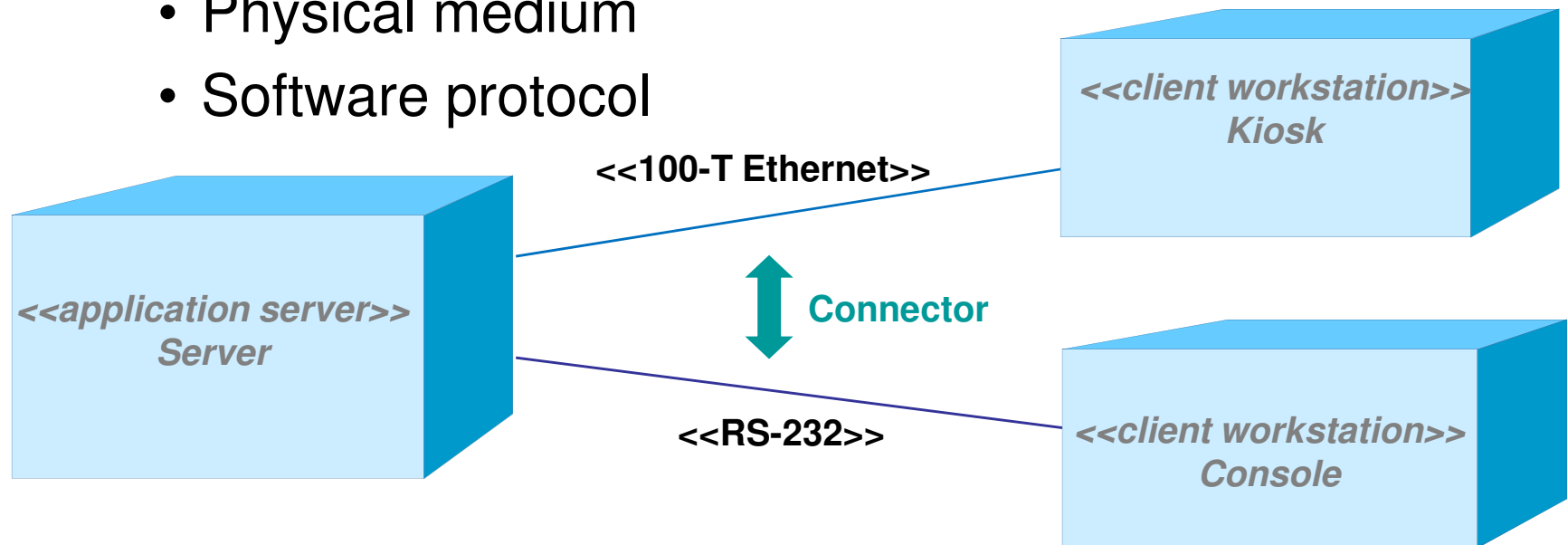
# What Is a Node?

- Represents a run-time computational resource
  - Generally has at least memory and often processing capability.
- Types:
  - Device
    - Physical computational resource with processing capability.
    - May be nested
  - Execution Environment
    - Represent particular execution platforms

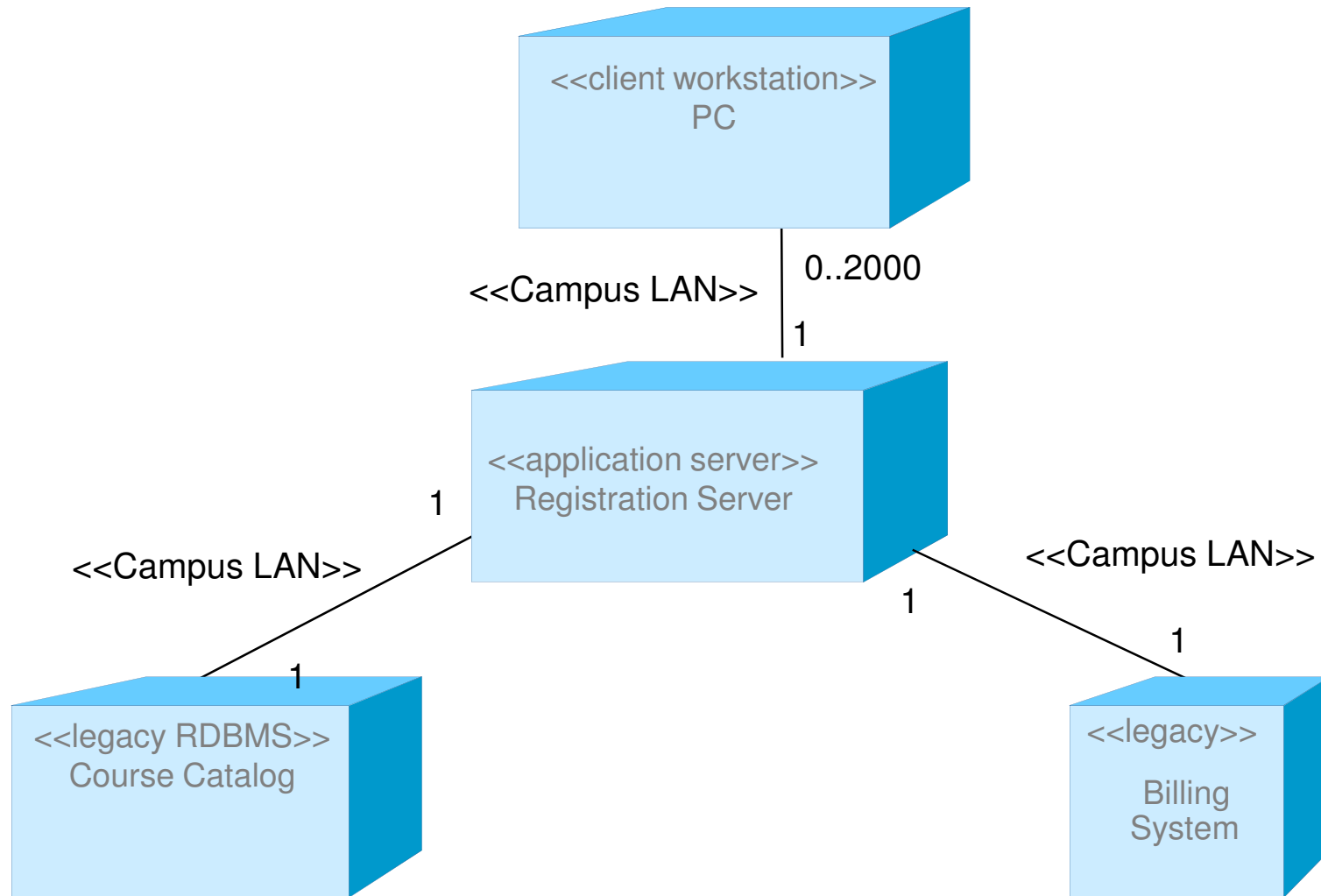


# What Is a Connector?

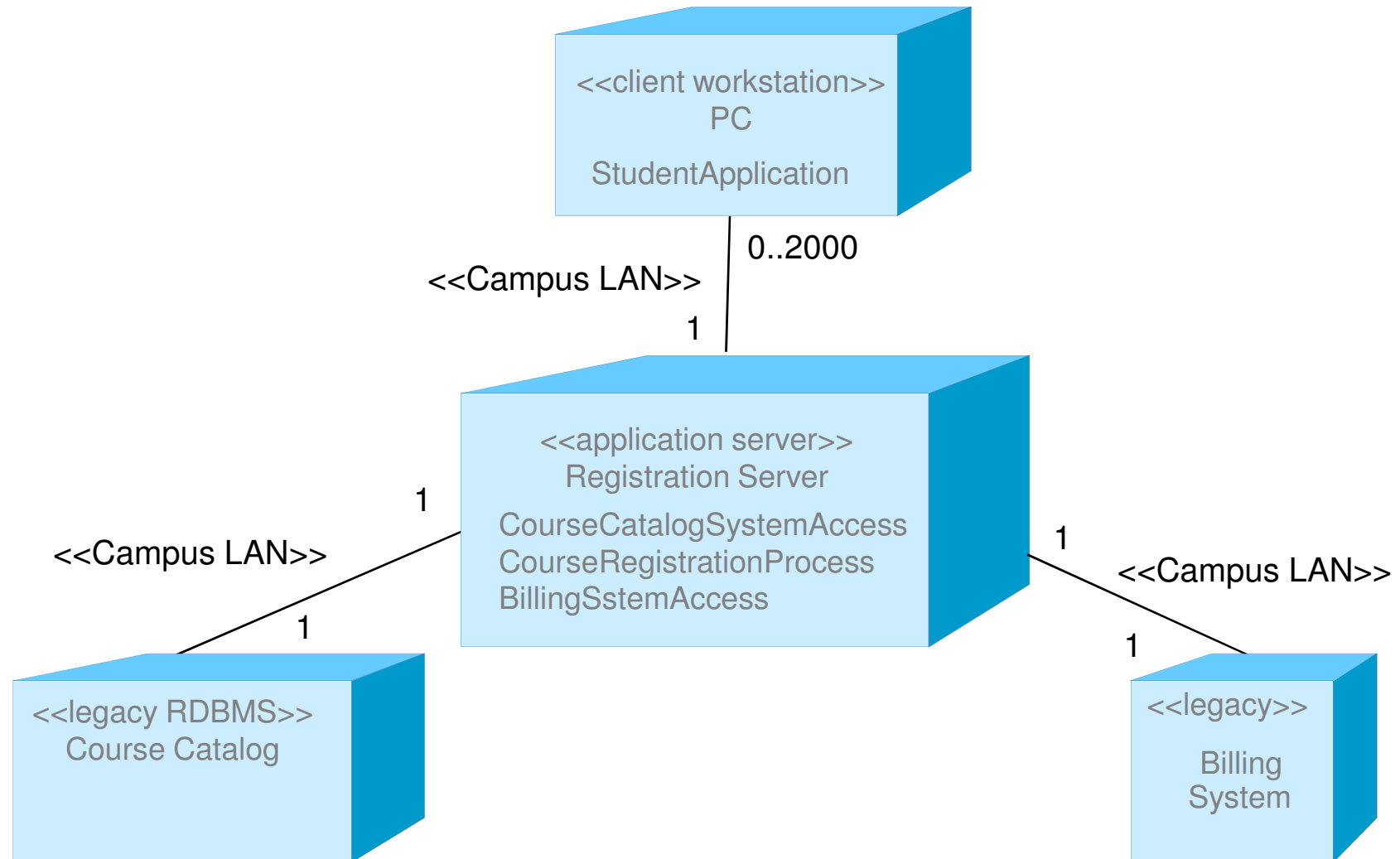
- A connector represents a:
  - Communication mechanism
    - Physical medium
    - Software protocol



# Example: Deployment Diagram



# Example: Deployment Diagram with Processes



# Review

- ◆ Define state. How do you determine the classes with significant state?
- ◆ What is a state machine diagram? Describe the different parts of the diagram.
- ◆ What is a component diagram?
- ◆ What is the purpose of a deployment diagram?

