IV. State Diagrams

State Diagrams
Events and States
Superstates

State Diagrams (Statecharts)

- State diagrams model processes (business processes, machine processes, or anything in-between.)
- States
- Transitions
- Events, conditions and actions (all optional)
  
  Event[Condition]/Action
- Initial and final states
State Diagram for Purchase Order

- **Checking**
  - Start/Initial: Order received
  - Action: Do/check items
  - Condition: [all items in stock?]

- **Dispatching**
  - Action: Do/package items
  - Condition: [deliver package]

- **Waiting**
  - Event: Item received
  - Condition: [some item not In stock?]
  - Condition: [all items in stock?]
Course Lifetimes

A state represents a time period during which
- A predicate is true, e.g., budget - expenses > 0,
- An action is being performed, or
- Someone waits for an event to happen.
- A state can be “on” or “off”.
- States can have associated activities. Special activity constructs include:
  - do/stateDiagramName(parameterList) -- “calls” another state diagram;
  - entry/action -- carry out the action when entering the activity;
  - exit/action -- carry out the action when exiting;
Course Lifetimes, Again

- Initialization
  - do / Initialize
    - createCourse/
      count=0; CourseRoster.Create()
  
- addStudent[count<10]
  - entry/RegisterStudent
    - exit/CourseRoster.AddStudent(student)
  
- Open
  - entry/RegisterStudent
    - exit/CourseRoster.AddStudent(student)
  
- Cancelled
  - cancel
  
- Closed
  - do/FinalizeCourse

- quarterStarted

Superstates

- A superstate consists of two or more substates.
- There are AND and OR superstates.
- When an AND superstate is “on”, all its states are also “on”.
- When an OR superstate is “on”, one of its states is “on”.

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An OR Superstate

Transmission

- Neutral
  - select R
  - select N
- Reverse
  - select N
- Forward
  - select F

...More on Transmission

Transmission

- Neutral
  - select R
  - select N
- Reverse
  - select N
- Forward
  - select F
- First
  - upshift
  - downshift
- Second
  - upshift
  - downshift
- Third
  - stop
An AND Superstate

Additional Readings