

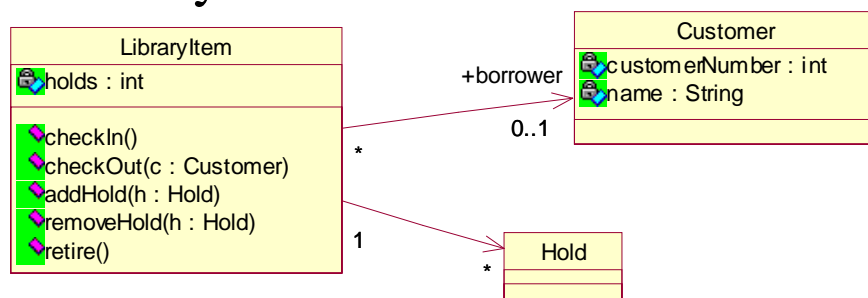
State Diagrams

- Interaction diagrams show behavior of a set of related objects
- UML State Diagrams show behavior of objects of a single class
 - state changes over lifetime
- Lifetime of an object
 - created with “new”
 - destroyed by garbage collector if not referenced anymore
 - in C++: with “delete”
- State
 - a period when a certain property holds
 - not directly shown in other diagrams or code
- UML version of Finite State Machines (FSMs)
 - also called State Charts, State Machines

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State Diagram Example:

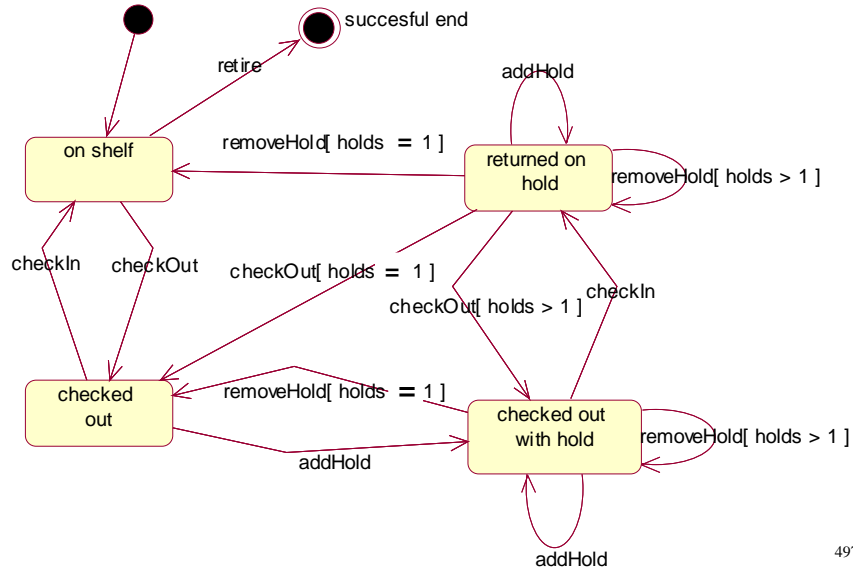
LibraryItem



- A LibraryItem is a book or video that can be borrowed
 - ‘holds’ is the number of holds on the item
- What states do objects of class LibraryItem have?

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State Diagram: Class LibraryItem



Elements of State Diagrams



start state



end state

- States
 - rounded rectangles
 - represent properties that exist for a significant period
 - can contain activities
- Transitions
 - represent instantaneous events
 - syntax: trigger [guard] / action
 - triggers are generally operation calls
 - guards are conditions that must be true
 - actions are additional things that may happen

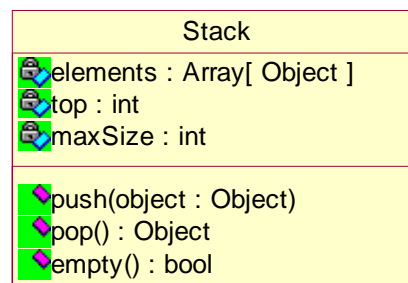
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State Diagrams

- Transitions that are not shown are assumed to lead to an error state
 - Example: event “check in” in state “on shelf”
 - make sure that all other possible transitions are shown
- Each diagram has exactly one start state
- There can be several end states
 - for object-oriented systems, the transition to the end state is obvious and can be left out
- Superstates
 - a set of states is a state too
- What are states?
 - sets of values of attributes
 - “checked in”
borrower == null
 - “checked out with holds”
borrower != null *and* holds > 0

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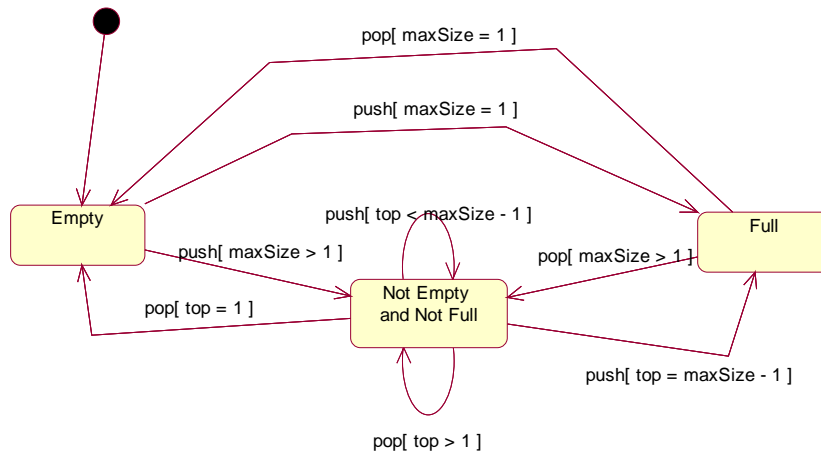
State Diagram: Stack Example



- Stack
 - stores Objects
 - only the Object stored last can be retrieved (popped)
 - can say if it is empty
 - has a maximum size
 - top represents the location of the next element that is added

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State Diagram: Stack



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