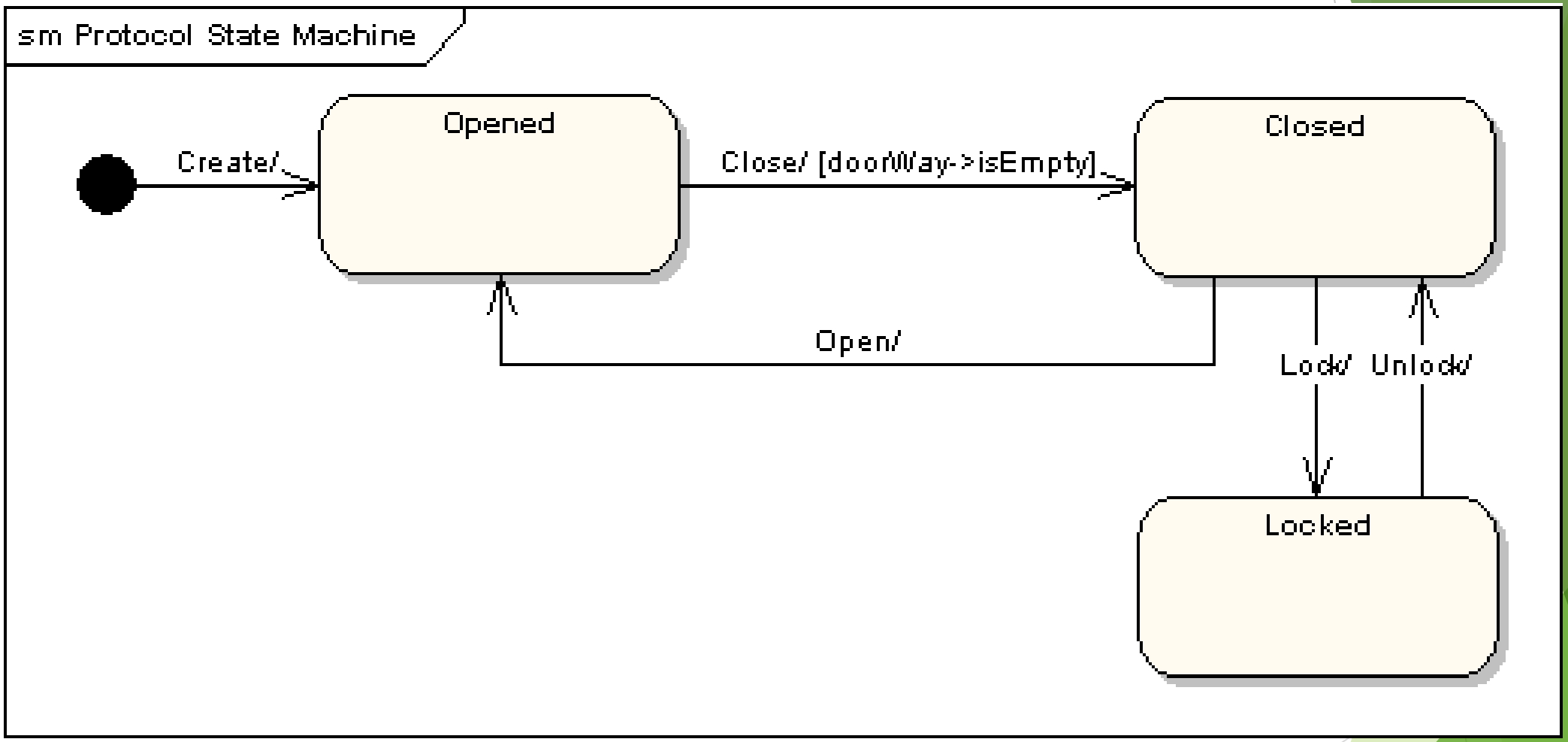
State Chart

- A state machine diagram models the behaviour of a single object, specifying the sequence of events that an object goes through during its lifetime in response to events.

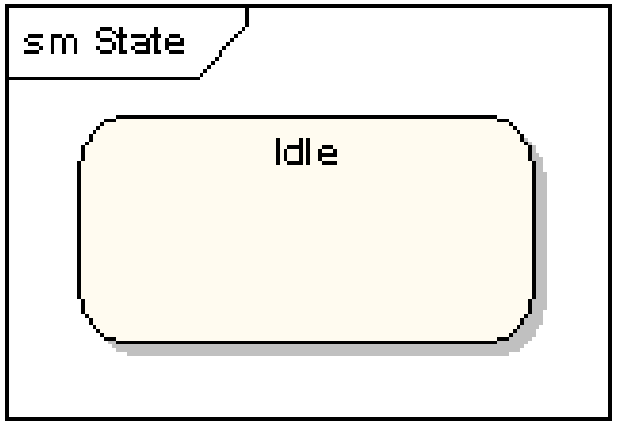
- As an example, let us take state machine diagram shows the states that a door goes through during its lifetime.


sm Protocol State Machine
Opened
Closed
Create/
Close/ [doorWay->isEmpty]
Open/
Lock/
Unlock/
Locked

- The door can be in one of three states: "Opened", "Closed" or "Locked".
- It can respond to the events Open, Close, Lock and Unlock.
- Notice that not all events are valid in all states; for example, if a door is opened, you cannot lock it until you close it.
- Also notice that a state transition can have a guard condition attached: if the door is Opened, it can only respond to the Close event if the condition doorWay->isEmpty is fulfilled.

States

- A state is denoted by a round-cornered rectangle with the name of the state written inside it.



Initial and Final States

- The initial state is denoted by a filled black circle and may be labeled with a name. The final state is denoted by a circle with a dot inside and may also be labeled with a name.
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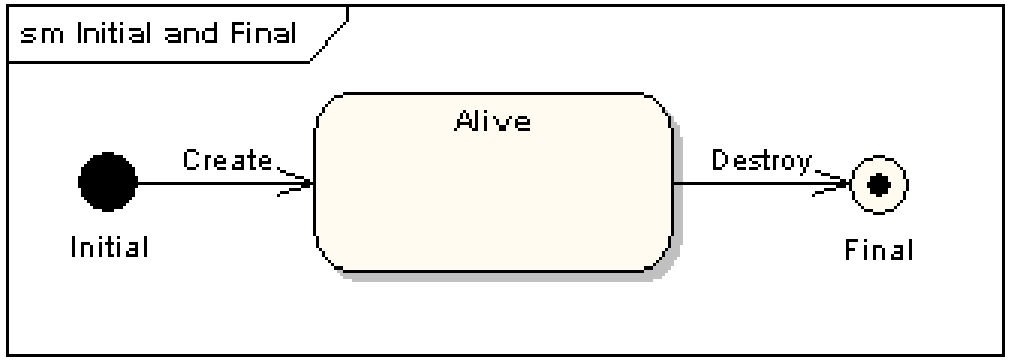
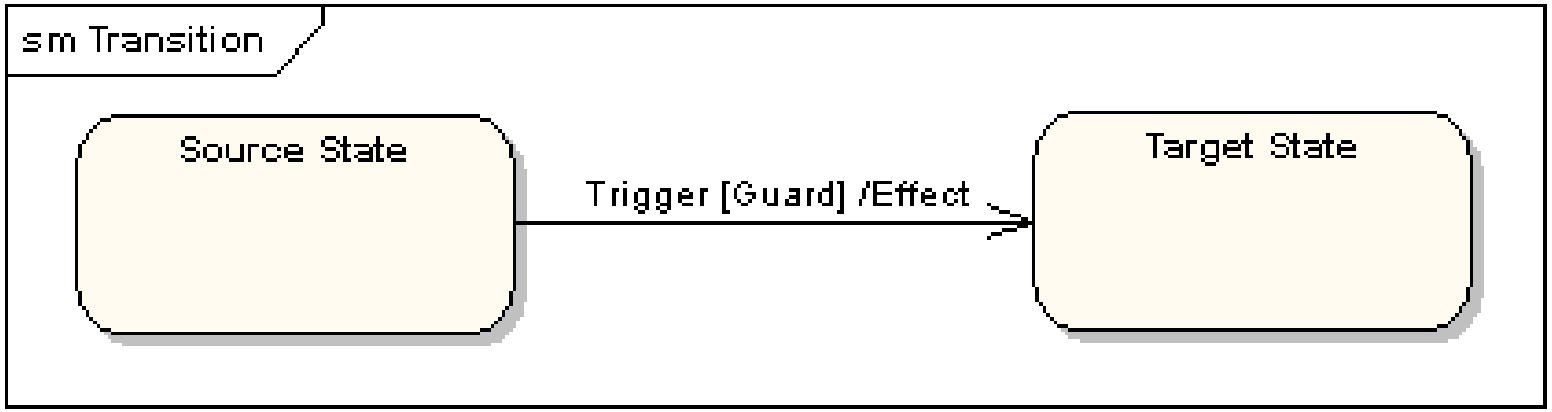


Transitions

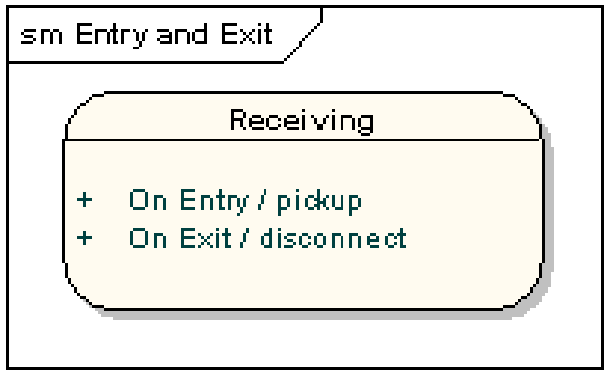
- Transitions from one state to the next are denoted by lines with arrowheads.
- A transition may have a trigger, a guard and an effect, as below.



- "Trigger" is the cause of the transition, which could be a signal, an event, a change in some condition, or the passage of time.
- "Guard" is a condition which must be true in order for the trigger to cause the transition.
- "Effect" is an action which will be invoked directly on the object that owns the state machine as a result of the transition.

State Actions

- In the transition example above, an effect was associated with the transition.
- If the target state had many transitions arriving at it, and each transition had the same effect associated with it, it would be better to associate the effect with the target state rather than the transitions.
- This can be done by defining an entry action for the state. The diagram below shows a state with an entry action and an exit action.



Self-Transitions

- A state can have a transition that returns to itself, as in the following diagram.
- This is most useful when an effect is associated with the transition.