

# Module 4: State & Event Modelling

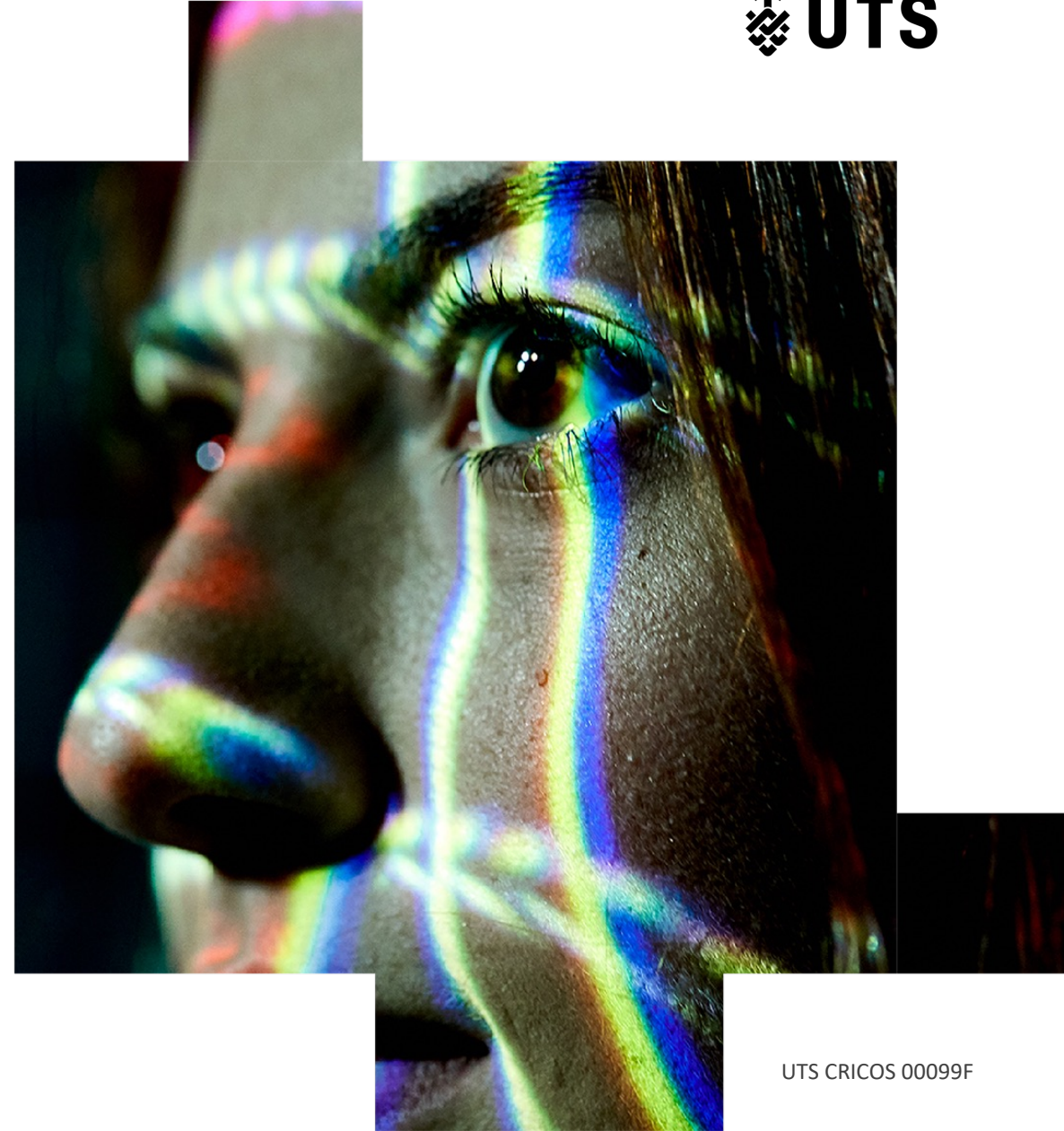
SSTC 2022  
Module 4 – Lecture 3

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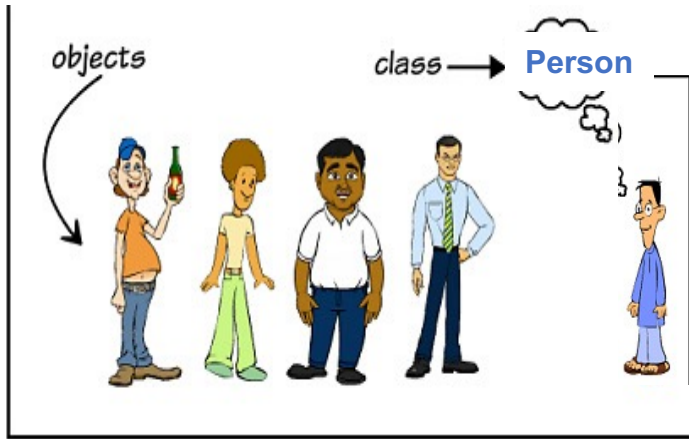
School of Computer Science, Faculty of Engineering and IT  
University of Technology Sydney (Australia)



# State & Event Modelling

# State & Event Modelling

What is an object "state"?



## Kid

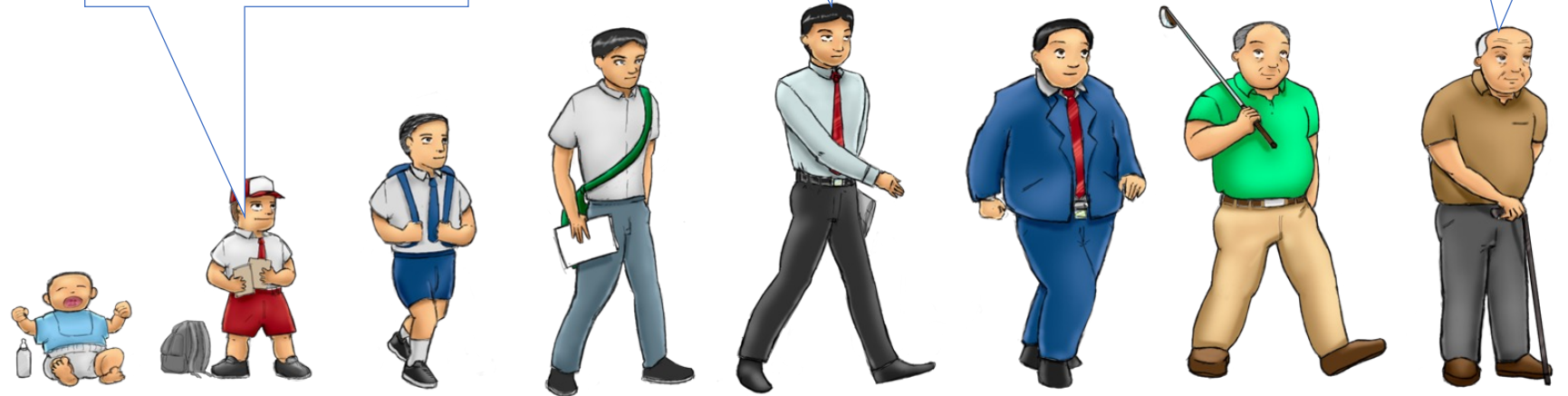
Name = Jim  
Age = 4  
Weight = 12  
Height = 80

## Adult

Name = Jim  
Age = 24  
Weight = 70  
Height = 173

## Elderly

Name = Jim  
Age = 74  
Weight = 85  
Height = 173



# State & Event Modelling

Why states, events and transitions?

- Show an object's **states**, and the **events** that cause them to transition between states.
- Movement from one state to another is called **transition** and is triggered by an event. When its triggering event occurs, a transition is said to fire.
- It helps analysts, designers and developers to **understand the behaviour of a given system and of the objects** in the system.

- To track an object's lifecycle.
- To provide status of an object at a given point in time
- To better understand the several states that an object goes through

# State & Event Modelling



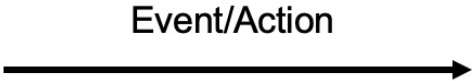

More on state/event

- Objects change their **state** in response to events (time and non-time events).
  - e.g. when you *press a switch/button*, a light object changes its state from **off** to **on**.
  - e.g. the `enrol()` method changes the state of the student object from being 'prospective' to 'enrolled'.
- Each time an object changes state, some of its attributes must change

# State Transition Diagram

# State Transition Diagram



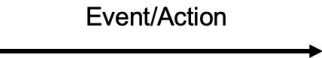

UML standard

	<b>Initial State:</b> This shows the starting point or first activity of the flow. Denoted by a solid circle.
	<b>State:</b> Represents the state of an object at an instant of time; one for each state of the Object we are describing. Denoted by a rectangle with rounded corners and compartments
	<b>Transition:</b> An arrow indicating the Object is to transition from one state to the other. The actual trigger event and action causing the transition are written besides the arrow, separated by a slash.
	<b>Final State:</b> The end of the state diagram is shown by a bull's eye symbol. <sup>12</sup>

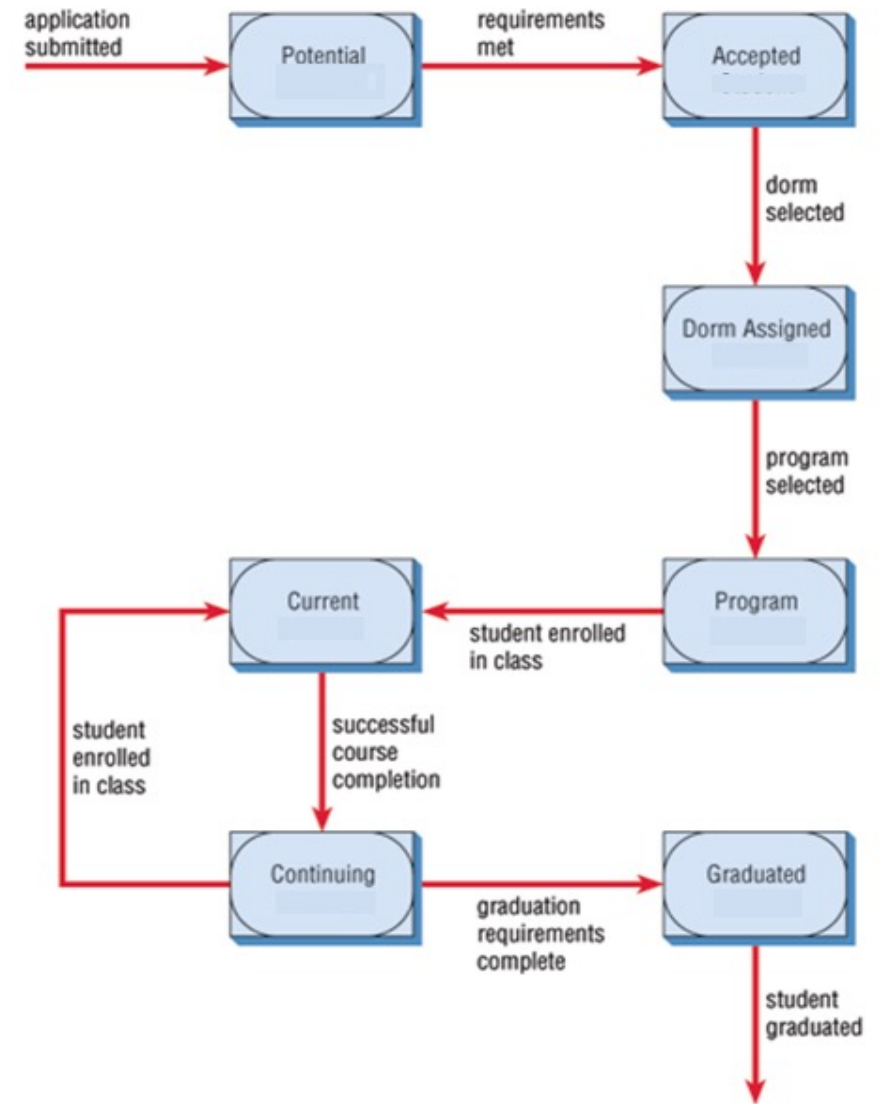


# State Transition Diagram

## Example

	<b>Initial State:</b> This shows the starting point or first activity of the flow. Denoted by a solid circle.
	<b>State:</b> Represents the state of an object at an instant of time; one for each state of the Object we are describing. Denoted by a rectangle with rounded corners and compartments
	<b>Transition:</b> An arrow indicating the Object is to transition from one state to the other. The actual trigger event and action causing the transition are written besides the arrow, separated by a slash.
	<b>Final State:</b> The end of the state diagram is shown by a bull's eye symbol. <small>12</small>




A statechart diagram showing how a student progresses from a potential student to a graduated student.

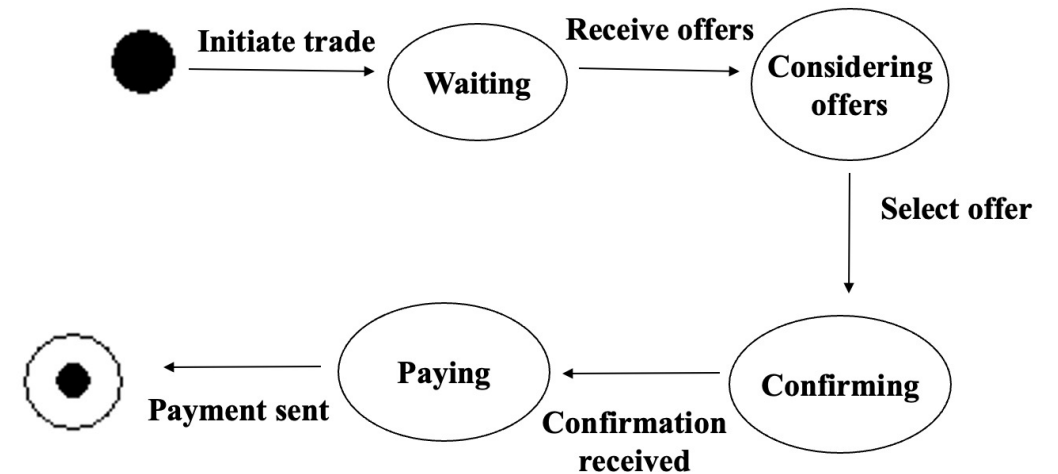




# State Transition Diagram

## Example

	<b>Initial State:</b> This shows the starting point or first activity of the flow. Denoted by a solid circle.
<div><div>State Name</div><div>Action and Activities</div></div>	<b>State:</b> Represents the state of an object at an instant of time; one for each state of the Object we are describing. Denoted by a rectangle with rounded corners and compartments
<div>Event/Action</div> 	<b>Transition:</b> An arrow indicating the Object is to transition from one state to the other. The actual trigger event and action causing the transition are written besides the arrow, separated by a slash.
	<b>Final State:</b> The end of the state diagram is shown by a bull's eye symbol. <small>12</small>



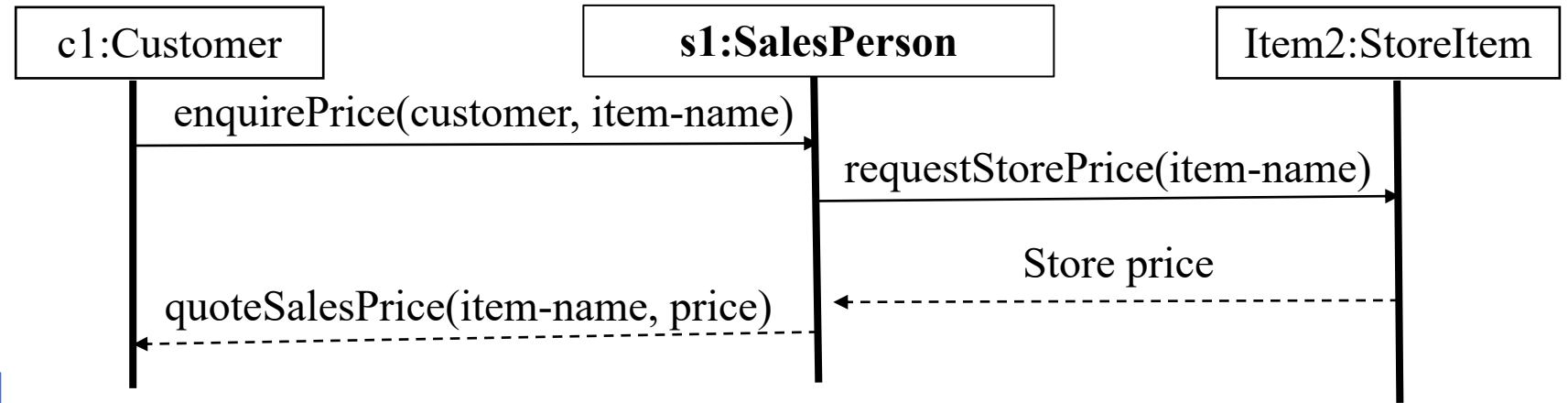
# State Transition Diagram

Focus on “Objects”

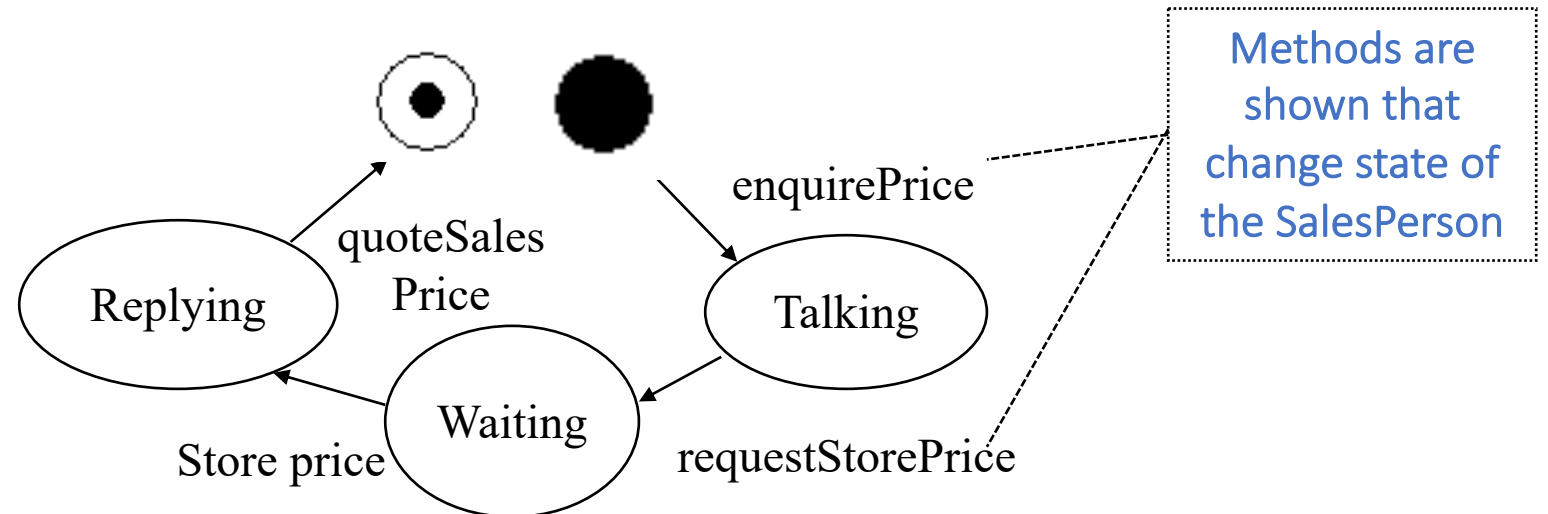
- State Transition Diagrams work in an OO context – i.e. **everything is an object!**
- A State Transition Diagram models the **behavior of a single object**
- However, even a **system or a sub-system can be considered as an object**. That is very common in Requirement Engineering where the focus is mostly on processes.

# State Transition Diagram

Focus on “Objects”

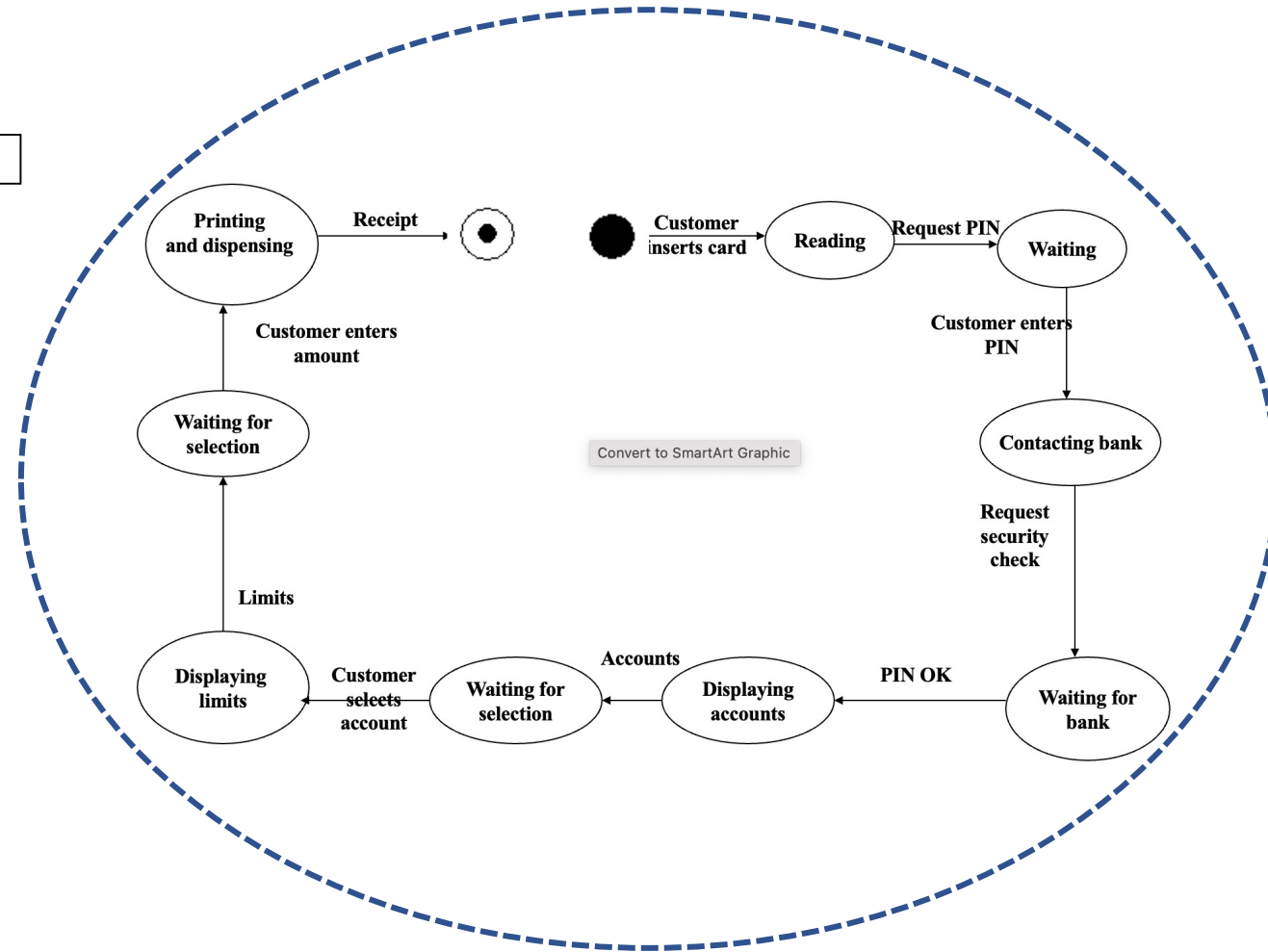
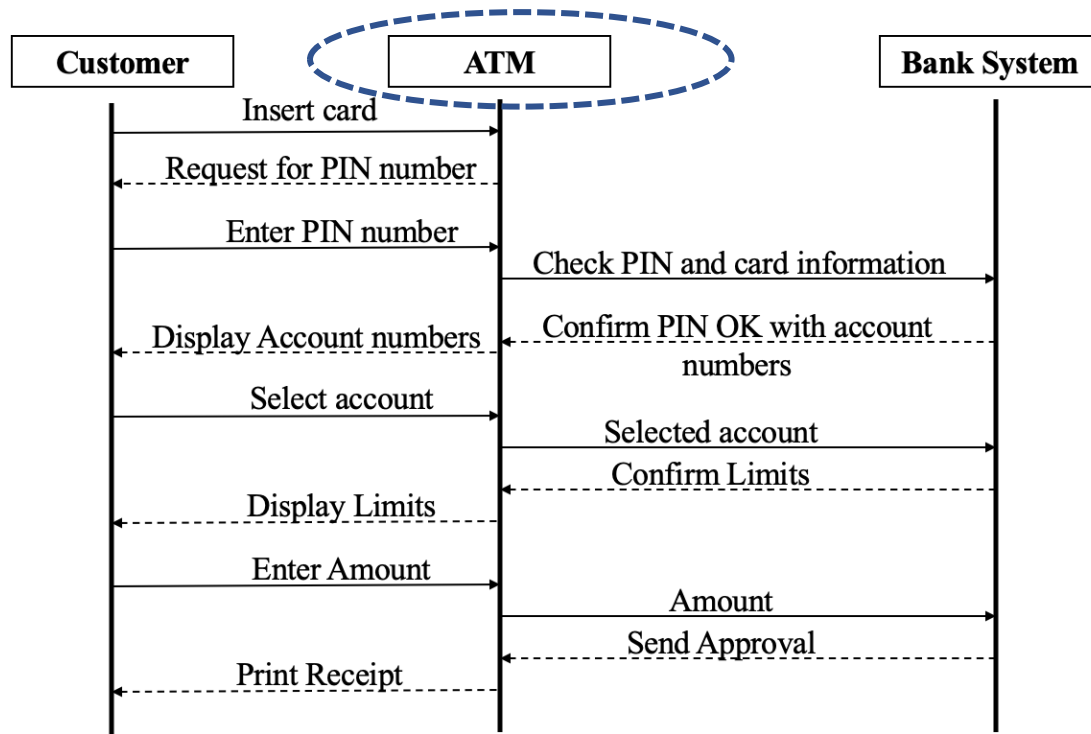


Consistency plays a key role



# State Transition Diagram

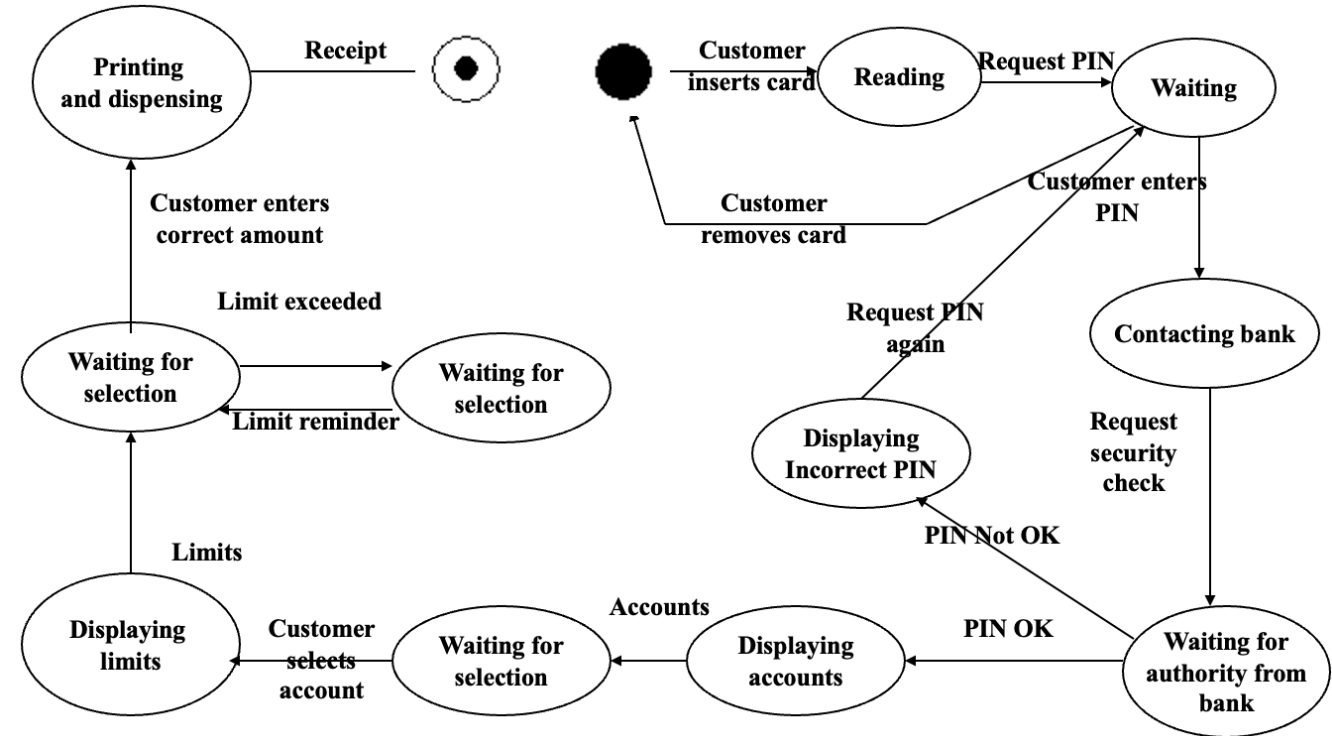
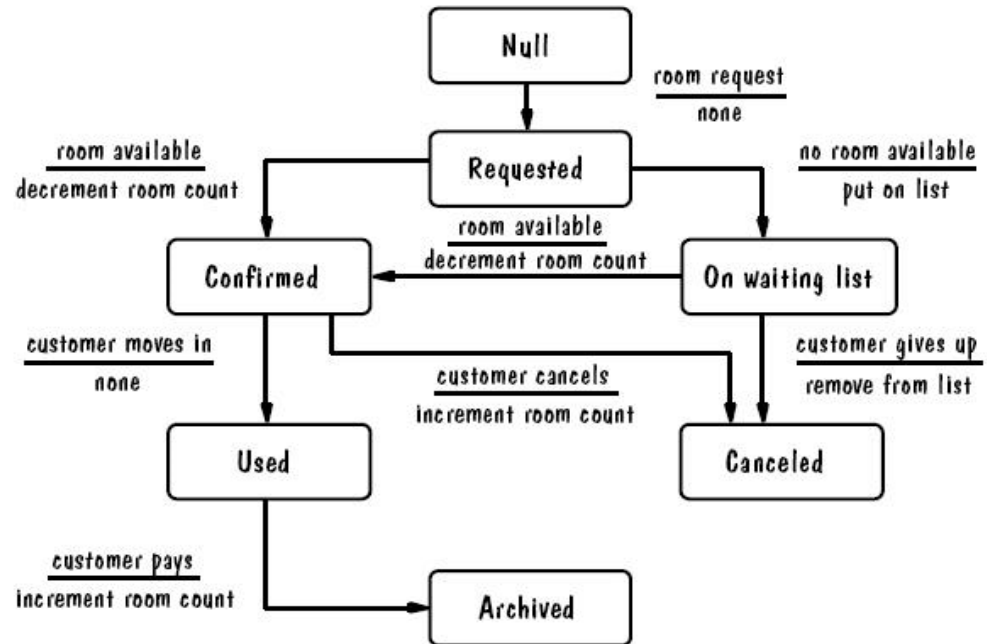
Focus on “Objects”



# State Transition Diagram

Focus on “Objects”

We can also model alternatives





Thank You!