UML Diagrams

OBJECT AND STATE CHART DIAGRAMS

SBI of an object

- An object has an identity that characterizes its own existence.
- The identity makes it possible to distinguish any object in an unambiguous way, and independently from its state
- SBI stands for State, Behavior and Identity. Since every object has the above three.

State:

- It is just a value to the attribute of an object at a particular time.

Behaviour:

- It describes the actions and their reactions of that object.

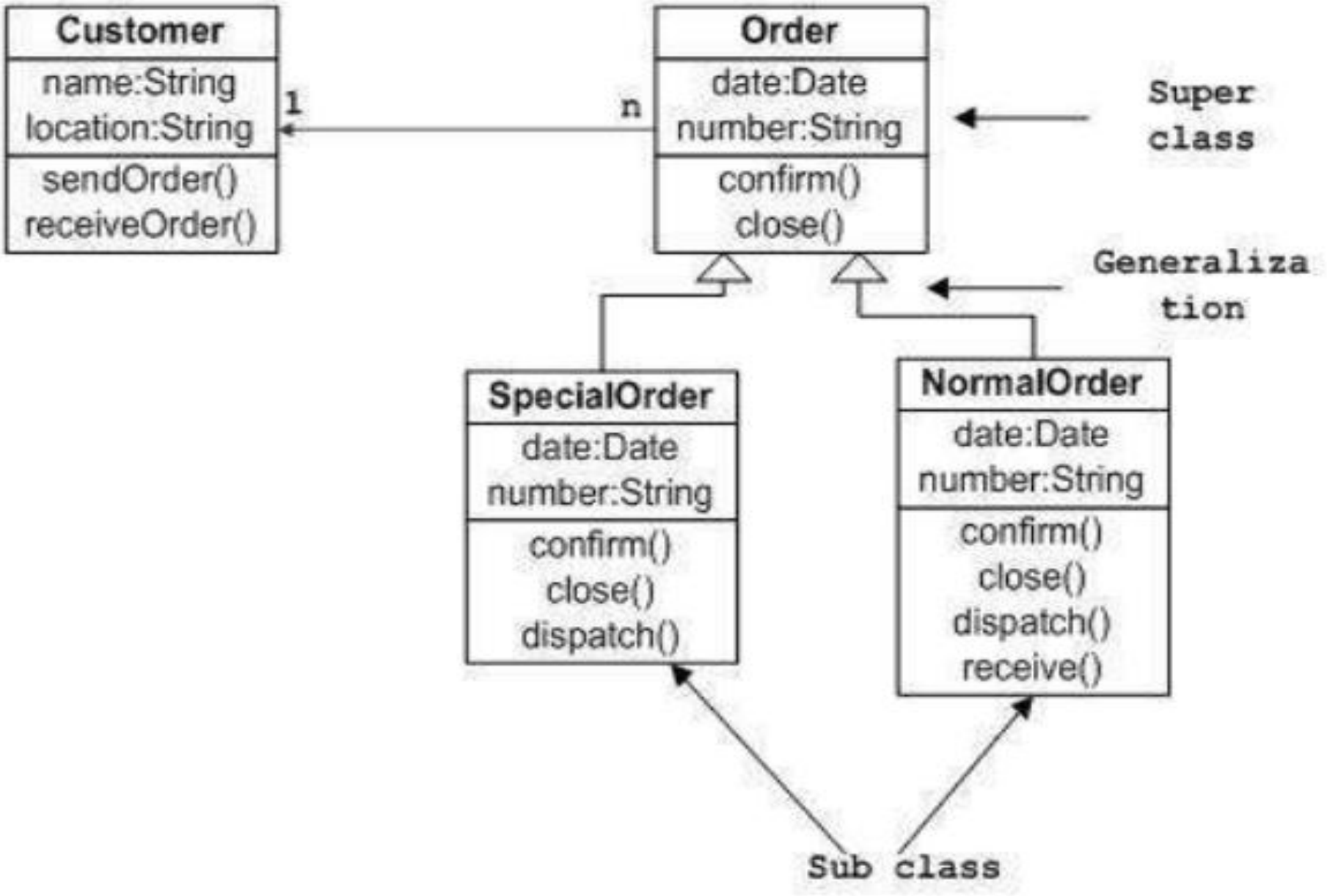
Identity:

- An object has an identity that characterizes its own existence.
- The identity makes it possible to distinguish any object in an unambiguous way, and independently from its state

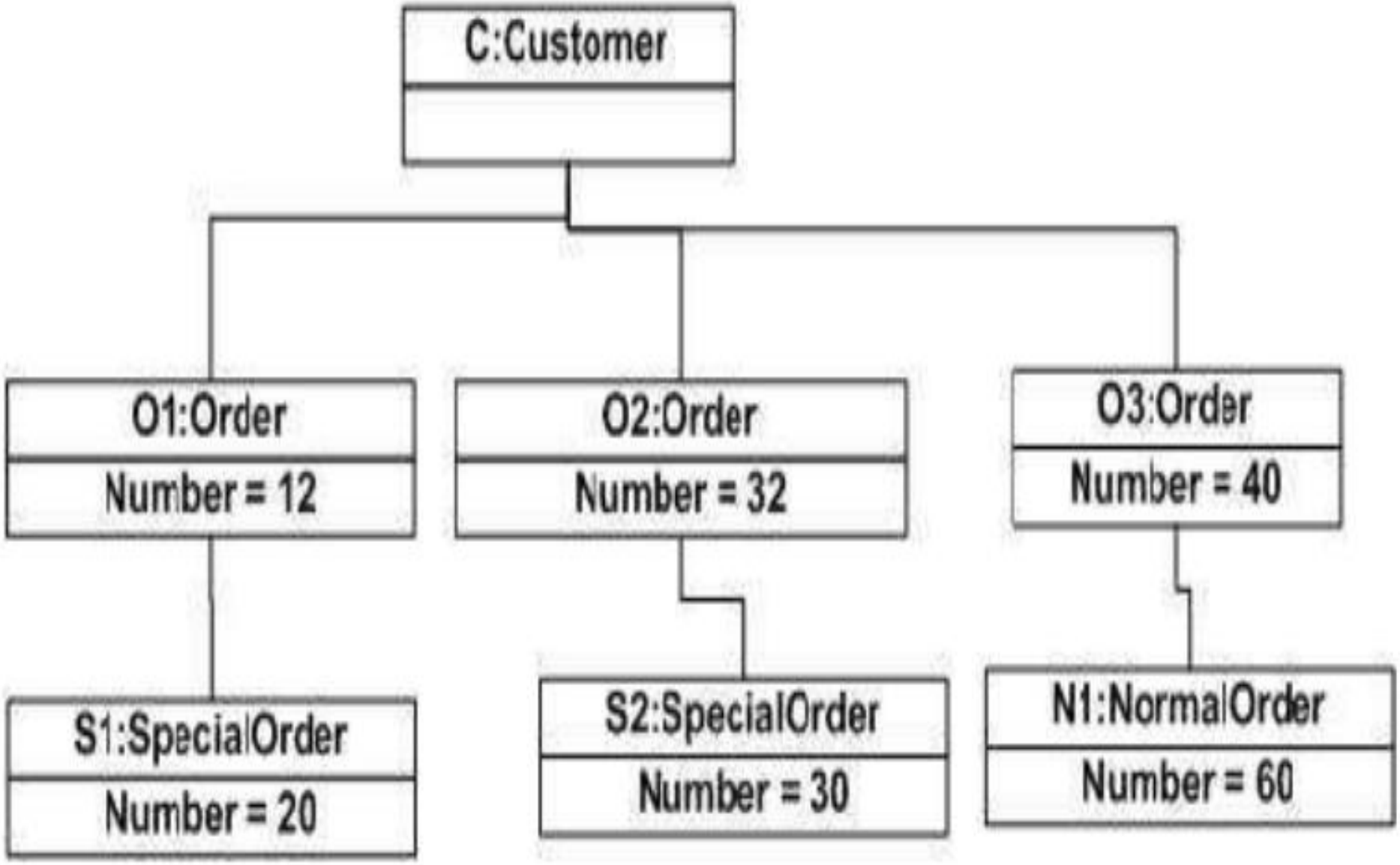
Object Diagram

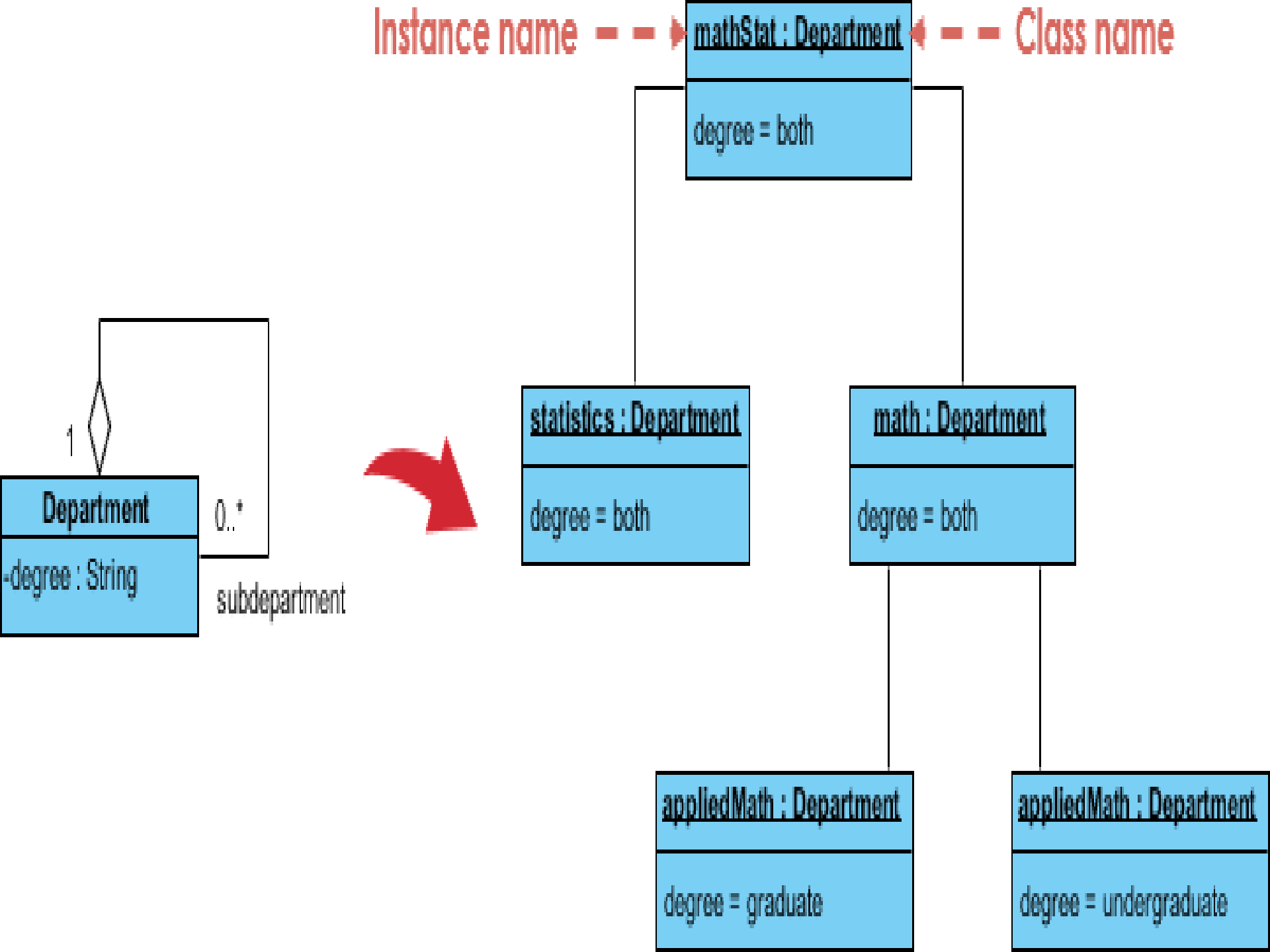
- Object diagrams are derived from class diagrams
- Object diagrams represent an instance of a class diagram.
- Object diagrams represent the static view of a system but this static view is a snapshot of the system at a particular moment.
- Object diagrams are used to render a set of objects and their relationships as an instance.

ORDER MANAGEMENT SYSTEM CLASS DIAGRAM



Object diagram of an order management system




Instance name
mathStat : Department
Class name
degree = both
1
Department
-degree : String
0..*
subdepartment
statistics : Department
degree = both
math : Department
degree = both
appliedMath : Department
degree = graduate
appliedMath : Department
degree = undergraduate

Class Diagram	Object Diagram
The class has three compartments: name, attribute, and operation.	The object has only two compartments: name and attribute.
The class name stands alone in the class name compartment.	The format for an object name is object-name, colon, class-name (1234:Order), with the entire expression underlined. You will encounter this notation in other diagrams that model objects rather than classes. Sometimes the object name is left off and only the colon and class-name are used. This is referred to as an anonymous object.

The class attribute compartment defines the properties of the attributes.	The object defines only the current value of each attribute for the test or example being modeled.
Operations are listed in the class.	Operations are not included in the object because they would be identical for every object of the same class.
The classes are connected with an *association* with a name, multiplicity, constraints, and roles. Classes represent a "classification" of objects, so it is necessary to specify how many may participate in the association.	The objects are connected with a *link* that has a name and no multiplicity. Objects represent single entities. All links are one-to-one, so multiplicity is irrelevant. Roles may be used on links.

State chart diagram

- State chart diagram is one of the five UML diagrams used to model dynamic nature of a system.
- They define different states of an object during its lifetime. And these states are changed by events.
- So State chart diagrams are useful to model reactive systems.

- Reactive systems can be defined as a system that responds to external or internal events.
- State chart diagram describes the flow of control from one state to another state..
- States are defined as a condition in which an object exists and it changes when some event is triggered.
- So the most important purpose of State chart diagram is to model life time of an object from creation to termination

Main purposes of using State chart diagrams

- To model the dynamic aspect of a system.
- To model the life time of a reactive system.
- To describe different states of an object during its life time.
- Define a state machine to model the states of an object.

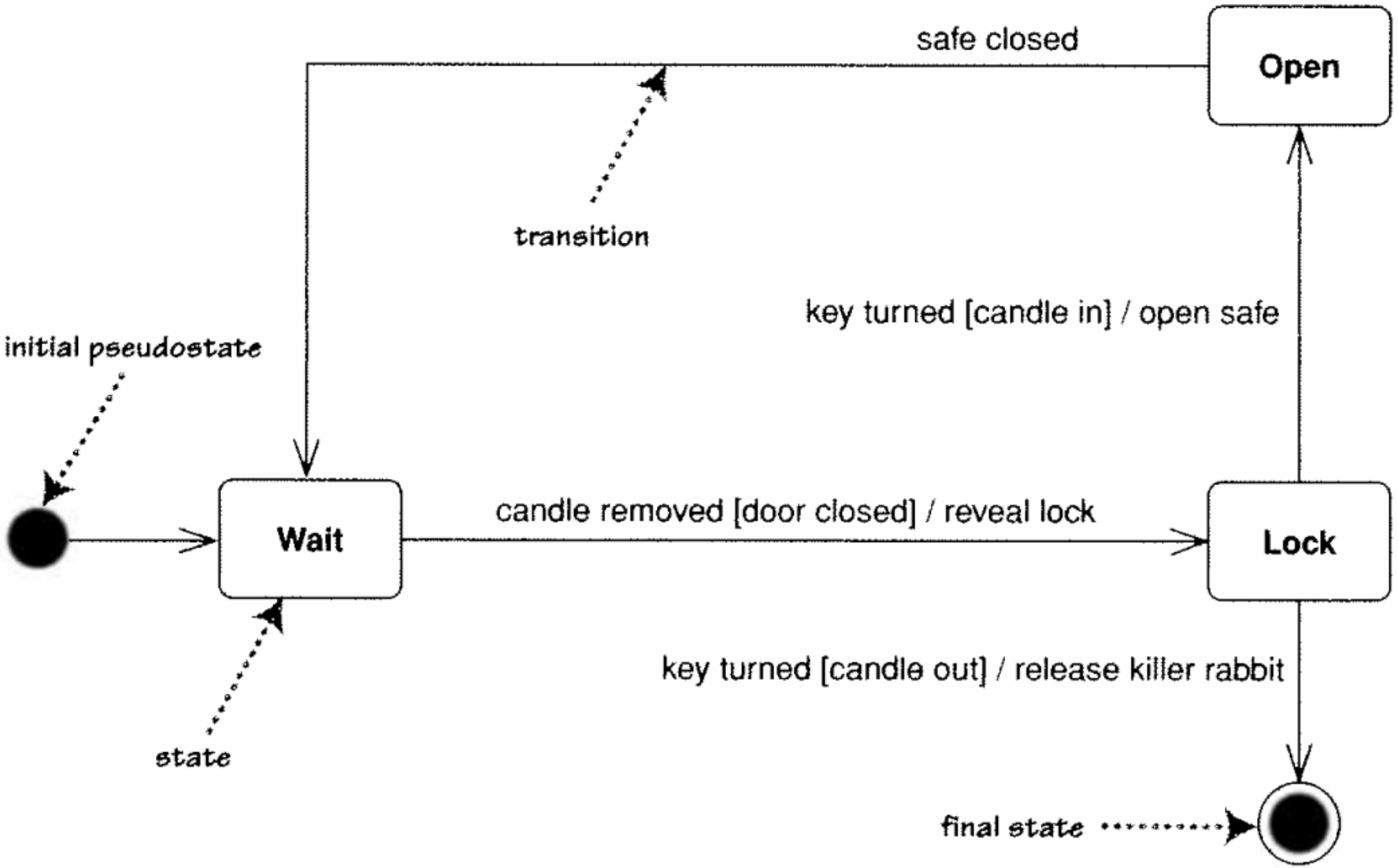
Before drawing a State chart diagram we should clarify the following points

- Identify the important objects to be analyzed.
- Identify the states.
- Identify the events.

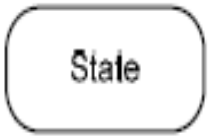
Following are the main purposes of using State chart diagrams:

- To model dynamic aspect of a system.
- To model life time of a reactive system. T
- To describe different states of an object during its life time.
- Define a state machine to model states of an object.

State chart diagram Notations



1. **State:** this is the current condition of an object reflected by the values of its attributes and its links to other objects [4]. The notation of state is



2. **Initial state:** it identifies or points to the state in which an object is created or constructed. It is also called the **pseudo-state** [1] as it doesn't have the features of an actual state but helps clarify the purpose of another state of the diagram. The notation is

3. **Final state:** is the state in which once reached, an object can never do a transition to another state and it may mean that the object has actually been destroyed and can no longer be accessed [4]. Notation is

4. **Event:** this is an occurrence of stimulus that cam trigger a state transition. An event of a statechart diagram corresponds to a message on a sequence diagram. Notation is

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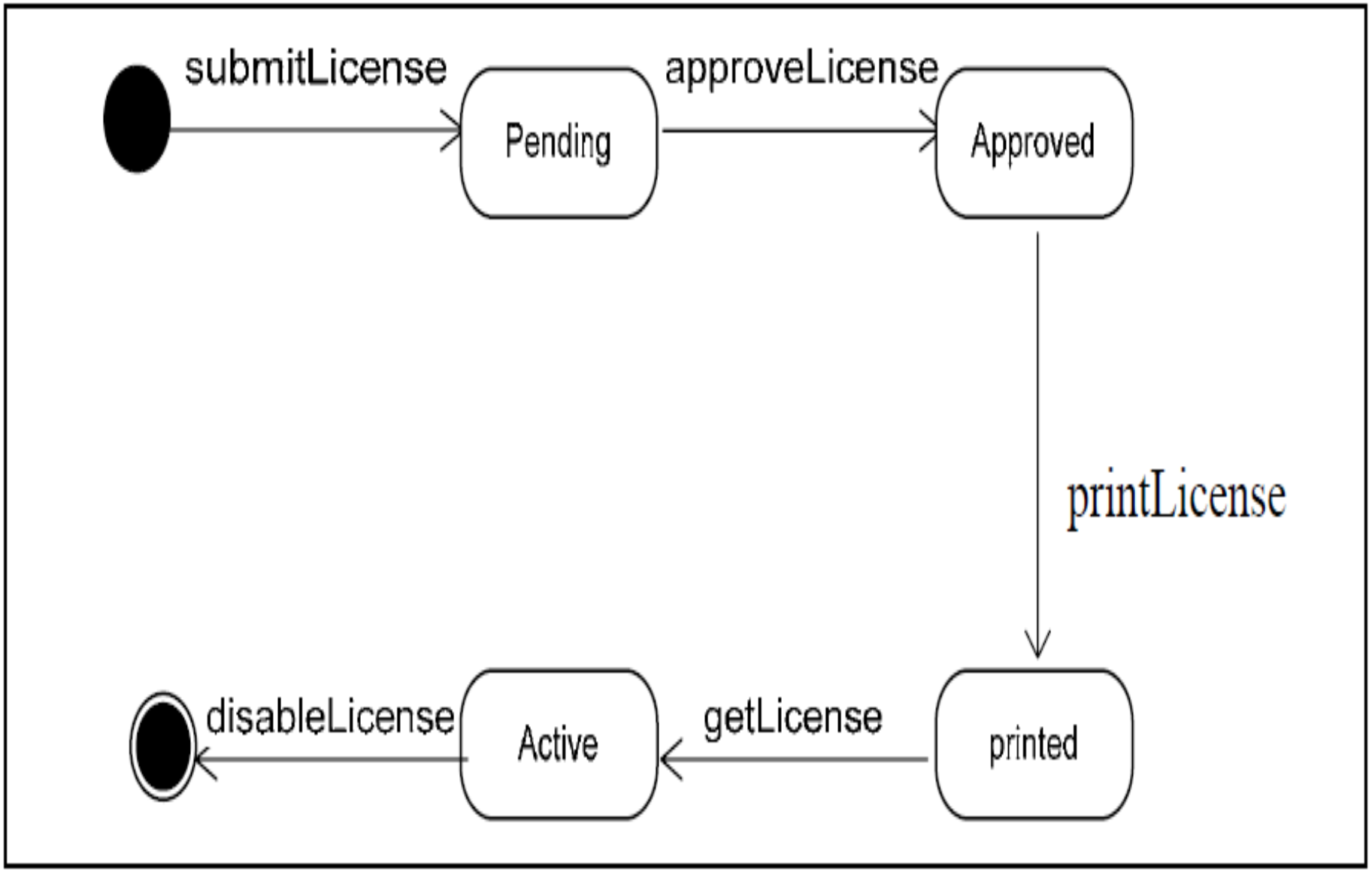

EXERCISE

- Draw a state chart diagram of an object BOOK in MMU library system
- Draw a state chart diagram of an object STUDENT in MMU university

END.

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