SOOAD

UNIT 5

OBJECT ORIENTED ANALYSIS & DESIGN

UNIT -5 Sequence, Collaboration, Activity & State Chart Diagram

- Sequence Diagram
- Collaboration Diagram
- Activity Diagram
- State Chart Diagram

UNIT -5 State Chart Diagram

- State Chart Diagram
  - Introduction
  - Elements of State Chart Diagram
  - Guideline for design of State Chart Diagram
  - Case Study

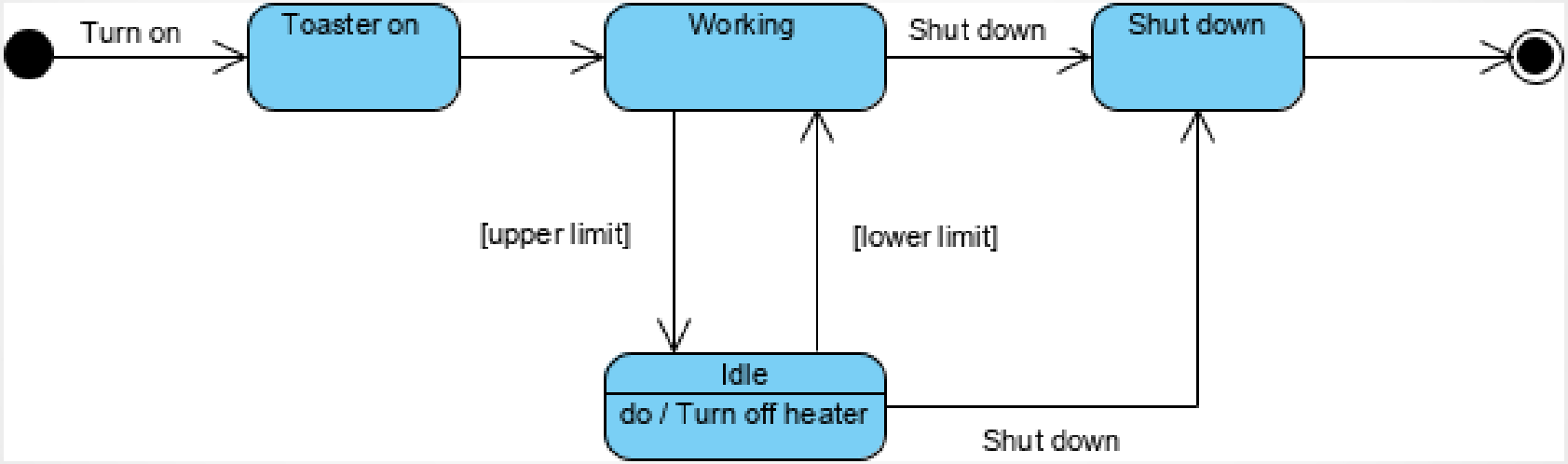
UNIT -5 StateChart Diagram

- **Introduction**
  - A state chart diagram **describe the state of an object or system, as well as the transitions between states.**
  - It can also be referred to as a **state diagram, state machine diagram, or a state transition diagram.**
  - State chart diagrams **depict the dynamic behaviour of an object based on its response to event.**
  - It **drawn to explore the complex behaviour of a class, actor, subsystem or component.**

UNIT -5 StateChart Diagram

- **Introduction**
  - A **state represents a stage in the behaviour pattern of an object.**
  - An **initial state, is also called a creation state.**
  - **Final state is one in which no transitions lead out of.**
  - **Transition is a progression from one state to another.**

UNIT -5 StateChart Diagram



UNIT -5 State Chart Diagram

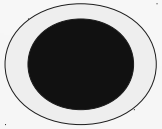
- **Elements of State Chart diagram**
  - **Initial State**
  - **Final State**
  - **State**
  - **Transitions**

UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **Initial State**
    - **Initial state is an element that explicitly shows the begining of a workflow on an state chart diagram.**
    - **It is point at which reading of the state chart diagram begins.**
    - **Starting point of the actions.**

UNIT -5 State Chart Diagram

- **Element of State Chart Diagram**
  - **Final State**
    - A final state is an element that exlicitly **shows the end of a workflow** on an **state chart** diagram.
    - There can be **multiple final state in an state chart** to indicate termination of **specific branches of the work flow.**



UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **State**
    - A state represents **a visible mode of behaviour** of an object that persisit for a period of time.
    - **Activities can run within a state.**
    - **Transformation occurs between states rather than within a state.**
    - **An action is best described as a task that takes place within a state such as On Entry, On Exit , Do.**

UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **Types of State**
    - **Simple state**
    - **Super state / Composite state**
    - **Concurrent Composite state**
    - **Sequential Composite state**
    - **Substate**

UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **Types of State – Simple States**
    - A state **that contains no substates.**

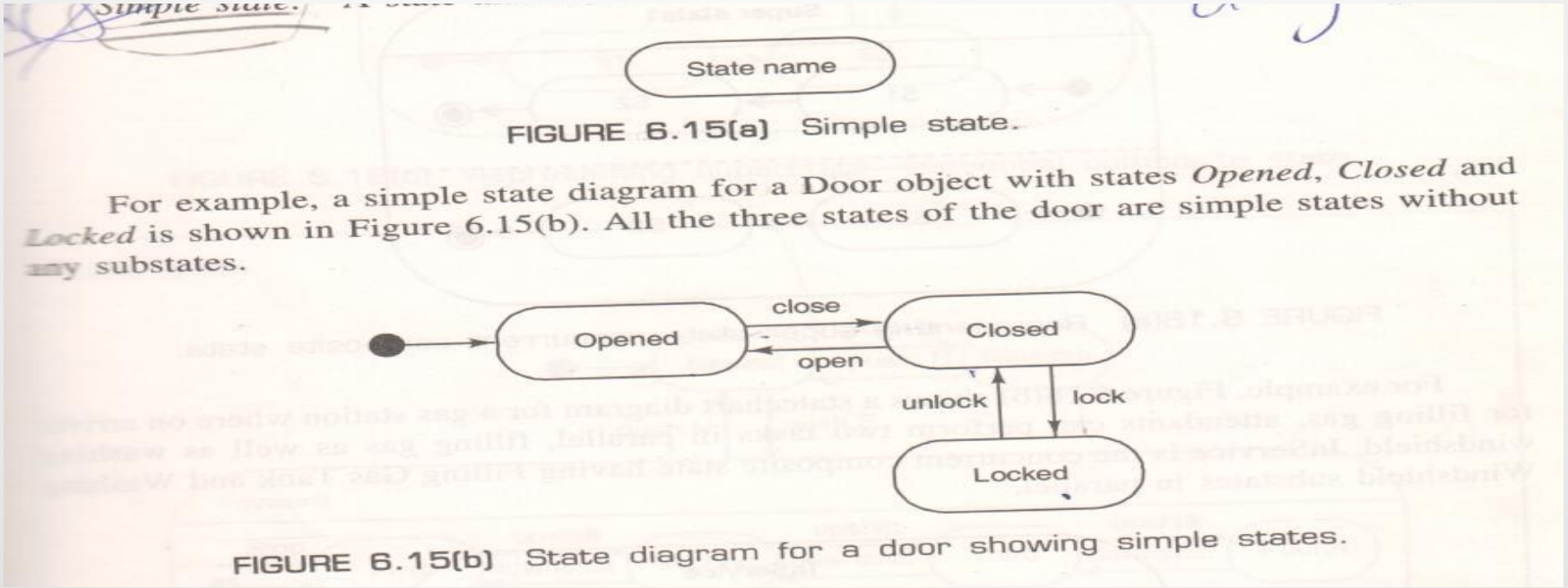


FIGURE 6.15(a) Simple state.

For example, a simple state diagram for a Door object with states *Opened*, *Closed* and *Locked* is shown in Figure 6.15(b). All the three states of the door are simple states without any substates.

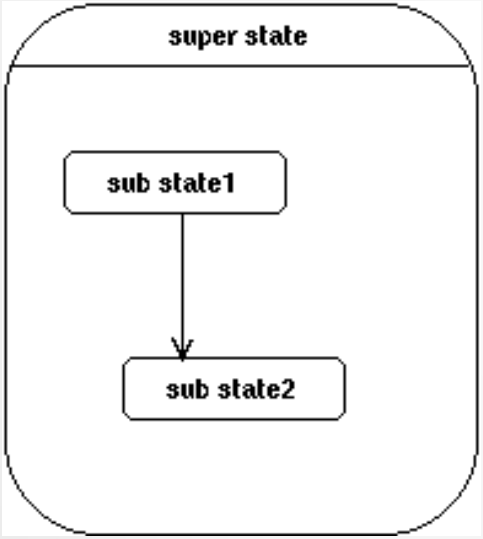
FIGURE 6.15(b) State diagram for a door showing simple states.

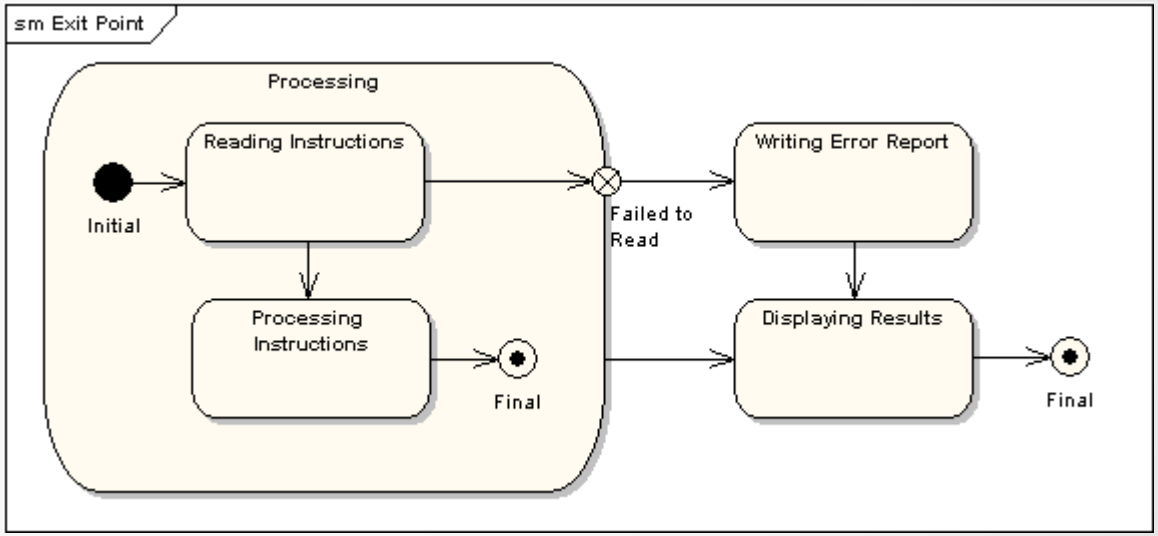
UNIT -5 State Chart Diagram

- **Elements of StateChart diagrm**
  - **Types of State – Super States or Composite State**
    - A state that **contains substates.**
    - Sometimes, it is difficult to model and anlayze an object having many states using a single state chart diagram.
    - In that case, a super statechart diagram is further elaborated.

UNIT -5 State Chart Diagram

- **Elements of StateChart diagrm**
  - **Types of State – Super States or Composite State**



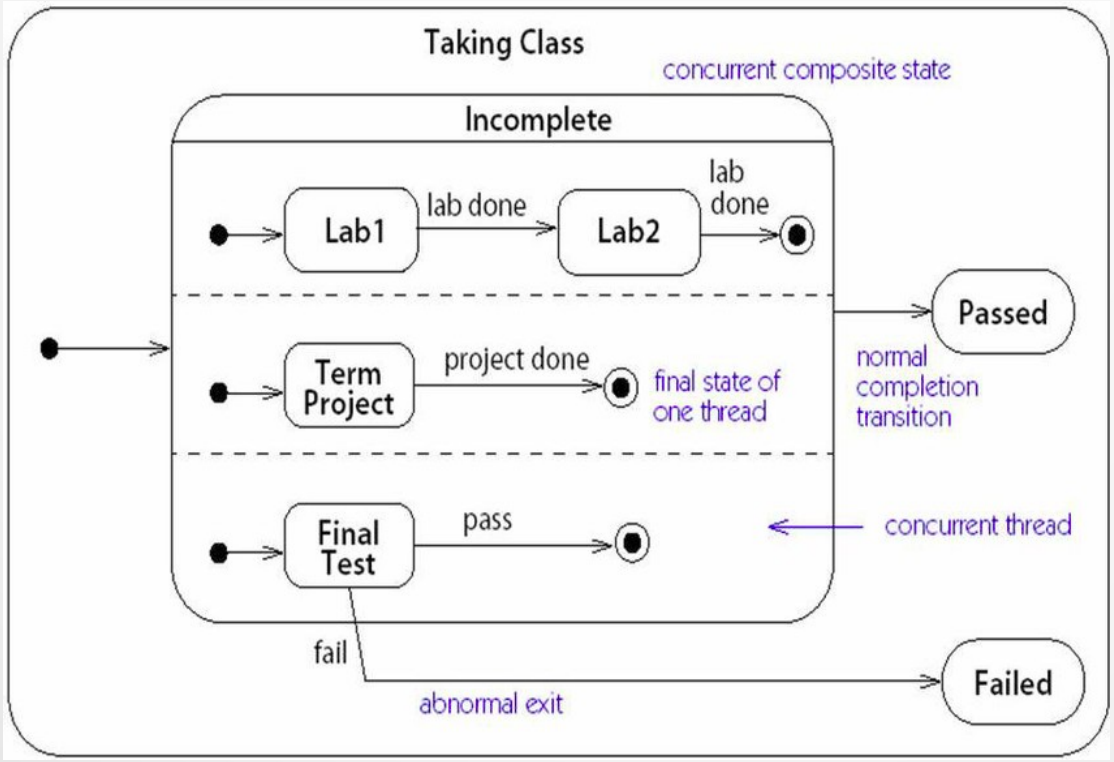


UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **Types of State – Concurrent Composite State**
    - The concurrent composite state is composed of **more than one sequential or concurrent composite state** or a **sequential composite state** depending upon the kind of substate it has.
    - The concurrent composite state is **useful when a given object has sets of independent behaviours.**

UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **Types of State – Concurrent Composite State**



UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **Types of State – Sequential composite state**
    - If a sequential composite **state is active, then exactly one of its substates is active.**

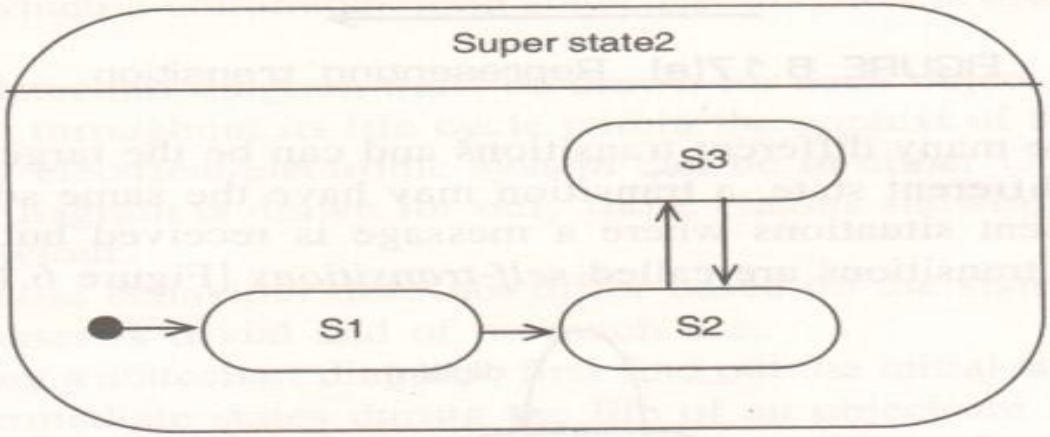
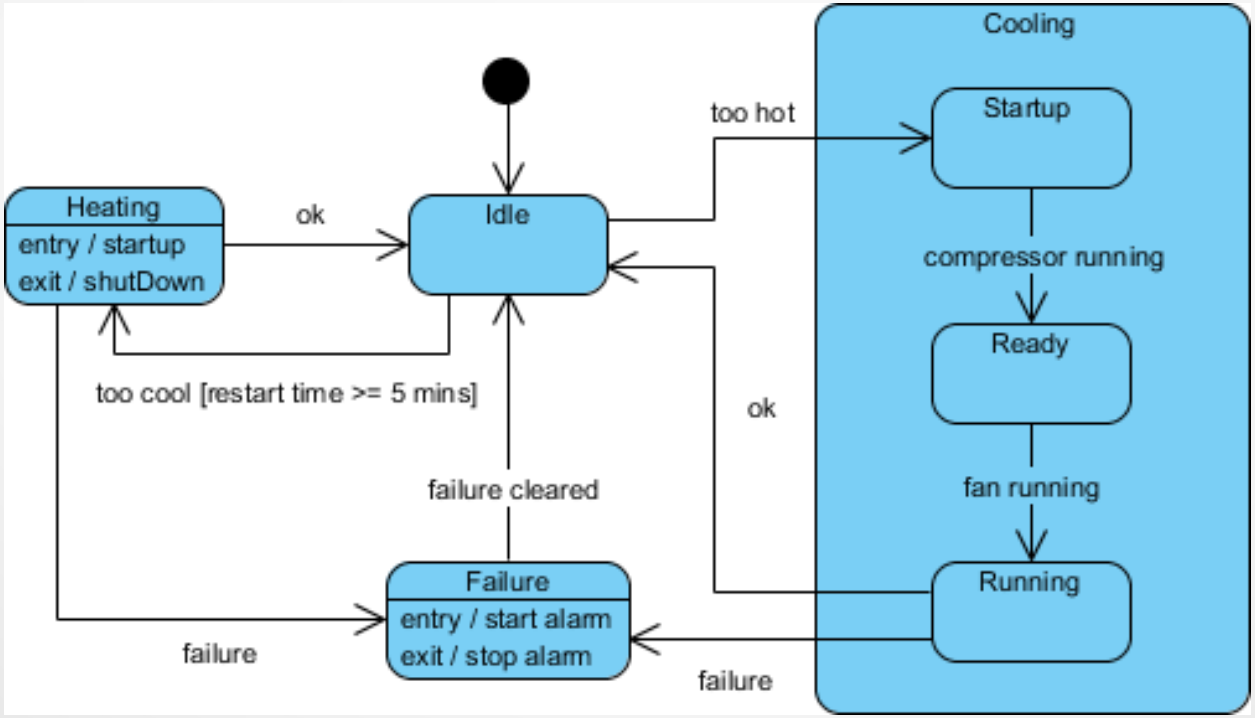


FIGURE 6.16(c) Representing superstate—sequential composite state.

UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **Types of State – Sequential composite state**



UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **Types of State – Substate**
    - A state that is **nested inside another state is called a substate.**

UNIT -5 State Chart Diagram

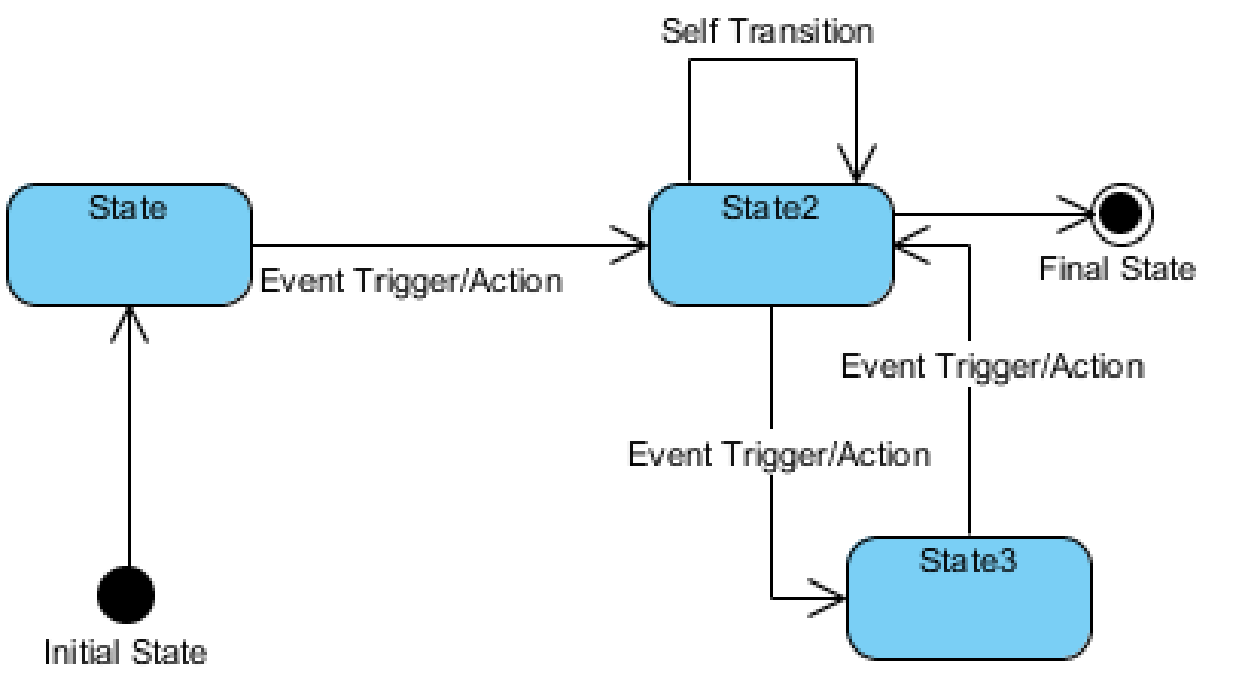
- **Elements of State Chart diagrm**
  - **Transitions**
    - A **state transition is a relationship between two states that indicates when an object transit from one state to other state once certain conditions are met.**
    - **A transition to the same state is recursive transition.**
    - **Each transition has**
      - **Event**
      - **Guard**
      - **Activity**

UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **Transitions**
    - All the three parts are optional.
    - **Event** triggers a potential change of state
    - **Guard** is a condition that must be true for the transition
    - **Activity** is some behaviour that is executed during the transition.

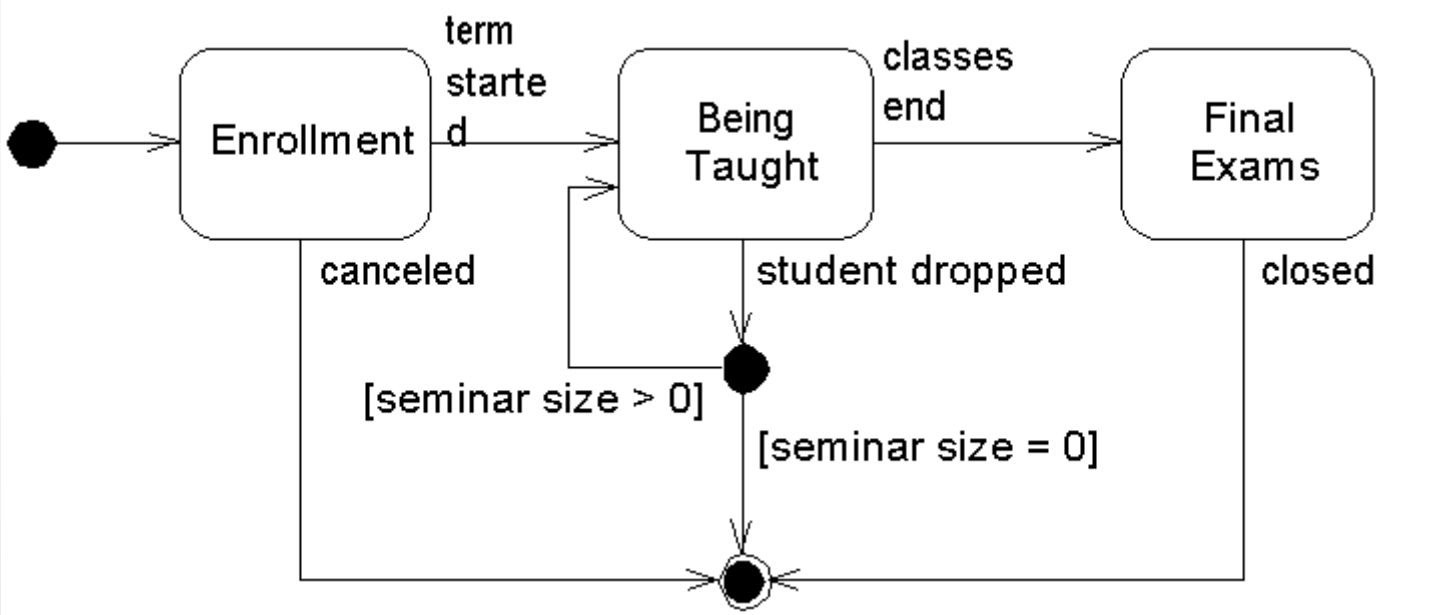
UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **Transitions**



UNIT -5 State Chart Diagram

- **Elements of State Chart diagrm**
  - **Transitions**



UNIT -5 State Chart Diagram

- **Guidelines for design of statechart diagram**
  - A **statechart diagram may be either one shot life cycle type or continous loop type.**
  - Object for **which one short life cycle statechart diagram is drawn have fixed life from START state till END sta**te.
  - Objects **for which a continuous loop statehart diagram is drawn, do not have an end state.**
  - A **separate statechart diagram must be drawn for each object.**
  - A state chart diagram is drawn for only those **classes showing interesting or complex internal behaviour.**

UNIT -5 State Chart Diagram

- **Guidelines for design of statechart diagram**
  - While drawing a statechart diagram, **first find out the intial state and final state.**
  - After identify all the states, start looking for transitions.
  - Always **place the intial state in the top-left corner and final state in the bottom right corner**
  - The **state name shoud be simple** and written in present tense.
  - If the state is very complex, it is better to exhibit its substates to resolve complexity.

CASE STUDY - 1

ADVERTISEMENT CAMPAIGN OF ABC PVT. LTD.

- ABC Pvt. Ltd. Company wants to start its advertisement campaign. The advertisement will be prepared. After the approval of the advertisement, the advertisement will be scheduled for publication. The advertisement will be published after scheduling is done.

UNIT -5 State Chart Diagram

- **Diagram for “Advertisement campaign” object**

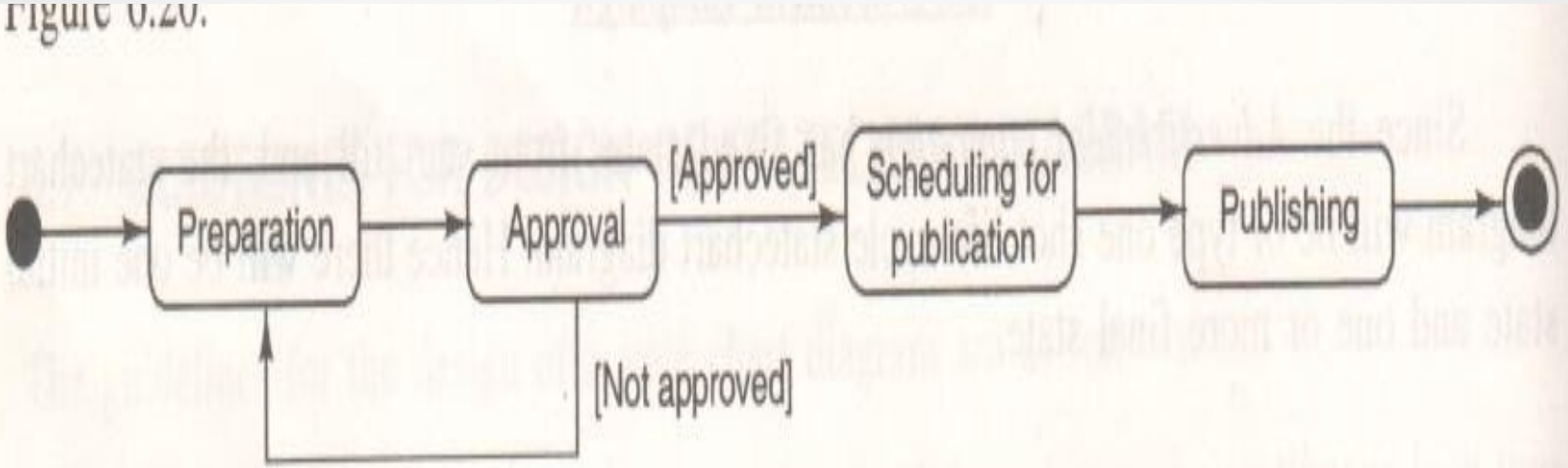
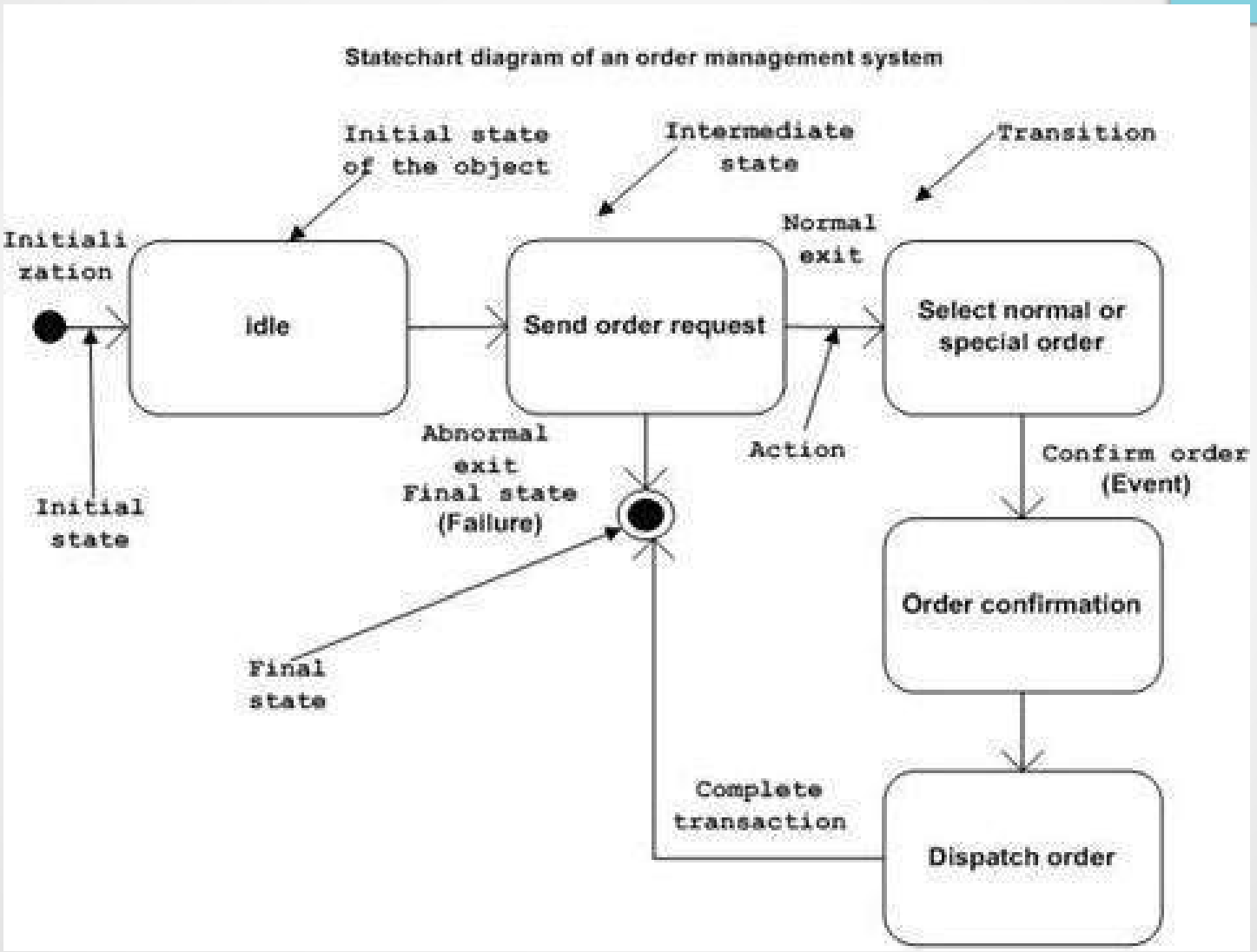


FIGURE 6.20 State chart diagram—advertisement campaign.

CASE STUDY - 2

ORDER MANAGEMENT SYSTEM



CASE STUDY - 3

REFER STUDENT LOAN PDF