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 Activity Diagram

- Activity Diagram
  - Introduction
  - Elements of Activity Diagram
  - Guidelines for design of Activity Diagram
  - Case study

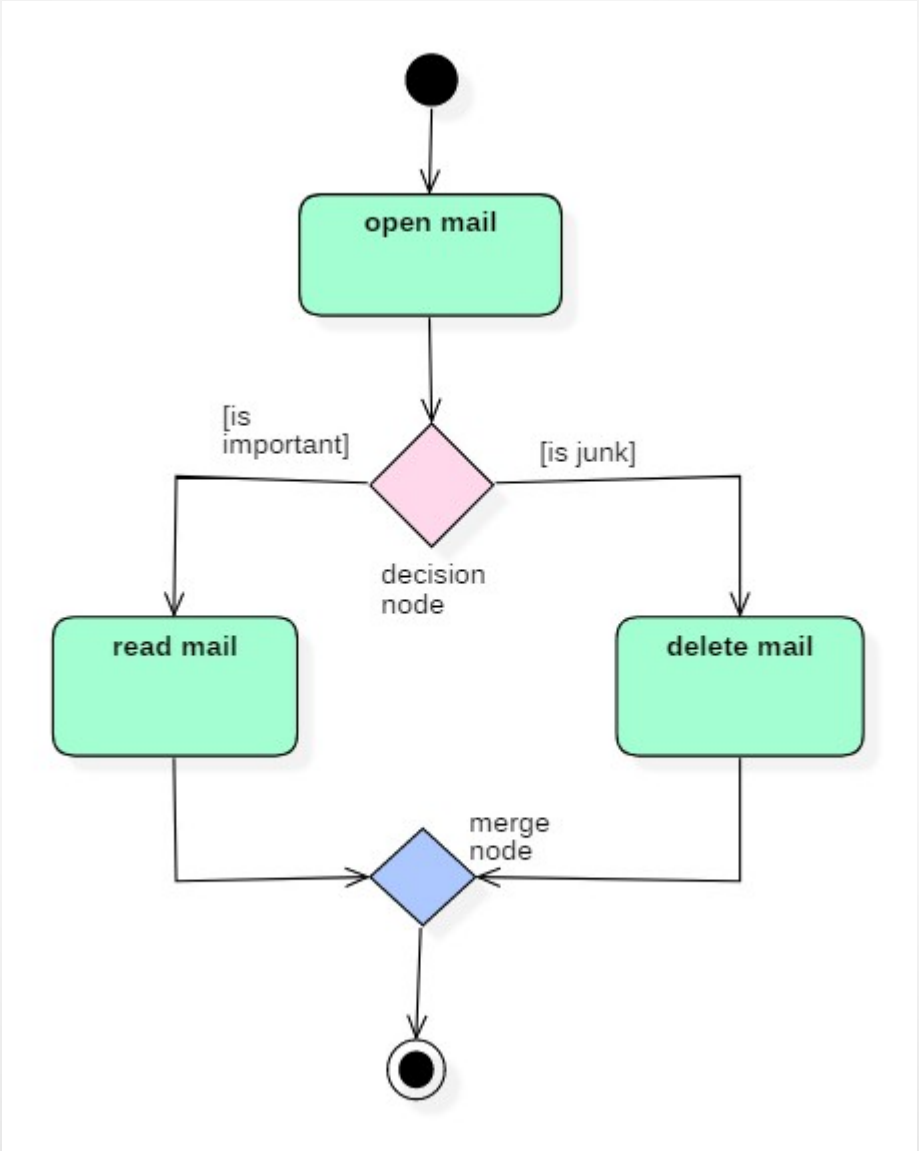
UNIT -5 Activity Diagram

- **Introduction**
  - Activity Diagram , in many ways are the **equivalent of flow charts and data flow diagrams (DFD).**
  - It **shows the flow of control from activity to activity.**
  - An activity diagram **shows all potential sequence flows in an activity.**
  - It used for **simple and perceptive illustration of what happens in a workflows,** what activities can be done in parallel, and whether there are alternative paths through the workflow.

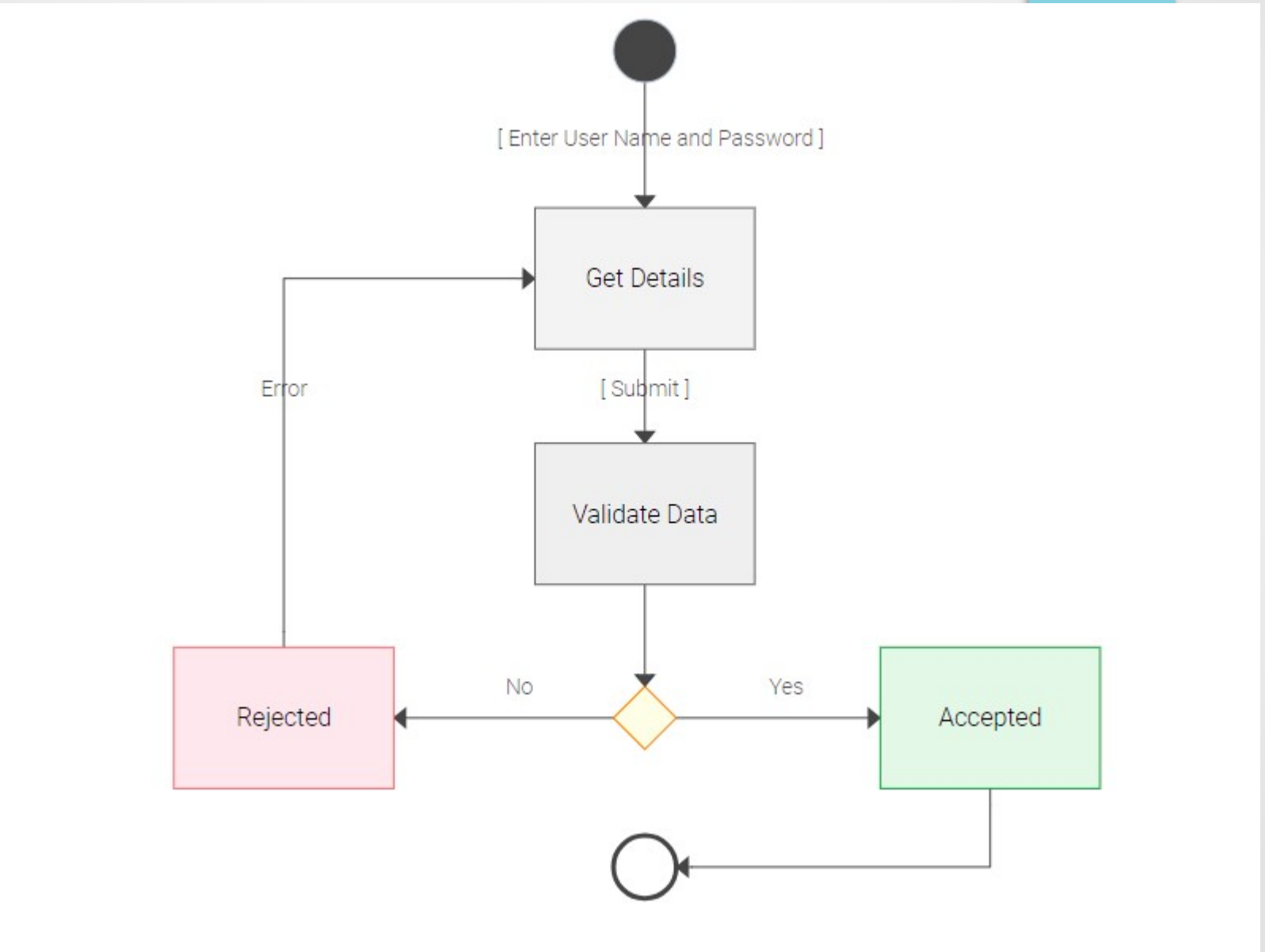
UNIT -5 Activity Diagram

- **Introduction**
  - **Can be used to mode a specific actor's workflow within the entire system.**
  - Can be used independent of use-cases for other purposes such as **to model business process of a system.**
  - **An activity diagram is a dynamic diagram that shows the activity and the event that cause the object to be in the particular state.**
  - **Shows the workflow from start point to the finish point detailing the many decision paths that exist in the progression of events.**

UNIT -5 Activity Diagram



UNIT -5 Activity Diagram



UNIT -5 Activity Diagram

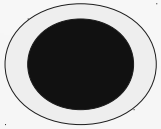
- **Elements of Activity Diagram**
  - **Initial State**
  - **Final State**
  - **Action/Activity**
  - **Transitions**
  - **Decisions**
  - **Synchronization, Fork and Join**
  - **Swimlanes**
  - **Objects & Object Flows**

UNIT -5 Activity Diagram

- **Elements of Activity Diagram**
  - **Initial State**
    - In initial state is an element that explicitly shows the **begining of a workflow** on an activity diagram.
    - It is point at which reading of the activity diagram begins.
    - **Starting point** of the actions.

UNIT -5 Activity Diagram

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



UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Action / Activity**
    - **Action states represent the non-interruptible actions of object** which cannot be further decomposed and take insignificant execution time.
    - **The activity states can be further decomposed,** their activity being represented by other activity diagrams.

Submit application

UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Transitions**
    - A **tranisition element connects the various elements of the activity diagram.**
    - It **represent the workflow between two or more action/activities or other elements.**
    - The transition element can have an optional label enclosed in square brackets call **“guard condition” or “Guard”.**
    - **Are used to define conditional logic.**

UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Transitions**

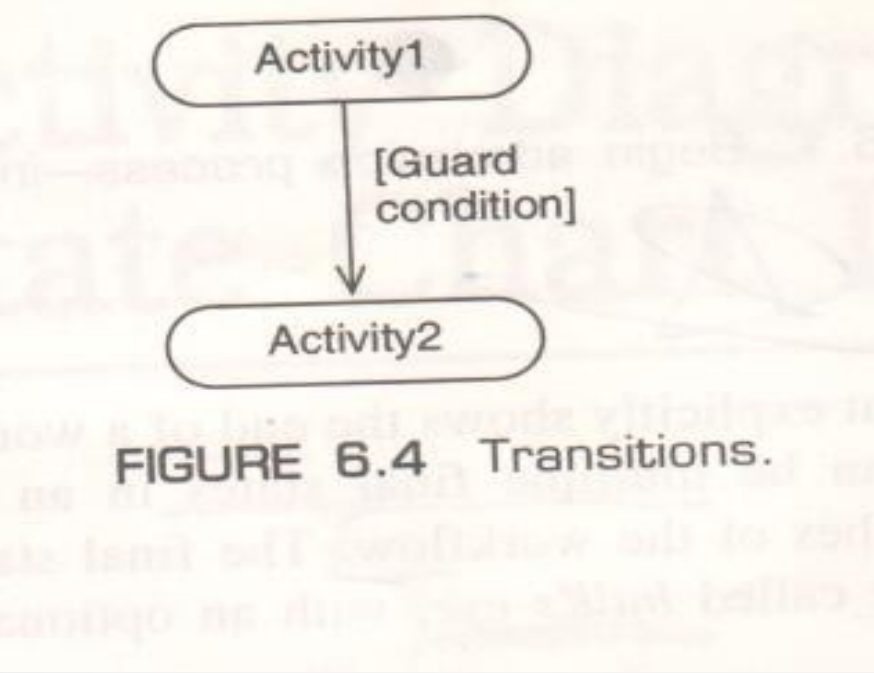


FIGURE 6.4 Transitions.

UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Decisions**
    - A decision element typically **has one incomeing transition and two or more outgoing transitions based on the outcome of gaurd conditions.**
    - Diamond shaped

UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Decisions**

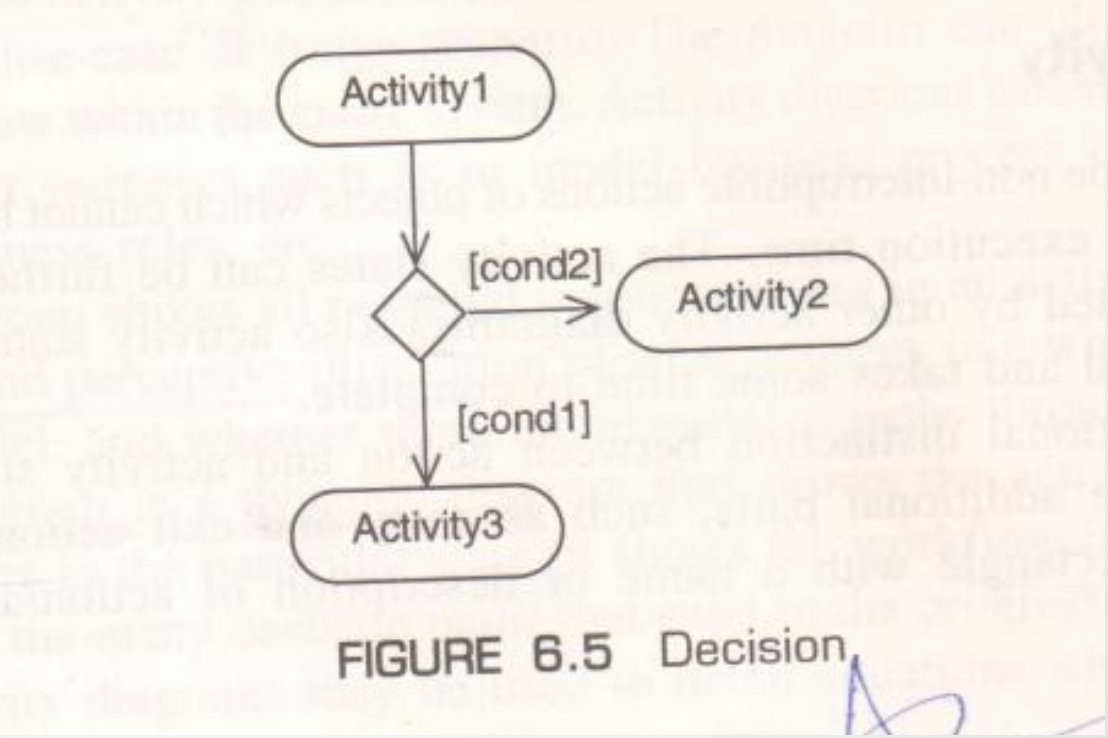


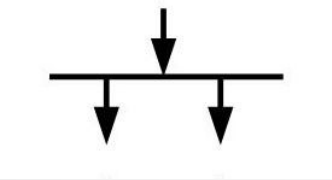
FIGURE 6.5 Decision

UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Synchronization, Fork and Join**
    - A synchronization element allows modelling of **simultaneous workflows** **in an activity** diagram.
    - Synchronization visually **define forks and joins.**

UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Synchronization, Fork and Join**
    - **A Fork** is a kind of synchronization element **that facilitates the modelling of simultaneous workflows in an activity.**
    - **A fork identifies where a single flow of control divides into two or more separate, but simultaneous flows.**



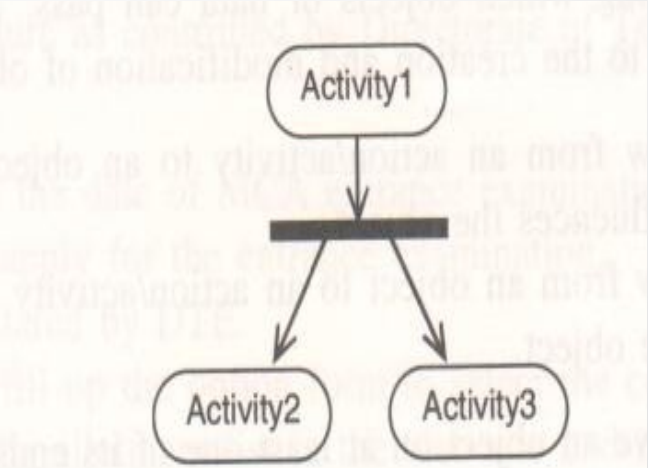
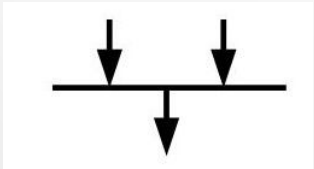


FIGURE 6.6(b) Fork.

UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Synchronization, Fork and Join**
    - **A Join** is another kind of synchronization element that **facilitates the modelling of simulataneous workflows in an activity.**
    - **A Join identifies where two or more simultaneous flows of cotnrol unite into a single flow of control.**



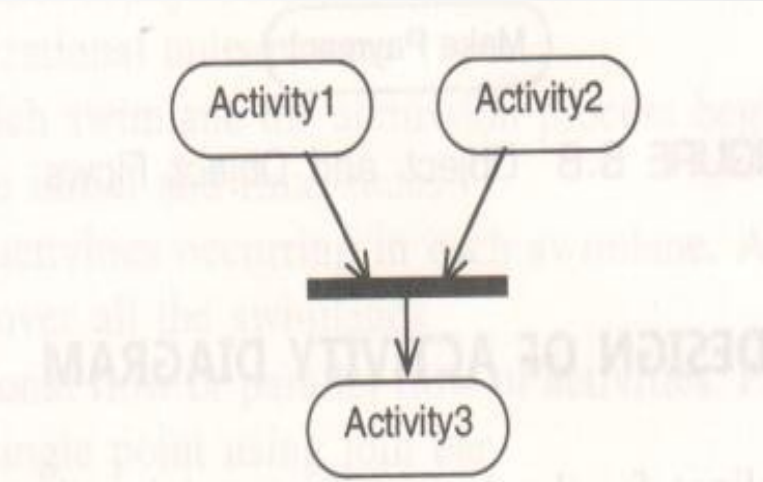


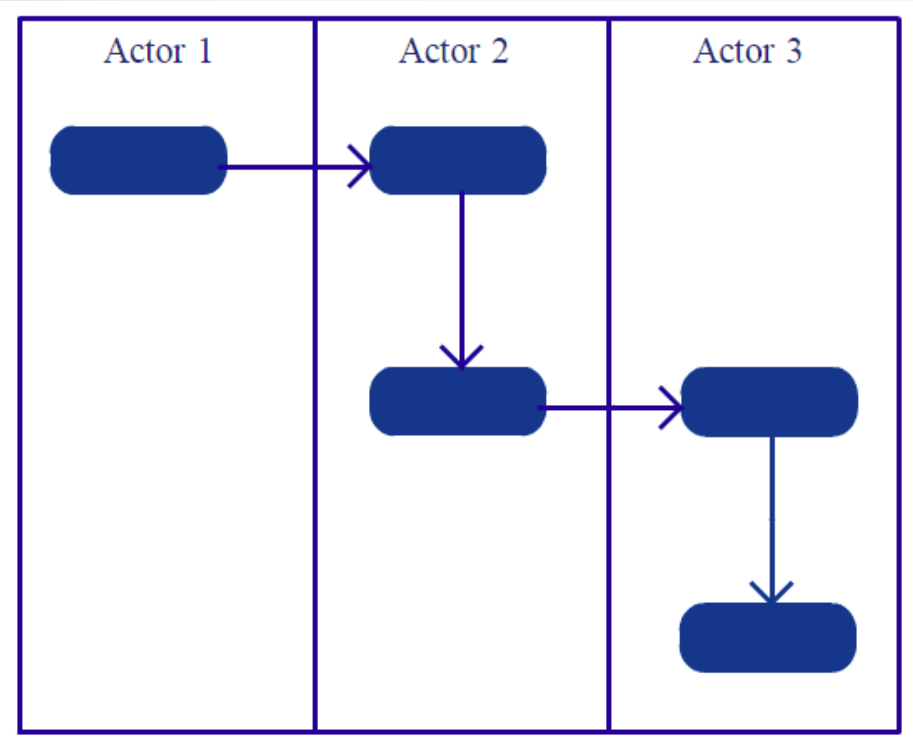
FIGURE 6.6(c) Join.

UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Swimlanes**
    - A **swimlane is an element that can represent a user, an organiational unit, or a role in an activity diagarm.**
    - Swimlane **depict who or what is responsible for carrying out specific activities.**
    - They **enable grouping of actions on the activity diagram performed by the same actor or by a single thread.**

UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Swimlanes**



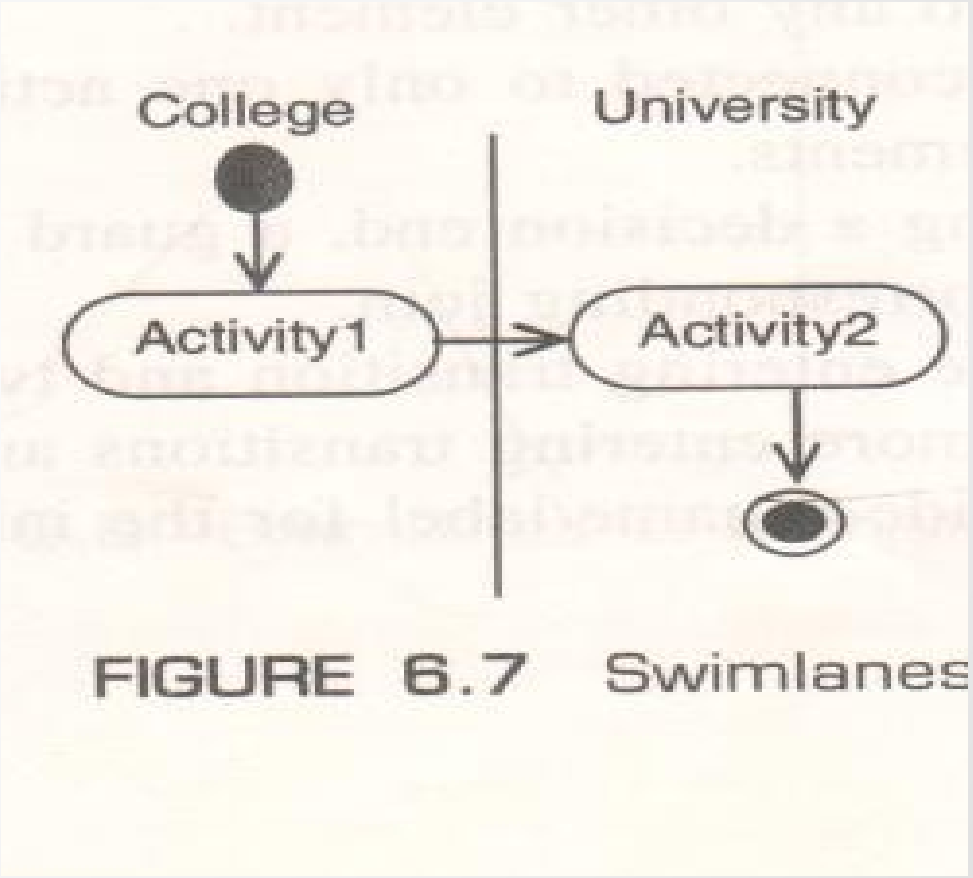


FIGURE 6.7 Swimlanes

UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Objects and Object Flows**
    - An object flow is **a path along which or data can pass**. An object is shown as a rectangle.
    - Object flow **refers to the creation and modification of objects in an activities.**
      - **Object flow arrow from an action / activity to an object means that the action / activity creates or influences the object.**
      - **Object flow arrow from an object to action / activity means that the action / activity uses the object.**

UNIT -5 Activity Diagram

- **Element of Activity Diagram**
  - **Objects and Object Flows**

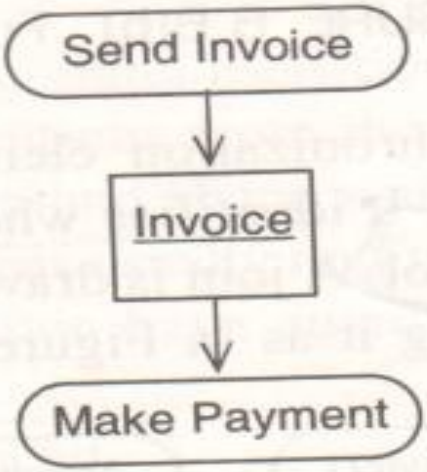
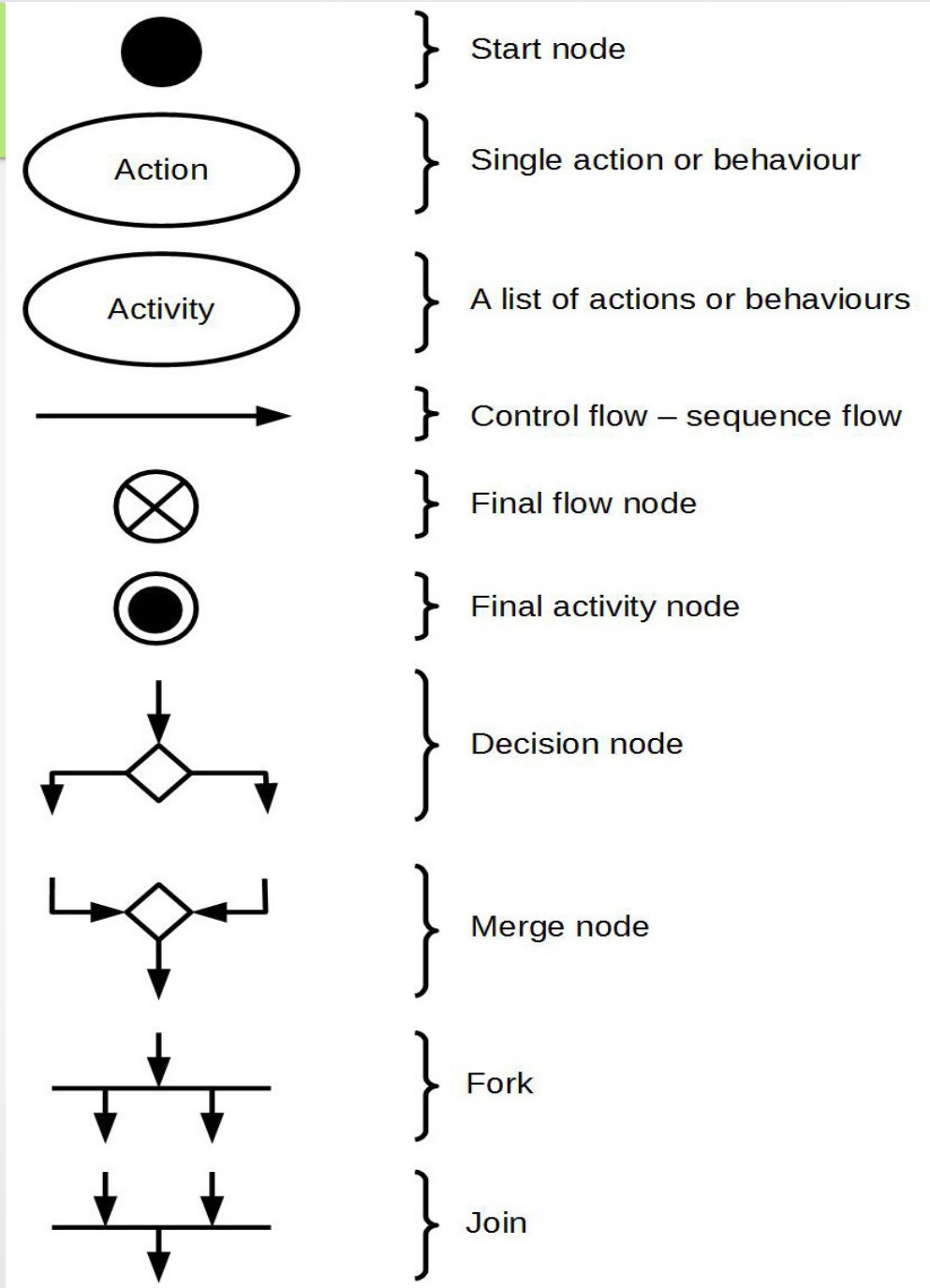


FIGURE 6.8 Object and Object Flows.


Start node
Action
Single action or behaviour
Activity
A list of actions or behaviours
Control flow – sequence flow
Final flow node
Final activity node
Decision node
Merge node
Fork
Join

UNIT -5 Activity Diagram

- **Guidelines for Design of a Activity Diagram**
  - **One activity diagram should be drawn for each use case**.
  - Always an activity **diagram should reflect business flow rather the system flow.**
  - **Only one initial state element should be drawn in an activity diagram**
  - In **case of swimlanes, the initial state should be placed in the first swimlane.**
  - As a thumb rule. **It should be avoided to have more than five swimlanes in a single activity diagram.**
  - An **intial state should be connnected direclty to action/activity element** of the activity diagram and not to any other element.

UNIT -5 Activity Diagram

- **Guidelines for Desing of a Activity Diagram**
  - The **initial state must be connected to only one action/activity element and not to multiple** action/activity elements.
  - On every transition, leaving a decision end, **a guard condition must be specified.**
  - **Every fork must have a correspoinding join**
  - A **fork must have only one entering transition and two or more leaving transition**
  - A **join must have two or more entering transition and only one leaving transition**
  - It is always better to **provide a name/label for the initial and final sates.**

CASE STUDY - 1

UNIT -5 Activity Diagram - Case Study

- **MCA Admission Procedure**

1. DTE advertises the date of MCA ntrance Examination.
2. Students has to apply for the entrance examination
3. Result are declared by DTE.
4. Student has to fill up the option form to select the college of his/her choice.
5. DTE displays the allotment list in the web site and intimation to all colleges.
6. Students should report the allotted colleges and complete the admission procedure.

UNIT -5 Activity Diagram - Case Study

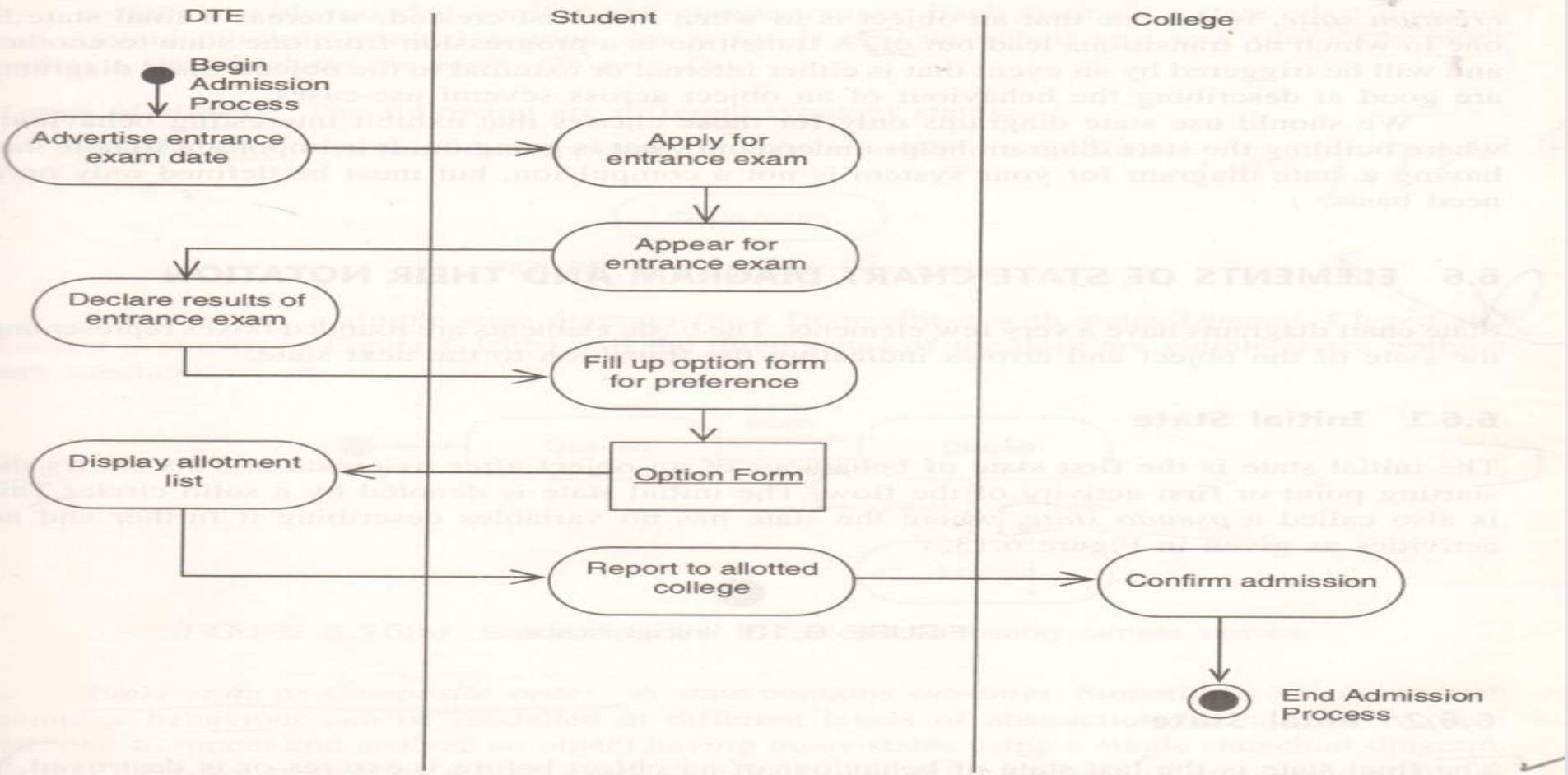
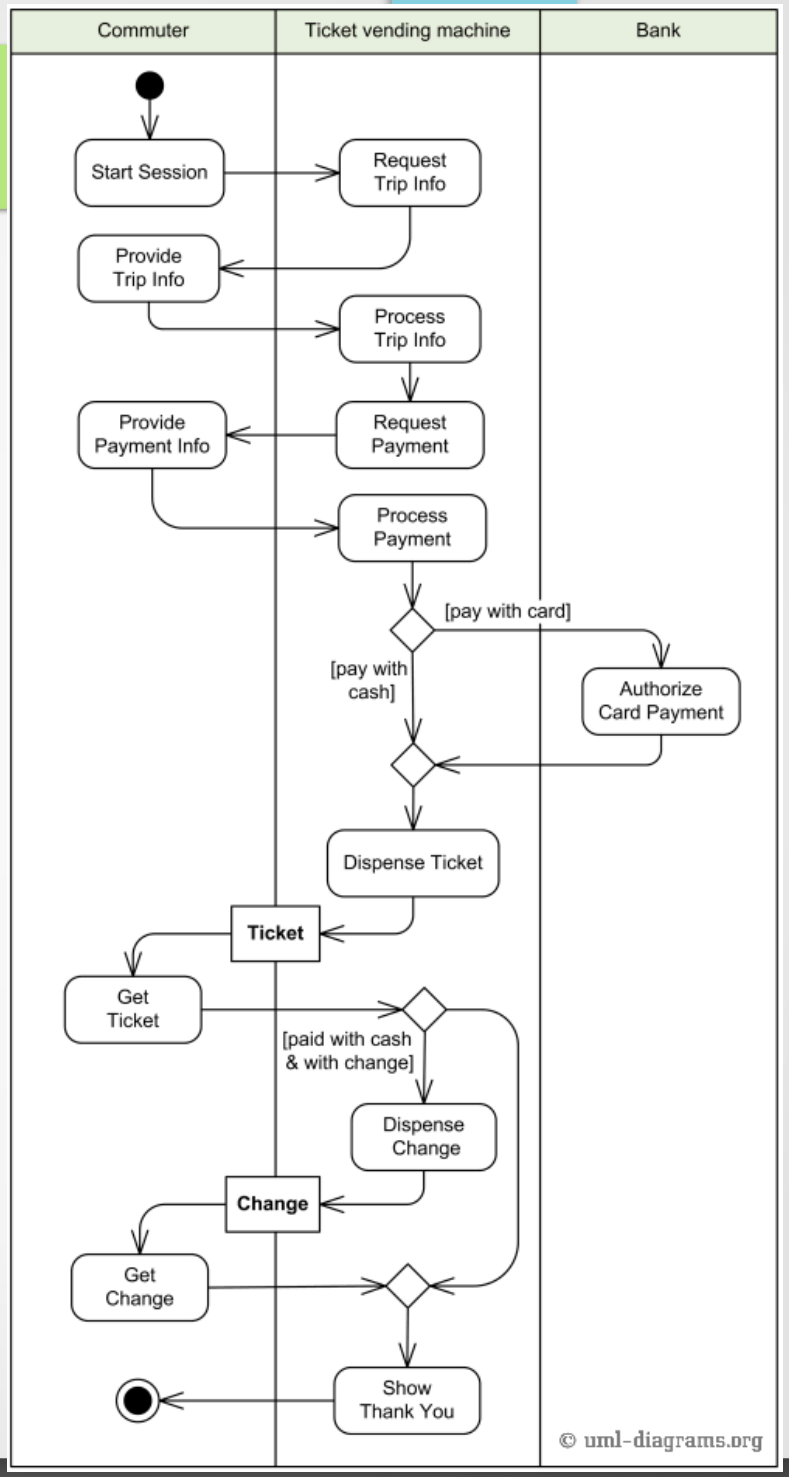


FIGURE 6.12 Complete activity diagram of admission process.

CASE STUDY - 2

PURCHASE TICKET



CASE STUDY - 3

REFER PDF FOR STUDENT LOAN SYSTEM