



## Assignment - 03

Q.

Define events, state, transition and guard condition in UML state diagram.

D.

In a UML state diagram, states represent the condition of an object at a specific time, events are the occurrences that trigger a potential change of state, transitions show the movement between states, and guard condition is a boolean expression must be true of transition to occur.

A.

### States

A state is a condition of situation during the life of an object during which it satisfies some condition, performs some activity or wait for some event.

P.

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E.

### Events

An event is a significant occurrence that happens at a specific point in time and can trigger a state transition.

### Transitions

A transition is a directed relationship between a source state and a target state, indicating that an object in the source state will perform certain actions and enter the target state when a specified event occurs and conditions are satisfied.

### Guard condition

A guard condition is a boolean expression that is evaluated after the triggering event occurs but before the transition fires.

e.g. (event-name / action)



Q.2 Differentiate between continuous life cycle state diagrams and one-shot life cycle state diagrams.

Features	continuous	one-shot
Object lifecycle	Objects have an ongoing, continuous and often indefinite existence	Objects have a finite life with a defined beginning and end.
states	No final state is defined. The object may loop through a series of states indefinitely.	Includes a distinct initial state and a distinct final state.

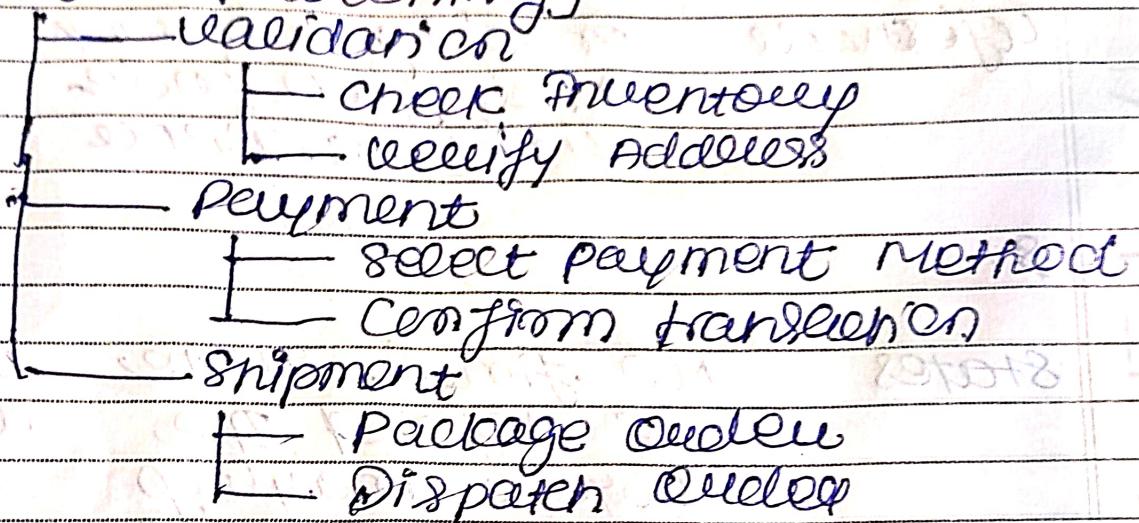
purpose To model behaviour that doesn't have a clear "end" To model behaviour that has a clear beginning and clear end.

Ex: A phone line that always is in a state of "ringing" A chess game is in an initial state and ends when a player wins/loses or draw.

# OPTIONAL PAPER

- Q. Develop a nested state diagram for an Online Order Processing system including at least three substates such as validation, payment and shipment.

Op. Level State : Order Processing  
[Order Processing]



State Transitions and Events

1. Initial State : Order Received
2. Validation State :
  - Check Inventory → if stock available →
  - Verify Address & if valid → transition to Payment
3. Payment State :
  - Select Payment method → choose method



- confirm transaction → if successful → transition to shipment

✓

shipment state:

P

Package Order → prepare for delivery

D

Dispatch Order → hand over to carrier

C

Final State : Order Delivered.

D

- Q. Illustrate signal generalization with an example.

One signal generalization is a concept in UML where multiple specific signals (events) are grouped under a more general signal. This allows a state machine to respond to a broad category of events using a single transition, improving clarity and reducing redundancy.

- Why use signal generalization?
- Simplifies state diagram by reducing the no. of transitions.
  - Promotes reuse of behavior across similar events.
  - Improves scalability when new signals are added under the same general category.

## Example: Online Payment System

- General Signal: payment event
- SWI - Signals
- Credit + Debit Payment
- VISA Payment
- Wallet Payment

State: Waiting Payment  
 On Payment Event → transition to  
 Payment Processing

Discuss the relationship between class models and state models.

Class models vs State models

Aspect: Class Model      State Model  
 Focus: Static Structure      Dynamic  
 of the system      behavior of  
 objects over time

Perceived

classes, attributes, states, transitions,  
 operations, events and  
 relationships to actions

represents

what an object is, what an object does all  
 how it behaves

A User class with a user object  
 name, email  
 login()

transitioning  
 from logged out  
 to loggin