

## \* Laboratory Practice - IV (OOMD) - Experiment Number - 1.

Name:- Kaustubh Shrikant Kobra

Class:- Fourth Year Engineering (BE)

Div:- A

Roll Number:- 37

Batch:- B-2

Department:- Computer Department

College:- AISSMS's IOIT

Title:-

State model

Problem Definition:-

Draw state model for telephone line, with various activities.

Prerequisite:-

Software Analysis Skills, Object Orientation and its development, Software Development life cycle, Types of Model.

Software and Hardware Requirements:-

Visual Paradigm 17.0 / Star UML,  
Windows 7 or above version or Linux,  
RAM - 4Gb and more, ROM - 128Gb and more,

Learning Objectives:-

To learn and draw state model / diagram.



### Outcomes:-

- ① We will understand the concept of state model, and
- ② We will learn to draw the state model/diagram for any system.

### Theory:-

#### State Diagram-

A state diagram is used to represent the condition of the system or part of the system at finite instances of time. It's a behavioral diagram and it represents the behavior using finite state transitions.

State diagrams are also referred to as state machines and state-chart diagrams. These terms are often used interchangeably. So simply, a state diagram is used to model the dynamic behavior of a class in response to time and changing external stimuli. We can say that each and every class using state diagrams.

#### Uses of Statechart diagram-

- ① We use it to state the events responsible for change in state (we do not show what processes cause those events)
- ② We use it to model the dynamic behavior of the system.
- ③ To understand the reaction of objects/classes to internal or external stimuli.



## Basic components of a statechart diagram -

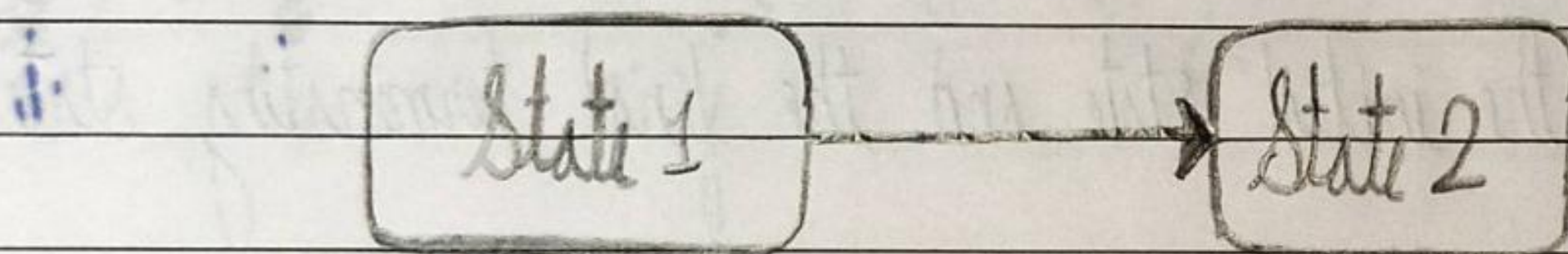
### ① Initial State -

We use a black filled circle represent the initial state of a system or a class.



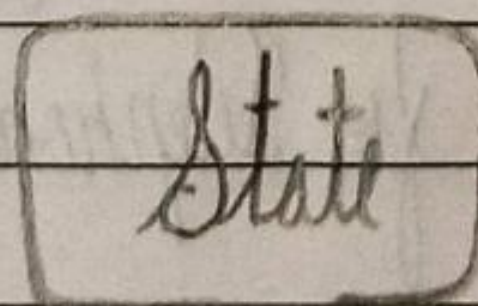
### ② Transition -

We use a solid arrow to represent the transition or change of control from one state to another. The arrow is labelled with the event which causes the change in state.



### ③ State -

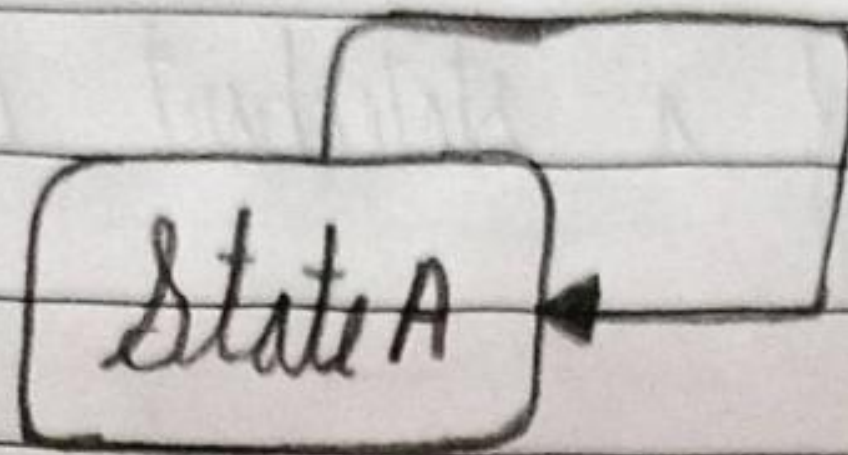
We use a rounded rectangle to represent a state. A state represents the conditions or circumstances of an object of a class at an instant of time.



### ④ Self transition -

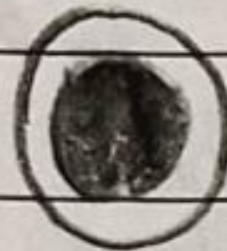
We use a solid arrow pointing back to the state itself to represent a self transition. There might be scenarios when the state of the object does not change upon the occurrence of an event.





### ⑤ Final State -

We use a filled circle within a circle notation to represent the final state in a state machine diagram.



### Steps to draw a state diagram -

1. Identify the initial state and the final terminating states.
2. Identify the possible states in which the object can exist (boundary values corresponding to different attributes guide us in identifying different states).
3. Label the events which trigger these transitions.

### The State Diagram for Telephone line -

- ① As a start of a call, the telephone line is idle.
- ② When the phone receiver is picked from hook, it gives a dial tone and can accept the dialing of digits.



- ③ If after getting a dial tone, if the user doesn't dial number within <sup>time</sup> interval then time out occurs and phone line gets idle.
- ④ After dialing a number, if the number is invalid then some recorded message is played.
- ⑤ Upon entry of a valid number, the phone system tries to connect a call and routes it to proper destination.
- ⑥ If the called person answers the phone, the conversation can occur.
- ⑦ When called person hangs up, the phone disconnects and goes to idle state.

### Conclusion:-

In this way, we learned how to draw a state model with an example of that is telephone line.