1ICPC317

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SDLC Laboratory

Quality Laboratory Manual

Experiment No. 08

To draw the behavioral diagram: State-chart diagram, Activity diagram.

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Experiment No. 08

Title of Experiment: To draw the behavioral diagram: State-chart diagram, Activity diagram.

Aim of Experiment: To understand the behavior of a system in terms of different states of its objects and the activities.

System Requirements – Win 10 and above OS, 4GB RAM, 2.33 GHz Processor

Software/s Requirement – StarUML

Experiment Objectives:

- Identify the distinct states a system have
- Identify the events causing transitions from one state to another
- Represent the above information pictorially using simple states
- Identify activities representing basic units of work, and represent their flow

Experiment Outcomes:

- Clear Visualization of different states of an Object
- Accurate Representation of activity flow
- Improved System Design and Communication.

Theory:

State chart Diagrams

In case of Object Oriented Analysis and Design, a system is often abstracted by one or more classes with some well-defined behaviour and states. A state chart diagram is a pictorial representation of such a system, with all its states, and different events that lead transition from one state to another.

State chart diagrams are normally drawn to model the behaviour of a complex system. For simple systems this is optional.

State

A state is any "distinct" stage that an object (system) passes through in it's lifetime. An object remains in a given state for finite time until "something" happens, which makes it to move to another state. All such states can be broadly categorized into following three types:

- **Initial:** The state in which an object remain when created
- **Final:** The state from which an object do not move to any other state [optional]

- **Intermediate:** Any state, which is neither initial, nor final, an initial state is represented by a circle filled with black. An intermediate state is depicted by a rectangle with rounded corners. A final state is represented by unfilled circle with an inner black-filled circle.

Transition

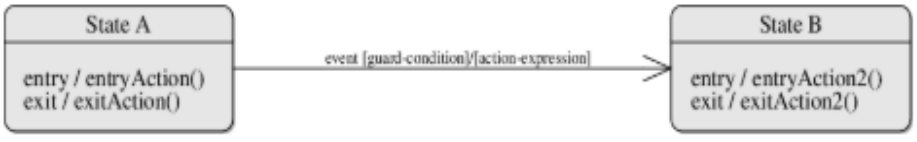
Transition is movement from one state to another state in response to an external stimulus (or any internal event). A transition is represented by a solid arrow from the current state to the next state. It is labeled by: event [guard-condition]/ [action-expression], where

- **Event** is the what is causing the concerned transition (mandatory)
- **Guard-condition** is which must be true for the transition to happen [optional]
- **Action-expression** indicate action to be performed as a result of the transition [optional]

Action

Actions represents behaviour of the system. While the system is performing any action for the current event, it doesn't accept or process any new event. The order in which different actions are executed, is given below:

1. Exit actions of the present state
2. Actions specified for the transition
3. Entry actions of the next state



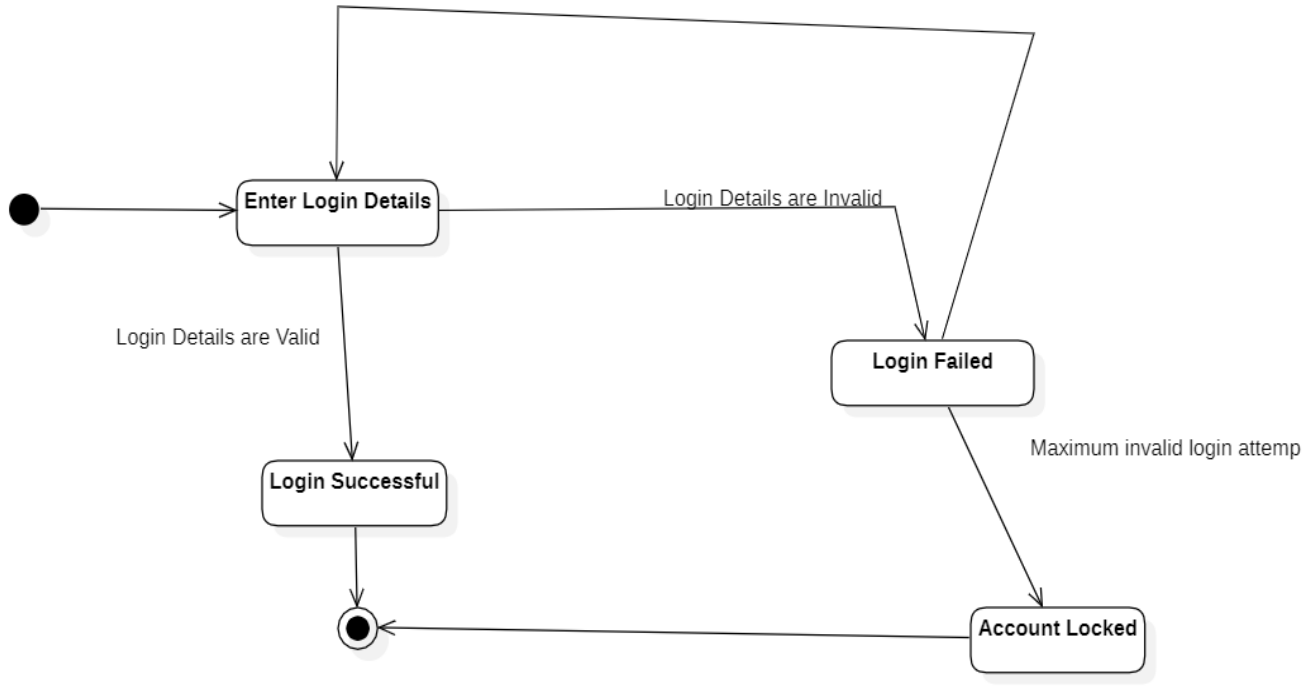


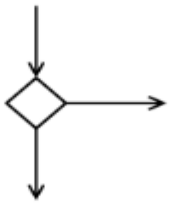
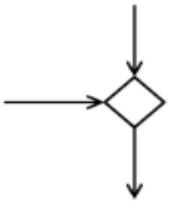
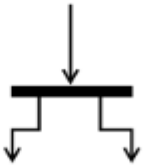
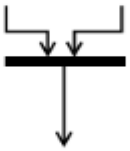
Fig: State chart diagram for Login System

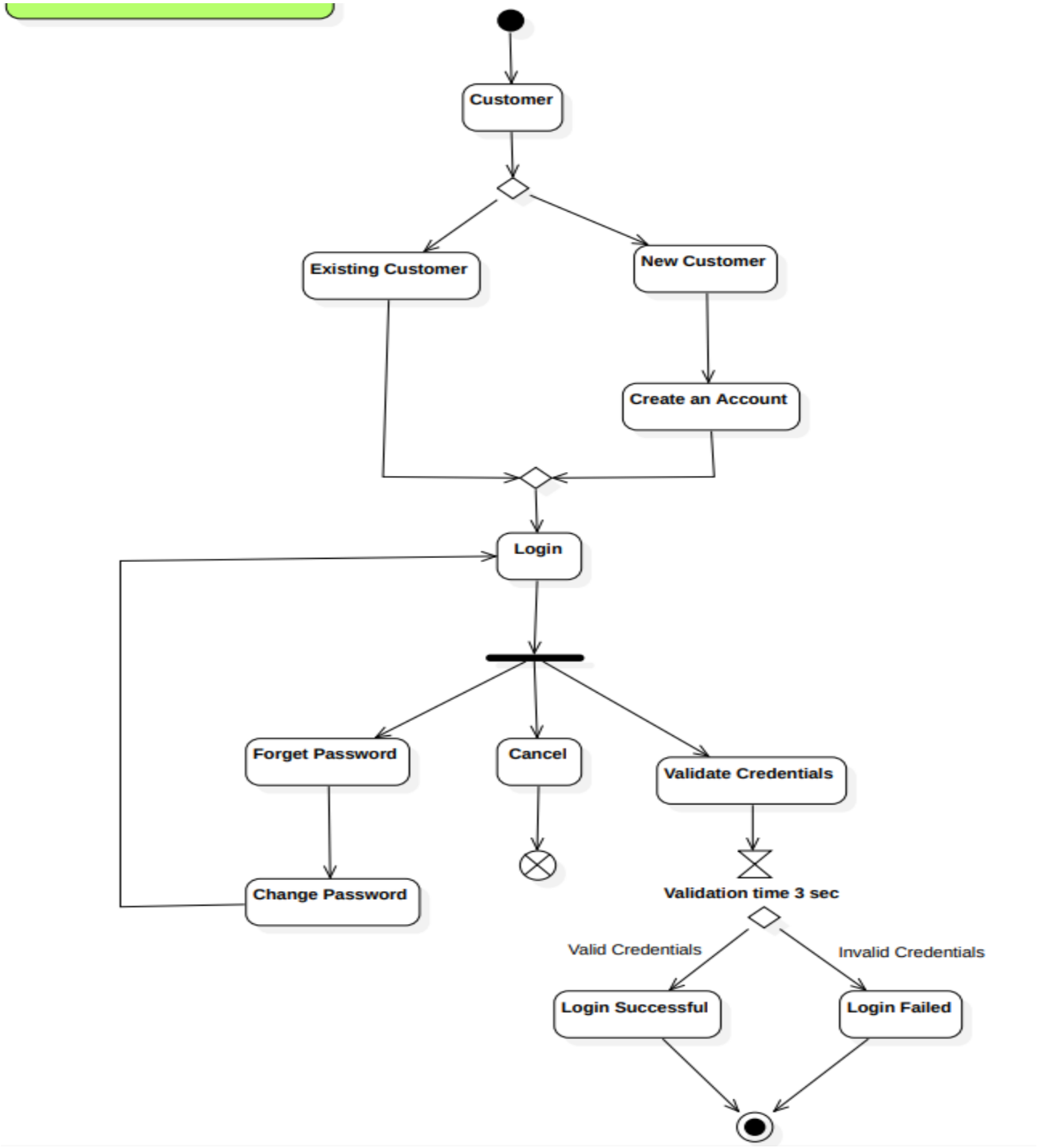
Activity Diagrams:

Activity diagrams fall under the category of behavioural diagrams in Unified Modeling Language. It is a high level diagram used to visually represent the flow of control in a system. It has similarities with traditional flow charts. However, it is more powerful than a simple flow chart since it can represent various other concepts like concurrent activities, their joining

Activity diagrams, however, cannot depict the message passing among related objects. As such, it can't be directly translated into code. These kind of diagrams are suitable for confirming the logic to be implemented with the business users. These diagrams are typically used when the business logic is complex.

Components of Activity diagram

Component	Graphical Notation
Activity	
Flow	
Decision	
Merge	
Fork	
Join	
Note	


Customer
Existing Customer
New Customer
Create an Account
Login
Forget Password
Cancel
Validate Credentials
Change Password
Validation time 3 sec
Valid Credentials
Invalid Credentials
Login Successful
Login Failed

Observations:

- Clarity: They provide a clear visual representation of system behavior, making it easier for stakeholders to understand.
- Communication: State charts facilitate better communication among team members by providing a common language.
- Documentation: They serve as a valuable documentation tool, capturing the dynamic aspects of a system.

Conclusion:

The experiment successfully demonstrated, the way of representing the behavioral view of a software application for better understanding of the system.

Expected Oral Questions:

1. What is State chart diagram?
2. What are the different states of an object?
3. What is Activity diagram?
4. How Activity diagram differs from Flowchart?

FAQs in Interview:

1. What are the different components used in state chart diagram?
2. What is the need of activity diagram?
3. Why we use State chart diagram?
4. List out benefits of state chart and activity diagrams?