

## Tutorial 3

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This tutorial is designed to revise your knowledge on state diagrams.

1. Draw a state chart diagram for the User Account object.

A company has a bug tracking system. This system has a User Account class, which represents a user in the system. Once the System Administrator creates a user, a User Account object will be created with a pending state. The User Account object will be active only when the System Manager approves the user. If the System Manager rejects the user, the User Account will be in inactive. The System Manager can call Activate User and Deactivate User to move the User Account object to active or inactive. The system administrator will periodically call Delete User function to delete the User Account objects, which are inactive.

2. Draw a State diagram for the following description.

When Electric iron turned on it goes to the LowHeat state where it sets its max temperature to 180 Celsius. Also it turns on the indicator light in yellow color. While in the state it increases its heat up to 180 Celsius. While in the LowHeat state, it can move to MediumHeat state if press the medium heat switch. When enters to the MediumHeat state, it sets its max temperature to 200 Celsius and set indicator light to green. While in the MediumHest state the heat goes up to 200 Celsius gradually. When it exits the MediumHeat state, it changes the indicator light color back to yellow. While in the MediumHeat state and if we press the high heat switch, the iron object moves to HighHeat state which sets the max temperature as 240 Celsius and set the indicator light color to red. While in the LowHeat, MediumHeat or HighHeat states, the iron object can be turned off by

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removing the voltage supply. Irrespective of the state, whenever it identified a voltage leakage, the iron object moves to Safe state after 1 minute. Safe state has its own sub states SelfCheck and Recovery respectively. While in the Safe state, the iron object can be moved to Off state if power supply removed. Also it can move to LowHeat state when recovered.

### **Self-Study Questions**

**Students need to try these questions by themselves.**

1. Draw a State diagram for the following description.

In Software Maintenance, Incident Management process helps to deal with unplanned interruption to an IT service. This helps to restore normal service operation as quickly as possible to minimize the adverse impact on business operations.

A user can inform about an incident to a support service personal or service desk through calls, emails or support chats. Then the service desk identifies the incident and logs it as a ticket. Then the ticket is in New state. The ticket can change its state to Categorized state from New state once the incident is assigned to a category or sub-category such as “Network”, “Hardware”, “Software” etc. After categorization, incident will be prioritized based on its urgency and impact, which will result the ticket, to be in either High Priority or Low Priority states.

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Once a ticket is in Low Priority state, problem can be easily diagnosed by the support service personal. Once the problem is clearly identified, ticket status will be changed to Diagnosed state and the problem will be resolved gradually. But, if a ticket in Low Priority state is identified as a service fulfillment (new requirement), then the ticket will be cancelled and handled separately through another system as a new requirement.

Once a ticket is in High Priority state, it will be moved to Assigned state as soon as it is assigned to an expertise technician to look into the matter. If the Expertise Technician diagnoses the problem, ticket status is changed to Diagnosed state. If the Expertise Technician could not diagnose the problem or if it requires advance support, then the ticket's state is changed to Escalate state. While in this state, assigning more expertise people to diagnose the problem and perform some advance diagnose techniques will take place.

From the Escalate state, the ticket can move back to Diagnosed state as soon as a technician invoke diagnosed function after identifying the problem clearly. If a technician could not diagnose or resolve the problem of an incident that is in Escalate state for a longer period, it will automatically move to Reported state after one months' time. When a ticket is in Reported state it will be notified to the Supervisors and handled separately.

Ticket can change its state to In Progress state from Diagnosed state when a technician start to apply solutions to a problem. Being in the In Progress state ticket can change to Escalate state if the technician could not resolve the problem.

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Once the technician apply the correct solution and recover the system, by invoking resolve method ticket can move to Resolved state. Eventhough technician think he resolved the problem, sometimes it might not completely recover the system. In such situations, if the client is not satisfied ticket will move back to In Progress state. If a problem is resolved and customer is satisfied, assigned technician can close the ticket and incident process ends.

2. Draw a State Diagram for the following System.

A Virus Guard is automatically loaded when the computer starts up and is initially in the checking state where it will do a self-scan and check if the virus definitions files are up to date. If there is an error in the self-scan, the virus guard changes its state to the critical state. In the critical state, the virus guard repair the virus definition files. Once finished, the virus guard moves back to checking state. If the virus definitions are up to date the Virus Guard changes its state to the active state. If the virus definition is over one month old it changes its state to the major updating state. If the virus definitions are less than one month old, it changes its state to the minor updating state. In both cases it downloads the updates from the virus guard website. In the major updating state it disallows installation of new software and restricts the access to the Internet and networks. In the minor updating state software installations from the web are disallowed.

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Once the updates are carried out successfully, the virus guard changes its state to the active state. If a virus is found and is a non-critical virus, then the Virus Guard changes to the Virus Alert State. Here it will clean the

Viruses from the source. If a virus which is of high risk or if an unknown virus is detected the virus guard moves into the critical virus alert state. In this state the network connections and all pen drives are disabled. The details of the virus are sent to the virus guard website through a secure tunnel. Once the virus is removed the system it would move to the active state.