Activity Diagram

INTRODUCTION

- Activity diagrams, along with use case and state machine diagrams, are considered behavior diagrams because they describe what must happen in the system being modeled.
- Activity diagrams consist of activities that are made up of actions which help people on the business and development sides of an organization come together to understand the same process and behavior.
- Activity diagram is defined as a UML diagram that focuses on the execution and flow of the behavior of a system instead of implementation.
- It is also called object-oriented flowchart.

BENEFITS OF ACTIVITY DIAGRAMS

- Demonstrate the logic of an algorithm.
- Describe the steps performed in a UML use case.
- Illustrate a business process or workflow between users and the system.
- Simplify and improve any process by clarifying complicated use cases.
- Model software architecture elements, such as method, function, and operation.

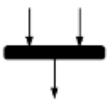
HOW TO DRAW AN ACTIVITY DIAGRAMS

- Activity diagram is a flowchart of activities.
- It represents the workflow between various system activities.
- Activity diagrams include swimlanes, branching, parallel flow, control nodes, expansion nodes, and object nodes.
- Activity diagram also supports exception handling.
- To draw an activity diagram, one must understand and explore the entire system.
- All the elements and entities that are going to be used inside the diagram must be known by the user.
- After analyzing all activities, these activities should be explored to find various constraints that are applied to activities.
- If there is such a constraint, then it should be noted before developing an activity diagram.

HOW TO DRAW AN ACTIVITY DIAGRAMS

- All the activities, conditions, and associations must be known.
- Following rules must be followed while developing an activity diagram :
  - All activities in the system should be named.
  - Activity names should be meaningful.
  - Constraints must be identified.
  - Activity associations must be known.

ACTIVITY DIAGRAMS SYMBOLS

Symbol	Name	Description
	Start symbol	Represents the beginning of a process or workflow in an activity diagram. It can be used by itself or with a note symbol that explains the starting point.
	Activity symbol	Indicates the activities that make up a modeled process. These symbols, which include short descriptions within the shape, are the main building blocks of an activity diagram.
	Connector symbol	Shows the directional flow, or control flow, of the activity. An incoming arrow starts a step of an activity; once the step is completed, the flow continues with the outgoing arrow.
	Joint symbol/ Synchronization bar	Combines two concurrent activities and re-introduces them to a flow where only one activity occurs at a time. Represented with a thick vertical or horizontal line.

ACTIVITY DIAGRAMS SYMBOLS

Symbol	Name	Description
	Fork symbol	Splits a single activity flow into two concurrent activities. Symbolized with multiple arrowed lines from a join.
	Decision symbol	Represents a decision and always has at least two paths branching out with condition text to allow users to view options. This symbol represents the branching or merging of various flows with the symbol acting as a frame or container.
	Note symbol	Allows the diagram creators or collaborators to communicate additional messages that don't fit within the diagram itself. Leave notes for added clarity and specification.
	Send signal symbol	Indicates that a signal is being sent to a receiving activity.

ACTIVITY DIAGRAMS SYMBOLS

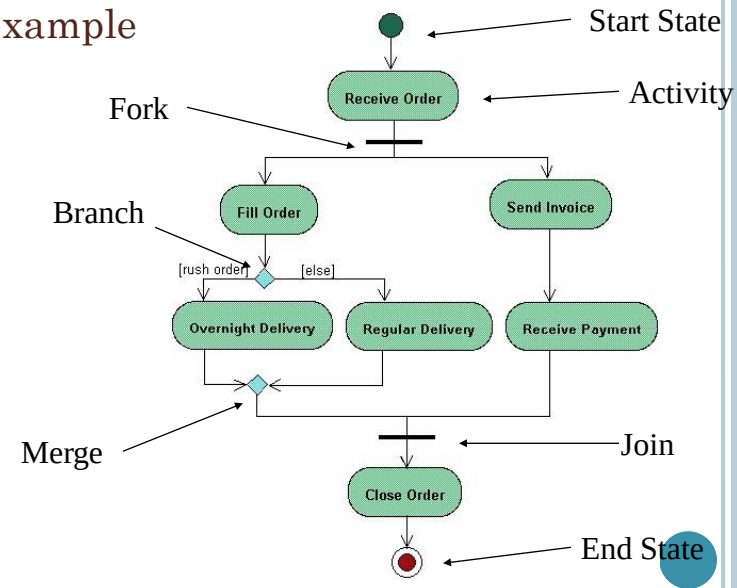
Symbol	Name	Description
	Receive signal symbol	Demonstrates the acceptance of an event. After the event is received, the flow that comes from this action is completed.
	Shallow history pseudostate symbol	Represents a transition that invokes the last active state.
	Option loop symbol	Allows the creator to model a repetitive sequence within the option loop symbol.
	Flow final symbol	Represents the end of a specific process flow. This symbol shouldn’t represent the end of all flows in an activity; in that instance, you would use the end symbol. The flow final symbol should be placed at the end of a process in a single activity flow.

ACTIVITY DIAGRAMS SYMBOLS

Symbol	Name	Description
[Condition]	Condition text	Placed next to a decision marker to let you know under what condition an activity flow should split off in that direction.
	End symbol	Marks the end state of an activity and represents the completion of all flows of a process.

- An activity partition or a swimlane is a high-level grouping of a set of related actions. A single partition can refer to many things, such as classes, use cases, components, or interfaces.
- If a partition cannot be shown clearly, then the name of a partition is written on top of the name of an activity.

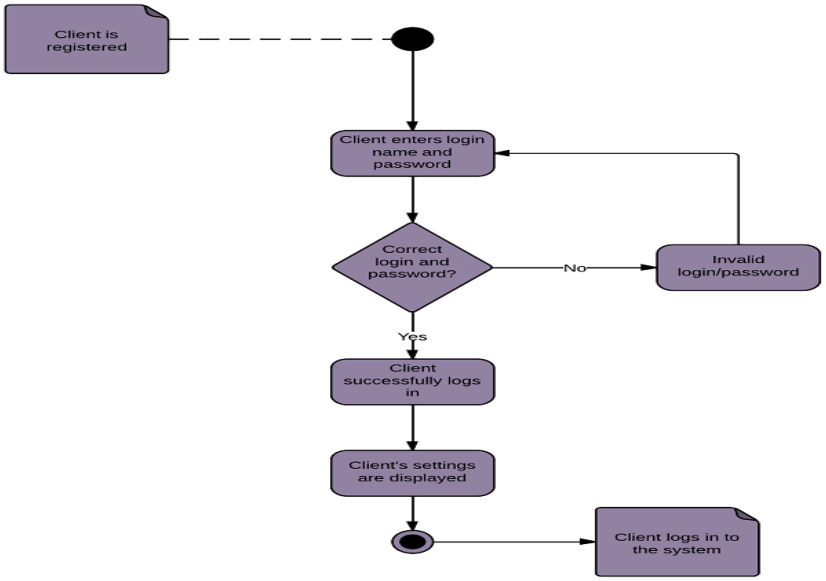
Activity Diagram Example



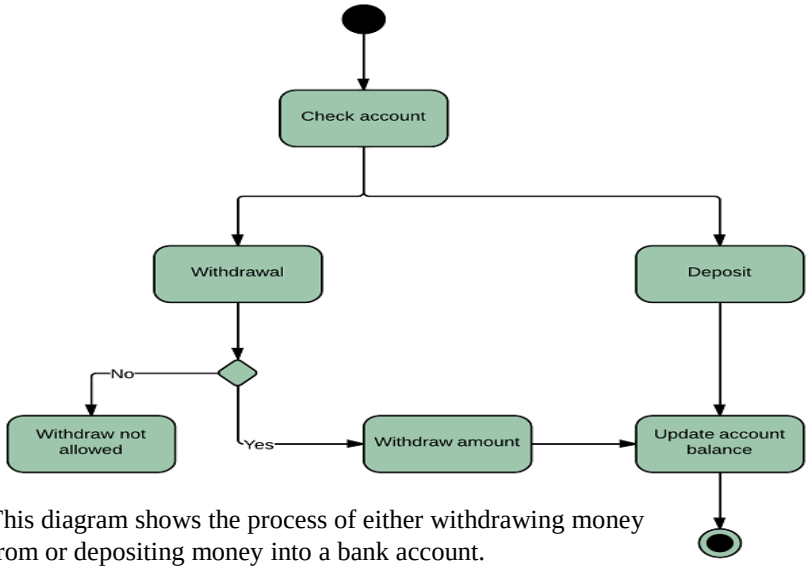
ACTIVITY DIAGRAM FOR A LOGIN

- Many of the activities people want to accomplish online—checking email, managing finances, ordering clothes, etc.—require them to log into a website.
- This activity diagram shows the process of logging into a website, from entering a username and password to successfully logging in to the system.

ACTIVITY DIAGRAM FOR A LOGIN



ACTIVITY DIAGRAM FOR A BANKING SYSTEM



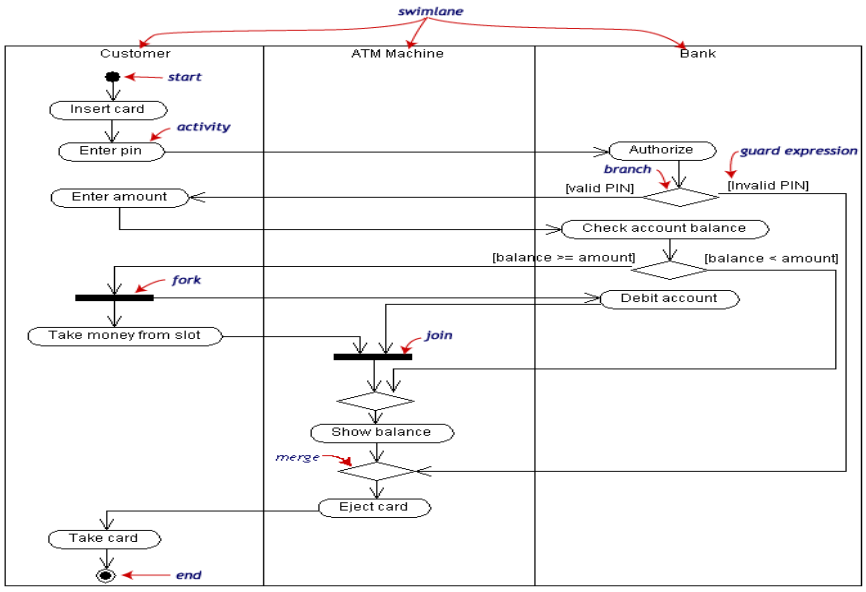
- This diagram shows the process of either withdrawing money from or depositing money into a bank account.

ACTIVITY DIAGRAM USING SWIMLANE

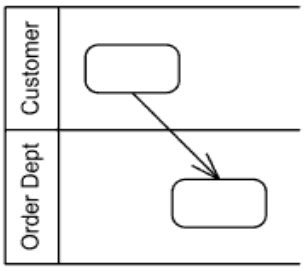
- Swimlanes (or activity partitions) indicate where activities take place.
- Swimlanes can also be used to identify areas at the technology level where activities are carried out
- Swimlanes allow the partition an activity diagram so that parts of it appear in the swimlane relevant to that element in the partition.

ACTIVITY DIAGRAM USING SWIMLANE

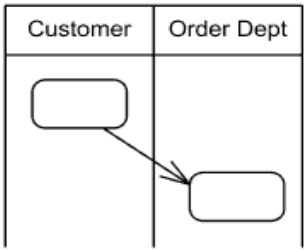
- Partitions may be constructed on the basis of:
  - the class and actor doing the activity
  - Partitioning by class and actor can help to identify new associations that have not been documented in the class model
  - the use case the activity belongs to
  - Partitioning by use cases can help document how use cases interact.



Withdraw money from a bank account through an ATM

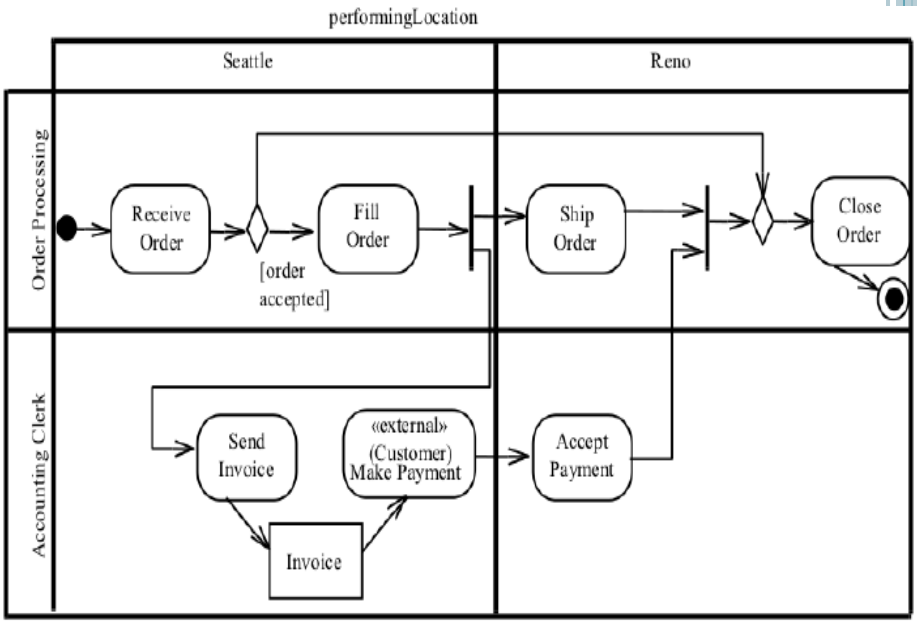


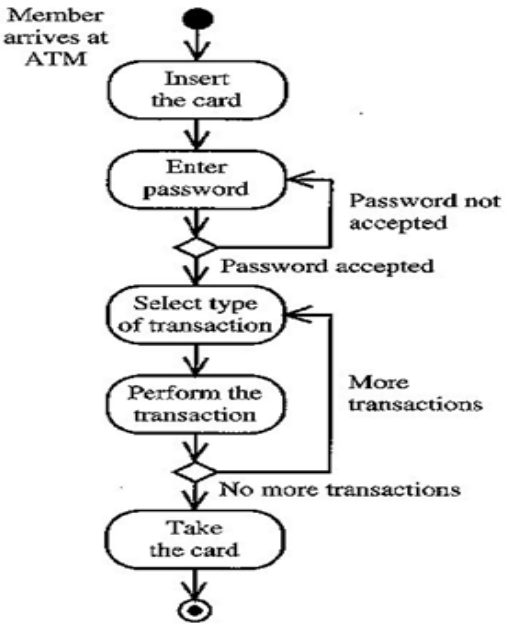
Activity partitions Customer and Order Dept as horizontal swimlanes



Activity partitions Customer and Order Dept as vertical swimlanes

Swimlane : Indicate who is **responsible for each group of activities.** multidimensional swimlanes





Activities involved in an ATM transaction.

WHEN USE ACTIVITY DIAGRAM

- Model the workflow in a graphical way, which is easily understandable.
- Model the execution flow between various entities of a system.
- Model the detailed information about any function or an algorithm which is used inside the system.
- Model business processes and their workflows.
- Capture the dynamic behavior of a system.
- Generate high-level flowcharts to represent the workflow of any application.
- Model high-level view of an object-oriented or a distributed system.