Activity diagram

Activity diagrams can be used in all stages of software development and for various purposes. And because they are a lot similar to flowcharts, they are generally more popular than other UML diagram types.

What is an Activity diagram?

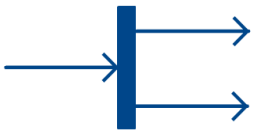
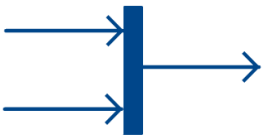
A UML activity diagram helps to visualize a certain use case at a more detailed level. It is a behavioral diagram that illustrates the flow of activities through a system.

UML activity diagrams can also be used to depict a flow of events in a business process. They can be used to examine business processes in order to identify its flow and requirements.

Activity Diagram Symbols

UML has specified a set of symbols and rules for drawing activity diagrams. Following are the commonly used activity diagram symbols with explanations.

Symbol	Name	Use
	Start/ Initial Node	Used to represent the starting point or the initia state of an activity
	Activity / Action State	Used to represent the activities of the process
	Action	Used to represent the executable sub-areas of a activity
	Control Flow / Edge	Used to represent the flow of control from one action to the other

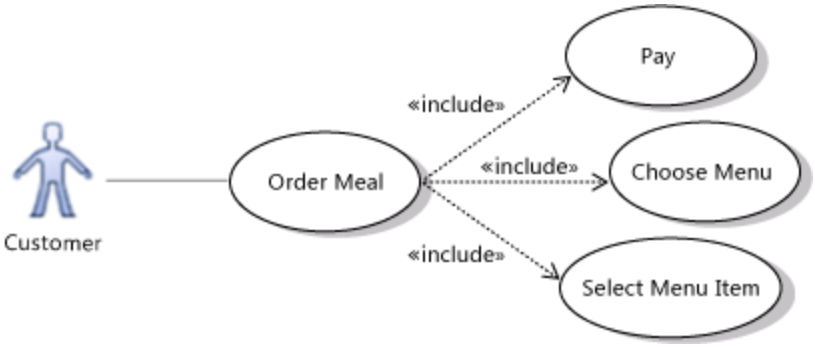
	Object Flow / Control Edge	Used to represent the path of objects moving through the activity
	Activity Final Node	Used to mark the end of all control flows within the activity
	Flow Final Node	Used to mark the end of a single control flow
	Decision Node	Used to represent a conditional branch point with one input and multiple outputs
	Merge Node	Used to represent the merging of flows. It has several inputs, but one output.
	Fork	Used to represent a flow that may branch into t or more parallel flows
	Merge	Used to represent a flow that may branch into t or more parallel flows
	Signal Sending	Used to represent the action of sending a signal an accepting activity

	Signal Receipt	Used to represent that the signal is received
	Note/ Comment	Used to add relevant comments to elements

Showing work flow between users and your system

You can use an activity diagram to show the flow of work between different use cases. It is frequently useful to begin a requirements model by drawing an activity diagram showing the major tasks that users perform - both with the system and outside it.

You can draw use case diagrams and activity diagrams to show different views of the same information. The use case diagram is more effective at showing the nesting of the smaller actions within the larger activity, but does not show the flow of work. For example:



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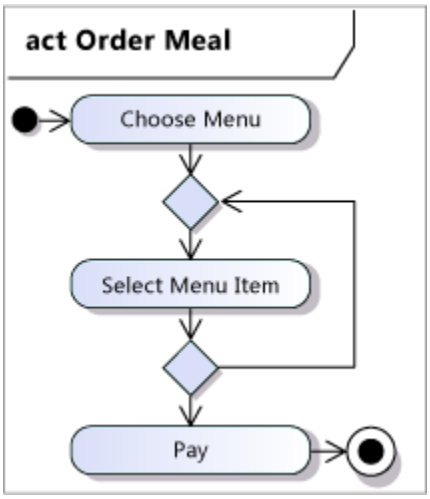
For example:

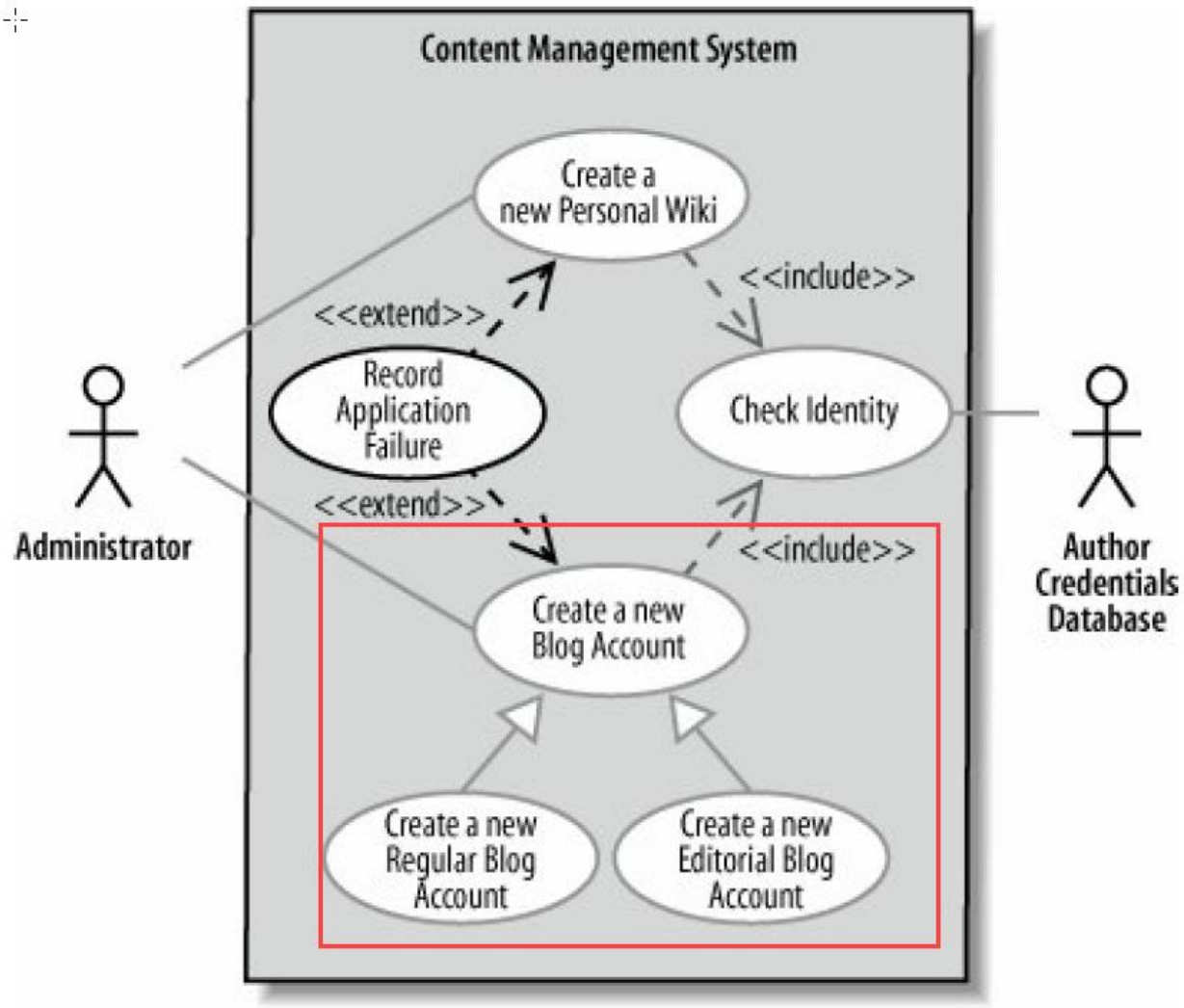


Activity diagrams are used to model the following:

- Use cases
- Classes
- Interfaces
- Components
- Collaborations

Activity diagrams are used to model processes and workflows.

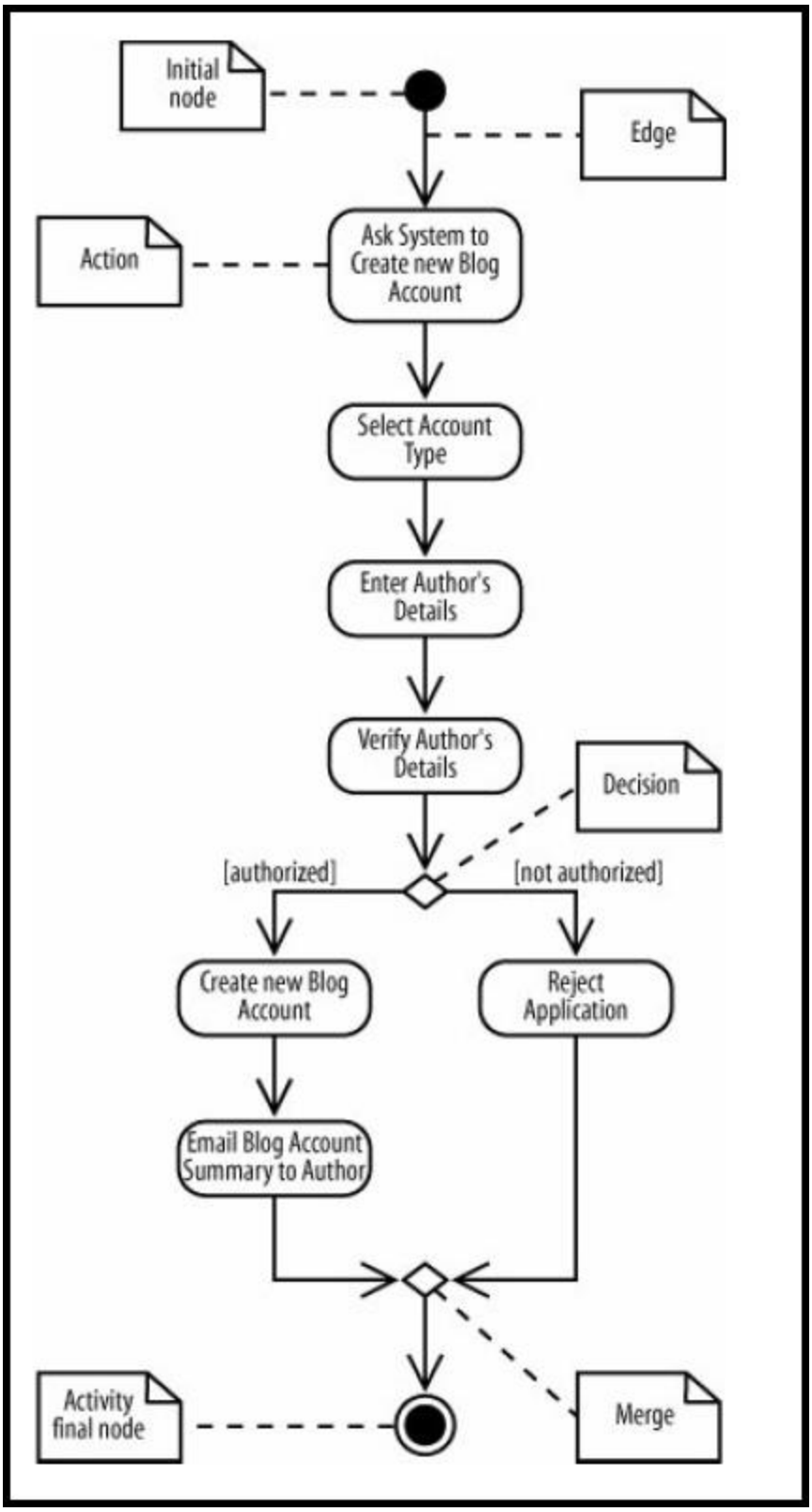
For example, you can use an activity diagram to model the steps involved with creating a blog account.



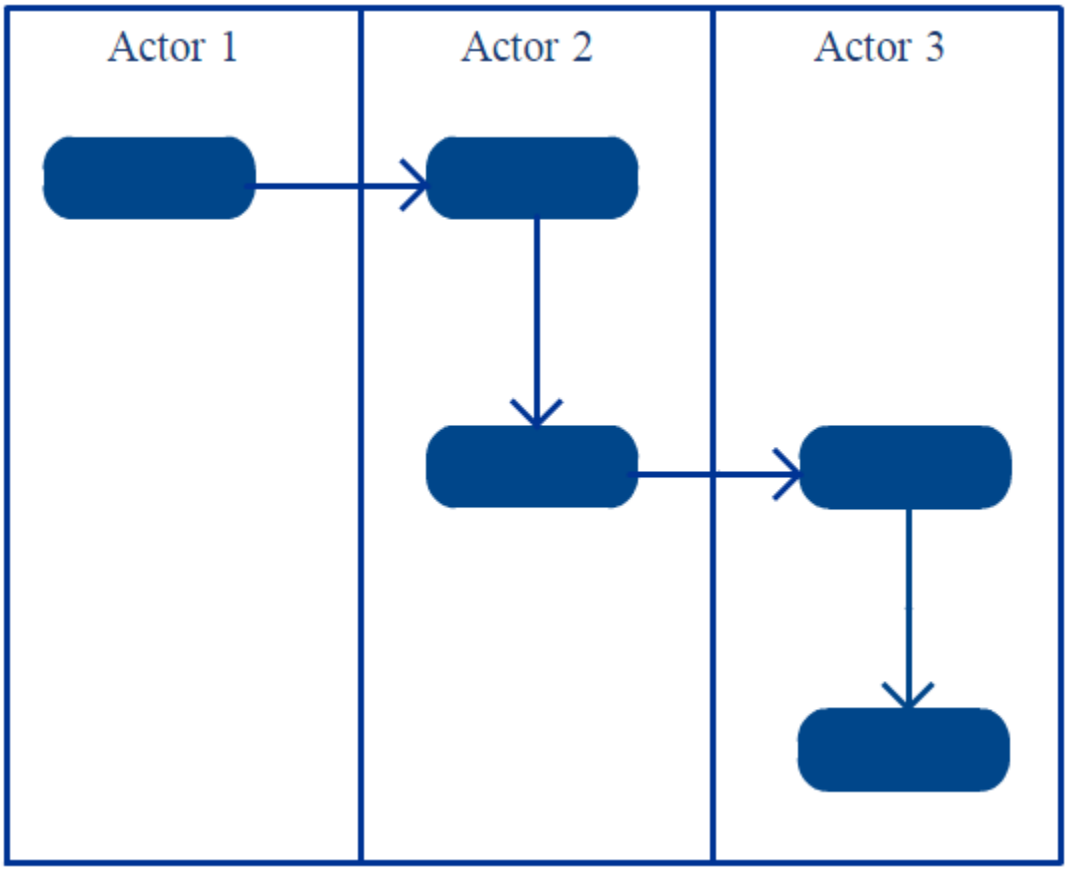
Let's look at the basic elements of activity diagrams by modeling the steps in the blog account creation use case. The following Table contains the Create a new Blog Account use case description. The Main Flow and Extension sections describe steps in the blog account creation process.

Use case name	**Create a new Blog Account**	
Related Requirements	Requirement A.1.	
Goal In Context	A new or existing author requests a new blog account from the Administrator.	
Preconditions	The system is limited to recognized authors, and so the author needs to have appropriate proof of identity.	
Successful End Condition	A new blog account is created for the author.	
Failed End Condition	The application for a new blog account is rejected.	
Primary Actors	Administrator.	
Secondary Actors	Author Credentials Database.	
Trigger	The Administrator asks the Content Management System to create a new blog account.	
Main Flow	Step	Action
	1	The Administrator asks the system to create a new blog account.
	2	The Administrator selects an account type.
	3	The Administrator enters the author's details.
	4	The author's details are verified using the Author Credentials Database.
	5	The new blog account is created.
	6	A summary of the new blog account's details are emailed to the author.
Extensions	Step	Branching Action
	4.1	The Author Credentials Database does not verify the author's details.
	4.2	The author's new blog account application is rejected.

Now let’s elaborating the use case (from requirement — what to the high level logic workflow — How) with an activity diagram :


Initial node
Edge
Action
Ask System to Create new Blog Account
Select Account Type
Enter Author's Details
Verify Author's Details
Decision
[authorized]
[not authorized]
Create new Blog Account
Reject Application
Email Blog Account Summary to Author
Activity final node
Merge

Activity Diagrams with Swimlanes

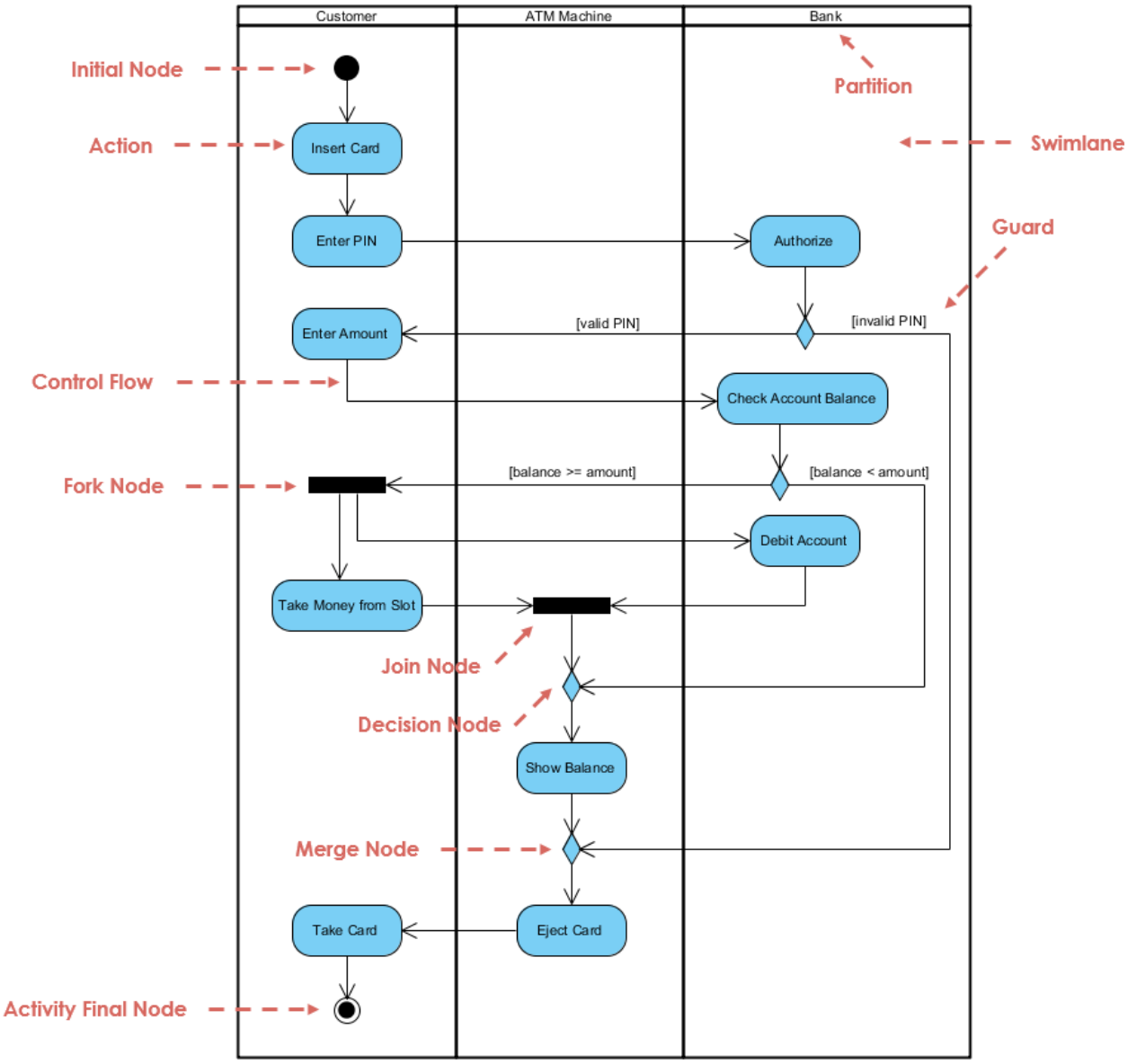


In activity diagrams swimlanes – also known as partitions – are used to represent or group actions carried out by different actors in a single thread. Here are a few tips you can follow when using swimlanes.

- Add swimlanes to linear processes. It makes it easy to read.
- Don’t add more than 5 swimlanes.
- Arrange swimlanes in a logical manner.

Here is an activity diagram example for ATM.

Withdraw money from an ATM Account - The three involved classes (people, etc.) of the activity are Customer, ATM, and Bank. represented swimlanes that determine which object is responsible for which activity. The process begins at the black start circle at the top and ends at the concentric white/black stop circles at the bottom. The activities are rounded rectangles.



A single transition comes out of each activity, connecting it to the next activity, which may branch into two or more mutually exclusive transitions. Guard expressions

(inside [ ]) label the transitions coming out of a branch. A branch and its subsequent merge marking the end of the branch appear in the diagram as hollow diamonds. A transition may fork into two or more parallel activities. The fork and the subsequent join of the threads coming out of the fork appear in the diagram as solid bars.

What is the Difference Between Use Case Diagram and Activity Diagram?

A use case diagram represents the user's interaction with the system. On the other hand, an activity diagram represents the series of actions or flow control in a system similar to a flowchart. A use case diagram helps to model the system and user interactions while an activity diagram helps to model the workflow of the system. This is the main difference between use case diagram and activity diagram.