

Chapter 4: Activity Diagrams

- Introduction to Activity Diagram
- Activity Diagram Elements
 - Initial State
 - Activities (Action State)
 - Transition
 - Guard Condition
 - Decision and merge point
 - Concurrency (Fork and Join)
 - Final State
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- Example of Activity Diagram

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Introduction to Activity Diagram

- Modeling workflow or task flow
- Modeling the process flow
- Modeling the algorithm of methods (instead of using flowchart)
- We can Draw Activity Diagram to model the dialog of Use Case Narrative in Use Case Model

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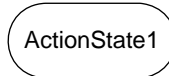
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Elements of Activity Diagram

- Initial State: start the process or task



- Action State or Activities: name of task



- Transition: the flow line between action states

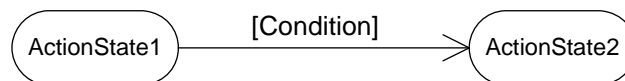


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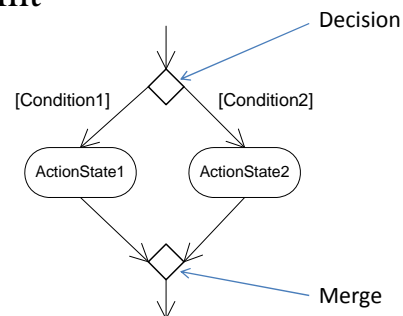
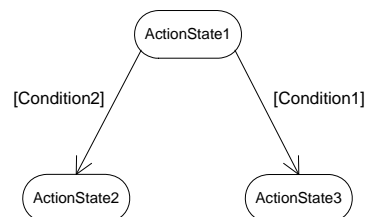
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Elements of Activity Diagram

- Guard Condition: condition of transition



- Decision and merge point

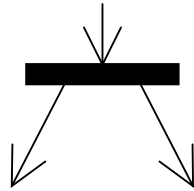


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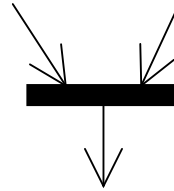
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Elements of Activity Diagram

- Concurrency: Concurrent process

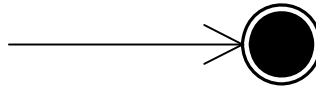


Fork Transition



Join Transition

- Final State: the end of task or process

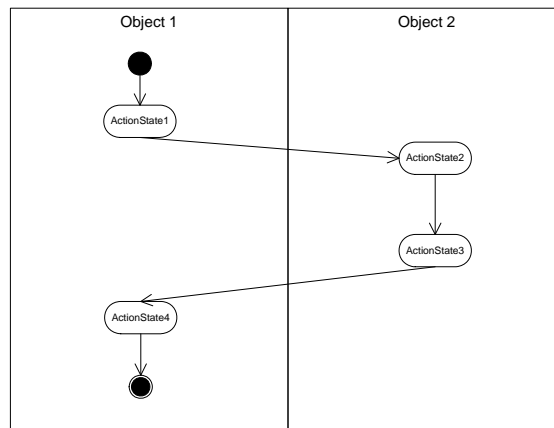


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Elements of Activity Diagram

- Swim lanes: use swim lane to assign responsibilities to the action states. This usually use when the processes handle by more than one objects.



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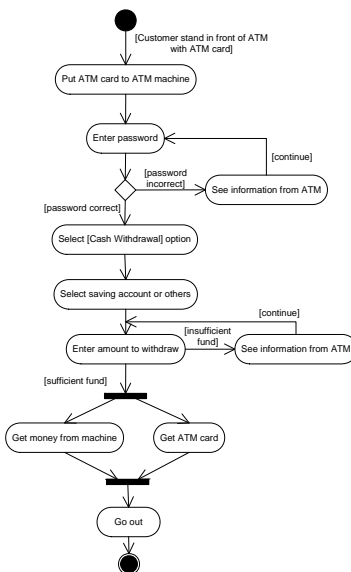
Example of Activity Diagram

- **Example 1:** Withdraw Cash from ATM Using ATM Card
(Process flow of customers)
 - Put ATM card to ATM machine
 - Enter password
 - If [password correct] then
Select withdraw cash option
Select saving account
Enter amount to withdraw
If amount is insufficient then
See information from Machine
(enter amount again)
 - Otherwise: Get money from machine and Get ATM card
 - Else
See information from machine
(Re-enter password again)
 - Go out

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Example of Activity Diagram-Withdraw cash from ATM



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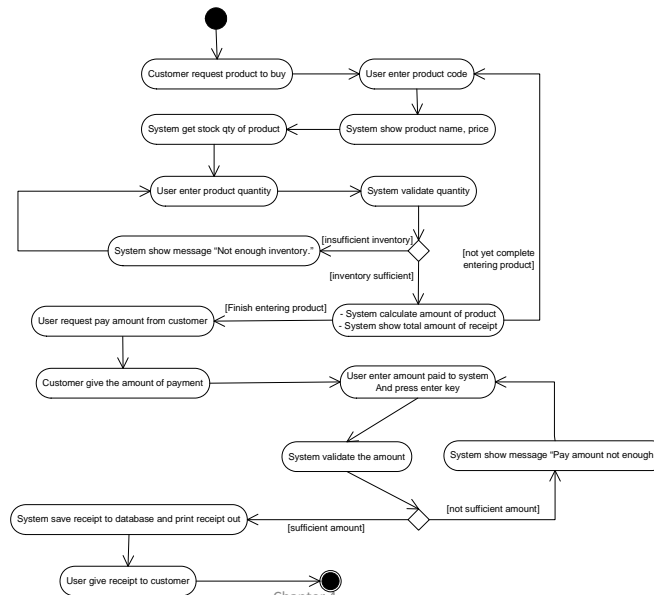
Example of Activity Diagram

- **Example 2:** Create Receipt (Process flow)
 - Customer request product to buy
 - User enter product code
 - System show product name, price
 - System get stock qty of product
 - User enter product quantity
 - System validate quantity
 - If [sale quantity] greater than [stock quantity] then
 - System show message "Not enough stock."
 - (User re-enter product qty again and system re-check)
 - Else
 - System calculate amount of product
 - System show total amount of receipt
 - (User continue enter product code)
 - (Until user indicates that he/she is done on entering product code requested by customer)
 - User request pay amount from customer
 - Customer give the amount of payment
 - User enter amount paid to system and press enter key
 - System validate the amount
 - If [Amount Paid] less than [Total Amount] then
 - System show message "Pay amount not enough."
 - (User re-enter pay amount again and re-check by system)
 - Else
 - System print receipt out
 - User give receipt to customer

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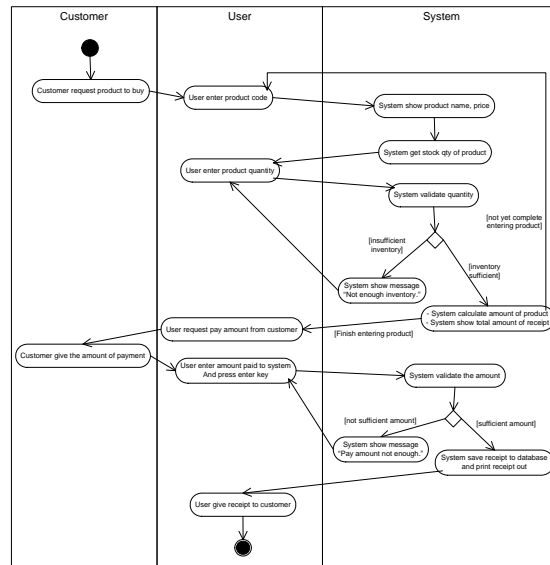
Example of Activity Diagram-Create Receipt



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Example of Activity Diagram-Create Receipt (Swimlane)



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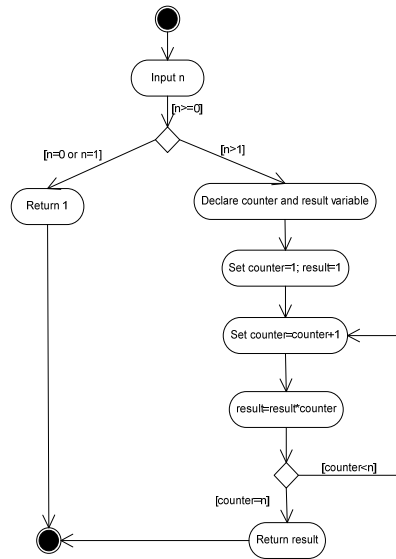
Example of Activity Diagram

- **Example 3:** Calculate $f(n)=n!$ ($n \geq 0$)
 - Input n
 - If $n=0$ or $n=1$
 - return 1
 - Else
 - declare counter and result variable
 - set counter=1; result=1
 - loop until counter= n
 - counter=counter+1
 - result=result*counter
 - end loop
 - return result

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Example of Activity Diagram – Calculate n!



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