ACTIVITY DIAGRAM

- **What is Activity Diagram?**

  Activity diagram is another important behavioral diagram in UML diagram to describe dynamic aspects of the system. Activity diagram is essentially an advanced version of flow chart that modeling the flow from one activity to another activity.

- **UML Diagram type:**

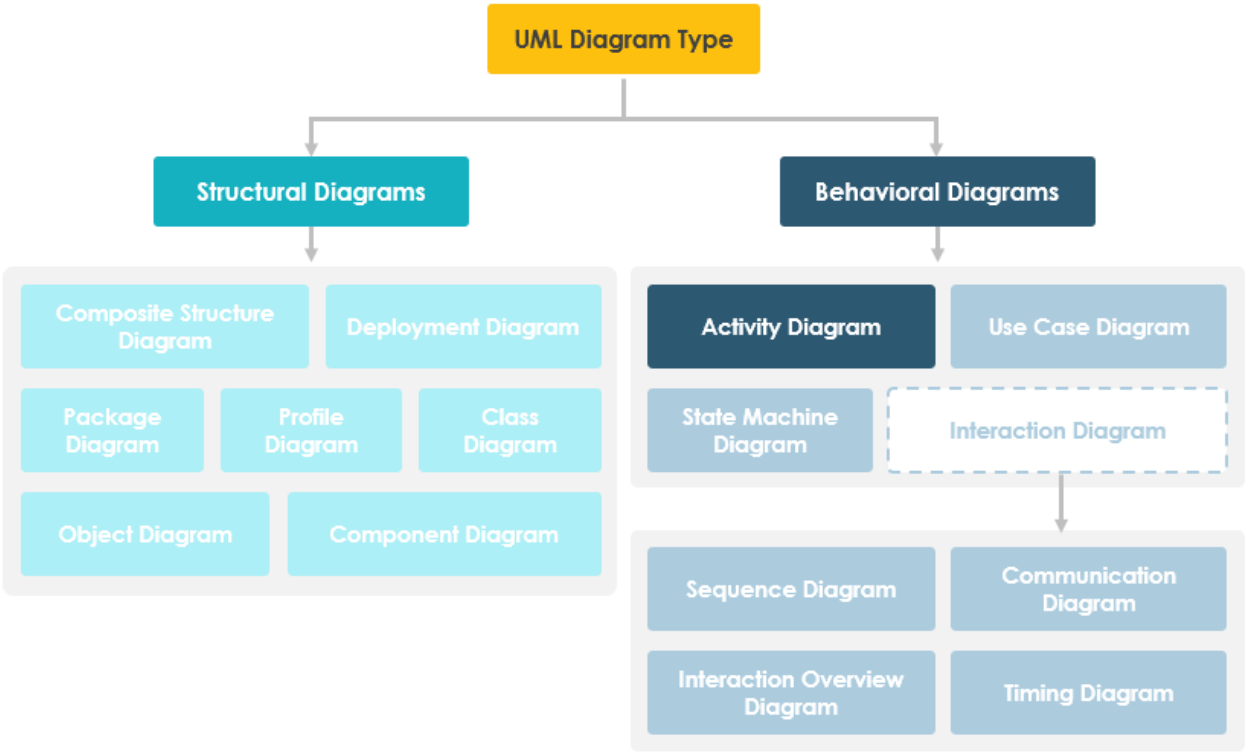


Figure 1: UML Diagram type

- **When to Use Activity Diagram:**
  Activity Diagrams describe how activities are coordinated to provide a service which can be at different levels of abstraction. Typically, an event needs to be achieved by some operations, particularly where the operation is intended to achieve a number of different things that require coordination, or how the events in a single use case relate to one another, in particular, use cases where activities may overlap and require

coordination. It is also suitable for modeling how a collection of use cases co-ordinate to represent business workflows.

1. Identify candidate use cases, through the examination of business workflows
2. Identify pre- and post-conditions (the context) for use cases
3. Model workflows between/within use cases
4. Model complex workflows in operations on objects
5. Model in detail complex activities in a high level activity Diagram

- **Activity Diagram - Learn by Examples:**
  A basic activity diagram - flowchart like

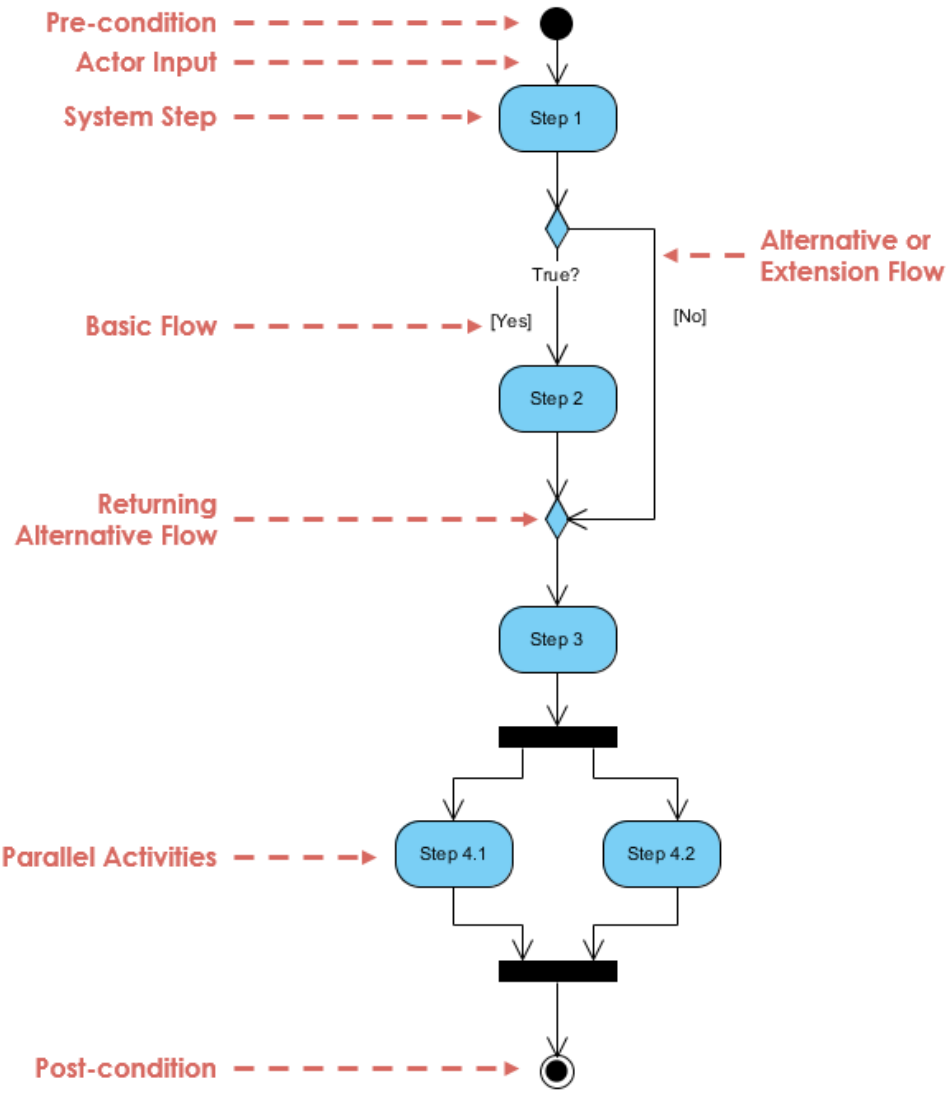


Figure 2: Example of Activity Diagram

- **Activity Diagram - Modeling a Word Processor**
  The activity diagram example below describes the workflow for a word process to create a document through the following steps:
  1. Open the word processing package.
  2. Create a file.
  3. Save the file under a unique name within its directory.
  4. Type the document.
  5. If graphics are necessary, open the graphics package, create the graphics, and paste the graphics into the document.
  6. If a spreadsheet is necessary, open the spreadsheet package, create the spreadsheet, and paste the spreadsheet into the document.
  7. Save the file.
  8. Print a hard copy of the document.
  9. Exit the word processing package.

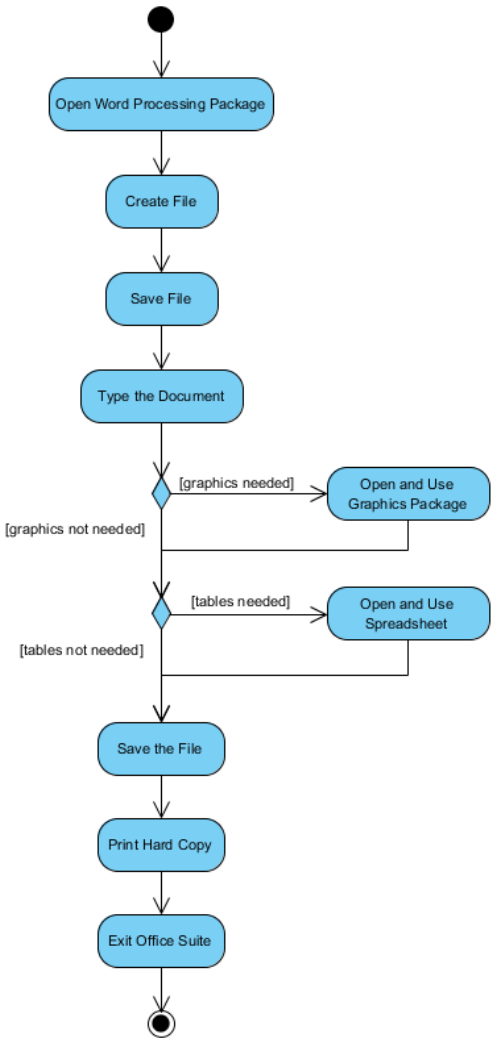


Figure 3: Activity Diagram - Modeling a Word Processor

- **Activity Diagram Example - Process Order:**
  Given the problem description related to the workflow for processing an order, let's model the description in visual representation using an activity diagram:

  Process Order - Problem Description:

  Once the order is received, the activities split into two parallel sets of activities. One side fills and sends the order while the other handles the billing.

  On the Fill Order side, the method of delivery is decided conditionally. Depending on the condition either the Overnight Delivery activity or the Regular Delivery activity is performed.

  Finally, the parallel activities combine to close the order.
  The activity diagram example below visualizes the flow in graphical form.

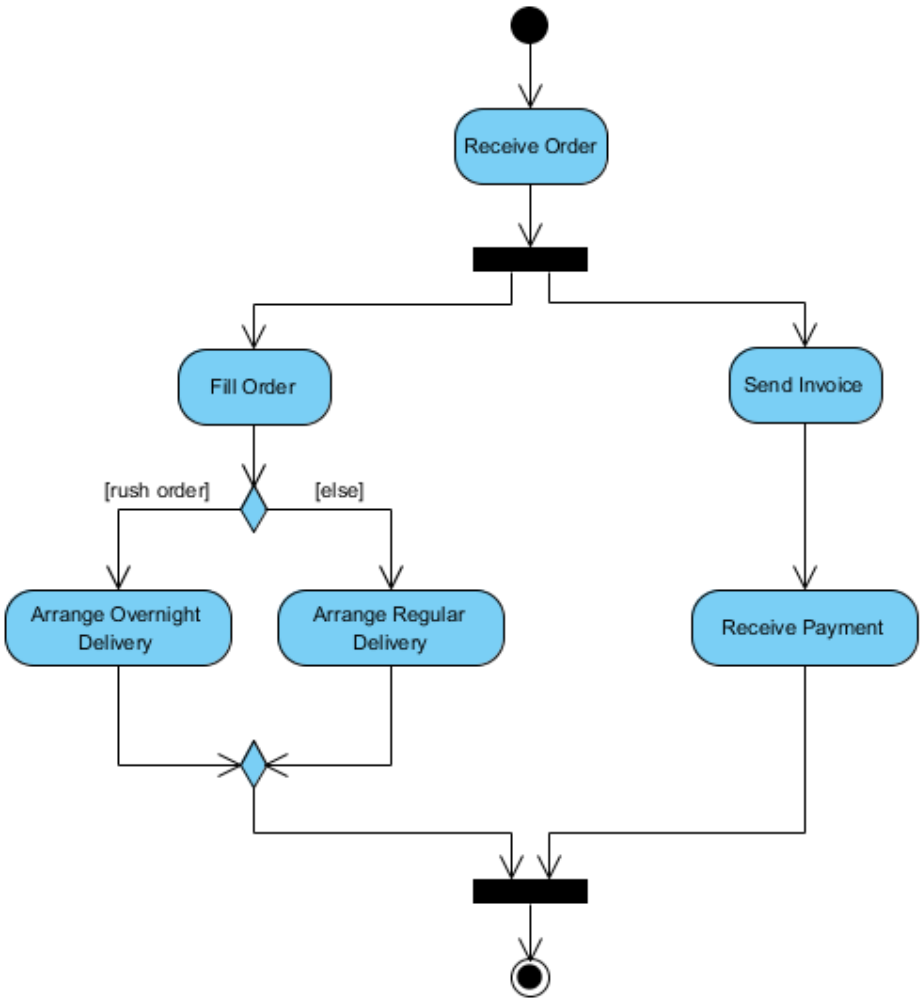


Figure 4: Activity Diagram – Process Order

- **Activity Diagram Example - Student Enrollment**

  This UML activity diagram example describes a process for student enrollment in a university as follows:

  1. An applicant wants to enroll in the university.
  2. The applicant hands a filled out copy of Enrollment Form.
  3. The registrar inspects the forms.
  4. The registrar determines that the forms have been filled out properly.
  5. The registrar informs student to attend in university overview presentation.
  6. The registrar helps the student to enroll in seminars
  7. The registrar asks the student to pay for the initial tuition.

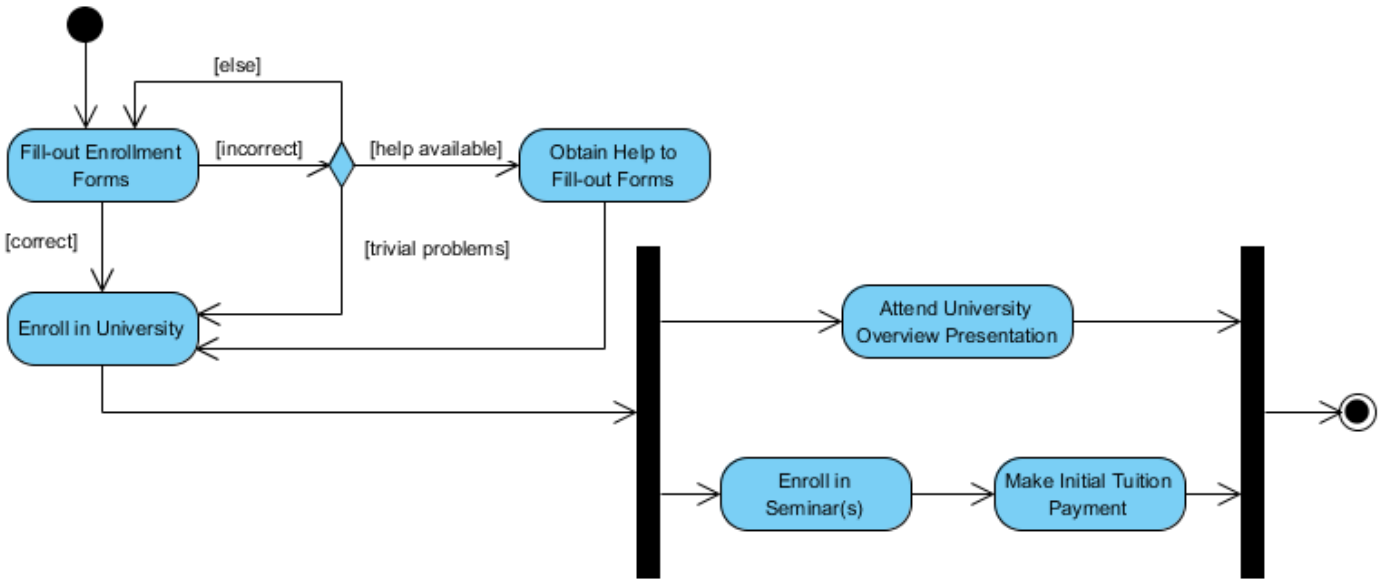


Figure 5: Activity Diagram – Student Enrollment

- **Activity Diagram – Swimlane :**

  A swimlane is a way to group activities performed by the same actor on an activity diagram or activity diagram or to group activities in a single thread. Here is an example of a swimlane activity diagram for modeling Staff Expenses Submission:

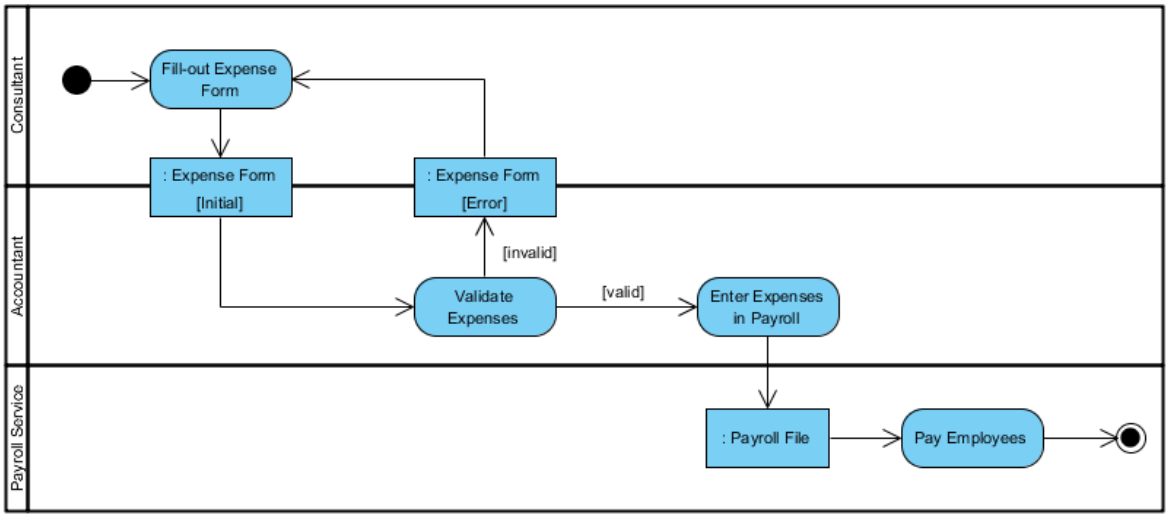


Figure 6: Activity Diagram – Swimlane

- **Swimlane and Non-Swimlane Activity Diagram:**

The activity diagram example below describes the business process for meeting a new client using an activity Diagram without swimlane.

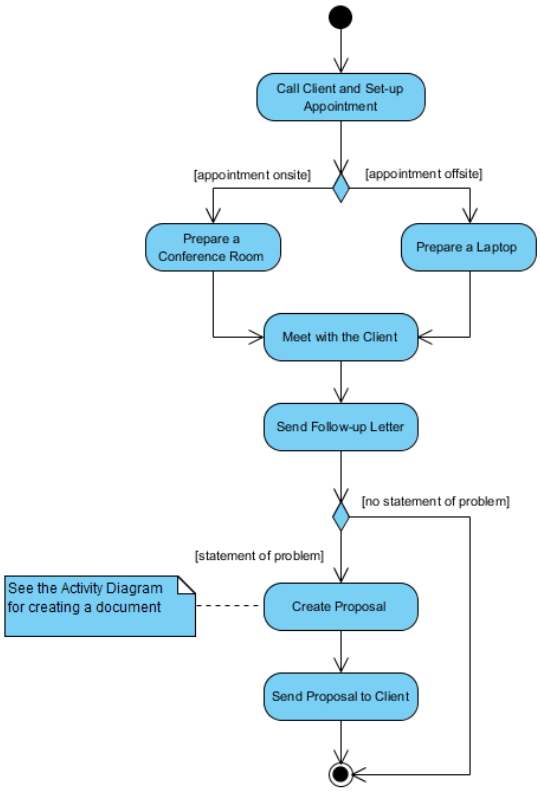


Figure 7: Activity Diagram – Non Swimlane

This figure below describes the business process for meeting a new client using an activity Diagram with swimlane.

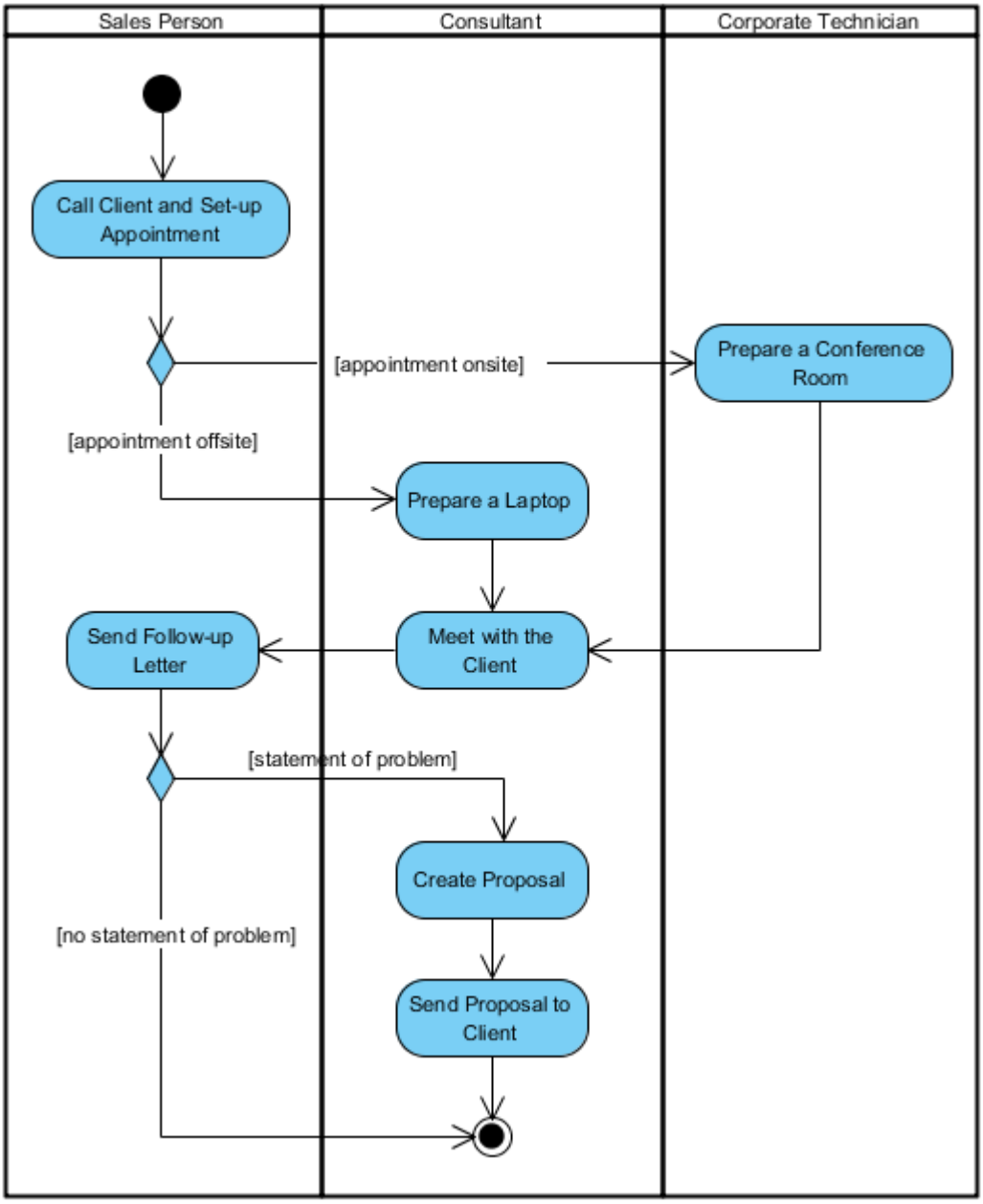
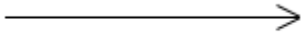
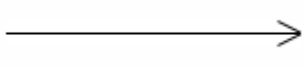
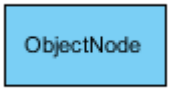
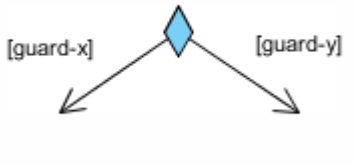
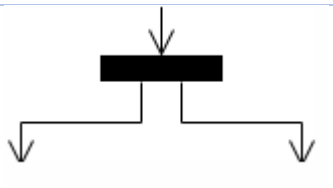
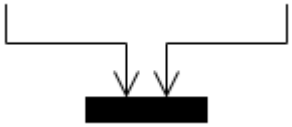


Figure 8: Activity Diagram with Swimlane

- **Activity Diagram Notation Summary:**

Activity Is used to represent a set of actions	
Action A task to be performed	
Control Flow Shows the sequence of execution	
Object Flow Show the flow of an object from one activity (or action) to another activity (or action).	
Initial Node Portrays the beginning of a set of actions or activities	
Activity Final Node Stop all control flows and object flows in an activity (or action)	
Object Node Represent an object that is connected to a set of Object Flows	
Decision Node Represent a test condition to ensure that the control flow or object flow only goes down one path	
Merge Node Bring back together different decision paths that were created using a decision-node.	

Fork Node Split behavior into a set of parallel or concurrent flows of activities (or actions)	
Join Node Bring back together a set of parallel or concurrent flows of activities (or actions).	
Swimlane and Partition A way to group activities performed by the same actor on an activity diagram or to group activities in a single thread