

Engenharia de Software (14341, 16230, 15386)

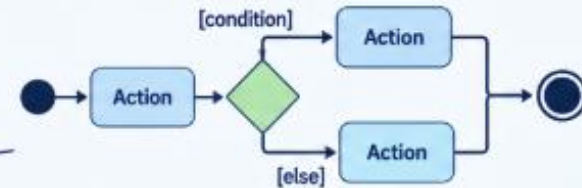
L06: Dynamic Modelling #1

L06

Practical Lab #6 Activity Diagrams

Modelling Workflows and Business Processes

*From
Actions to
Flow.
Model Real
Behaviour.*



Today's Competency Readiness Indicators

By the end of this lab, you will be better able to:



Identify activities, flows and decisions

Recognize the main activities, control flows, decisions and parallel flows in a process or system behaviour.



Create activity diagrams

Model system or business processes using UML activity diagrams with actions, decisions, merges, forks, joins and swimlanes where appropriate.



Model responsibilities

Use swimlanes to represent different actors, systems or organizational units and assign responsibilities to activities.



Analyse and improve processes

Use activity diagrams to analyse process efficiency, identify bottlenecks and suggest improvements.



Ensure consistency with requirements

Verify that the model is aligned with the previously defined requirements, use cases and other UML diagrams.



Communicate and validate behaviour

Explain the activity diagram to stakeholders and validate that it accurately represents the intended system or business process.

Related SFIA Competencies (main areas)

MODL

Systems Modelling

DESN

Systems Design

ANAL

Business Analysis

PROG

Programming / Software Development



L06 – DYNAMIC MODELLING I: ACTIVITY DIAGRAMS

Goal: Model the workflow of use cases to understand how the system's work is performed.

1 Requirements Engineering

- ☒ Stakeholders
- ☒ Features
- ☒ Personas
- ☒ Scenarios
- ☒ User Stories

2 Requirements Analysis

- ☒ Use Case Specifications
- ☒ Use Case Diagram
- ☒ Class Diagram (Domain Model)

3 Dynamic Modelling

- ☒ Activity Diagram
- ☐ Sequence Diagram
- ☐ State Diagram

4 Software Design

- ☐ Software Architecture
- ☐ Design Decisions

Legend

- ☒ Completed milestone
- ☐ Pending milestone

TODAY'S SPRINT GOAL

Model the workflow of the selected use case using Activity Diagrams to better understand how the system's work is performed.

PART 1 Project Brief

10 min ⌚

CLIENT REQUEST #2



"Students should be able to reserve a study room in less than one minute."

To achieve this, we need to understand the reservation process.

Your task:

Understand the process and model the workflow for the selected use case.

Think about:

- What are the main steps?
- Where are decisions taken?
- Are there parallel activities?
- Who performs each step?



TODAY'S DELIVERABLE

- Activity Diagram of the selected use case



PART 2 Core Project

60 min ⌚

Choose one use case from your project (e.g., "Reserve Study Room").

1 Understand the Use Case

Review the use case specification and clarify the main flow.

Identify Activities

List the actions/activities that must be performed.

Model the Workflow

Create the Activity Diagram using actions, decisions, fork/join and swimlanes when relevant.

☒ **Validate the Flow**

Ensure the workflow is complete, clear and aligned with the use case specification.

DELIVERABLE

Activity Diagram

(+ brief explanation of the flow)

PART 3 Engineering Challenge

25 min ⌚

PROCESS EVOLUTION CHALLENGE

A new requirement is introduced:

"The university now requires lecturers' approval before confirming a study room reservation."

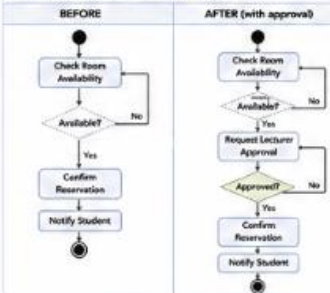
How does this affect the model?

Your task:

Analyse the impact on your Activity Diagram.

- 1 Where would you add the new activity(ies)?
- 2 What new decision(s) are needed?
- 3 Which new roles/actors are involved?
- 4 Which swimlanes (if any) are impacted?
- 5 How does this change the main flow?

EXAMPLE (RESERVE STUDY ROOM)



DELIVERABLE

Impact Analysis Report with the 5 questions above
(No need to redo the entire diagram)

PART 4 AI Challenge

15 min ⌚

Use an LLM (e.g., ChatGPT) to generate both diagrams for the selected use case.



SUGGESTED PROMPT

"Create an Activity Diagram for the use case 'Reserve Study Room' in the Smart Campus system. Include the main flow, decisions and swimlanes for Student, System and Lecturer (Approval if needed)."



Compare the generated diagrams with yours.

CHECKLIST

- ☒ Are the activities complete?
- ☒ Are decisions correct?
- ☒ Are swimlanes appropriate?
- ☒ Are parallel paths used where needed?
- ☒ Are alternative flows considered?

PART 5 Reflection & Discussion

15 min ⌚

Discuss with your team and be ready to share.



Which activity was the most challenging to model? Why?



Did any activity belong to a single actor/role? Why or why not?



How does the Activity Diagram help you understand the use case better?



What did you learn today about processes tools?

ENGINEERING INSIGHT



Activity diagrams describe processes and workflows. They focus on what is done and in what order, not on how objects communicate.

TIPS FOR SUCCESS

- Start from the main happy path.
- Add decisions where choices exist.
- Use swimlanes to show responsibilities.
- Keep the diagram simple at first.
- Validate with the use case specification.

ACTIVITY DIAGRAM ELEMENTS (UML)



SEQUENCE DIAGRAM ELEMENTS (UML)



STATE DIAGRAM ELEMENTS (UML)



TOOLS YOU CAN USE

- diagrams.net (draw.io)
- Lucidchart
- Visual Paradigm Online
- PlantUML
- miro

QUESTIONS?

Let's clarify, explore and learn together!



Concepts

Anything you didn't understand?



Applications

How do we apply these ideas?



Decisions

Want to discuss any trade-offs?



Next Steps

What would you like to learn next?



No question is too small!

Your questions help everyone learn and grow.



Ask freely, challenge ideas, and let's build understanding **together!**