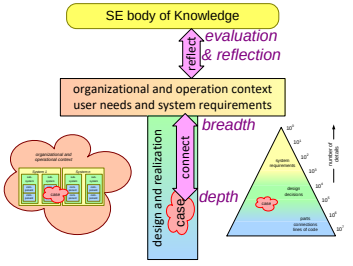
Systems Engineering Master Project

by *Gerrit Muller* HSN-NISE
e-mail: gaudisite@gmail.com
www.gaudisite.nl

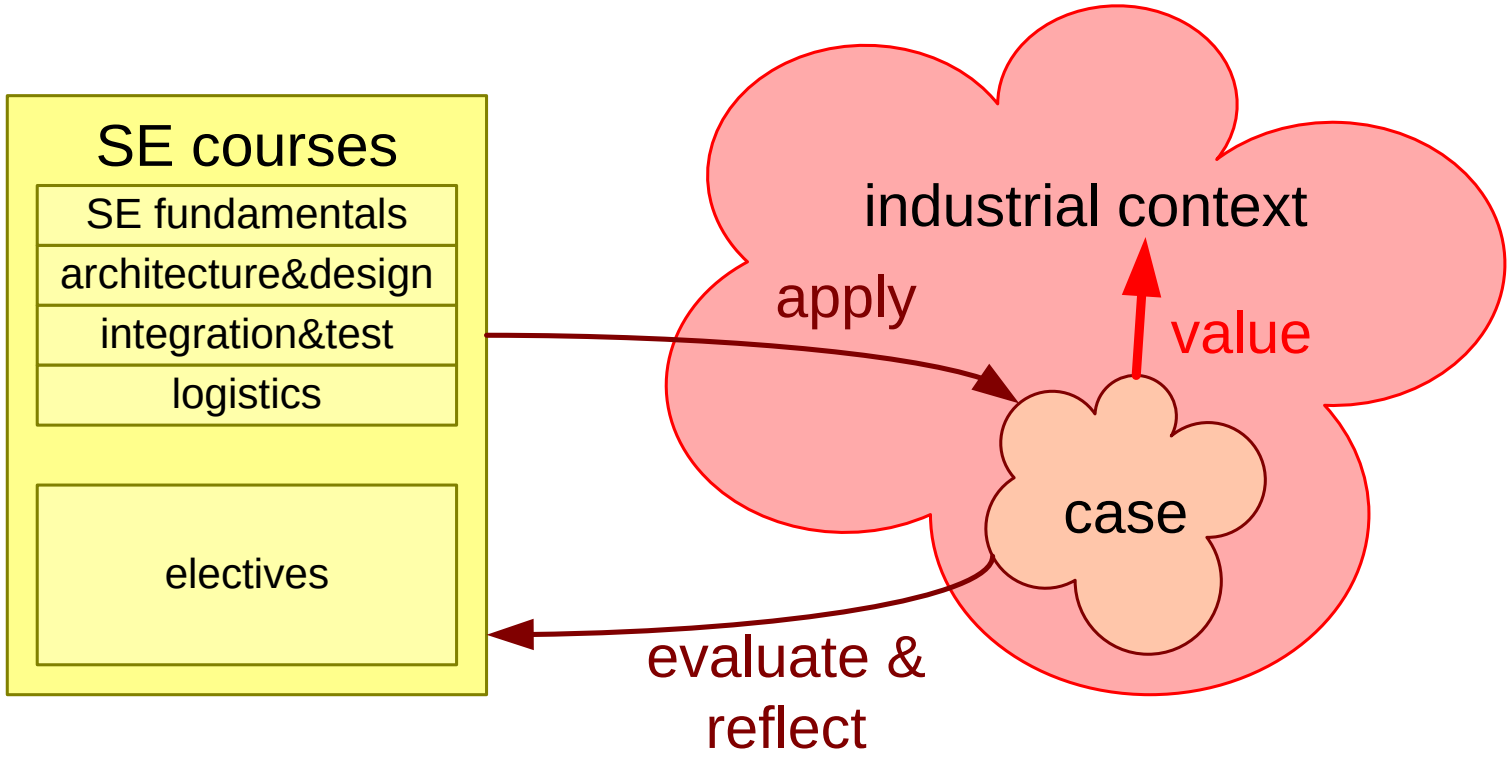
Abstract

The master study Systems Engineering is completed by performing a master project. This document describes objectives and guidelines for the project and the resulting paper or report.



May 15, 2021
status: concept
version: 1.8

Objectives of Master Project



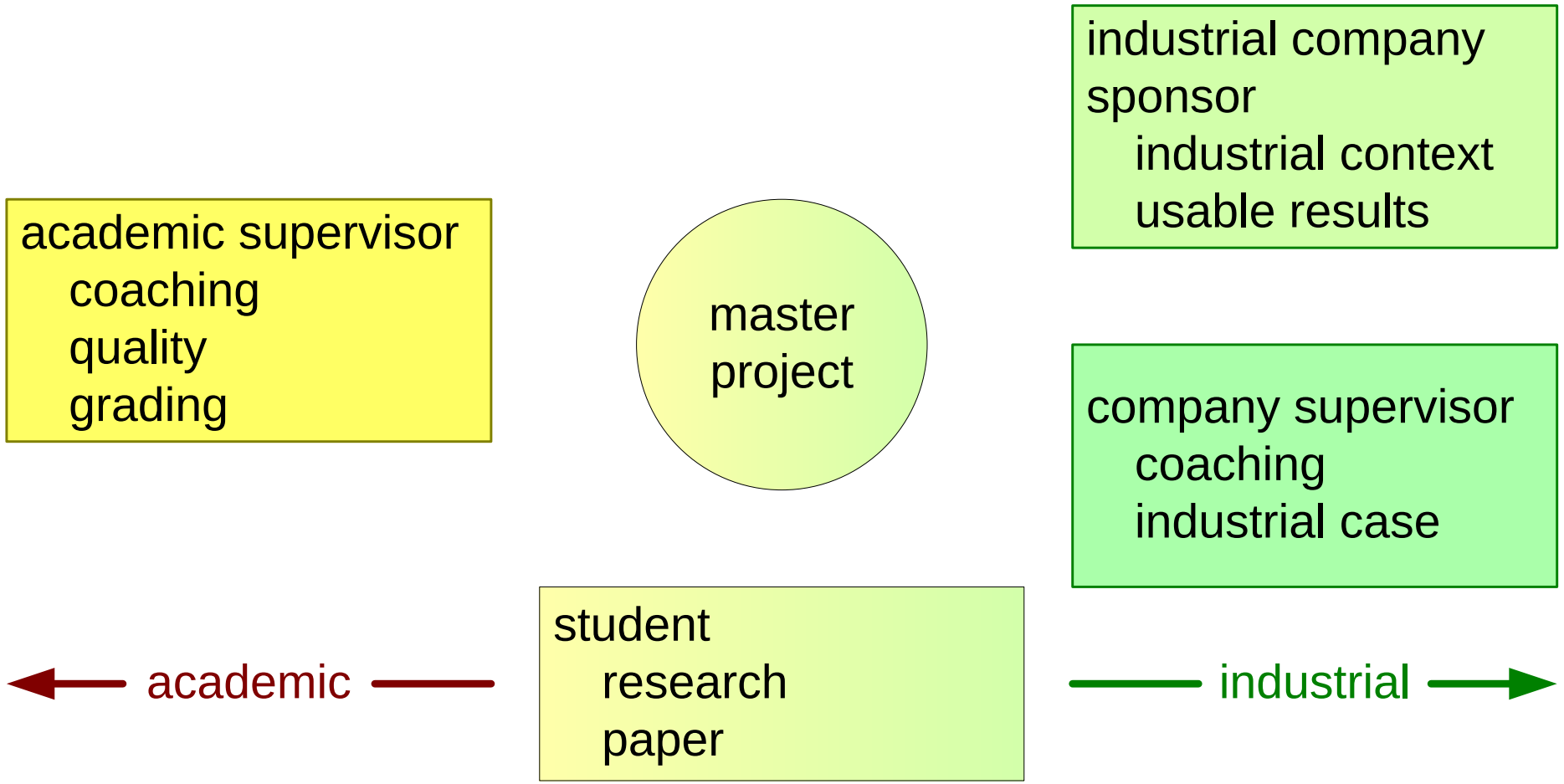
Apply SE methods, techniques, and concepts in practice
and evaluate and reflect on its application,
while providing value to the industrial sponsor

Formalized Goal Statement

The goals of the Final Project are:

- the students have to show their **professional competence** and the acquired command of the systems engineering discipline by applying it to a selected problem.
- the selected problem has to be **relevant** in the context of the **company** in which the student works
- **competence** is truly put into **practice**.
- to facilitate the students to make the step from “just applying” to “**critical evaluation** and **reflection**”.
- to verify that students are capable to operate at **academic level**.

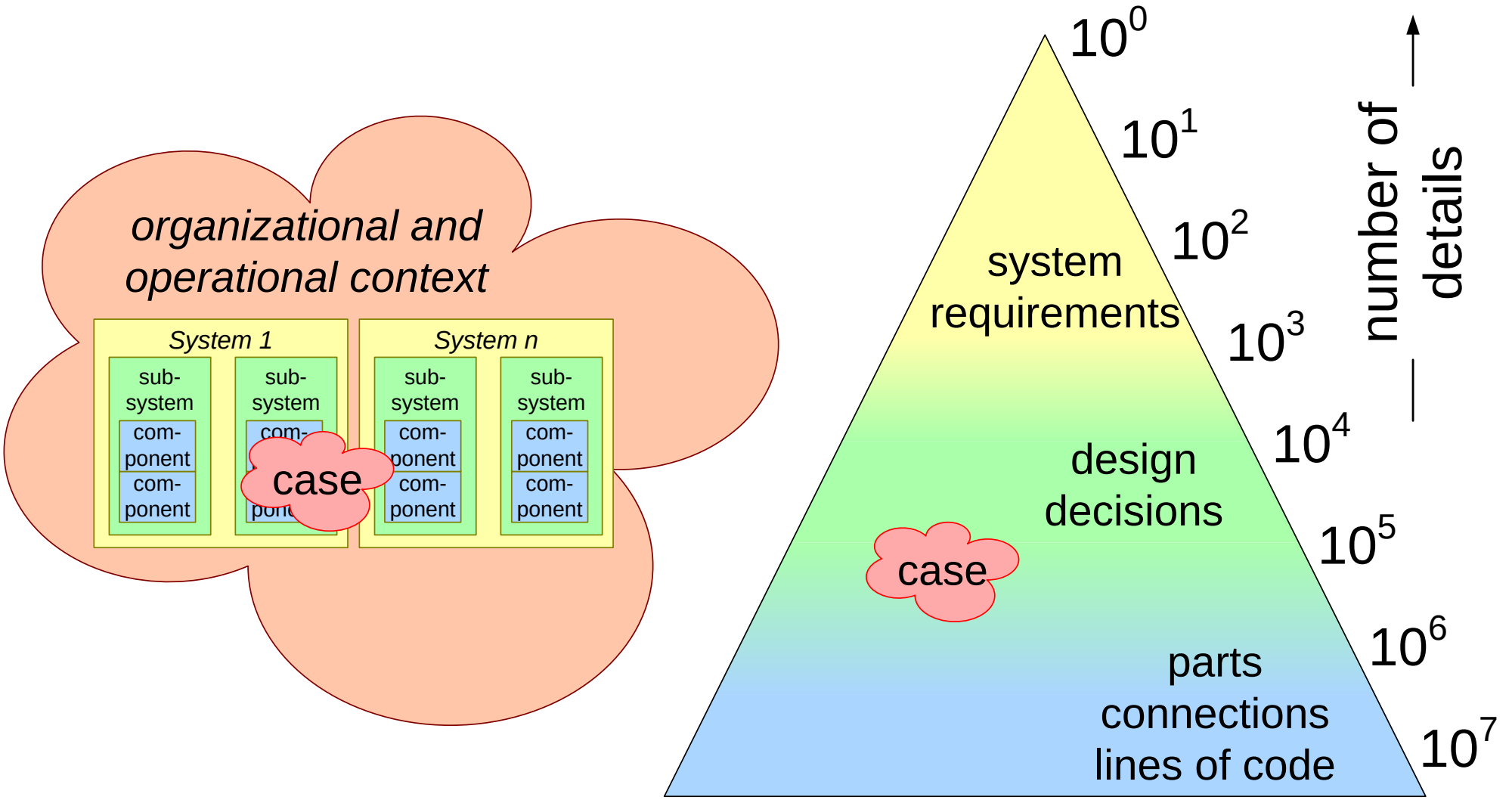
Stakeholders of the Master Project



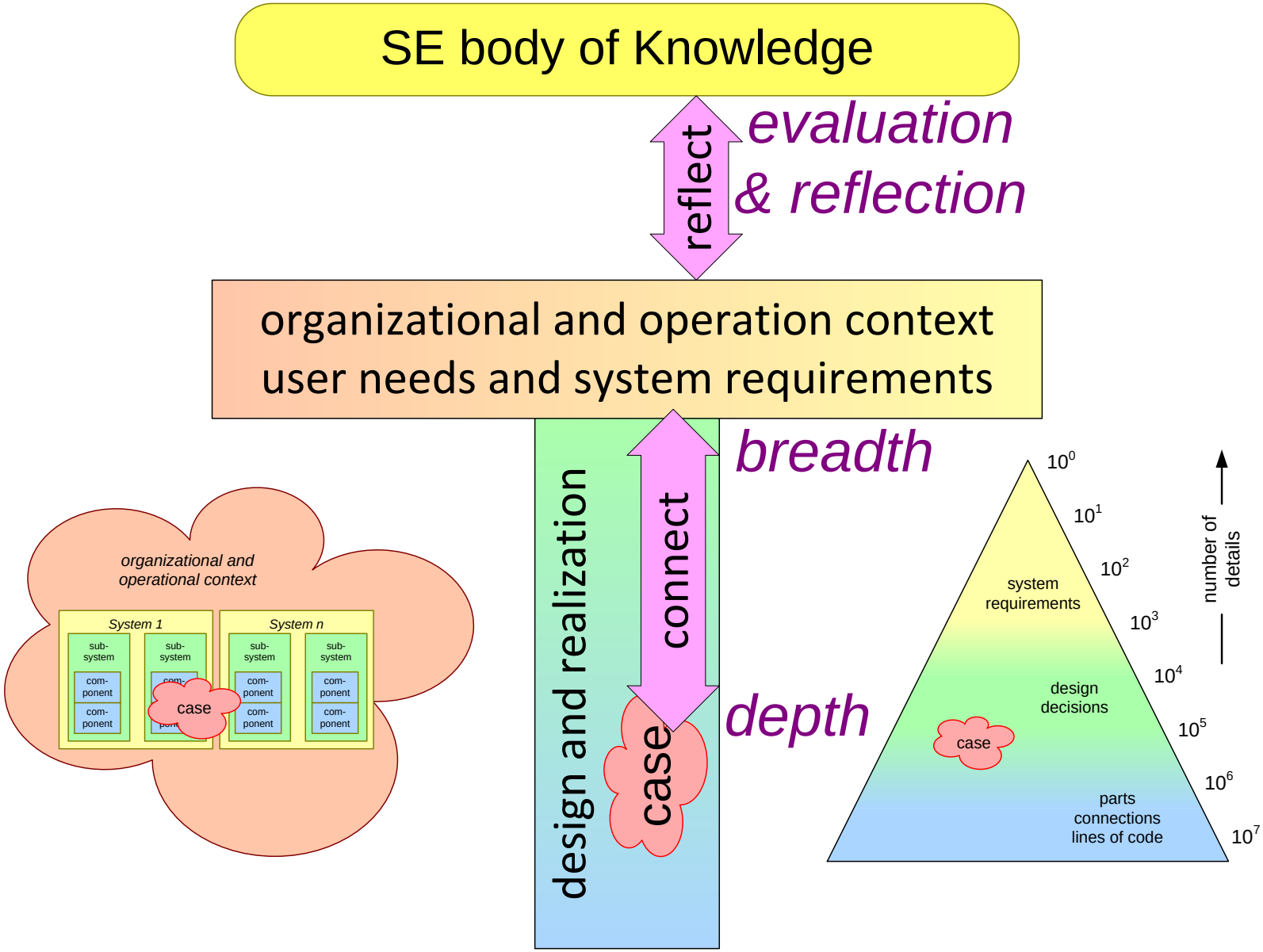
Scoping is Crucial

What methods, techniques, tools, concepts	Systems Engineering
What (sub)systems, releases, functions, qualities, aspects, disciplines, technologies	industrial
What timing of activities and deliverables	planning
What resources (student time, means, advisors)	planning
What approach, criteria	research

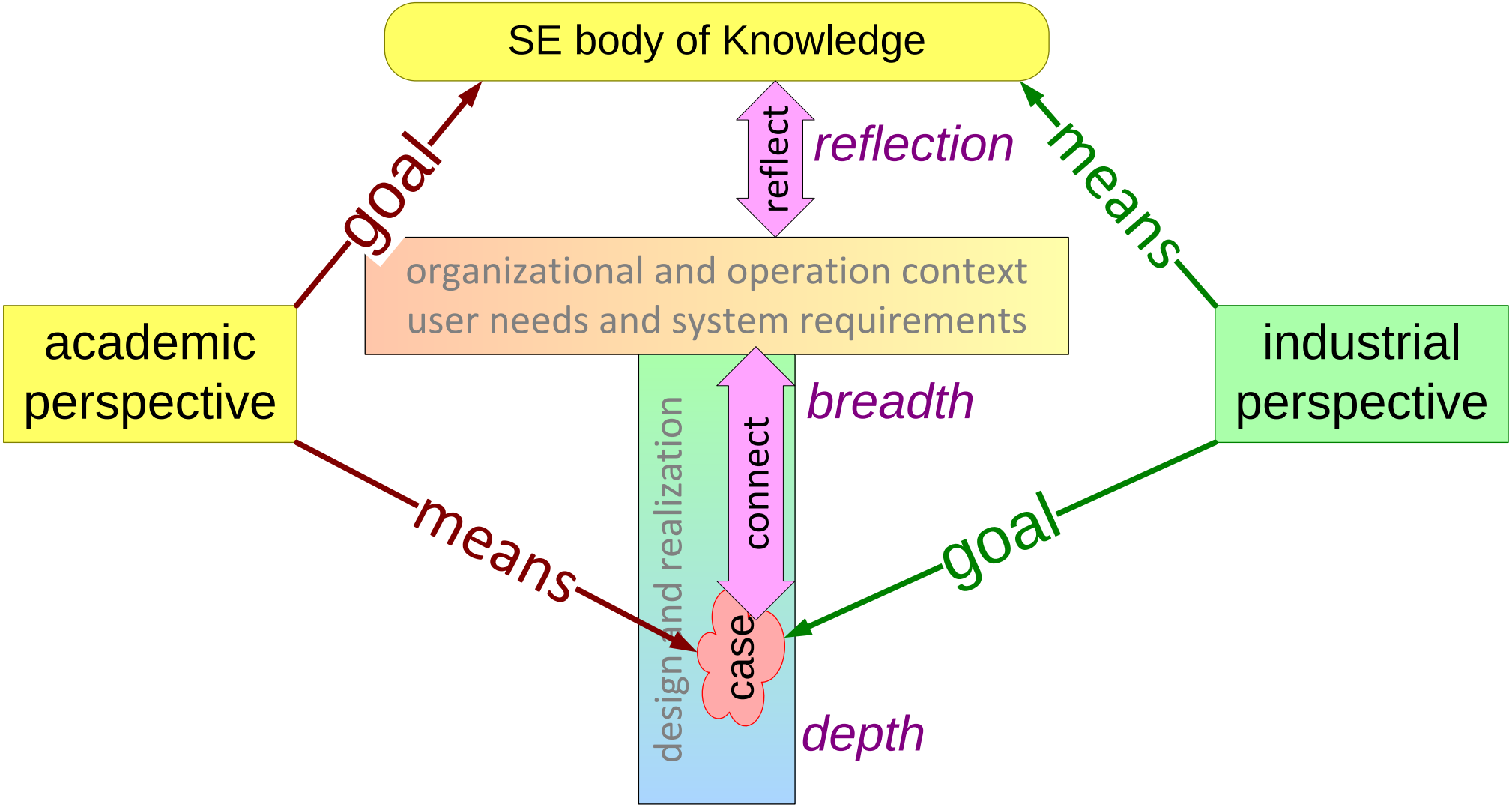
Case Positioning



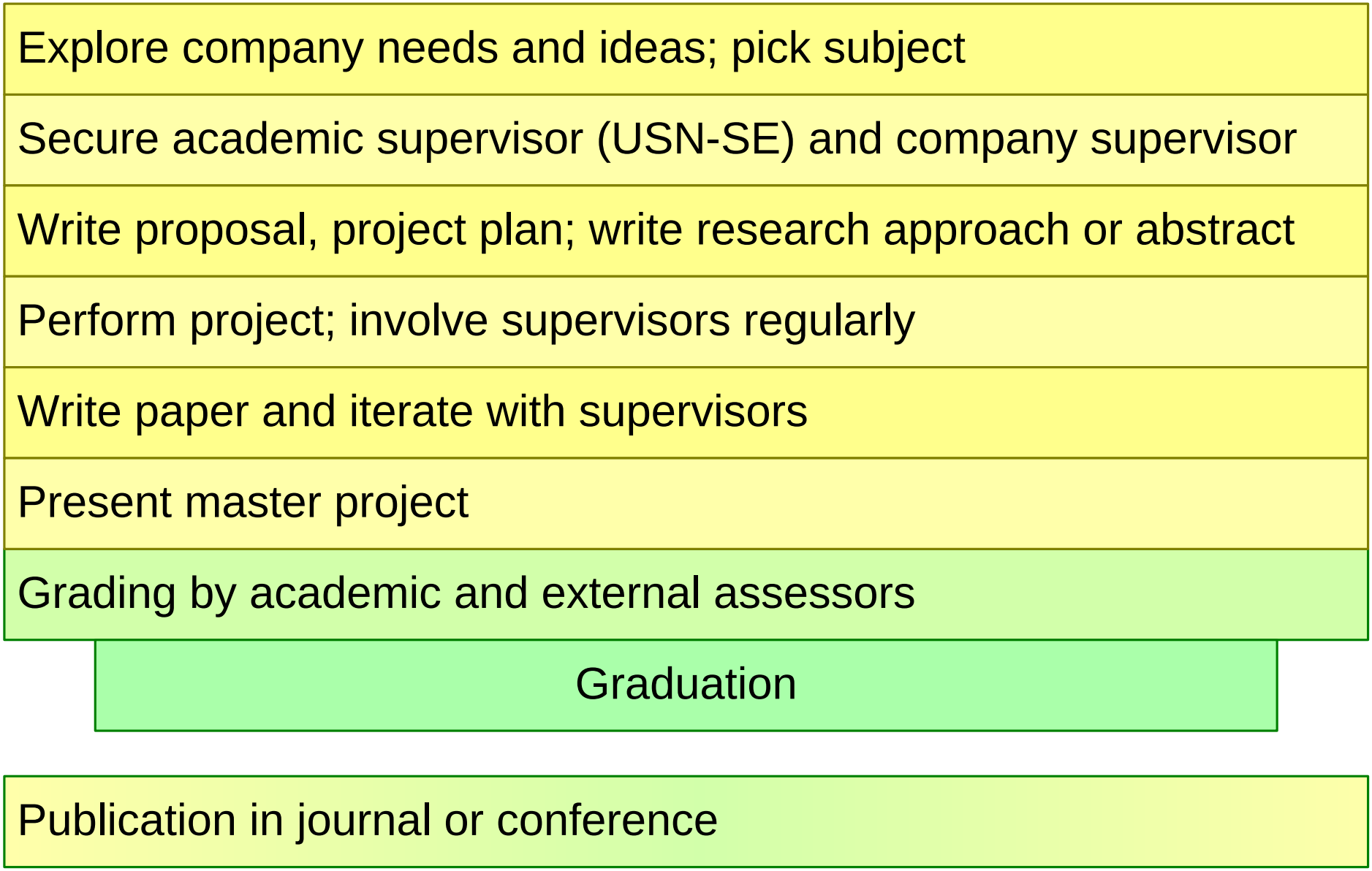
Depth, Breadth and Reflection



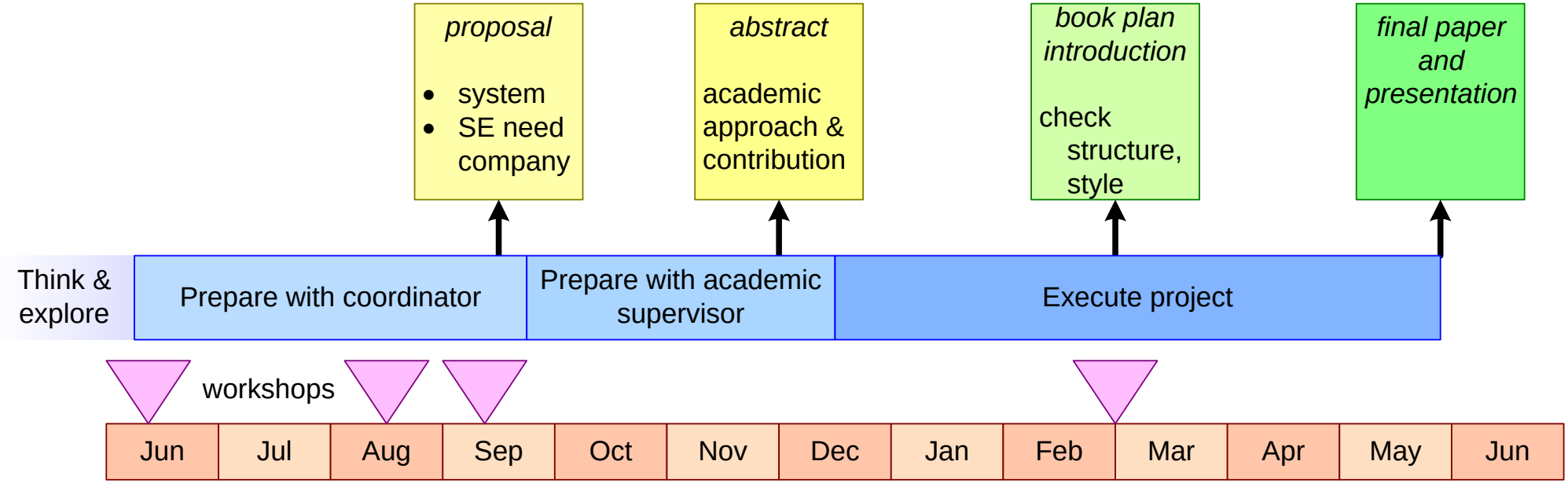
Difference Academic and Industrial Goals



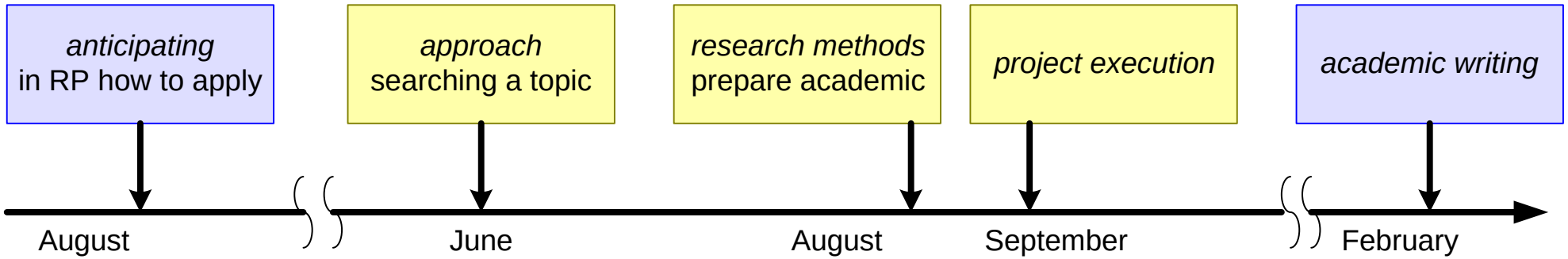
Process of Master Project



Timeline of the Master Project

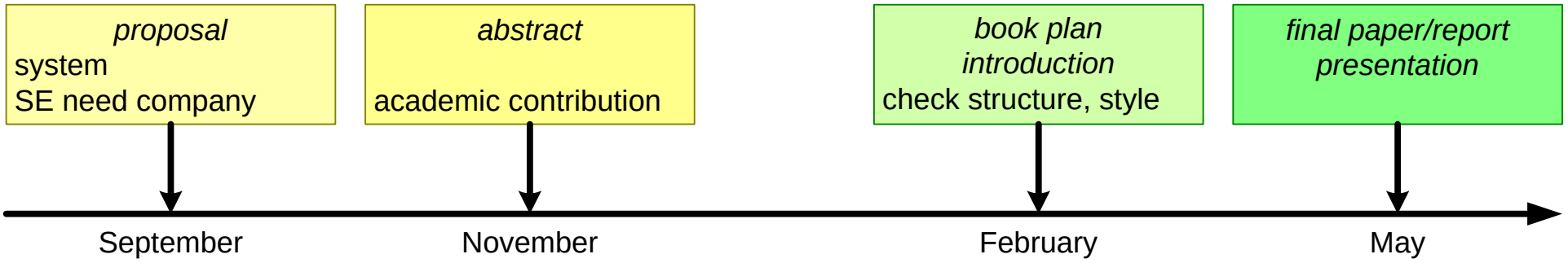


SEMP Workshops



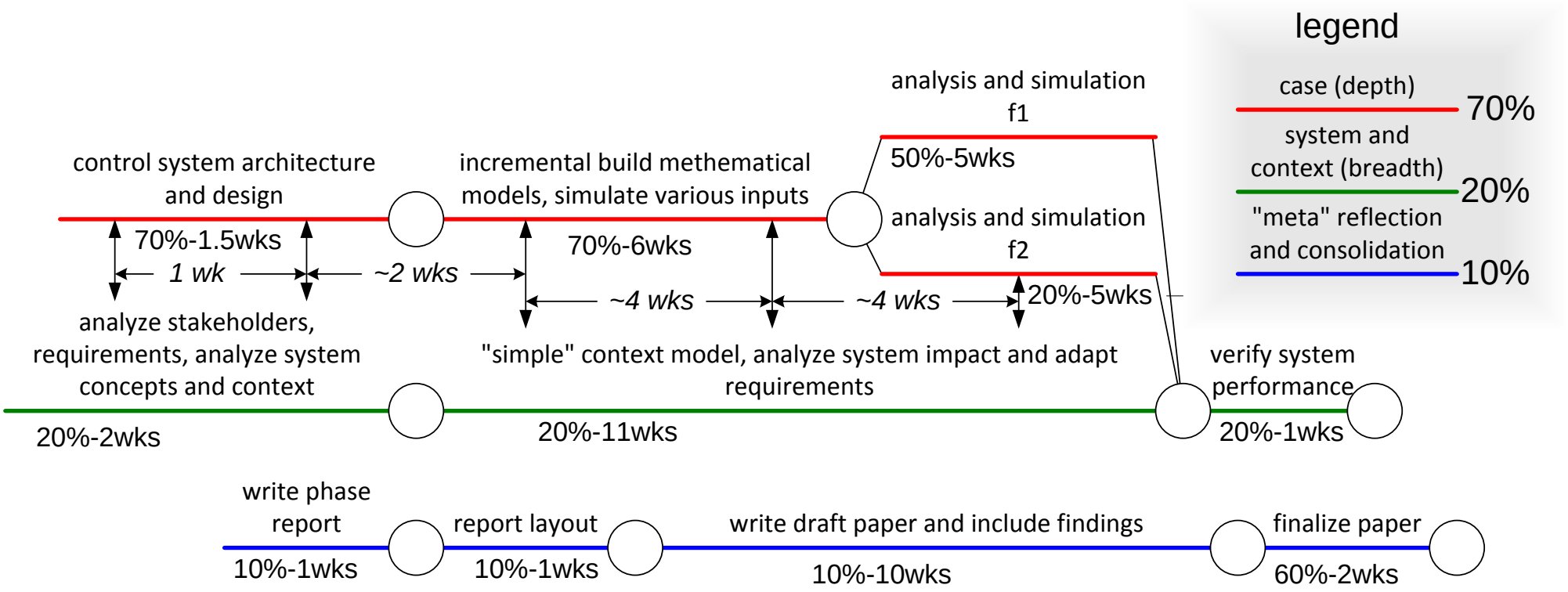
tentative dates for milestones for IM students

Master Project Milestones



tentative dates for milestones for IM students

Plan: Simple PERT Diagram



Abstract

"A good abstract should answer three questions:

What did I do,

what did I learn,

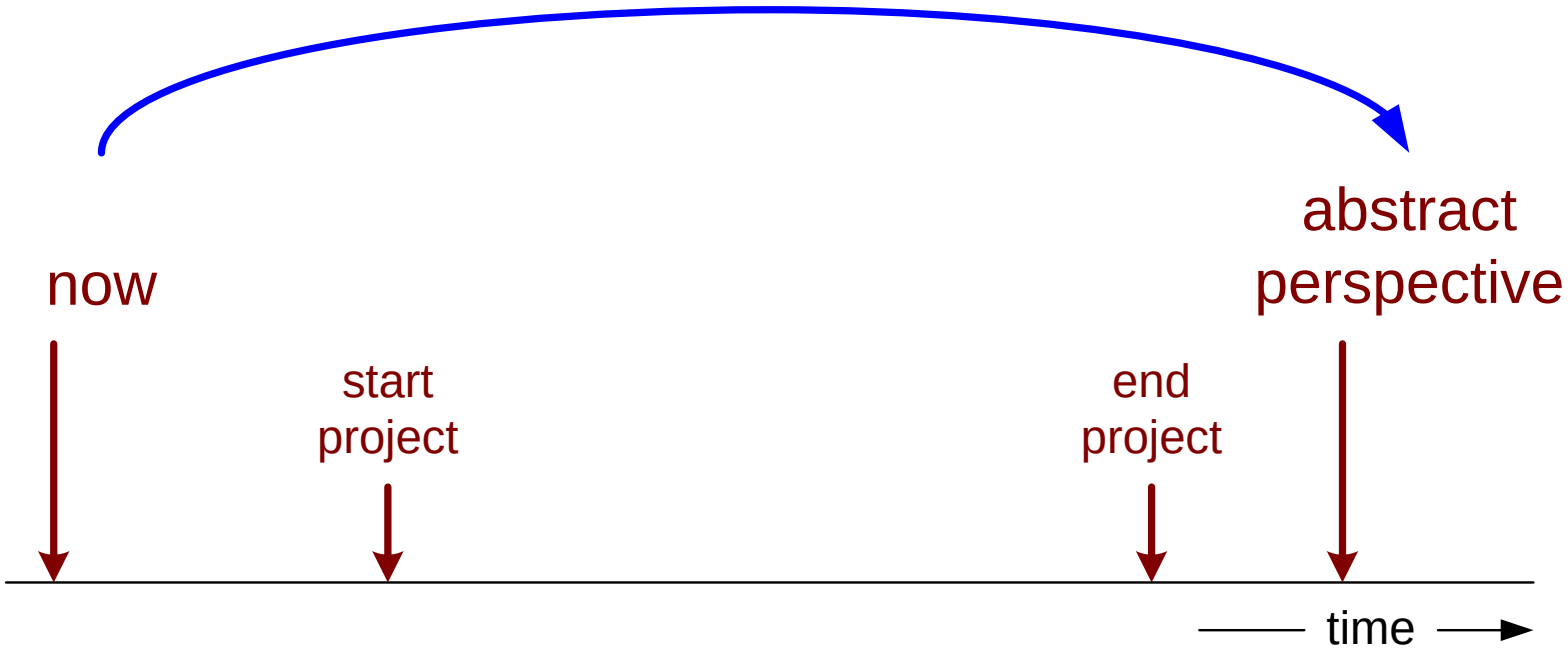
and why is that important?

The key is to identify something or things that can be reused in the future."

Prof. Michael Pennotti, Stevens Institute of Technology

Needed: Time Machine

"fast forward" yourself into the future
what do you expect to be the project outcome?



Students write an initial abstract at the start to think through what can happen. At the end of writing the paper, you write the real abstract. The academic supervisor has to accept the initial abstract before starting the project.

Project Execution

maintain a project log	data, findings documents references
keep supervisors involved	regular presentations regular meetings
time box and iterate	case system and context reflection and consolidation
early feedback on paper	start writing early elicit feedback early work incremental

Publishable Paper

1. Explanation of the subject; what is the goal of the project?

2. Positioning of the subject in the academic context and literature; what does this paper add to the Body of Knowledge?

3. How is the project performed, what has been done.

4. Evaluation of the project, reflection on the results and the project itself.

5. Paper should be submittable to a refereed conference or to a journal; the academic supervisor may accept a report as well.

Stevens Guidelines for Paper

1. Clearly introduce the problem that the manuscript is discussing/ addressing,

2. Discuss the problem background. That is, discuss the research that has been previously conducted by you or others in the field (or related fields) to solve/address the same or similar problem,

3. Develop a succinct argument for the methods or ideas proposed in your manuscript,

4. Present a clear and understandable justification of why the proposed methods or ideas contribute to a superior or different solution to the problem. A clear statement of your contributions is often crucial to reviewers. Clear specify this when possible. And finally,

5. Discuss the likely future directions of the research being conducted by you (your group).

http://www.stevens-tech.edu/ses/documents/fileadmin/documents/pdf/SE_Master_Project_Guidelines.pdf

Final Presentation at the end of the project

student presentation of master project

~30 minutes presentation

~20 minutes questioning by examinators

~10 minutes examinators conclude

committee:

- academic supervisor
- at least one other academic staff member of SE
- external assessor
- (optional) company supervisor or representative
- at least 3 people

Publication Process

Company screens paper for sensitive or confidential issues, see http://www.gaudisite.nl/BuskerudSEpublicationProcedureSlides.pdf
Select target journal or conference, typical choices are: INCOSE symposium, CSER, Journal of SE
Transform the paper into the prescribed format or template
Review of the paper by USN-SE and Company, adapt paper
Submit paper to journal or conference
Process journal or conference feedback
Final review by company
Submit final version
Visit conference and present paper

Third Party Involvement

If a third party is involved, e.g. a customer or supplier,

then ask the third party to agree with publication procedure:

http://www.gaudisite.nl/BuskerudSEpublicationProcedureSlides.pdf

and ask who will be reviewer for the third party

Conventions for Submitting Project Deliverables

Submission instructions

use for all preparation deliverables the following conventions:

filename: SEMP <your name> <subject>.<version>.<extension>

e.g. SEMP John Student abstract.2.doc

where subject = {proposal | abstract | plan | presentation | paper | ...}

email to: <gerrit . muller@ gmail . com>

subject: SEMP <subject>

"standard" file types preferred, e.g. pdf, jpg, doc, xls, ppt

Links

workshop 1 in June

Master Project Description: http://www.gaudisite.nl/SEthesisProjectPaper.pdf

workshop 2 in August

Systems Engineering Research Methods: http://www.gaudisite.nl/SEresearchMethodsSlides.pdf

workshop 3 in September

Master Project; Writing an Abstract: http://www.gaudisite.nl/MasterProjectWritingAnAbstract.pdf

Master Project; Execution Phase: http://www.gaudisite.nl/MasterProjectProjectExecution.pdf

Publication procedure: http://www.gaudisite.nl/BuskerudSEpublicationProcedureSlides.pdf

Guidelines for visualizations: http://www.gaudisite.nl/VisualizationGuidelinesSlides.pdf

Validation of Systems Engineering Methods and Techniques in Industry

http://www.gaudisite.nl/CSER2012_Muller_validationSEinIndustry.pdf

Systems Engineering Research Methods (paper)

http://www.gaudisite.nl/CSER2013_Muller_SEresearchMethods.pdf

Systems Engineering Research Validation http://www.gaudisite.nl/SEresearchValidationPaper.pdf

Published Master Project papers: http://www.gaudisite.nl/MasterProjectPapers.html

Workshop Academic Writing http://www.gaudisite.nl/RPacademicWritingSlides.pdf