Project Management

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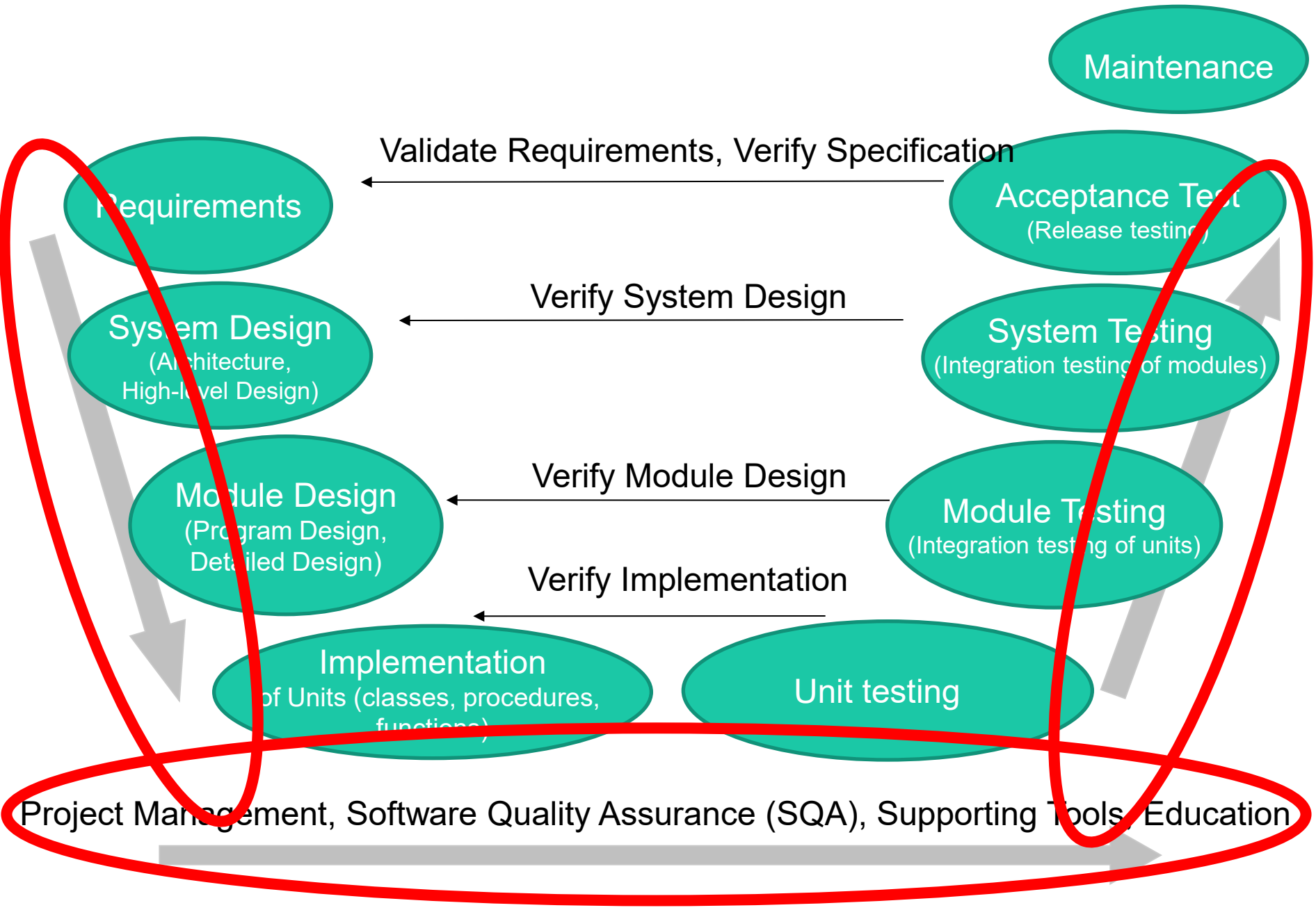
Agenda:
Definition of a project
GANNT chart
Estimation
Two success factors
Risks
Documentation


Maintenance
Validate Requirements, Verify Specification
Requirements
Acceptance Test
(Release testing)
Verify System Design
System Design
(Architecture,
High-level Design)
System Testing
(Integration testing of modules)
Verify Module Design
Module Design
(Program Design,
Detailed Design)
Module Testing
(Integration testing of units)
Verify Implementation
Implementation
of Units (classes, procedures,
functions)
Unit testing
Project Management, Software Quality Assurance (SQA), Supporting Tools, Education

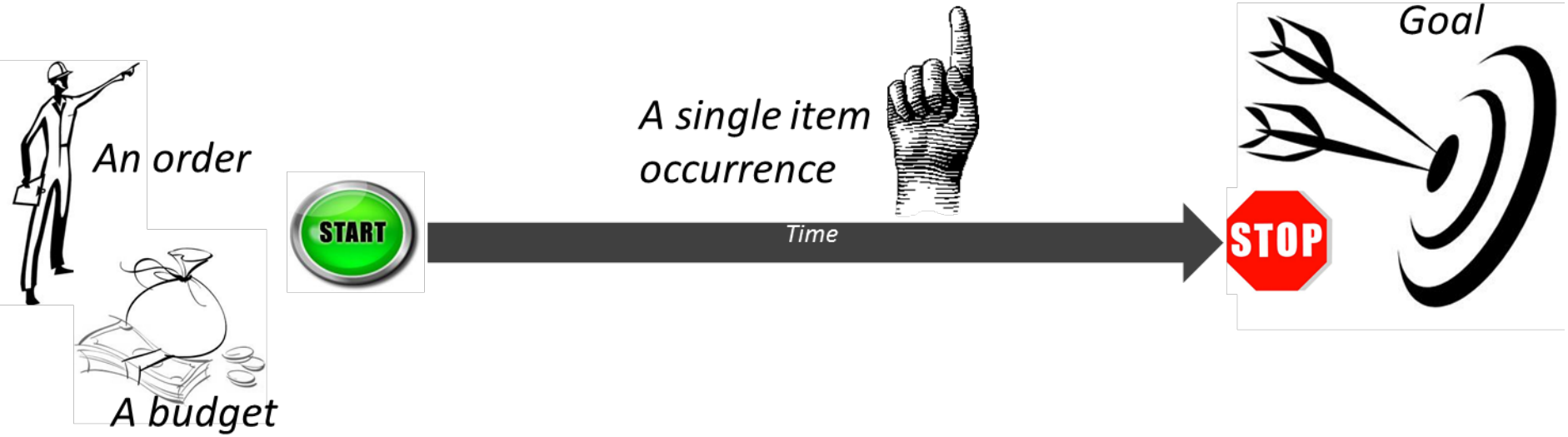
What is a project?

Definition of a project

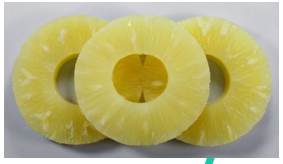
- A project is a temporary endeavor undertaken to create a unique product or service

Project Management Institute

Necessary parts of a project

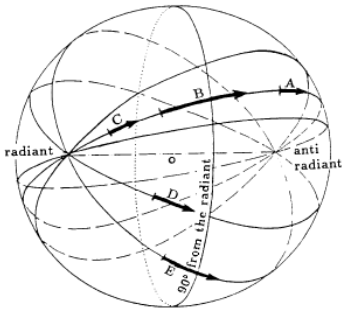


There is always a balance between goal and process



Clear purpose/goal, but no predefined process to follow to get there.

Unclear purpose/goal, but a strict process that you have to follow.



Which project would you like to work in?

https://www.menti.com/9x8hi5h31w

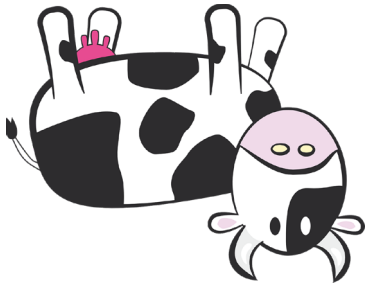
Course standard

Smart goals

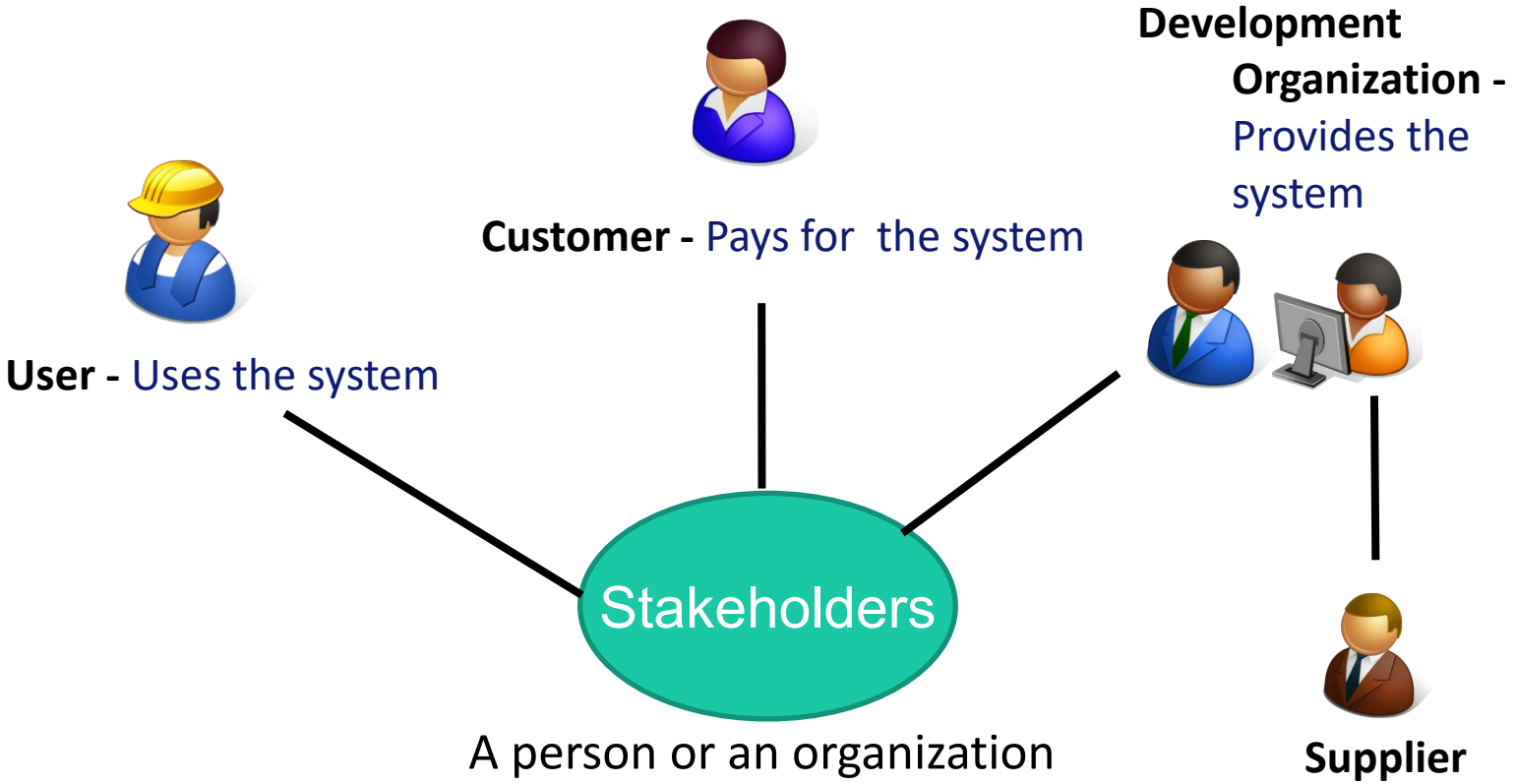
- Specific — Must be straightforward and answer the questions: **What** will you do? **Why** is it important?
- Measurable — If you cannot measure it, how do you then know if the goal is reached or not?
- Agreed upon — Agreed upon with all stakeholders (e.g. customer, user etc.)
- Realistic — Possible with the current resources, knowledge and time. You must be both willing and able to do it.
- Timely — A clear time frame for the goal.

A SMART goal is normally the best, but …

- 18 years late
- 11 times more costly
- Injured employees
- Dead cows



A stakeholder has a major interest in the project outcome



Course standard

The four dependent project parameters

Calendar Time

Resources

Project

Features

Quality

Agenda:

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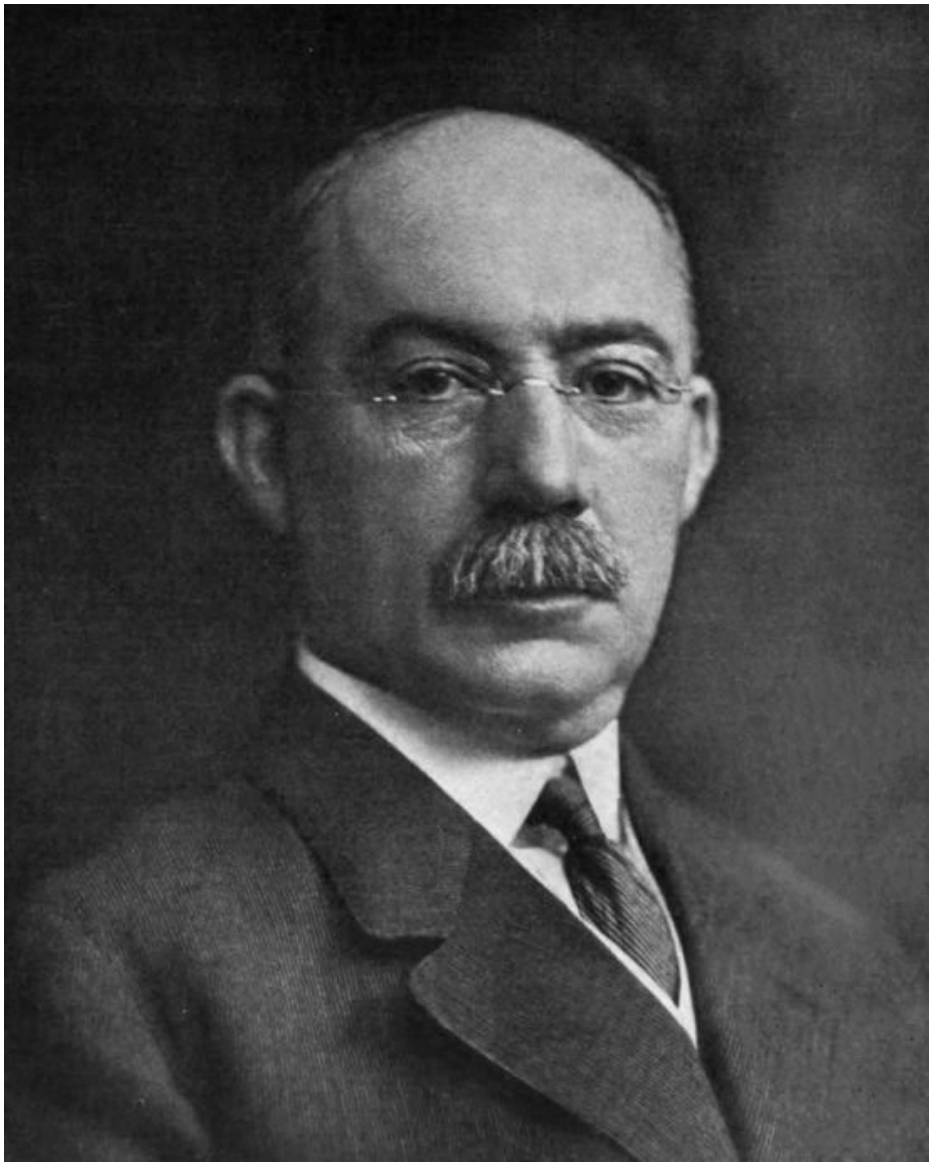


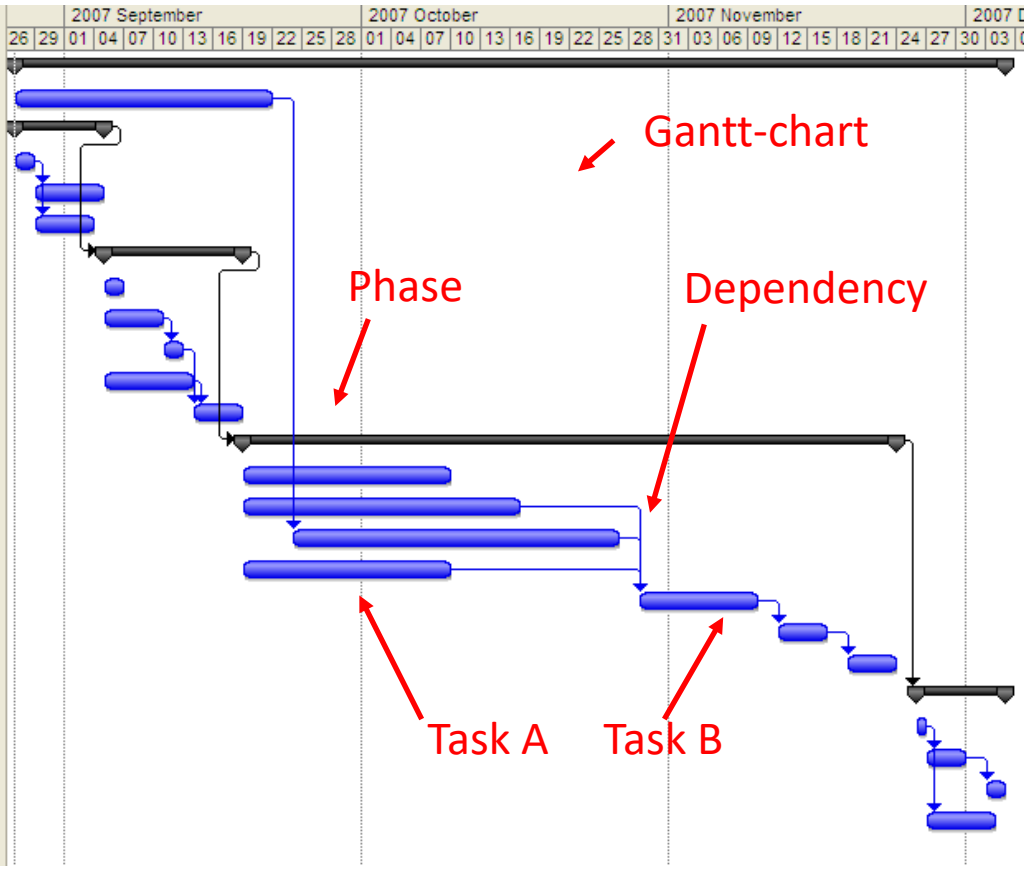
By John R. Dunlap ed. - Engineering Magazine, Vol 51, 1916,, Public Domain, https://commons.wikimedia.org/w/index.php?curid=38050079

Course standard

Tasks, duration, and dependencies

Phases

Task Name	Duration	Start	Finish	Predeces
Project Total	**72 days**	**Mon 07-08-27**	**Tue 07-12-04**	
Training in J2EE	20 days	Mon 07-08-27	Fri 07-09-21	
Inception	**7 days**	**Mon 07-08-27**	**Tue 07-09-04**	
Interview users	2 days	Mon 07-08-27	Tue 07-08-28	
Requirement specification v1	5 days	Wed 07-08-29	Tue 07-09-04	4
User interface prototype	4 days	Wed 07-08-29	Mon 07-09-03	4
Elaboration	**10 days**	**Wed 07-09-05**	**Tue 07-09-18**	**3**
Finalize project plan	2 days	Wed 07-09-05	Thu 07-09-06	
Requirement specification v2	4 days	Wed 07-09-05	Mon 07-09-10	
Validate Requirements	2 days	Tue 07-09-11	Wed 07-09-12	9
Architecture specification	7 days	Wed 07-09-05	Thu 07-09-13	
Buffer	3 days	Fri 07-09-14	Tue 07-09-18	10;11
Construction	**48 days**	**Wed 07-09-19**	**Fri 07-11-23**	**7**
Detailed design	15 days	Wed 07-09-19	Tue 07-10-09	
Implement Database module	20 days	Wed 07-09-19	Tue 07-10-16	
Implement Business logic	25 days	Mon 07-09-24	Fri 07-10-26	2
Implement User interface	15 days	Wed 07-09-19	Tue 07-10-09	
Integration testing	10 days	Mon 07-10-29	Fri 07-11-09	15;17;16
System testing	5 days	Mon 07-11-12	Fri 07-11-16	18
Buffer	5 days	Mon 07-11-19	Fri 07-11-23	19
Transition	**7 days**	**Mon 07-11-26**	**Tue 07-12-04**	**13**
Installation	1 day	Mon 07-11-26	Mon 07-11-26	
Fault correction	4 days	Tue 07-11-27	Fri 07-11-30	22
Acceptance testing	2 days	Mon 07-12-03	Tue 07-12-04	23
User training	5 days	Tue 07-11-27	Mon 07-12-03	22



Task/Activity

Duration

Task A is predecessor (precursor) of Task B

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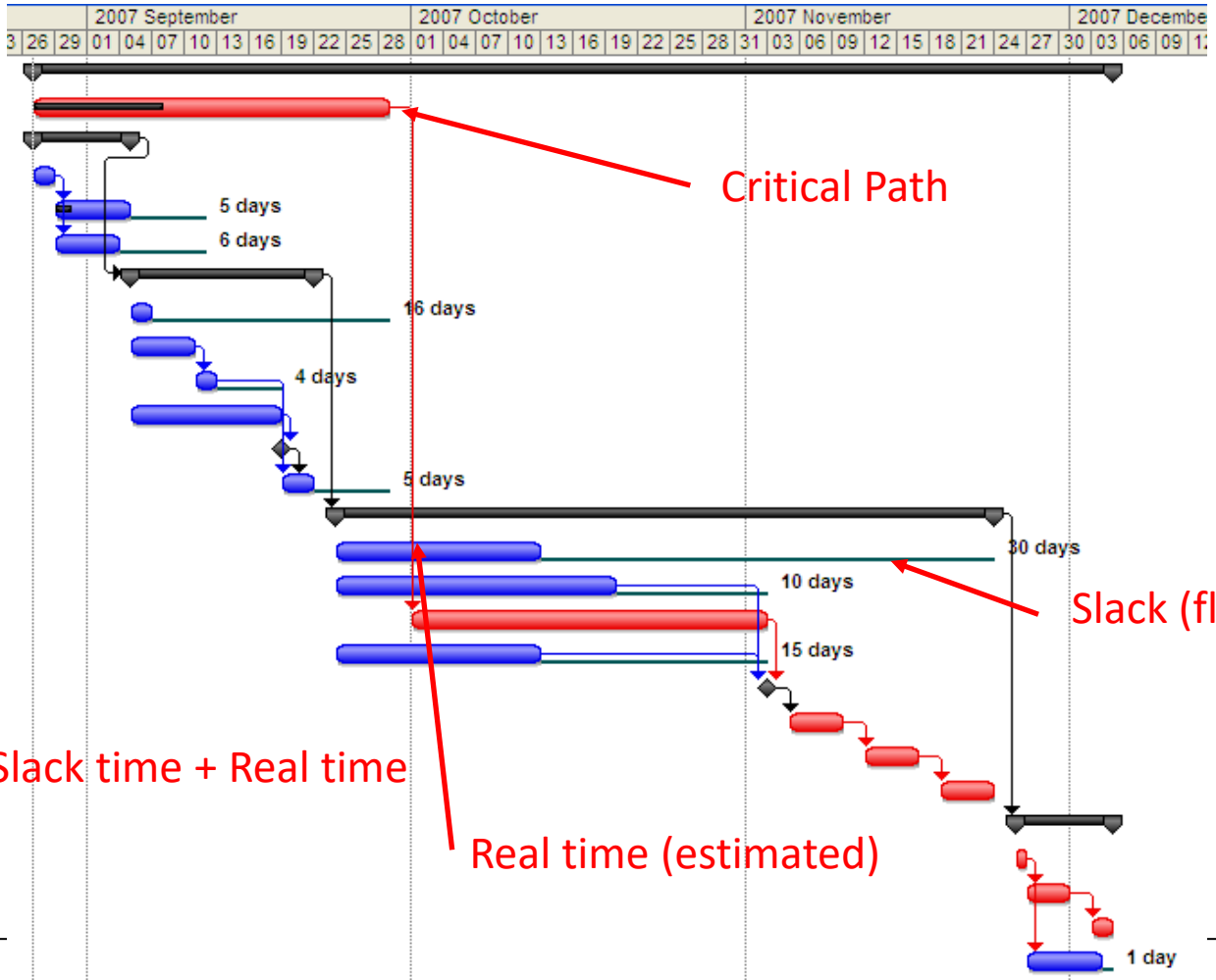
Critical path, slack time, and real time

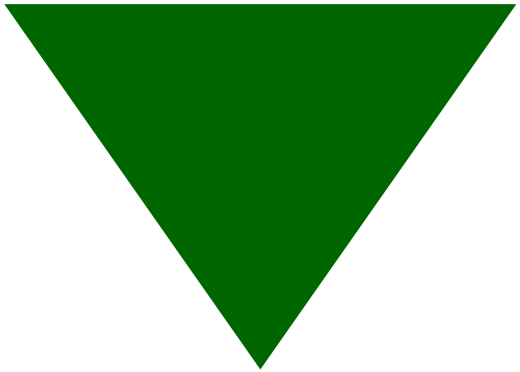


Available time = Slack time + Real time

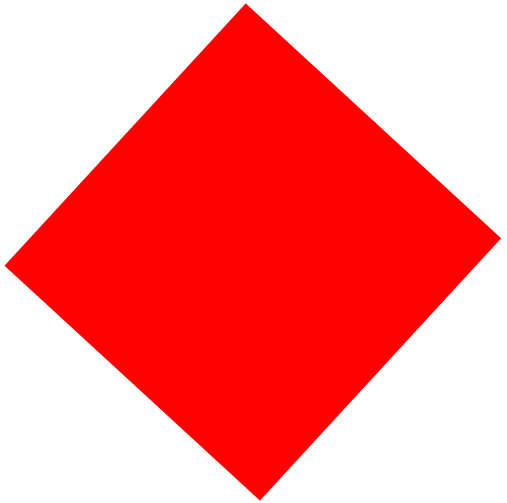
Repetition of critical path in GANTT charts

https://youtu.be/scOu4l2ZvQs

Mile-stone and toll-gate



Milestone



Tollgate

Verify internal sub-goal fulfillment

- Properties of a SMART goal

External decision point

- E.g. after a pre-study phase, the customer decides if the project should continue or not.

Agenda:

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~~GANNT chart~~

Estimation

Two success factors

Risks

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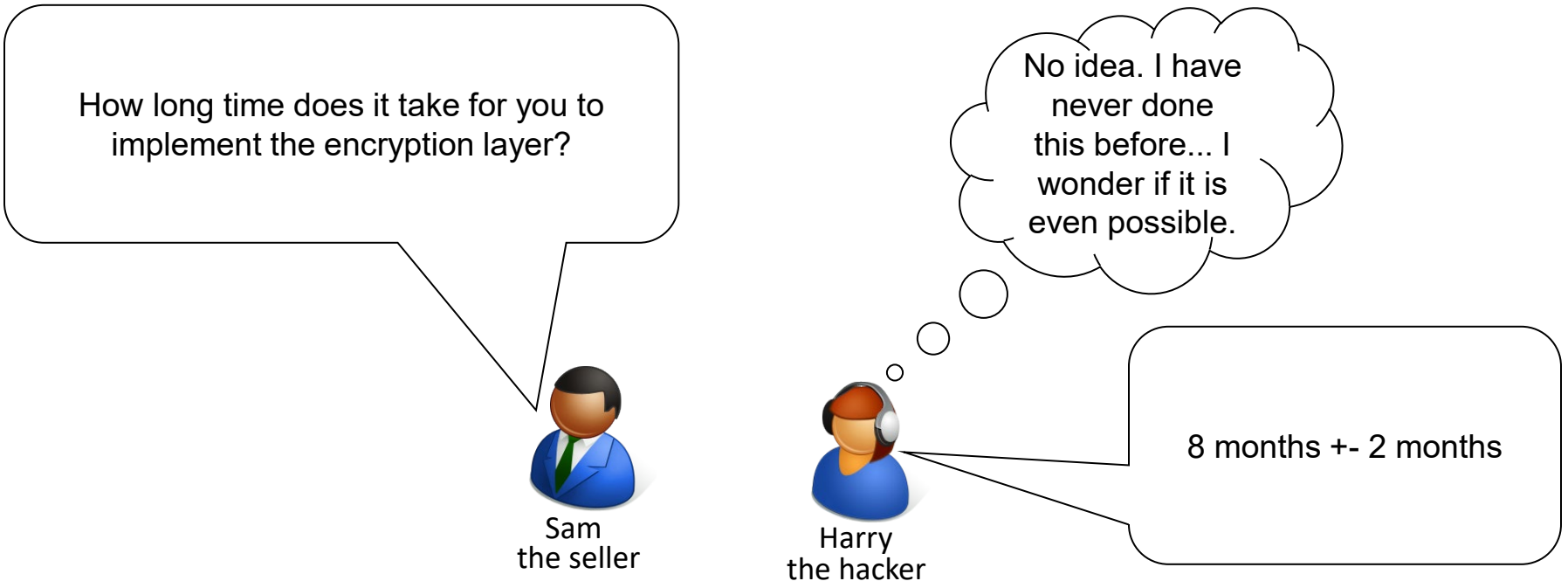
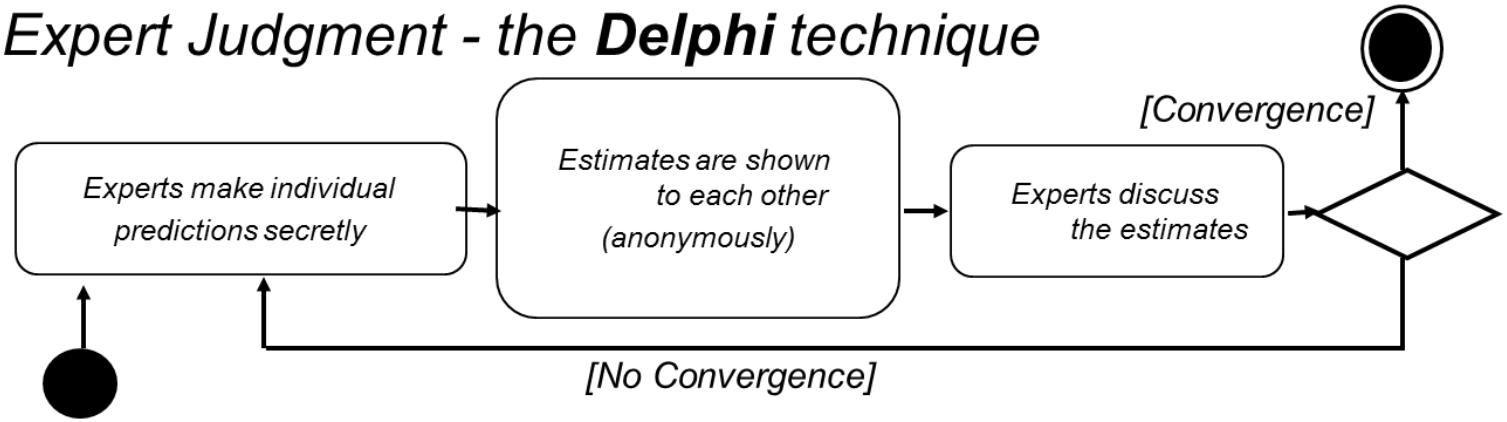
Effort estimation in practice?



Two lines of research and practice

Expert Judgment - the **Delphi** technique



Algorithmic Methods - COCOMO and COCOMO II

COCOMO (Boehm, 1981)

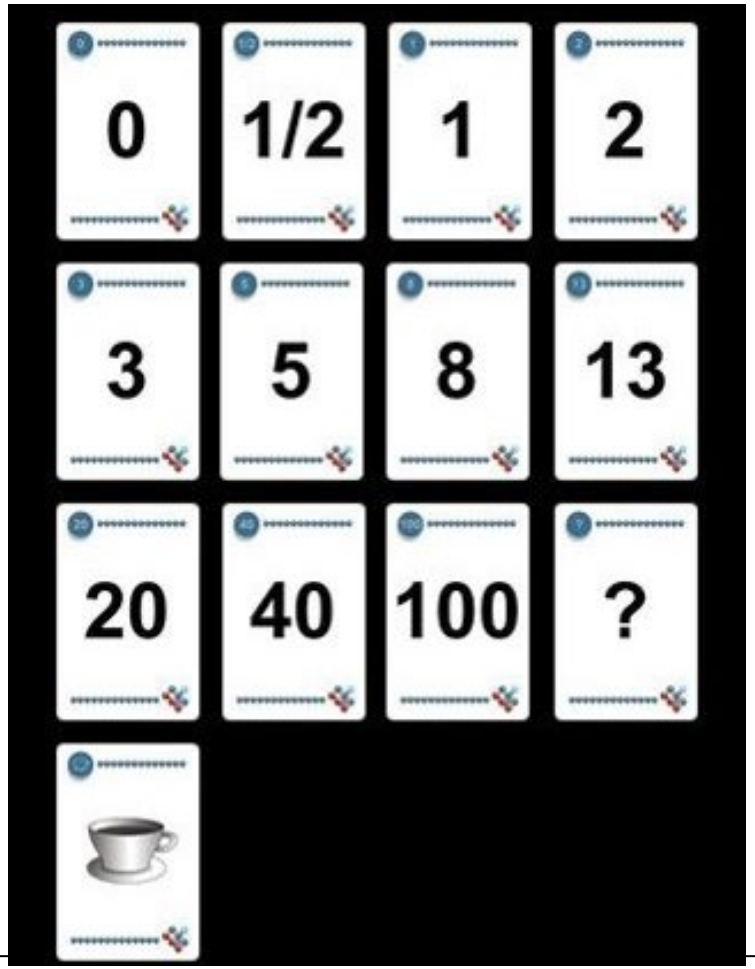
- *An formula where parameters are estimated using real projects.*
- *Input: No of code lines*
- *Output: Effort (time)*

COCOMO II

- *Takes into account changes in SE, such as component reuse, prototyping*
- *Other inputs than number of code lines. E.g. functionality from requirements, number of screens etc.*

Agile estimation and planning poker

- Variant of Delphi method
- Unit: Points (the effort of a well understood, small item)
- Fibonacci-series of numbers



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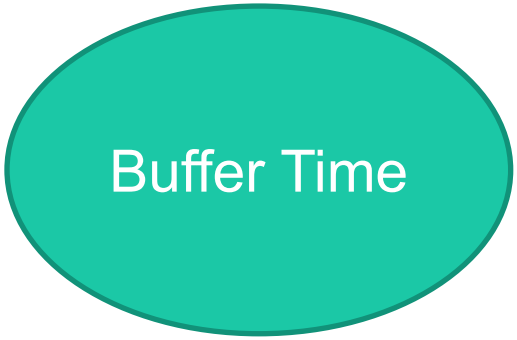
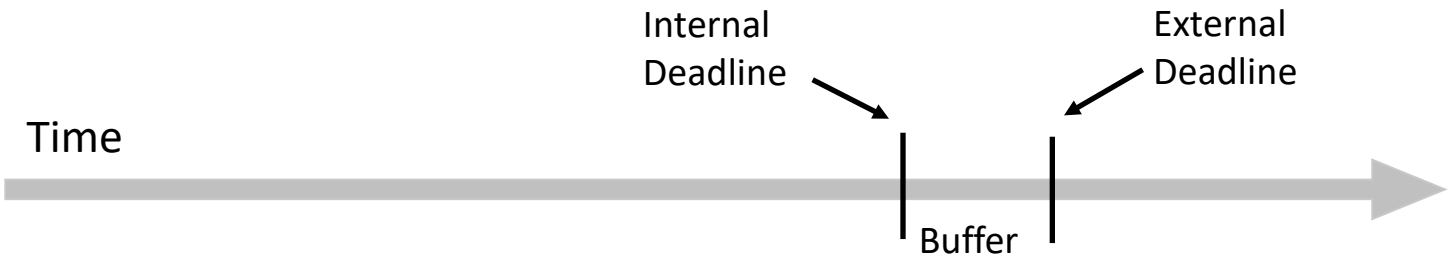
Buffer time is a key to success





To whom should you communicate the deadlines?

A good team is another key to success

A good team can produce better results than individuals working alone.

Optimal team size

Optimal size between 5-12 members

Large projects can divide into several teams.

Cross functional team (XFT)

- Members with diverse competence => multiple perspectives of the product
- Members with enough competence => autonomous; breaks silos and hierarchies in the organization
- Pros:
  - Sees the overall goals
  - Sees the hurdles
  - Sees the innovation
- Cons:
  - Limits individual competence growth
  - Too broad goal creates aimless discussion

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Risks

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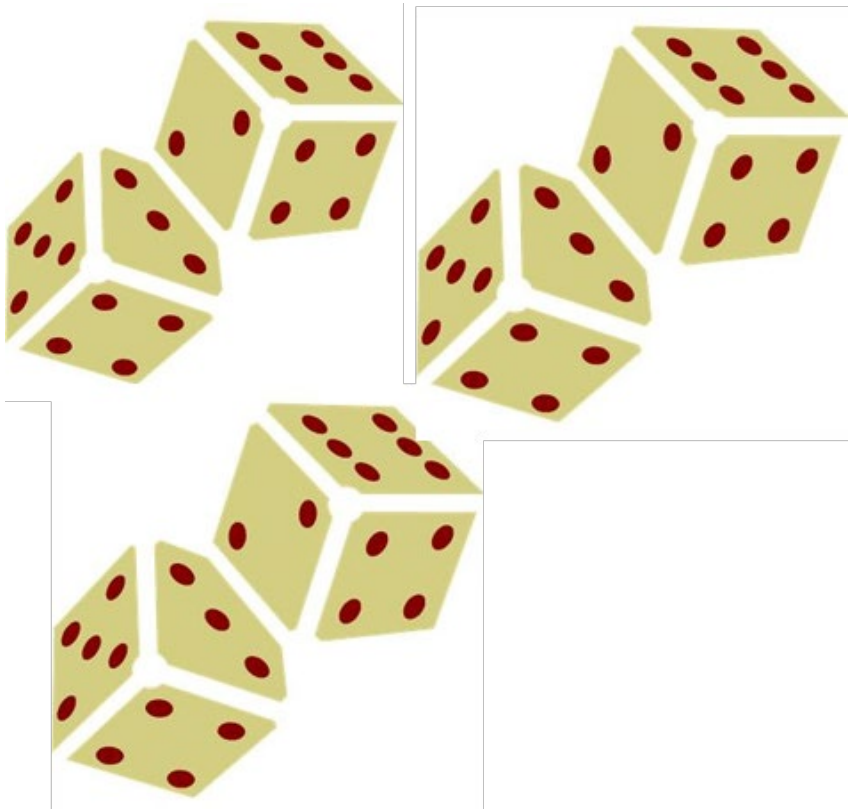
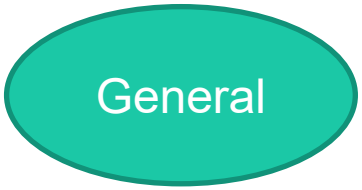
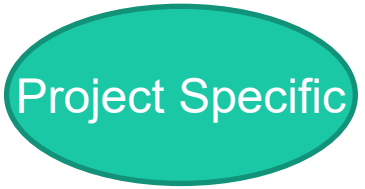
Risk is something that can eliminate full success of the project

- **Staff turnover** - Experienced team members will leave the project
- **Requirement change** - Significant requirements will change late in the process.
- **Size underestimated** - The size of the project was larger then expected



Kinds of risks



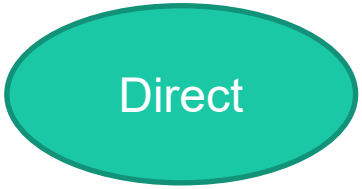


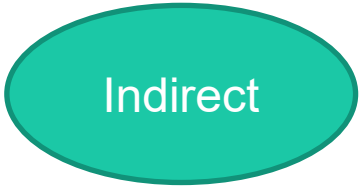
"A team member gets sick"

"There is a risk that the project gets delayed"

"The delivery of the development hardware environment is delayed."

"Anders needs to visit his family, since his father is sick."

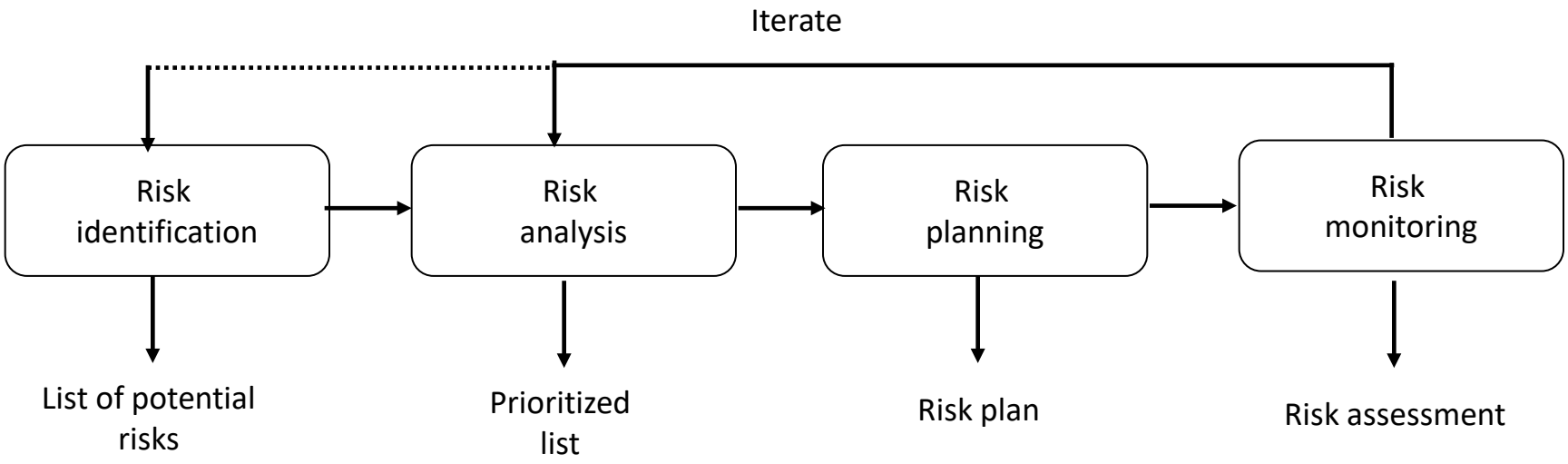




The project has great control
"The Windows platform will not scale"

Risk where the project has little control
"The big search engine company will change the API with no warning."

Risk management is the process of measuring or assessing risk and then developing strategies to manage the risk.



1. Risk identification: brainstorming

- **What can go wrong?**
- **Technology risks** - Hardware/software technology used for development, e.g. using Java
- **People risks** - people in the development team
- **Organizational risks**
- **Tools risks** - Risks with the current tool used
- **Requirements risks** - Changes in customer requirements
- **Estimation risks** - Wrong project estimations

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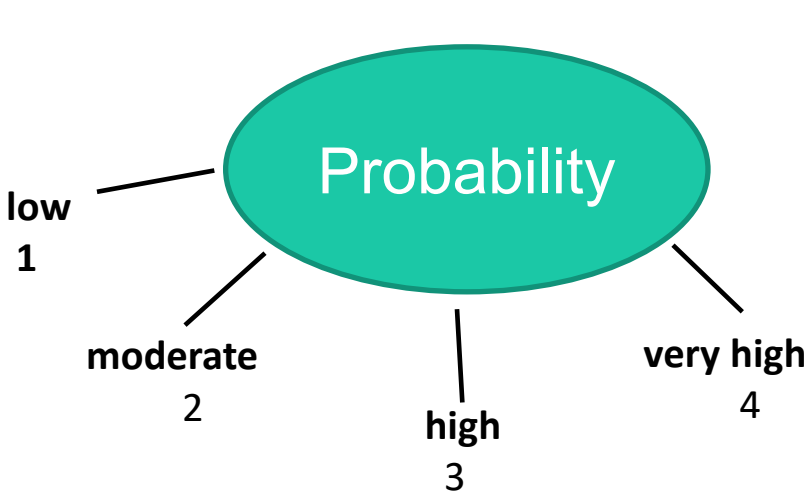
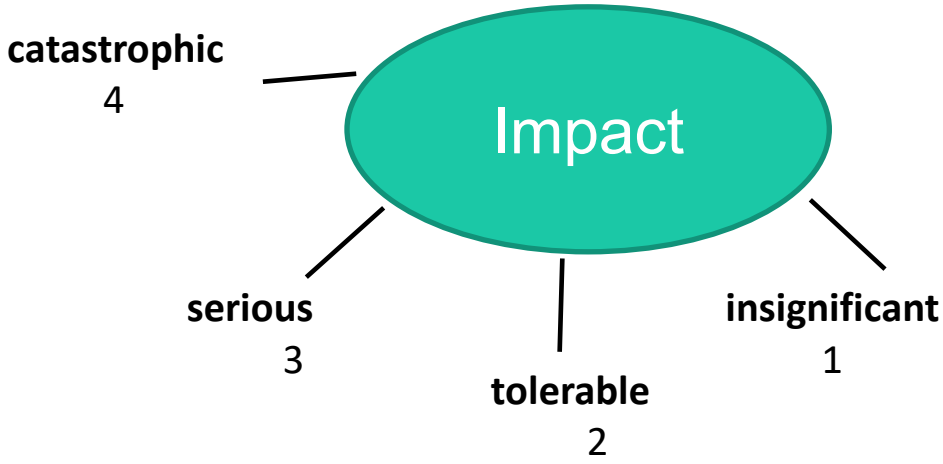
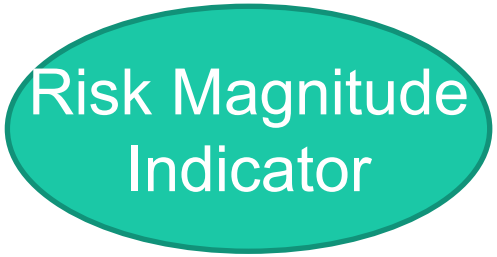
2. Risk analysis





Probability x Impact =



Sort list after risk magnitude!

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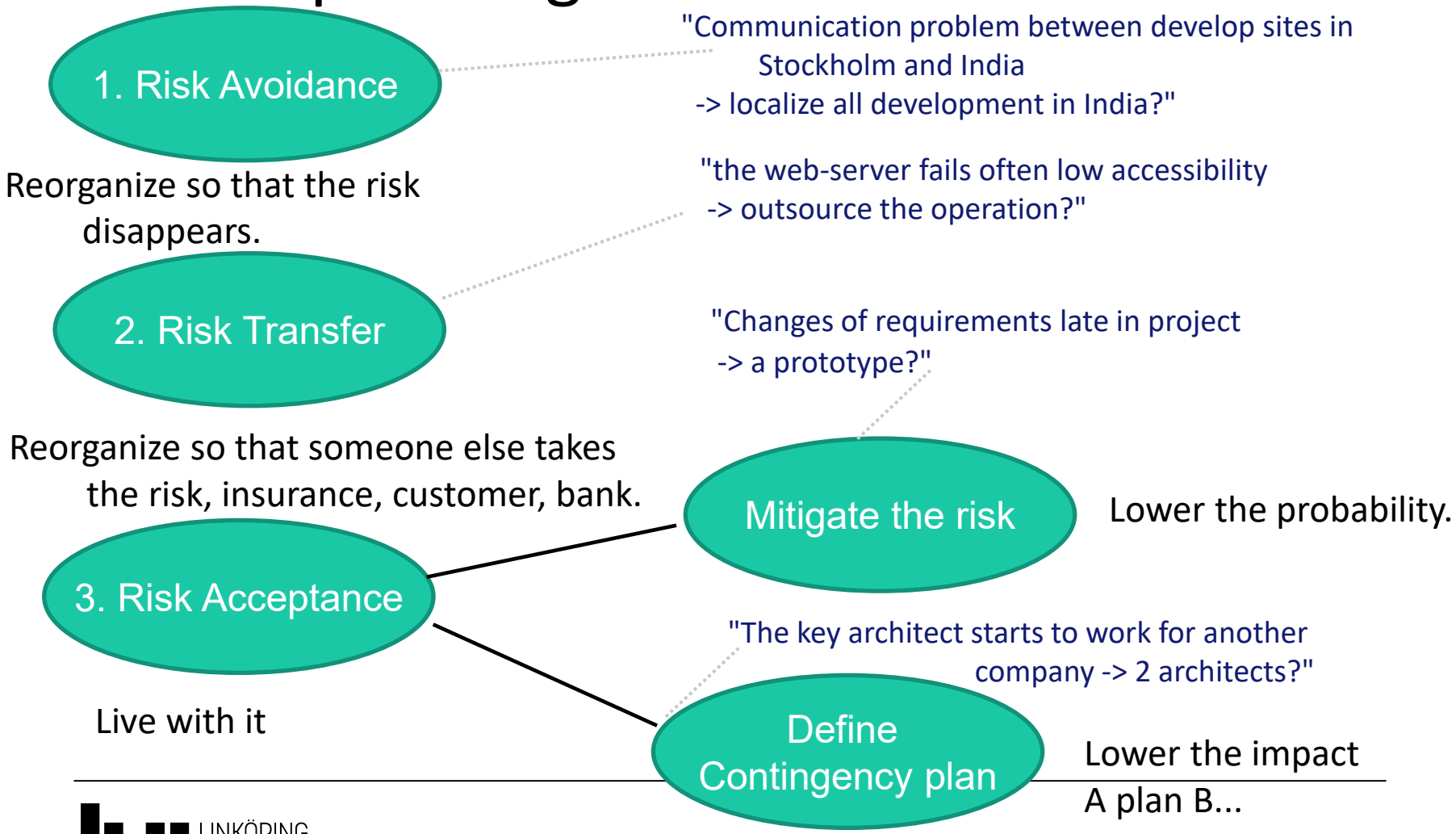
3. Risk planning: What do we do if…?



Example

Identify

Analyze

#	Risk Description	Probability	Impact	Risk Factor
1	During implementation it is discovered that the new web-platform cannot talk to the legacy database system	Moderate (2)	Serious (3)	6

Plan

Avoid risk: Do not introduce a new web-platform. Use the existing platform.

Transfer risk: Sign a contract with a contractor, who guarantees access to the system.

Accept risk

Mitigate: - Create a prototype early in the process.
- Solve issues before implementation phase

Contingency plan: Transfer the whole old legacy database system to a modern DBMS.

Make risks useful

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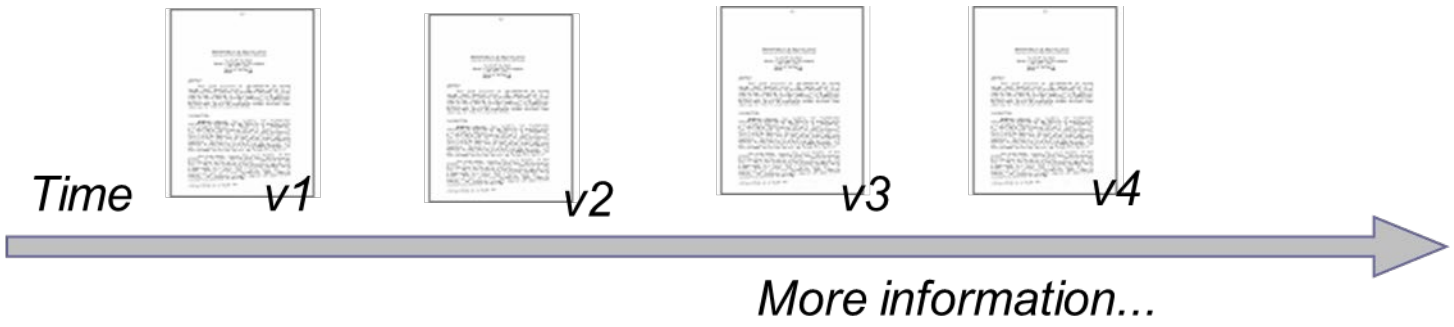
~~Risks~~

Documentation

The project plan

- Tool for the project manager
- Communication medium between project members and other stakeholders
- **What** should be done, **when** and by **who**
- **When is the plan finished?**



Course standard

Content of the project plan

Project Description
- Background to the project
- Relevant constraints (budget etc.)
- Project Goal
- Start and expected end date.

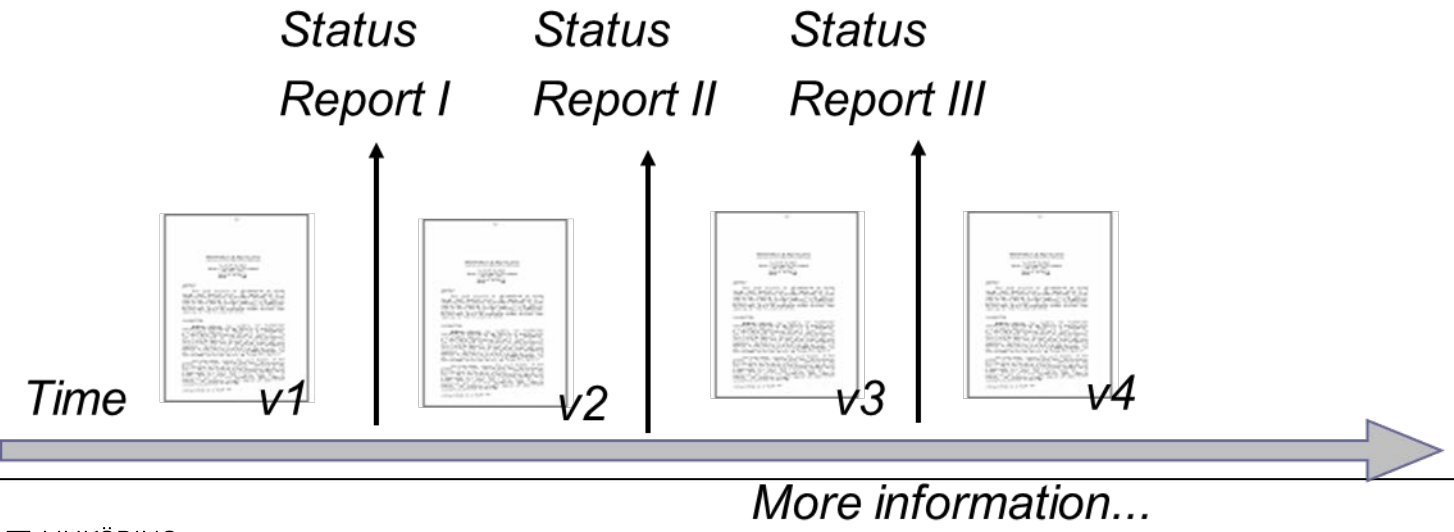
Time and Resource Plan
- Milestones
- Tollgates
- Deliverables
- Activities
- Resources

Project Organization
- Roles
- Knowledge / skill
- Training
- Communication and reports

Risk Management
- Risks, Probability, and Impact
- Mitigation and Contingency plan

Project status reports

- Summary - current status
- What has happened since last report
- What happens next (both in long and short term)
- Problems and risks



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