Project Management

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Questions

- What is a project?
- Who are the people involved?
- How is it carried out?

- See, among others:
  - *Matthias Geirhos, IT-Projektmanagement – Was wirklich funktioniert – und was nicht, Galileo Press, 2. Auflage, 2015.*
  - *Litke, Kunow, Schulz-Wimmer, Projektmanagement, Haufe-Lexware GesmbH, 3. Auflage, 2015.*

What is a project?

- Characteristics:
  - Uniqueness
  - Start and end date
  - Resources (money, personnel, etc.)
  - Goal
  - Complexity

What is a project?

*A **project is a complex task** that has a beginning and an end, for which a **project-specific organization** has been set up and which pursues a specific goal.*

Project-specific organization

- Project manager
- Project team
- Project plan: activities, deadlines, allocation of resources.
- Control bodies (e.g., steering committee, stakeholders)

Project manager responsibilities

- Communicate
  - Within the project team
  - With the client/stakeholders
- Delegate
- Reducing complexity/planning
- Motivate
- Controlling

Project planning / Project management

- Purpose:
  - Without project management, far more projects fail than with it.
  - Project management makes complexity manageable!
  - The project plan is a management and control tool
  - The project plan serves as motivation/justification for resources
  - Project management consists of best practices

Phases of a project

- **1. Project assignment**
  - Project name
  - Client
  - Start date
  - Objectives
  - Non-objectives
  - Justification
  - Desired project end date
  - Budget or cost estimate
  - Project manager
  - Control authorities
  - Criteria for project completion

Phases of a project

- **2. Decision on project implementation, management, etc.**
- **3. Kick-off event:**
  - Team should understand the project goals
  - Team should support the project goals
  - Formal start of the project
  - Getting to know the team members
- **4. Project planning**
  - Creation and maintenance of the project plan

Phases of a project

- **5. Project completion**
  - Project completion report
  - Possible acceptance including report
  - Project completion should be published by the client (including acknowledgments)
  - Possibly also a closing ceremony
  - Project completion analysis
  - Refrain from critical reviews!

Project planning

- Creation of a project plan including effort and cost estimates!

- Adjustment of the project plan during the project

Effort and cost estimation

- Based on requirements!
- Requirements must have:
  - A unique name/ID
  - A title
  - Creator
  - Affected applications/systems
  - A desired date
  - A priority
  - Description of current status and target status
  - Description of benefits

Effort and cost estimation

- Individual estimate: Based on the project manager's experience
- Group estimate: Based on the experience of a group
- Using methods:
  - Function points
  - Use case points
  - COCOMO II

Individual assessment

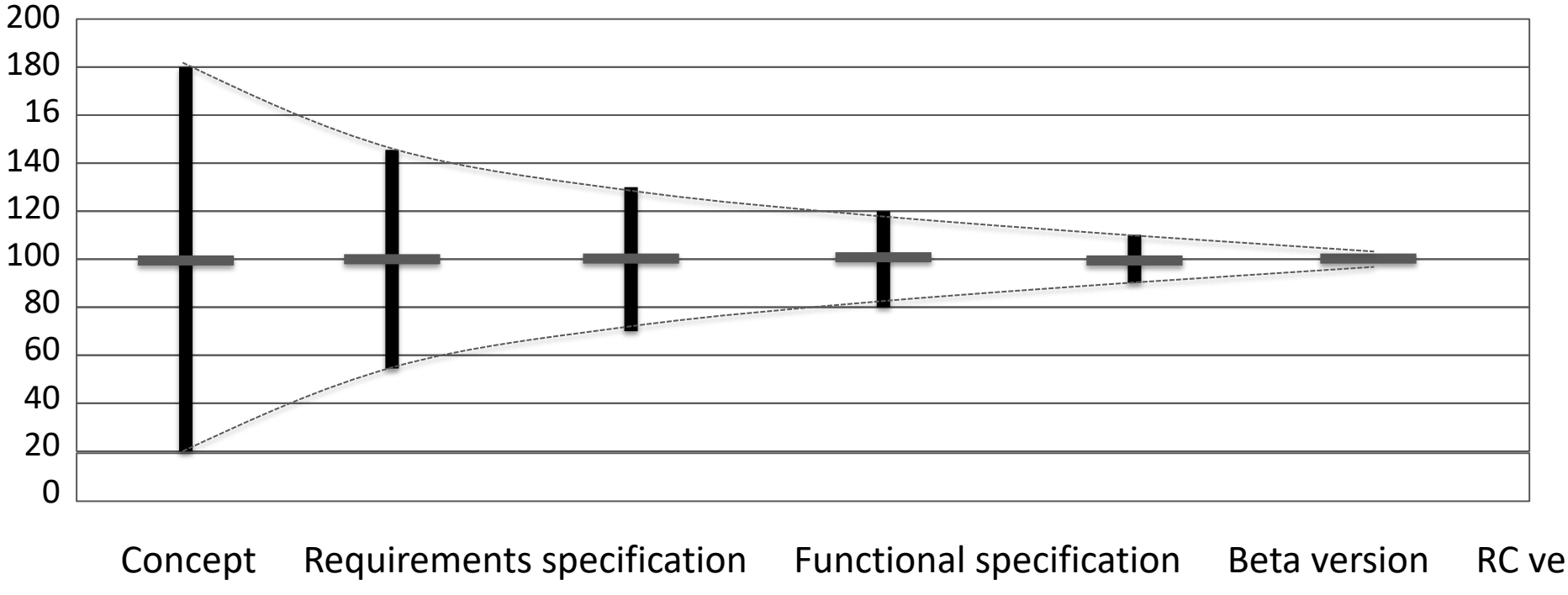
- **Advantages**:
  - Fast, inexpensive, and uncomplicated
- **Disadvantages**
  - Estimates are difficult to compare, no exchange of experience, quality depends on the person performing the assessment
- **Requirements:**
  - No influence on estimates

Group assessment

- **Advantages**:
  - Often more accurate, as it is less subjective
- **Disadvantages**
  - More time-consuming and costly, risk of peer pressure or significant influence from management
- **Requirements:**
  - 3–5 people
  - Perform estimates independently
  - Analyze deviations! No averaging

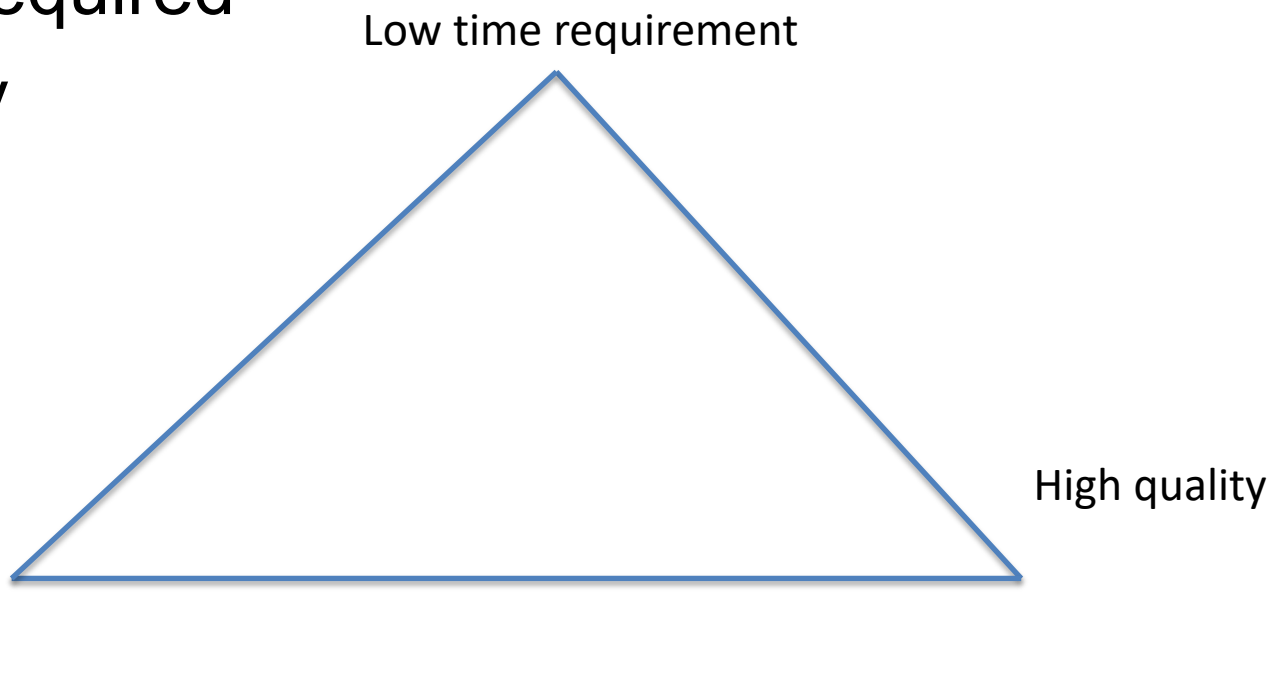
Inaccuracies in project estimation

- “Cone of uncertainty”



The magic triangle of project management

- Trade-off
  - Cost
  - Time required
  - Quality



Project planning

- **Step 1: Identification of processes**
  (= work packages, tasks, project phase)

  – Compilation of a list of topics:
  – Refining the topics
  – Organizing the topics

  – Expected results per process

Project planning

- **Example**:
  - Tests
  - Software implementation
  - Migration of legacy data
  - Usability tests
  - ...

  - Tests can be broken down into:
    - Test preparation
    - Creation of tests from the specification
    - Conducting module tests
    - Conducting system tests
    - ...
  - Organizing individual tasks

Project planning

- **Step 2: Determine and plan dependencies**
  - Are there any dependencies between tasks?
  - If so:
    - Does one process have to be completed before another can be started (end-to-start relationship)?
    - Do two processes have to be completed at the same time (end-to-end relationship)?
    - Do two processes have to start at the same time (start-start relationship)?

Project planning

- **Step 3: Determine the effort**
  - How much time is required for each task?
  - What other resources (e.g., personnel) are needed?
    - Consider availability, vacations, etc.
  - Determine start and end times for each task
    - Forward calculation (from the start of the project)
    - Backward calculation (from the end of the project)

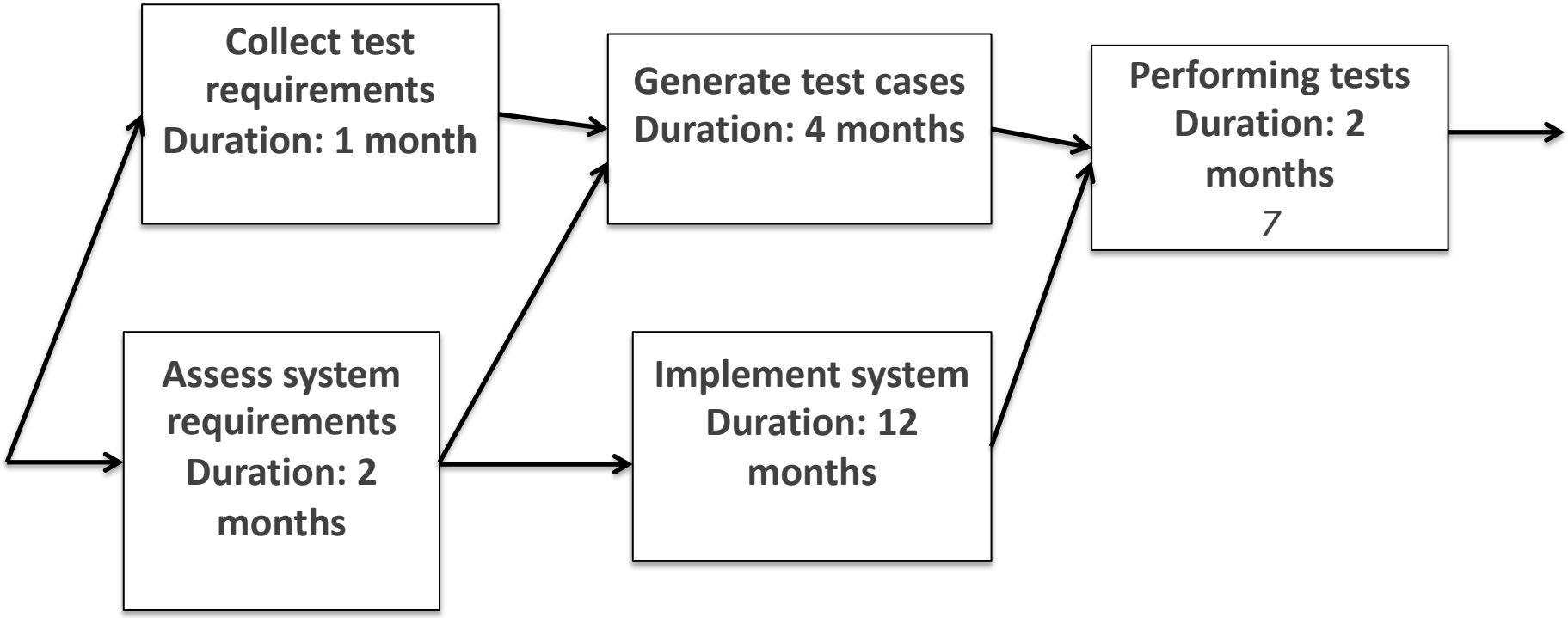
Project planning

- Forward or backward calculation
  - Starts with a date
  - Goes through the processes, taking dependencies into account, and determines the end or start time of the process.

    Start time = end time - duration

Example

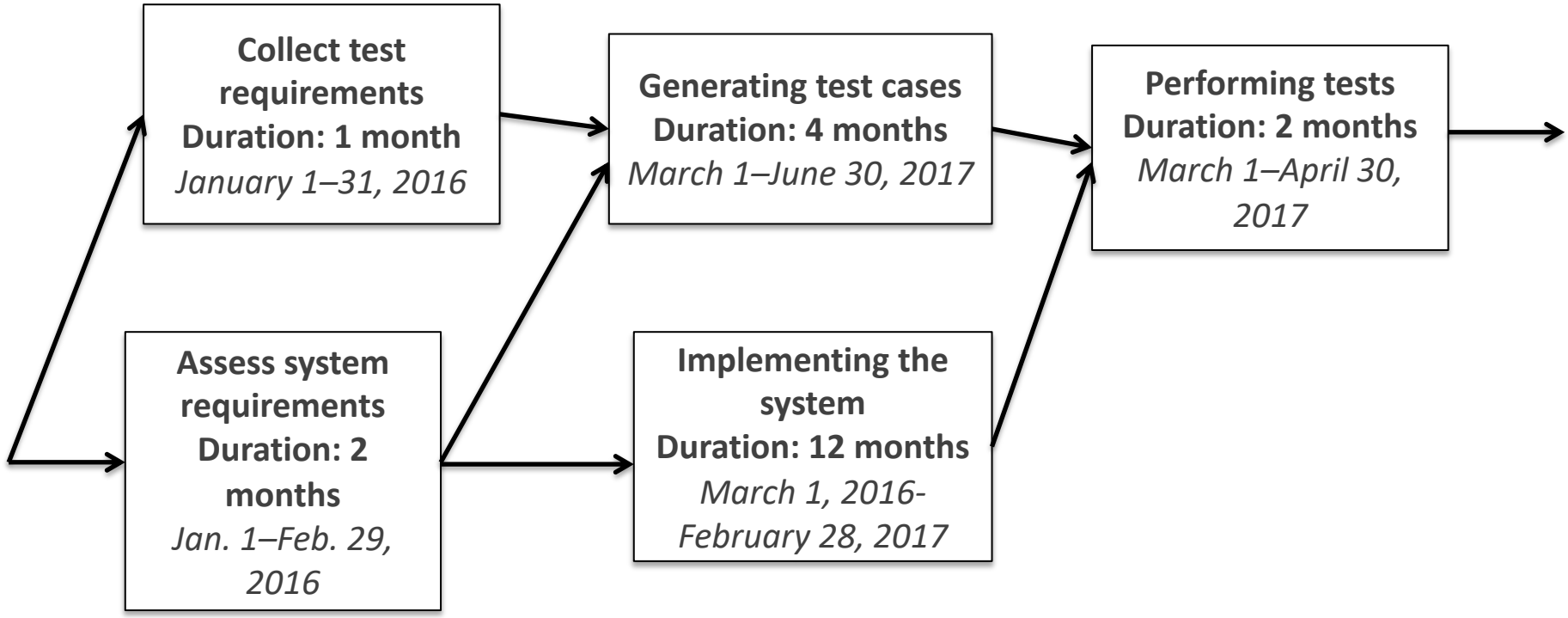
End: 05/2017



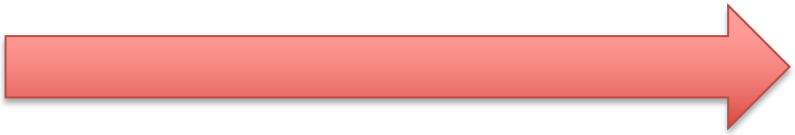
Start: 01/2016

Example

End: 05/2017

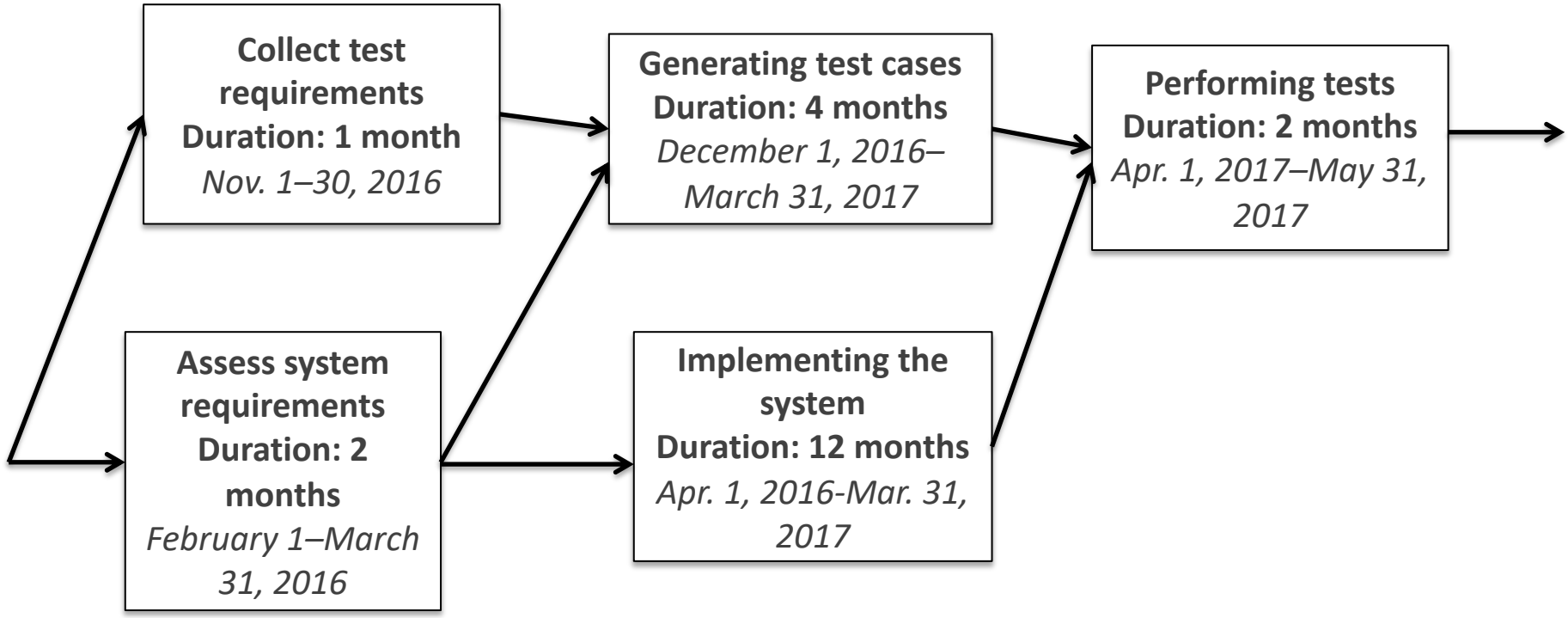


Start: January 2016



Example

End: 05/2017



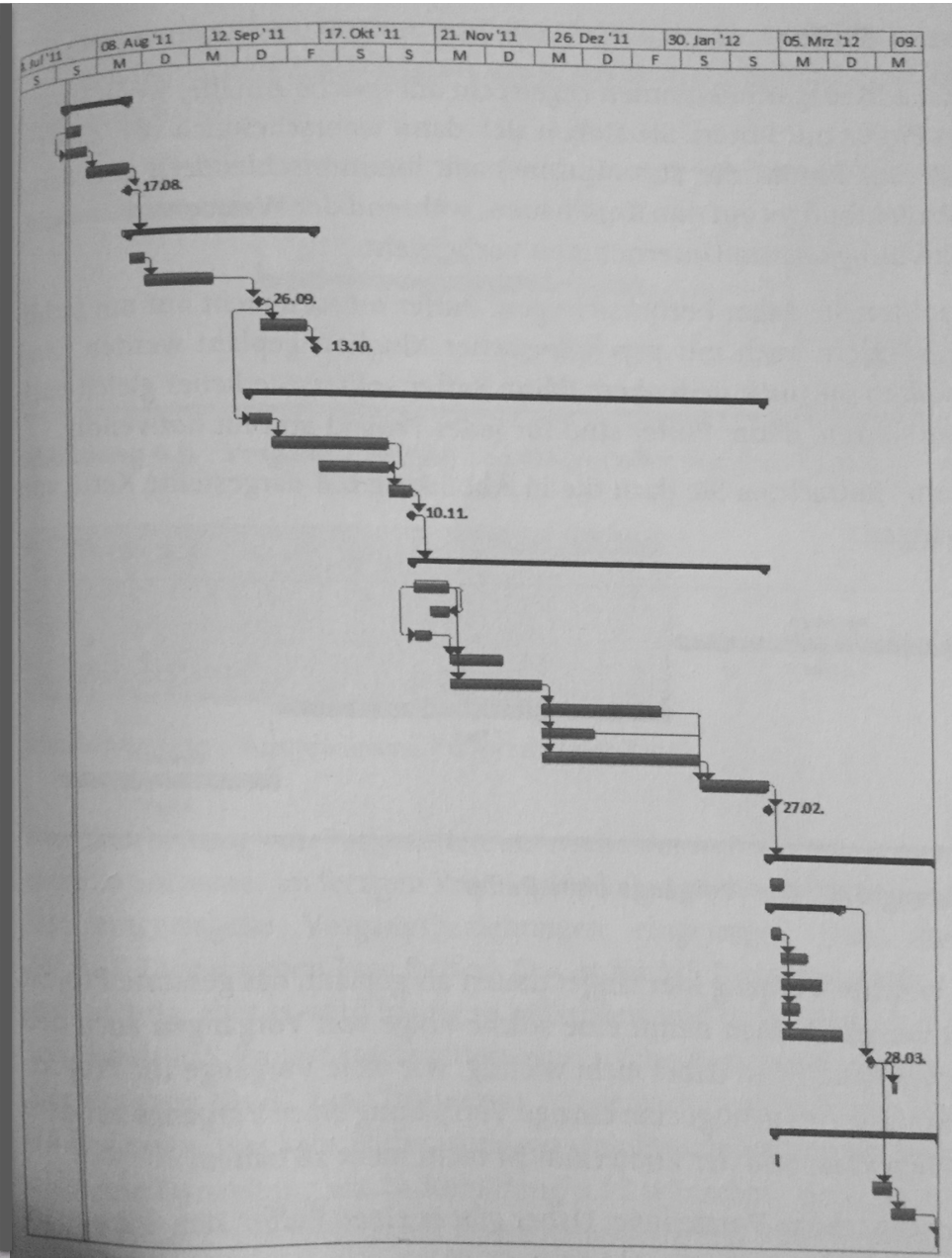
Start: January 2016

Project planning

- **Milestones**:
  - These are events of particular importance!
  - Example: Approval of the requirements specification
  - Trigger events or decisions, e.g., purchase of software XY
  - Can also be the completion of phases, e.g., requirements document approved
  - Milestones should always be used explicitly!

Project plan – Gantt chart

Nr.	Vorgangsname	Dauer	Anfang	Fertig stellen	Vorgänger	Ressourcenname
1						
2	**Voruntersuchung**	**15 Tage**	**Do 28.07.11**	**Mi 17.08.11**		
3	Projektvorbereitung	3 Tage	Do 28.07.11	Mo 01.08.11		
4	Anbietersuche	5 Tage	Do 28.07.11	Mi 03.08.11	3AA	
5	Erste Anbietergespräche	10 Tage	Do 04.08.11	Mi 17.08.11	4	
6	Projektrag genehmigt	0 Tage	Mi 17.08.11	Mi 17.08.11	5	
7						
8	**Anforderungsanalyse**	**41 Tage**	**Do 18.08.11**	**Do 13.10.11**	**6**	
9	Schwachstellenanalyse	3 Tage	Do 18.08.11	Mo 22.08.11		
10	Lastenheft formulieren	15 Tage	Di 23.08.11	Mo 12.09.11	9	
11	Lastenheft abgenommen	0 Tage	Mo 26.09.11	Mo 26.09.11	10EA+10 Tag	
12	Anbieterauswahl	10 Tage	Di 27.09.11	Mo 10.10.11	11	
13	Make or Buy-Entscheidung	0 Tage	Do 13.10.11	Do 13.10.11	12EA+3 Tage	
14						
15	**Spezifikation**	**112 Tage**	**Fr 23.09.11**	**Mo 27.02.12**		
16	Review des Lastenhefts	5 Tage	Fr 23.09.11	Do 29.09.11	11EA-2 Tage	
17	Pflichtenheft erstellen	25 Tage	Fr 30.09.11	Do 03.11.11	16	
18	Prototypen entwickeln	15 Tage	Fr 14.10.11	Do 03.11.11	17EE	
19	Proof of Concept	5 Tage	Fr 04.11.11	Do 10.11.11	18	
20	Pflichtenheft abgenommen	0 Tage	Do 10.11.11	Do 10.11.11	19	
21						
22	**Entwicklung**	**77 Tage**	**Fr 11.11.11**	**Mo 27.02.12**	**20**	
23	Datenmodellierung	7 Tage	Fr 11.11.11	Mo 21.11.11		
24	Performance-Optimierung	4 Tage	Mi 16.11.11	Mo 21.11.11	23EE	
25	Analyse der Altdatenbank	3 Tage	Fr 11.11.11	Di 15.11.11	23AA	
26	Datenmigration	12 Tage	Di 22.11.11	Mi 07.12.11	23;24;25	
27	Stammdaten	20 Tage	Di 22.11.11	Mo 19.12.11	23	
28	Personalkostenplanung	27 Tage	Di 20.12.11	Mi 25.01.12	27	
29	Urlaubsmodul	12 Tage	Di 20.12.11	Mi 04.01.12	27	
30	Weitere Module	35 Tage	Di 20.12.11	Mo 06.02.12	27	
31	Berichte	15 Tage	Di 07.02.12	Mo 27.02.12	30;28;29	
32	Testfreigabe	0 Tage	Mo 27.02.12	Mo 27.02.12	31	
33						
34	**Test**	**37 Tage?**	**Di 28.02.12**	**Mi 18.04.12**	**31**	
35	Migrationstest	4 Tage	Di 28.02.12	Fr 02.03.12		
36	**Akzeptanztest**	**15 Tage**	**Di 28.02.12**	**Mo 19.03.12**		
37	Stammdaten	3 Tage	Di 28.02.12	Do 01.03.12		
38	Personalkostenplanung	6 Tage	Fr 02.03.12	Fr 09.03.12	37	
39	Berichte	8 Tage	Fr 02.03.12	Di 13.03.12	37	
40	Urlaubsmodul	3 Tage	Fr 02.03.12	Di 06.03.12	37	
41	Sonstige Module	12 Tage	Fr 02.03.12	Mo 19.03.12	37	
42	Release Candidate	0 Tage	Mi 28.03.12	Mi 28.03.12	36EA+7 Tage	
43	RTM-Release	1 Tag?	Do 05.04.12	Do 05.04.12	42EA+5 Tage	
44						
45	**Einführung**	**37 Tage?**	**Di 28.02.12**	**Mi 18.04.12**		
46	Installation	1 Tag	Di 28.02.12	Di 28.02.12		
47	Schulung	4 Tage	Do 29.03.12	Di 03.04.12	42	
48	Parallelbetrieb	5 Tage	Mi 04.04.12	Di 10.04.12	47	
49	Projektabschluss	1 Tag?	Mi 18.04.12	Mi 18.04.12	48EA+5 Tage	

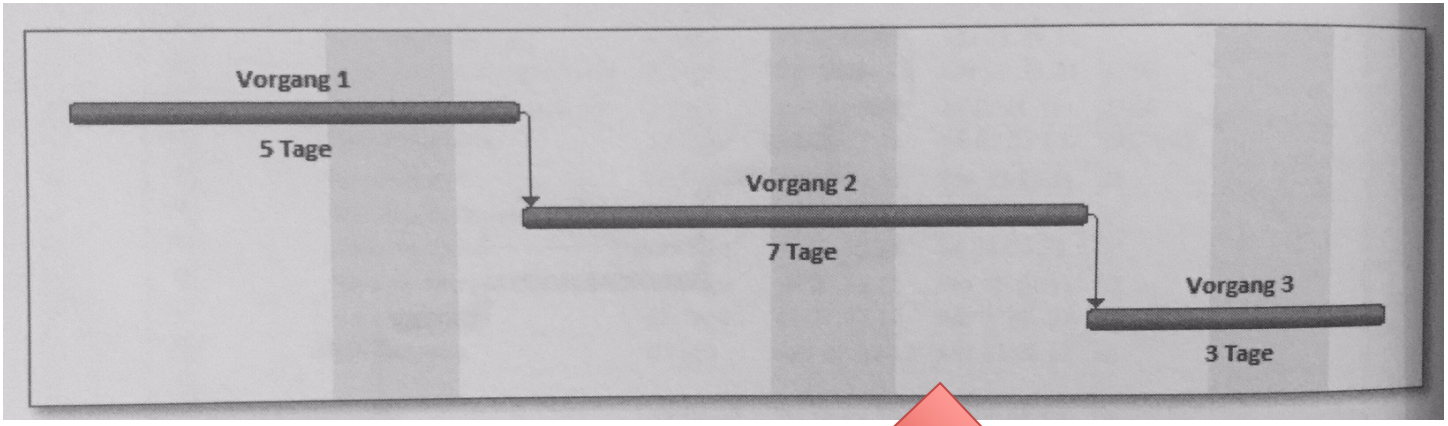


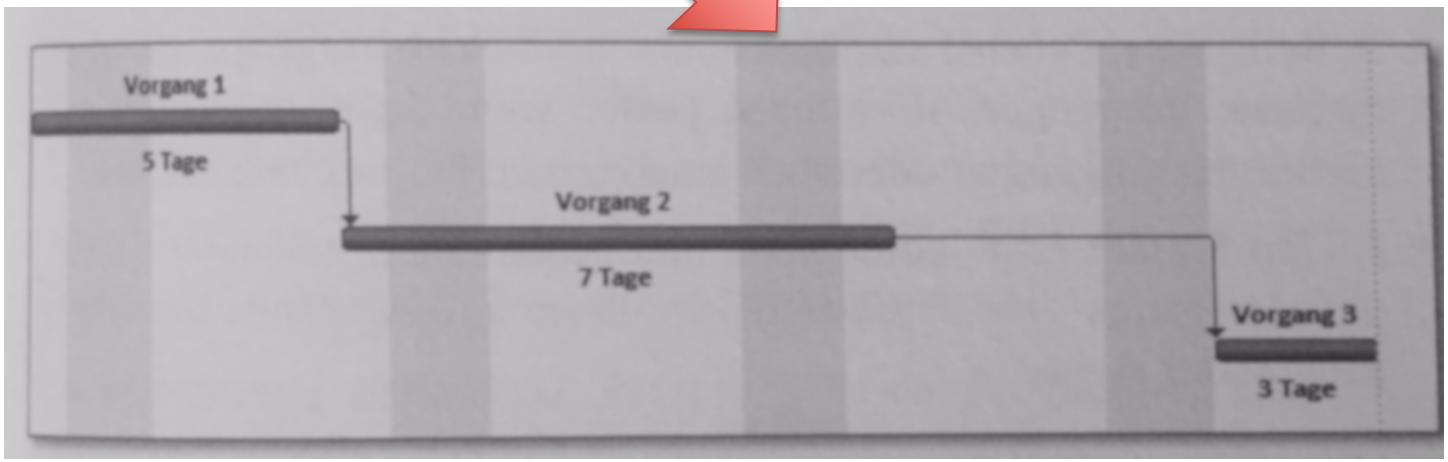
Project planning

- Plan **buffers**!
  - Explicitly add time buffers for certain processes
  - Particularly important for ***critical paths*** = Path through the project plan that also delays the project in the event of delays!

  - Distinctions:
    - Free buffer: Period that can take longer than originally planned without delaying the subsequent process
    - Total buffer: Period that can last longer than planned without extending the project duration.

Explicitly add buffer





Project planning

- **Step 4: Plan resources**
  - Resources should be allocated to all processes
  - Consideration of vacation time and the availability of equipment required for the project

Project planning

- **Step 5: Plan costs**
  - What costs are incurred and are relevant to the project?
    - Personnel
    - Costs for externally provided services
    - Material costs
  - How high are the costs?
  - Planning costs: When will costs be incurred and how much will they be?
  - Get your cost plan approved!
  - Aim to include a cost buffer

Project planning

- **Step 6: Identify and assess risks**
  - Cost risks
  - Personnel risks
  - Technological risks
  - Technical risks
  - Schedule risks
  - Incorporate risks into the project plan accordingly.
  - What impact do the individual risks have on the project plan and resources?
  - How are the risks being managed?
  - Is there a plan B?

Project phases

- Breaking down into individual phases (processes, tasks) serves to reduce complexity
- Agile project implementation is becoming increasingly popular!

Out	In
Only one possible process model	Adaptation of the model to the needs of the project
Rigid sequence of phases	Iterations, setbacks, and leaps are possible
Results of the project phases are fixed	Results of the project phases can be refined and adapted during the course of the project
Detailed planning of the phases at the start of the project	Rough planning at the beginning, which becomes more precise and detailed as the project progresses
Fixed contract design	Fixed contract design with agreed flexibility
Results are available at the end of a project phase	Presentable results at short intervals, still within a project phase
Classic project management	Agile project management

Summary

- Project management based on a project assignment
- Project manager is responsible for project implementation, communication, resources, and planning
- Project plans based on processes
  - Identify risks
  - Estimating costs
  - Identify critical paths
  - Explicitly introduce buffers (time and costs)