

Fachhochschule Frankfurt am Main
Fachbereich 2: Informatik
SS 2008

IT Project Management

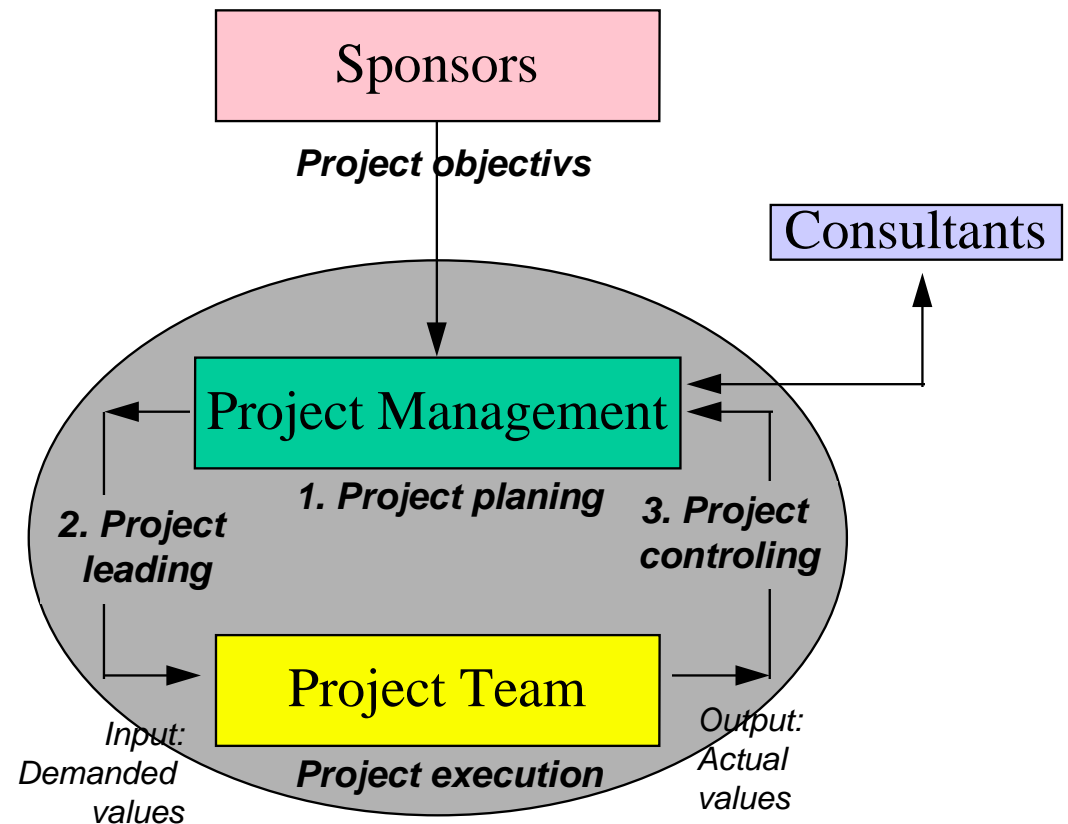
Lecture 4:
General (IT) Project Management
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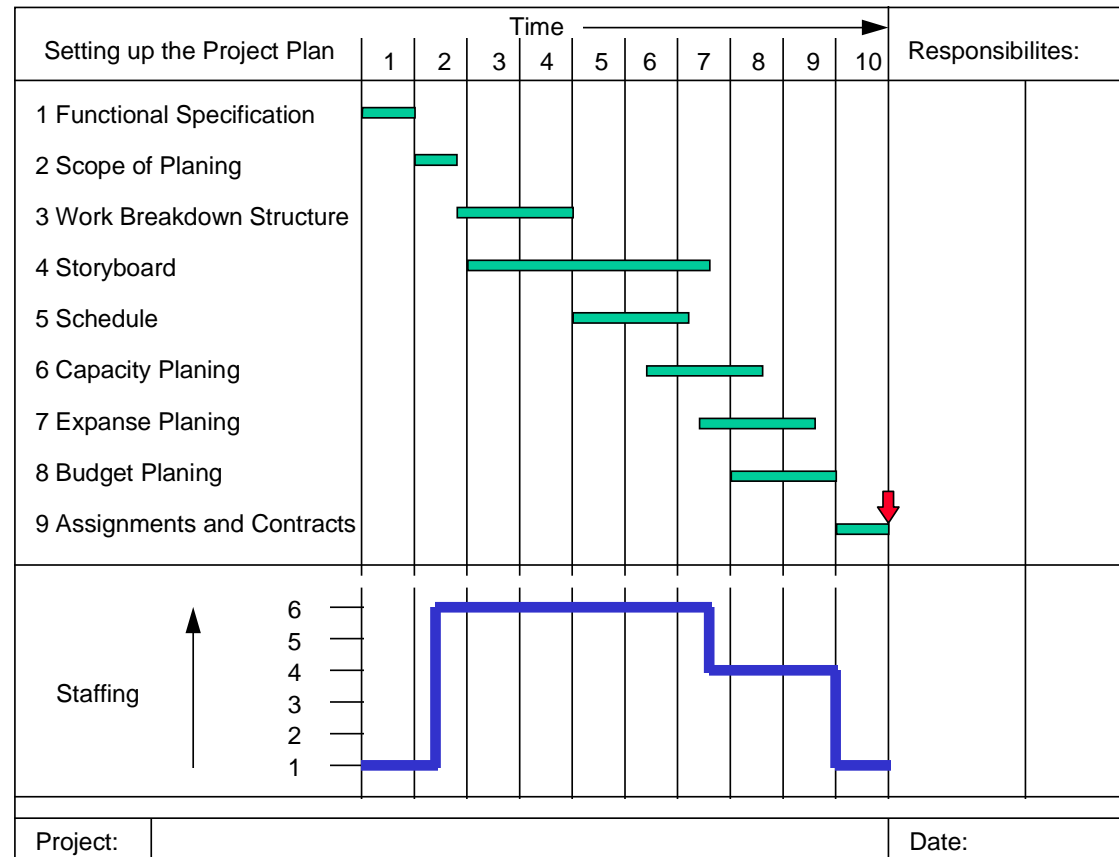
Start of a new Project

- A project is nothing one can plan in detail and in advance, since it is driven by mostly inner forces. Thus, the first drafts) of the
 - project's tasks,
 - it's Work Breakdown Structure
 - the it's organisation in terms of Sub Project Leader and staffing
- are undoubtedly vague and probably unrealistic.
 - There is still no good understanding, what efforts in term of time, labour force, and money needs to be spend for the identified legs.
 - In addition, any risk assignment is still impossible.



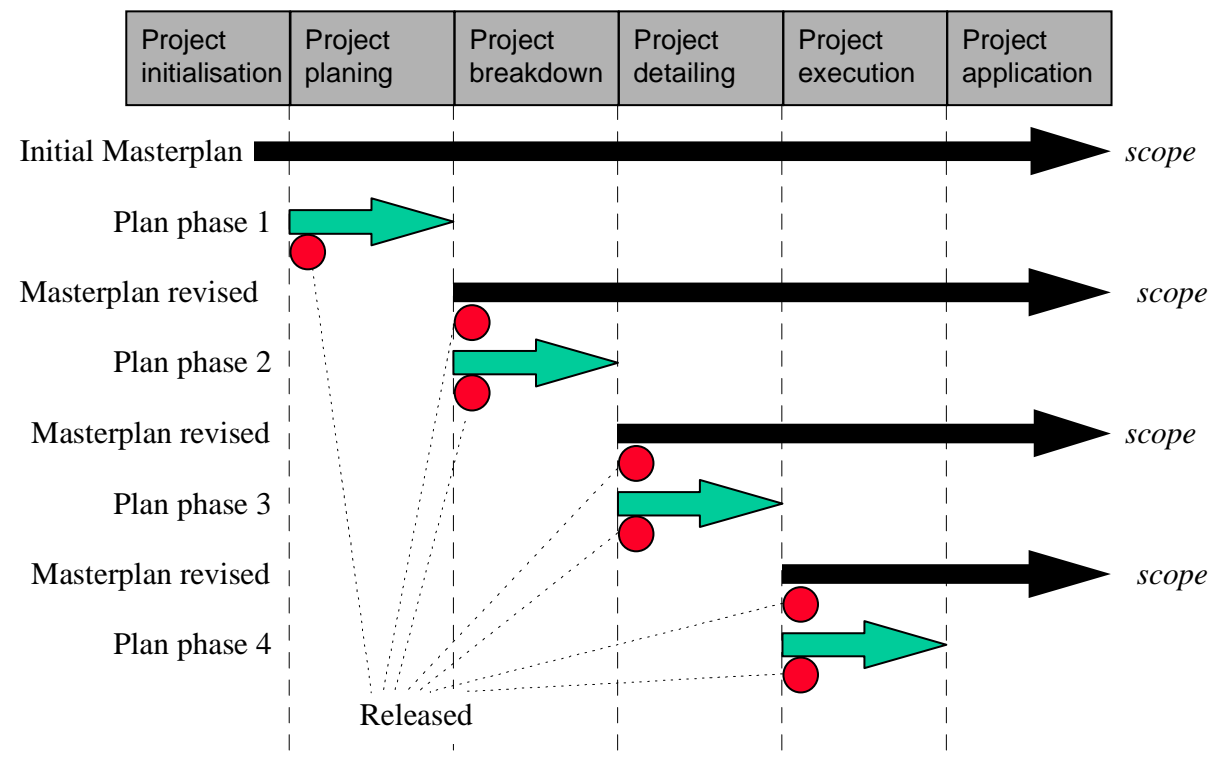
The Project's planning plan

- The first step is to plan the project.
 - Even this very initial phase requires internal and perhaps external expertise.
- Depending on the size of the project, this initial planning phase spans weeks or perhaps months.
 - Depending on the progress of the project, already some of the evaluations have already been carried out even before the final project manager has been assigned.
 - In that case the PL has to execute the task and participation is reduced to later adjustments.



Finishing the Project's planning plan

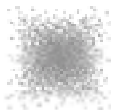
- This initial Project Plan (or *Masterplan*) will be accompanied by individual and more detailed phase plans.
 - While the project walks through the respective phases, the Project Plan is subject for subtle or more severe corrections.
- The Project Plan has to be revised by Project Management and revisions have to be streamlined with the SPLs.
 - The whole plan needs confirmation by upper management and
 - finally will be brought to attention to the project members.



Project Dependencies

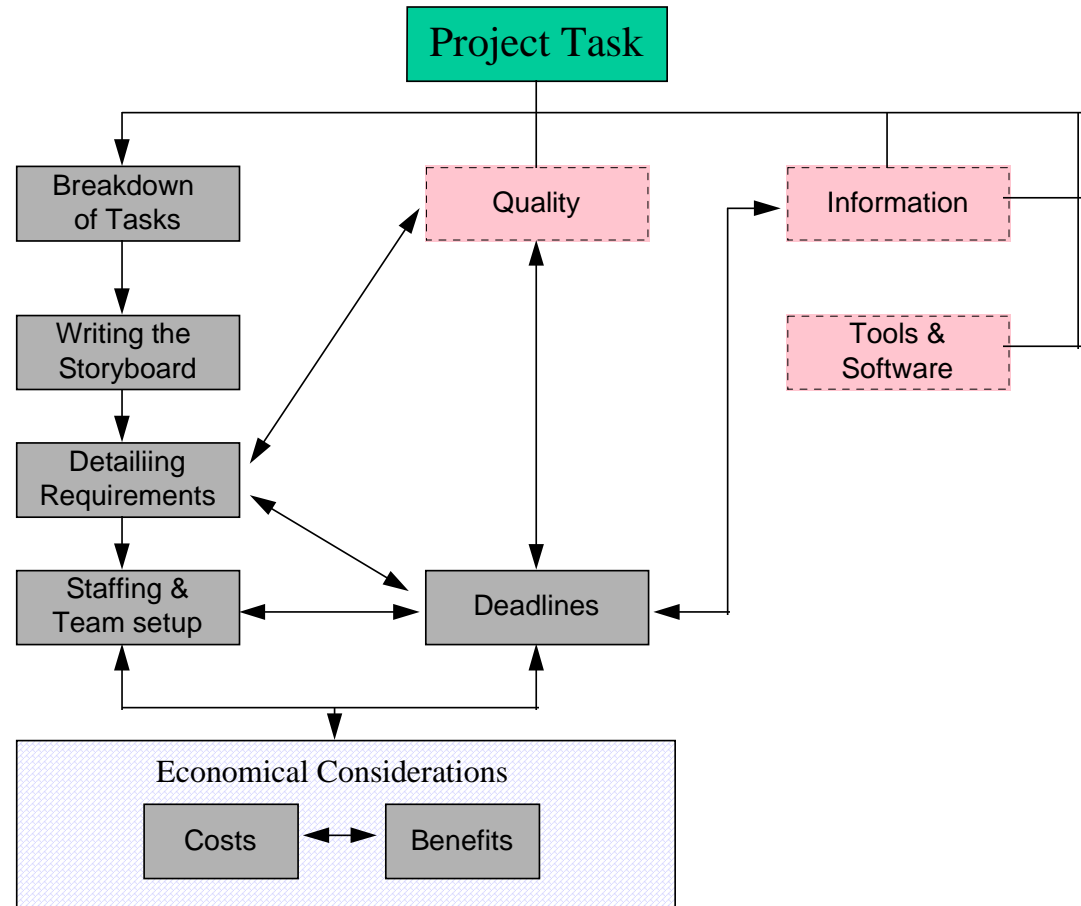
Any current IT project has to obey a lot of dependencies:

- Internal (given by the project itself):
 - project definition (functional description, deadline, quality),
 - realisation (team, methods),
 - budget constraints (costs, ROI)
- External (the resulting outcome of the project has to be placed in the real world):
 - compatibility (interfaces),
 - acceptance (customers), and or course
 - competition (price, market share).



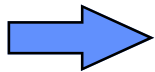
Identifying Dependencies and Tasks

- Without a good understanding the dependencies and tasks, a project runs on undefined risk which may impact the project significantly.
 - Project management is responsible to identify at least the internal dependencies,
 - to express them explicitly against upper management and sponsors,
 - and considering these in the project plan.



Work Breakdown Structure Approach

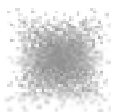
- Once the dependencies are identified, it is time to start working on the breakdown of tasks and to establish the *Work Breakdown Structure (WBS)* base on the project's functional and/or technical description.
- The WBS is effectively a breakdown of the *System Structure* and allows to
 - determine and define the particular functional parts of the system,
 - build (confined) subprojects according to the functional parts,
 - identify dependencies and required interfaces between the parts, and perhaps
 - allows to assess efforts and risks to the individual parts.



Typically, the WBS is a top-down approach starting from the general specifications and requirements to the necessary level of detail: The structural elements.

As with most plans, the WBS will evolve during the project's lifetime.

In particular, in the beginning, not all functional parts can be clearly be identified.



Establishing the WBS

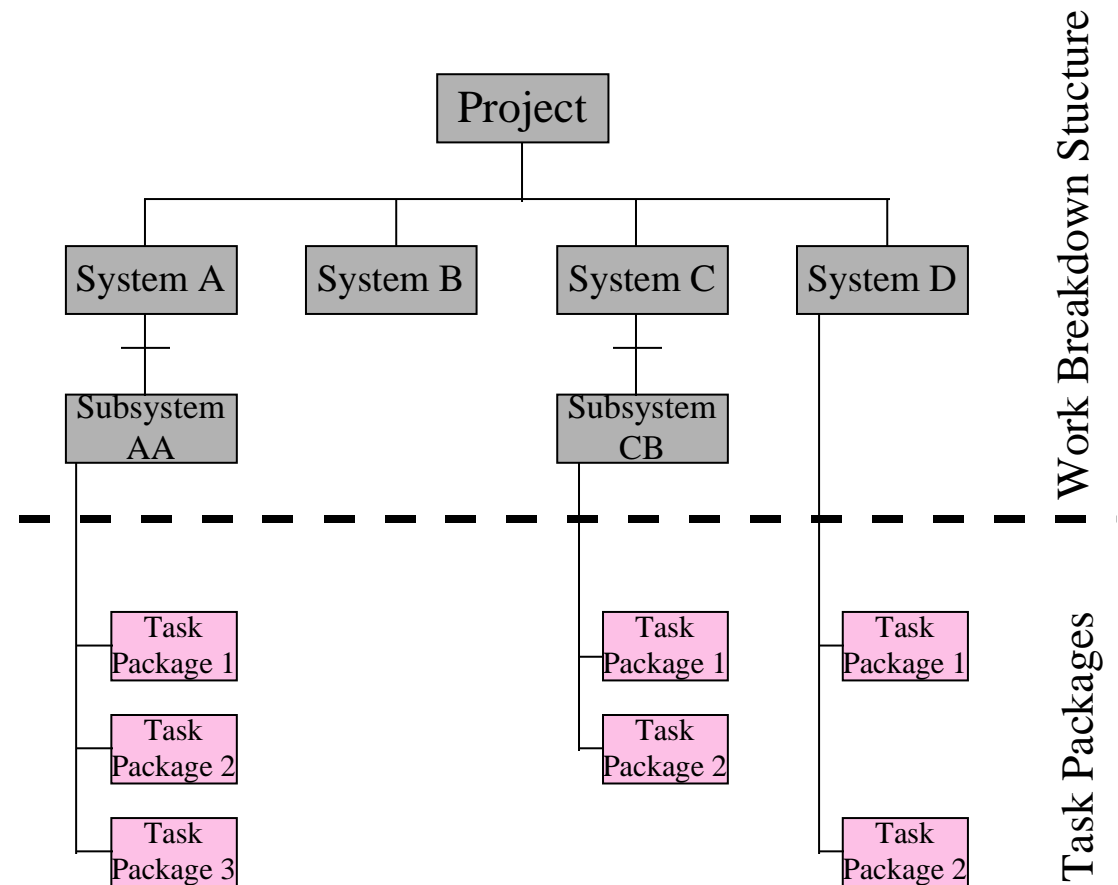
- After the WBS has been established initially, it is necessary to define particular tasks which can be assigned to individual project members, groups, or perhaps external providers:
 - By construction, every task is self-confined and can be completed independently from each other (except for streamlining the interfaces).

PHASE of PLANING	RESULTS of PLANING																									
1. Defining the task of structuring	<ul style="list-style-type: none"> - <i>Gathering ideas</i> - <i>Brainstorming</i> 																									
2. Chosing a structuring method	<ul style="list-style-type: none"> - <i>top down approach</i> - <i>bottom up approach</i> 																									
3. Draft of a Work Breakdown Structure (WBS)																										
4. Definition of structural elements	<ul style="list-style-type: none"> - <i>Gathering ideas</i> - <i>Brainstorming</i> 																									
5. Verification of structural elements	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> <th>D</th> </tr> </thead> <tbody> <tr> <th>A</th> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>B</th> <td></td> <td></td> <td>●</td> <td></td> </tr> <tr> <th>C</th> <td>●</td> <td></td> <td>●</td> <td></td> </tr> <tr> <th>D</th> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <ul style="list-style-type: none"> ● compatible ● incompatible ● investigation required 		A	B	C	D	A					B			●		C	●		●		D				
	A	B	C	D																						
A																										
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5. Finalising the WBS																										



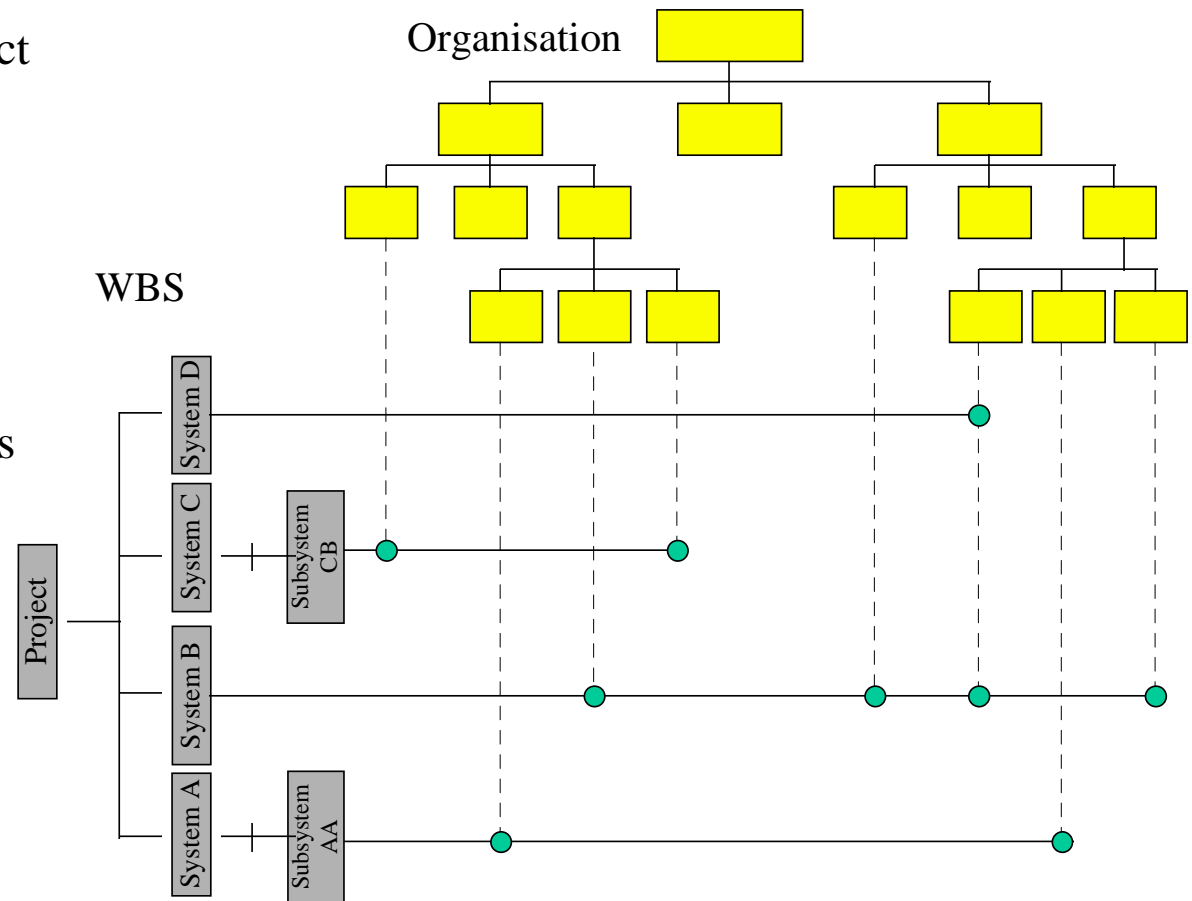
Task Assignments

- From the point of the assigned person or group, a task is a sub-project and requires a comparable level of project management, in particular regarding efforts, deadlines, and quality.
- The task should be considered as 'black box' [A -> task -> A']:
 - A defined input [A] is provided to the [task],
 - the [task] has to react upon receipt in a deterministic manner as defined in the corresponding use-case, and
 - the [task] produces a well-defined output [A'] .



Project Organisation

- In parallel with the WBS breakdown, the organisation structure of the project can now be established.
 - Now, the staff members can be organised in groups while it is possible to estimate (at first glance) the size and the qualification of groups according to the WBS
- Not only a (final) organigram and thus the resulting reporting chains is derived, but rather the assignment of the individual groups with tasks becomes transparent and perhaps allows to estimate possible incompleteness of tasks and staffing.
 - This diagram shows in addition the *Level of Responsibility* for the individual groups and their co-operation in the whole project.



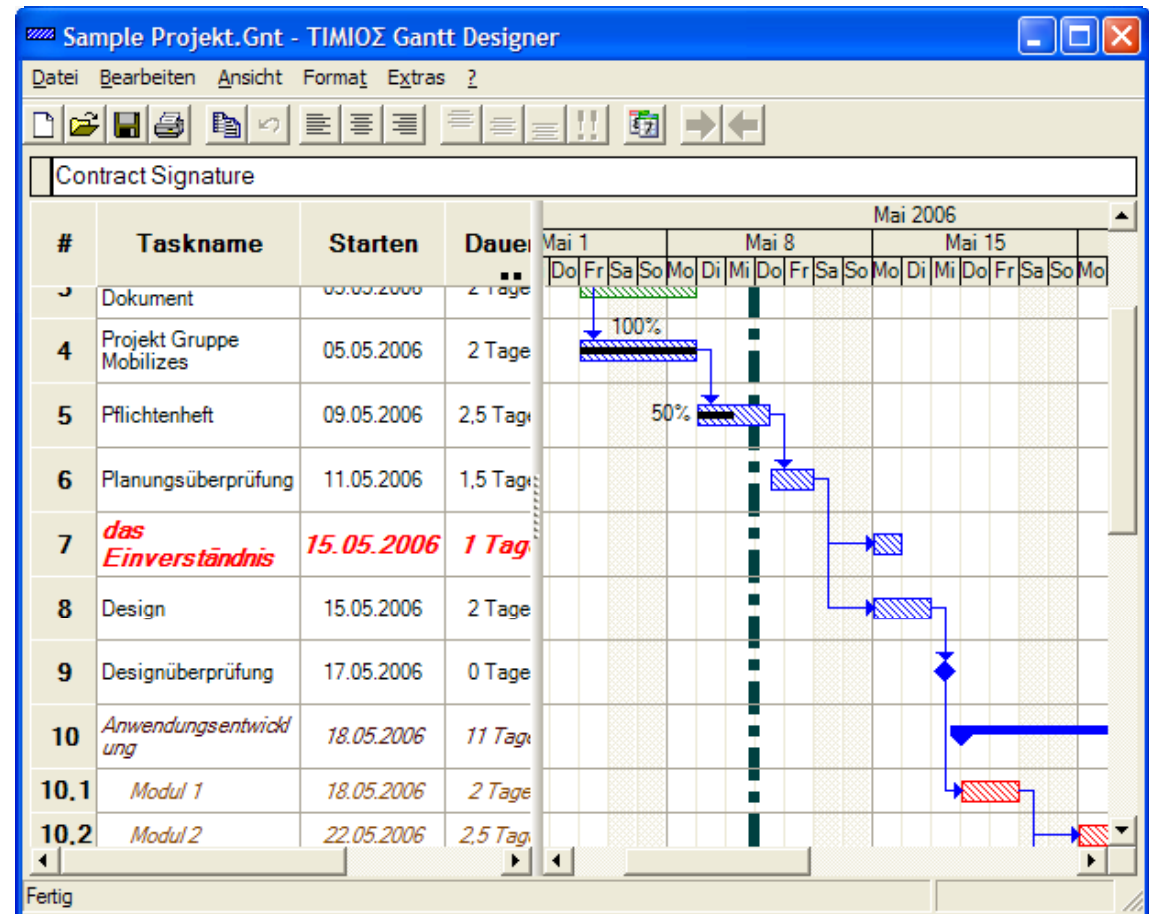
Schedule Management: Assigning Deadlines and Resources to Tasks

- Once evaluated, the WBS provides you with the layout of your project with respect to
 - systems,
 - subsystems, and
 - tasks (as structural element).
- The top-down approach for the WBS is now complemented with a bottom-up approach to assign
 - Deadlines
 - Resourcesto each activity which is known as *schedule management*.



Gantt Diagrams

- A particular 'view' can be visualised by a *Gantt chart* (named after the inventory Henry L. Gantt). Here,
 - the duration of the individual activities are displayed as bars
 - which have a related start and end date and showing their (linear) dependencies.
 - Steps can be combined to tasks, sections or phases.
 - The level of completion or critical steps can be easily visualised.



Purpose of Gantt Graphs

- Computer programs to provide Gantt charts techniques, allow in addition to define
 - common human resources (availability's) and
 - available budgets for the whole project,
- which can be shared among the individual activities, according to definable keys (percentages).
- A mathematical breakdown of those assigned numbers yields an estimate of
 - the level of completeness regarding activities, section, and phase level,
 - the used resources and budgets with the same level of detail.

Regarding the very advantages of Gantt charts (in particular using dedicated software, like Microsoft's Project), the disadvantages of Gantt charts result in the facts:

Gantt charts do not show the functional dependencies (compared to the WBS).

Larger projects result in very large Gantt diagrams and are hard to read.



Project Lists

- The calculation within a Gantt chart is based on a spread-sheet; just the representation of the results follows the 'bar' scheme, known as Gantt chart or diagram.
 - However, the basic calculation involved can be realised with basic spread-sheet means, or can be expressed as chained lists.
 - Those simple spread sheets can be enhanced with inter-related sheets, where resources are defined can correlated with the individual activities.
 - Though, very easy to use and to adopt to a project, the information here is very limited and only suited for smaller projects.

Activity	Name	Predecessor	Successor	Duration [Days]	Start Date	Due Date
1	Definition 2		2		2.2.2009	8.2.2009
2	Teambuilding	1	3	10	9.2.2009	28.2.2009
3	WBS	2	4			
4						

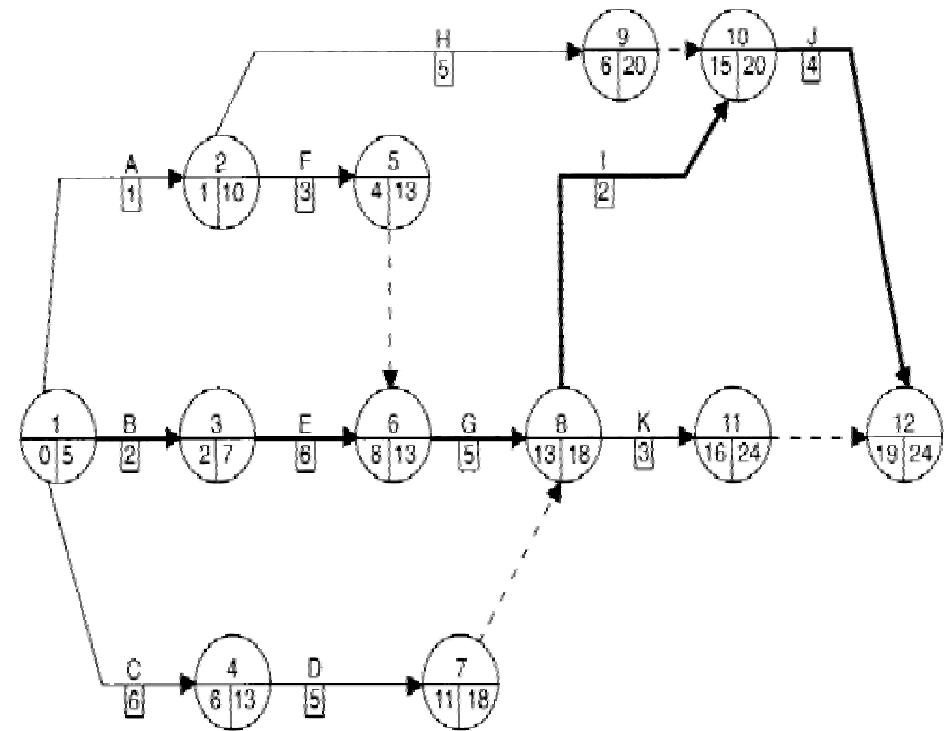


Netplan Techniques

- The Netplan technique is defined in DIN 69900 with the following scopes:

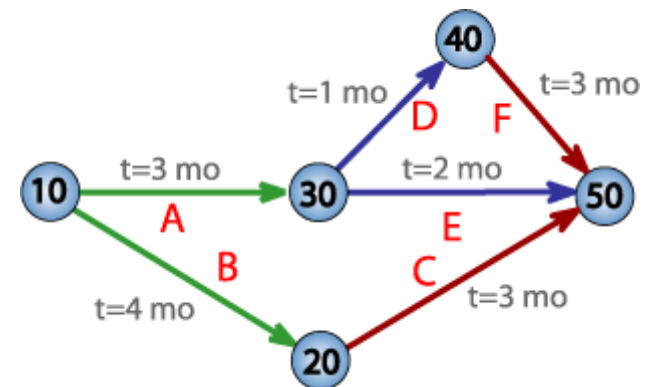
"The netplan technique includes procedures for project planing and control. The netplan is a graphical representation of flow-structures, in order to visualise logical and temporal dependencies of activities."

- There exist three types of the Netplan approach whether the activities are describes as
 - vectors
 - or nodes,
 - or whether instead of activities events are meshed in nodes.



Critical Path Analysis (CPA)

- Once we have identified the resources required to achieve or complete a certain project task, we can gauge this task against all others.
 - Gauging means, we have to consider
 - the respective resources required, and
 - the effective dependencies
- for every task.
 - In a well-behaving WBS, dependencies can be expressed simply as number of interfaces with respect to it's completion schedule.



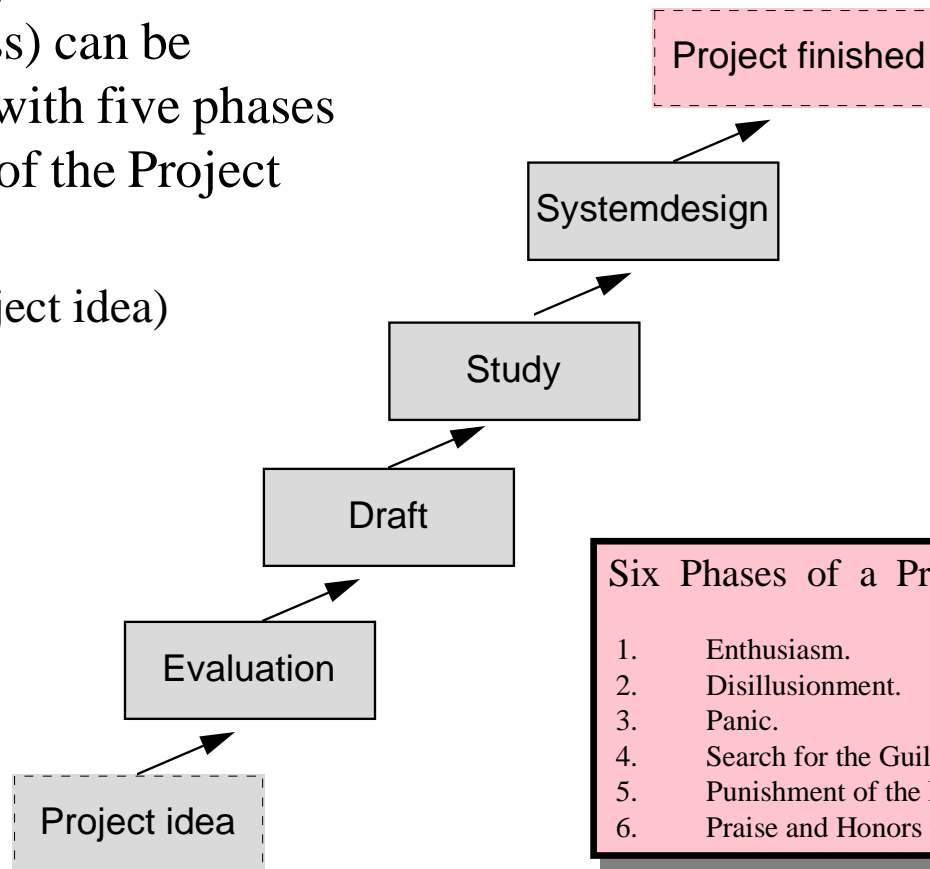
Five milestones (10 to 50) and six activities (A to F) are listed. The 'criticality' is provided in term of completion time (t). The paths B+C are most critical for the project. This diagram is a so-called PERT chart (Program Evaluation and Review Technique), which is equivalent to the Netplan 'activity-vector' approach.



Project Phases

- According to our today's understanding, a projects evolution (and perhaps progress) can be expressed in phases with five phases under responsibility of the Project Management.

- Initialisation (Project idea)
- Evaluation
- Draft
- Detailed Study
- Systemdesign
- Project finishing



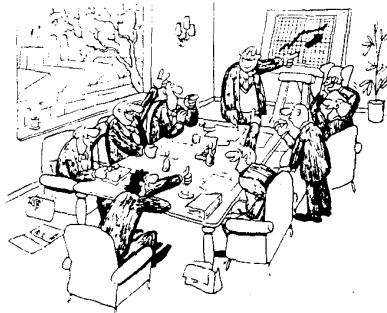
Six Phases of a Project

1. Enthusiasm.
2. Disillusionment.
3. Panic.
4. Search for the Guilty.
5. Punishment of the Innocent.
6. Praise and Honors for the Non-Participants.

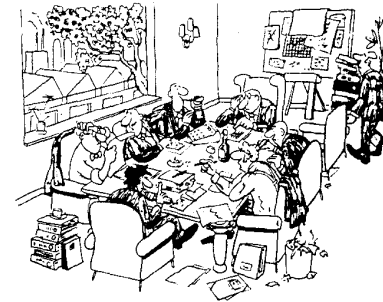


The Six Phases of Planning

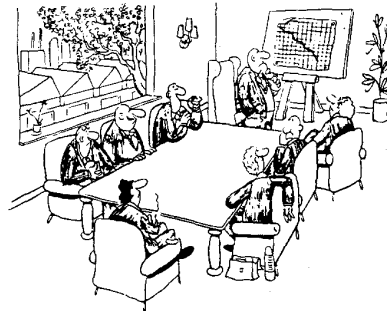
The 6 Phases of Planning - Die 6 Phasen der Planung - Les 6 phases du planning



- 1.** Enthusiasm
Begeisterung
Enthousiasme



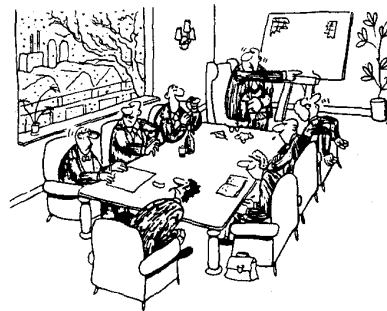
- 2.** Confusion
Verwirrung
Confusion



- 3.** Disillusion
Ernüchterung
Déception



- 4.** Finding a scapegoat
Suche der Schuldigen
Recherche du bouc émissaire



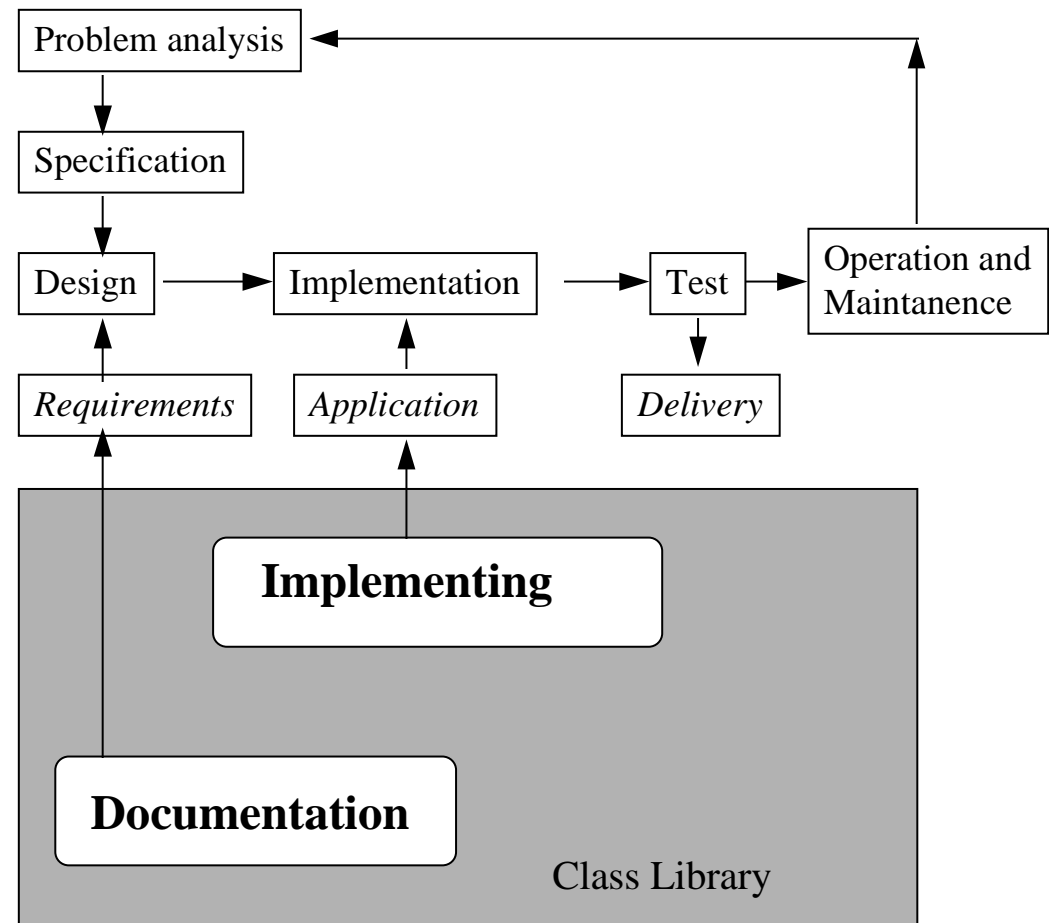
- 5.** Punishing the innocent
Bestrafung der Unschuldigen
Châtiment de l'innocent



- 6.** Bystander's reward
Auszeichnung der Nichtbeteiligten
Récompense du spectateur

Software Lifecycle Model

- Considering the construction of special tailored software, it became soon aware that software never is delivered as expected by the sponsors:
 - During the project evolution, the requirements of the software has changed; in particular because the deficiency of the original approach became apparent.
 - The functional aspects of design were not met, thus, additional development is necessary.
 - The quality of the software is below expectation and during operation an uncontrolled (and perhaps unrecoverable) behaviour is been observed (commonly referred to as 'bugs').

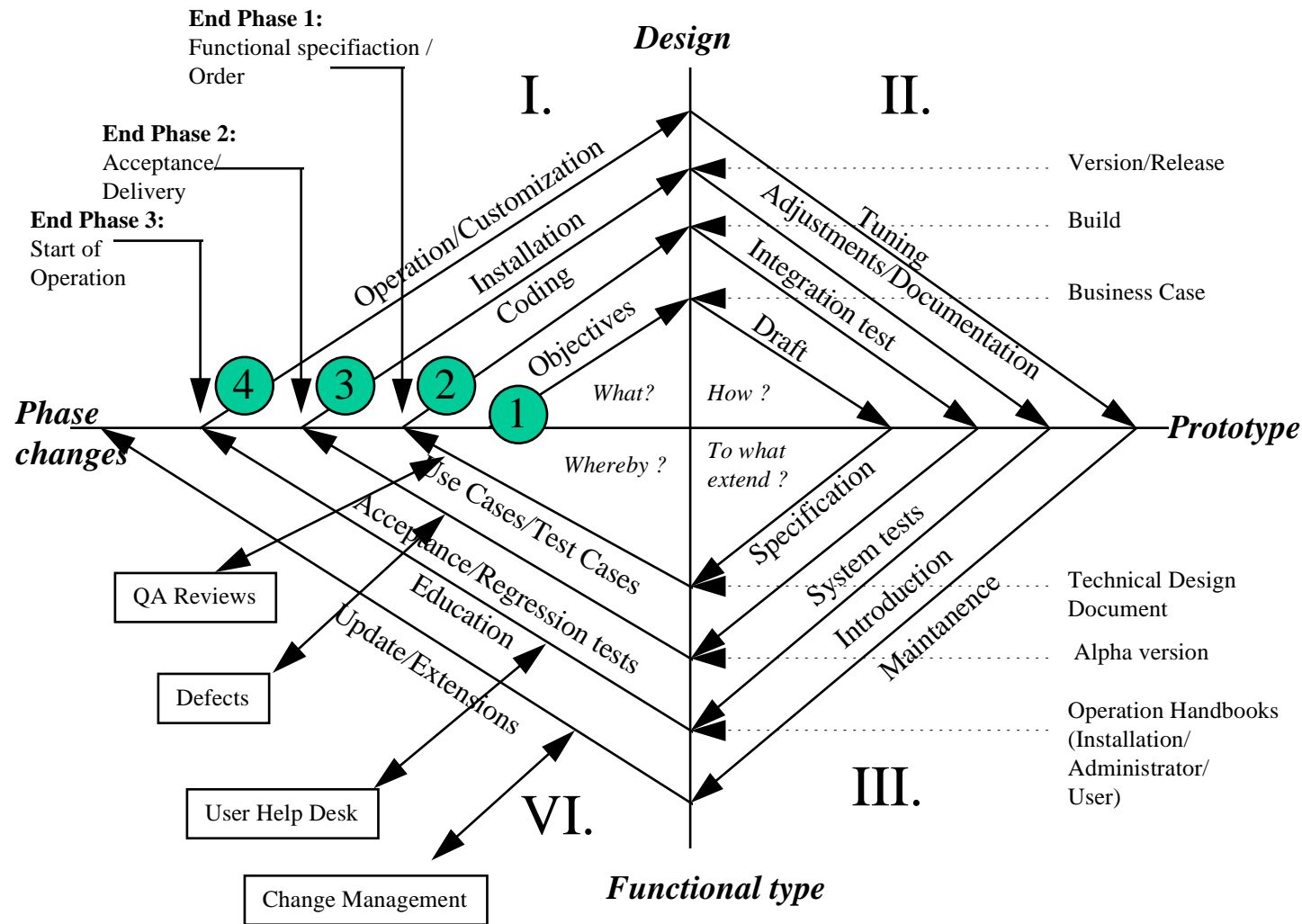


The Spiral Model

- More complex IT projects are not just focused on software development. Rather the project's tasks may include:
 - Adoption and configuration of standard software.
 - Considerable amount of special tailored software.
 - Configuration of hardware, operating system, and middleware.
 - Roll-Out of hard- and software.
 - Introduction of the new solution into operation.
 - Customisation of the current environment to include the new solution.
 - Education of the technical staff to become familiar with the new system.
 - Promoting the new solution to external customers.
 - Providing a full documentation for the integrated solution.
- Thus, today's IT projects require a merge of
 - special software development methods and
 - adopt classical project management approaches.
- One way to combine both worlds is to break down the software specific methods in a *Milestone* approach in a so-called *Spiral mode*

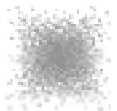


The Spiral Model (2)



The Spiral Model (3)

- The spiral model is essentially a phase model and describes the software development in cycles, while determining the four essential phases:
 - Design
 - Development
 - Functional testing
 - Operation
- Important here is, that the phase changes are well determined in terms of milestones to be achieved.
- Apart for development issues, the model also includes operational aspects. The four quadrants of the spiral model indicate in particular the basic questions needed to be raised:
 - What needs to be done ?
 - How do we achieve the results ?
 - To what extent do we meet our objectives ?
 - What are the relevant means ?



The Spiral Model (4)

- The milestones are additionally clearly described:
 - Start is the Business Case
 - Next step is the technical design document
 - The build of the first (working) version, tells that coding is on it's way
 - The first alpha version will be delivered to QA, thus the product should be mainly completed.
 - Now, the software enters the usual release/development cycle
 - Finally, not only the software but also the documents are in place for production

Unlike the WBS or the Gantt chart, the spiral model does not try to assess the logical structure of the project, nor tries it to pinpoint the project's current state or resource exhaustion.

The spiral model tells the Projekt Manager what is in place and what is missing, independently from the WBS.

The spiral model provides a framework for software development and can be used as a ruler for IT project managment.

