

# PROJECT MANAGEMENT AND AGILE METHODS

## Planning and Methods

---

© 2023 OTH Amberg-Weiden  
Prof. Dr. Kris Dalm MBA

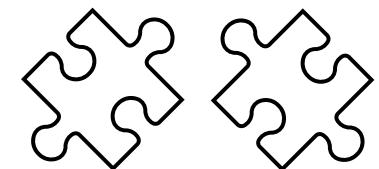
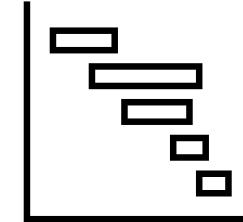


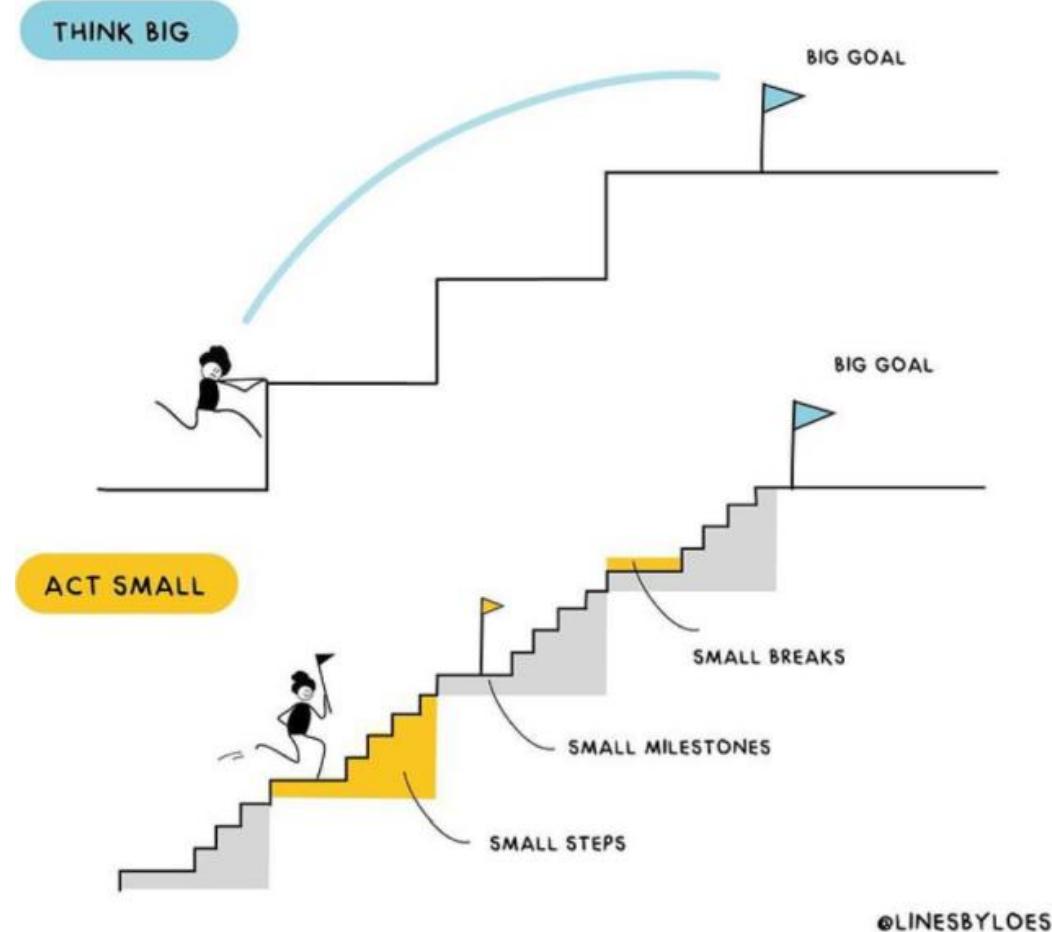
# Learning targets

After this chapter, you...

---

- Understand how the **Work Breakdown Structure (WBS)** works.
- Are familiar with **Project Plan** and **Gantt Chart**.
- Got to know what **PM KPIs** are available and how to interpret them.
- Know several **PM Methods**, e.g. SWOT, PEST, Pareto, etc.





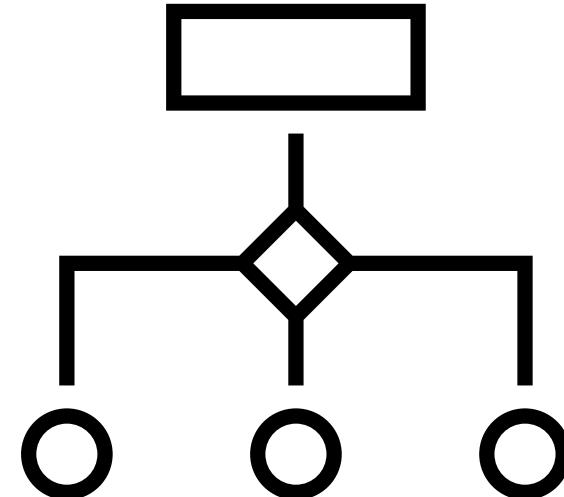
Project Management: Make projects manageable!

# Work Breakdown Structure (WBS)

## Definition

---

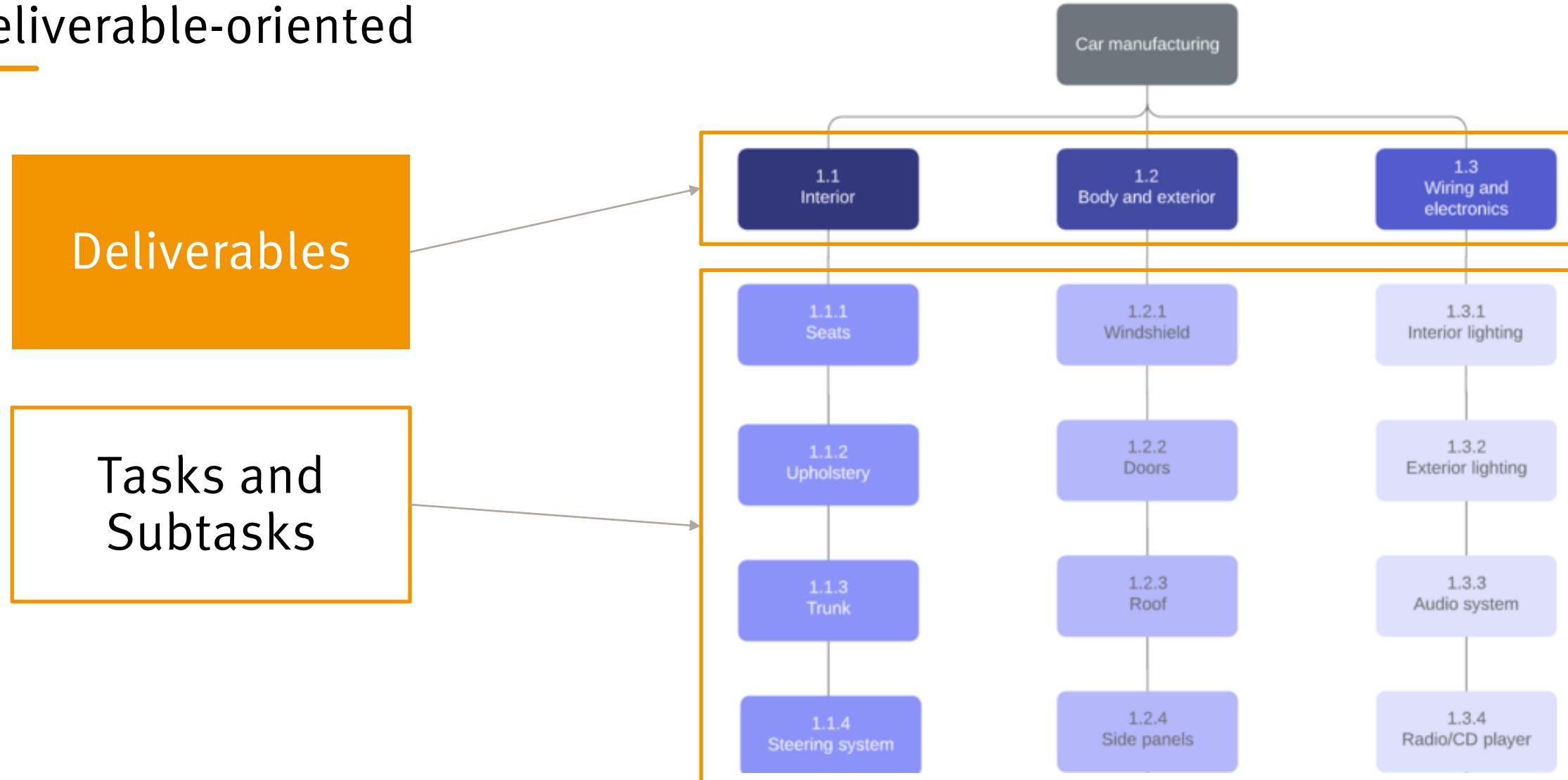
- A Work Breakdown Structure is a “deliverable oriented hierarchical decomposition of the work to be executed by the project team.”
- There are two types of WBS:
  - Deliverable-oriented and
  - Process-oriented



Source: PMBOK® Guide, <https://www.lucidchart.com/pages/work-breakdown-structure>

# Work Breakdown Structure (WBS)

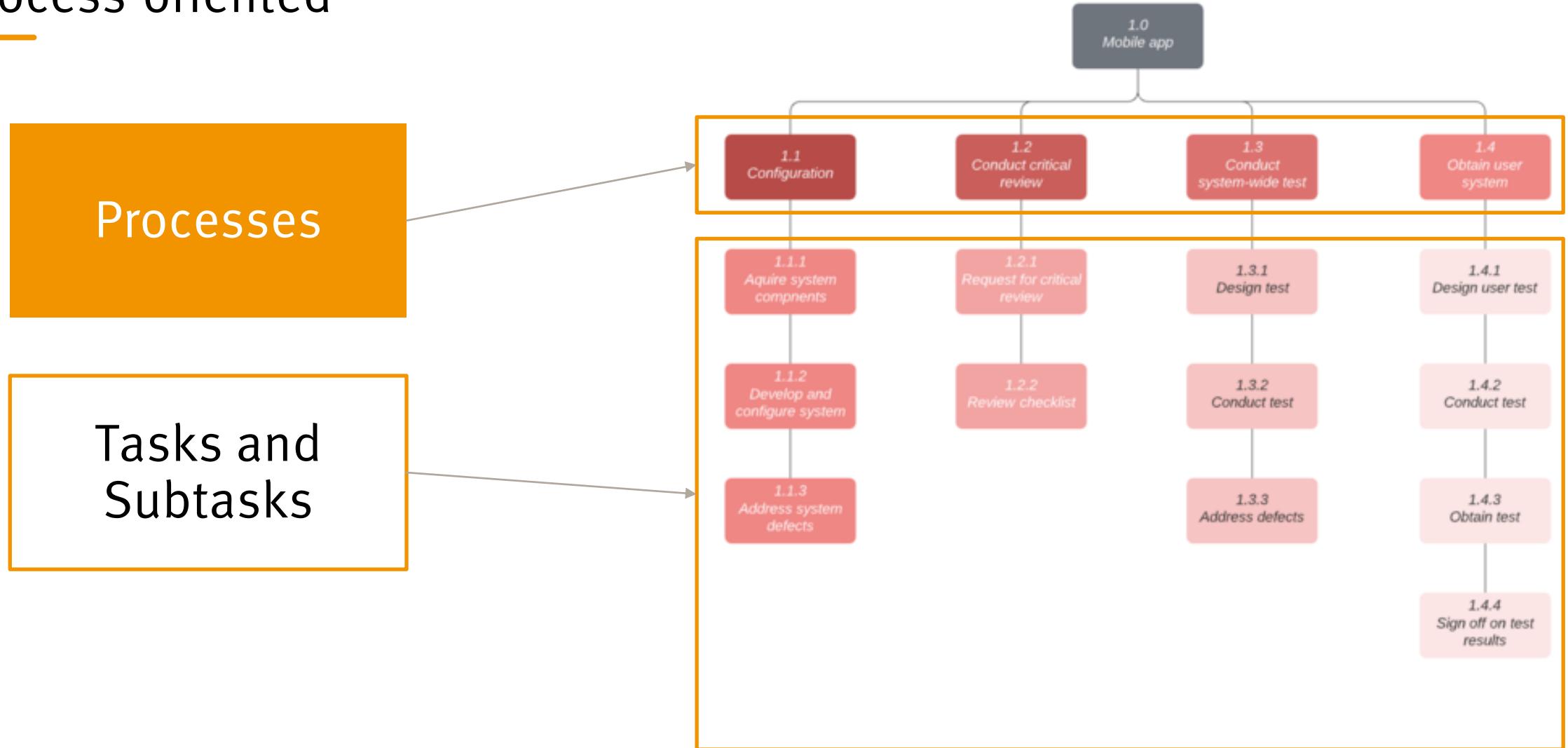
## Deliverable-oriented



Source: PMBOK® Guide, <https://www.workbreakdownstructure.com/>, <https://www.lucidchart.com/pages/work-breakdown-structure>

# Work Breakdown Structure (WBS)

## Process-oriented



Processes

Tasks and  
Subtasks

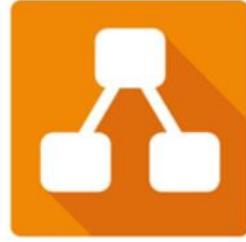
Source: PMBOK® Guide, <https://www.workbreakdownstructure.com/>, <https://www.lucidchart.com/pages/work-breakdown-structure>

# Work Breakdown Structure (WBS)

## Tools

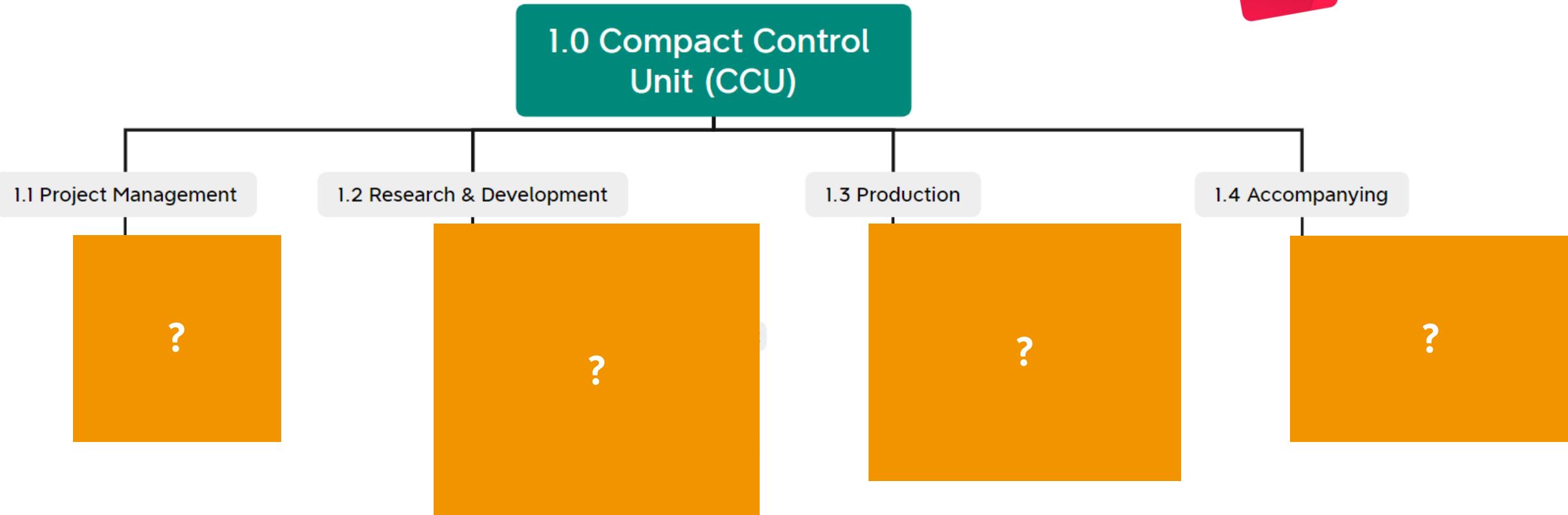
---

- Tools for developing a WBS?



# Work Breakdown Structure (WBS)

Example: CCU70 (Process-oriented WBS)



# Work Breakdown Structure (WBS)

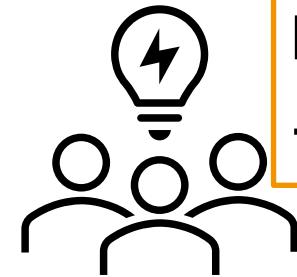
## Apply to your project

- Task: **Perform a WBS to your project.**
- Find the presented example in Moodle



Example WBS CCU

- Draw the WBS in a piece of paper and scan it or use any presented software.



Preparation: 20 min  
→ short presentation

# Project Plan

## Key Elements

---

1.1 Project Management				
1.1.1 Initiation	1	1	Project Manager	Done
1.1.2 Planning	2	2	Project Manager	Done
1.1.3 Execution	4	19	Project Manager	Doing
1.1.4 Monitoring	7	16	Project Manager	ToDo
1.1.5 Closing	23	2	Project Manager	ToDo

- A Project Plan summarizes the key items that are needed to achieve the project goals.
- A Project Plan is the most important document in project management.
- A Project Plan helps the project manager to keep the overview and helps the team members to identify responsibilities.
- Main Information in a project plan: timeline, scope and due dates.
- Optional Information in a project plan: resources, milestones, deliverables.
- The Project Plan is also used to monitor project status.
- A Project Plan with a Gantt Chart identifies critical paths.

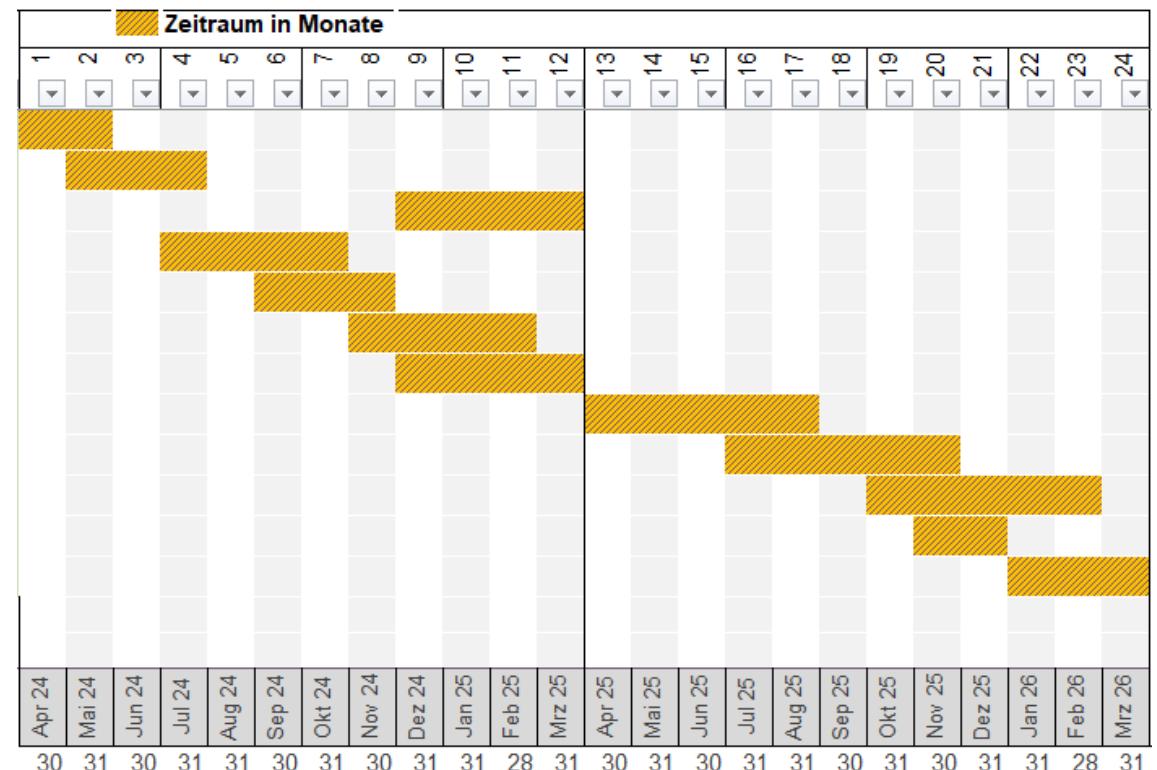
Source: <https://asana.com/de/resources/project-management-plan>

# Project Plan

## Gantt Chart

---

- A Gantt chart is a commonly used graphical view of a project schedule.
- It is a type of bar chart showing the start and finish dates of a project's elements such as resources, planning, and dependencies.
- Henry Gantt (1861-1919), an American mechanical engineer, designed the Gantt chart.



Source: <https://www.investopedia.com/terms/g/gantt-chart>

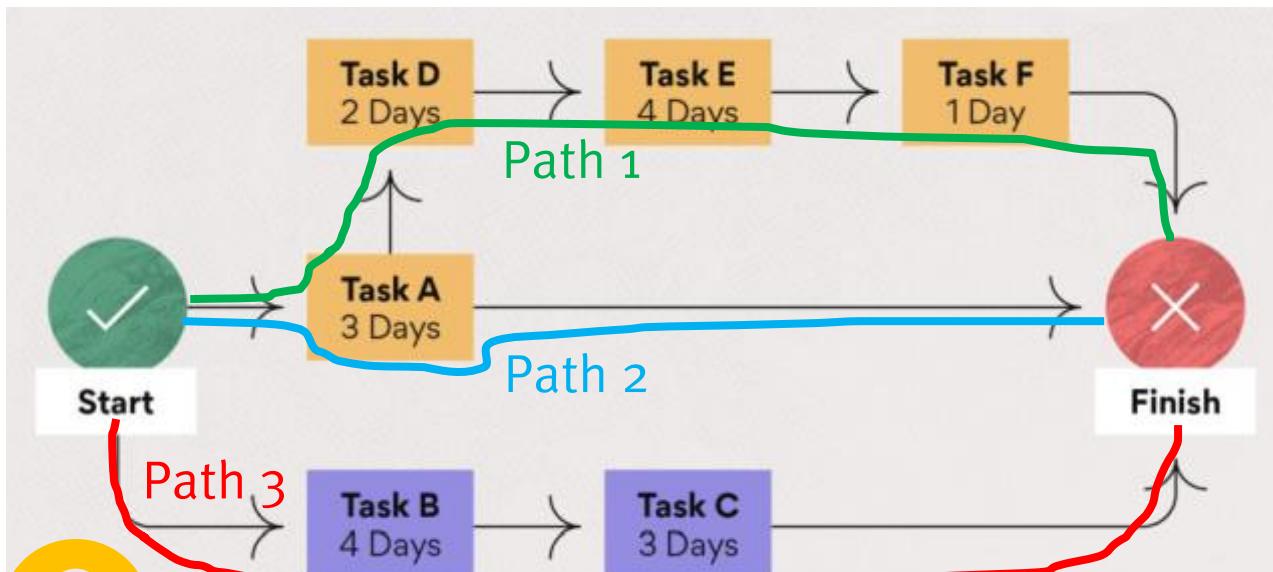
# Project Plan

## Critical Path Method (CPM)

- In project management, the critical path is the longest sequence of tasks that must be completed to execute a project.
- The tasks on the critical path are called “critical activities” because if they’re delayed, the whole project completion will be delayed. To find the critical path, project managers use the critical path method (CPM).

What can I do if the critical path is identified?

Which path is the critical path?



Handle the critical path:

- Allocate more resources
- Prioritize
- Plan buffer

# Project Plan

## Tools

---

- Tools for developing a Project Plan?



# Project Plan

## Estimation of Time

---



Estimate the total value of the coins the persons in this room have in their wallet right now.



In 10  
seconds

In 2  
minutes

In 2  
hours?

# Project Plan Estimation

---



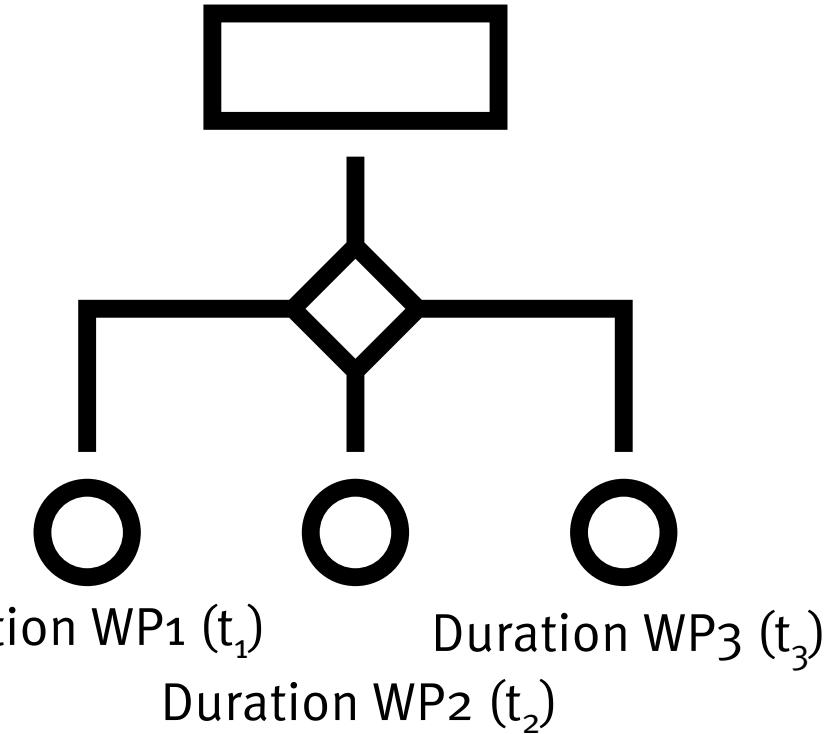
How would you estimate the needed time and resources for a work package?

- Estimation of Work Package's (WP) time and resources is based on:
  - Experience in PM (similar WP in past?)
  - Experience of project team
- Estimation can be conducted in different ways:
  - Top-Down Estimation
  - Bottom-Up Estimation
  - Analogous Estimation
  - Three-Point Estimating
  - Expert Judgement

# Project Plan

## Top-Down Estimation

- There is a fix overall duration for the project, and you have to break it down to the WPs.
- Commonly used if project duration is given e.g., by customer. This project estimate technique works well for this scenario as you have a block of time and can split it into activities to meet the deadline.



Project duration  $t_{\text{Project}} = t_1 + t_2 + t_3 + t_n$

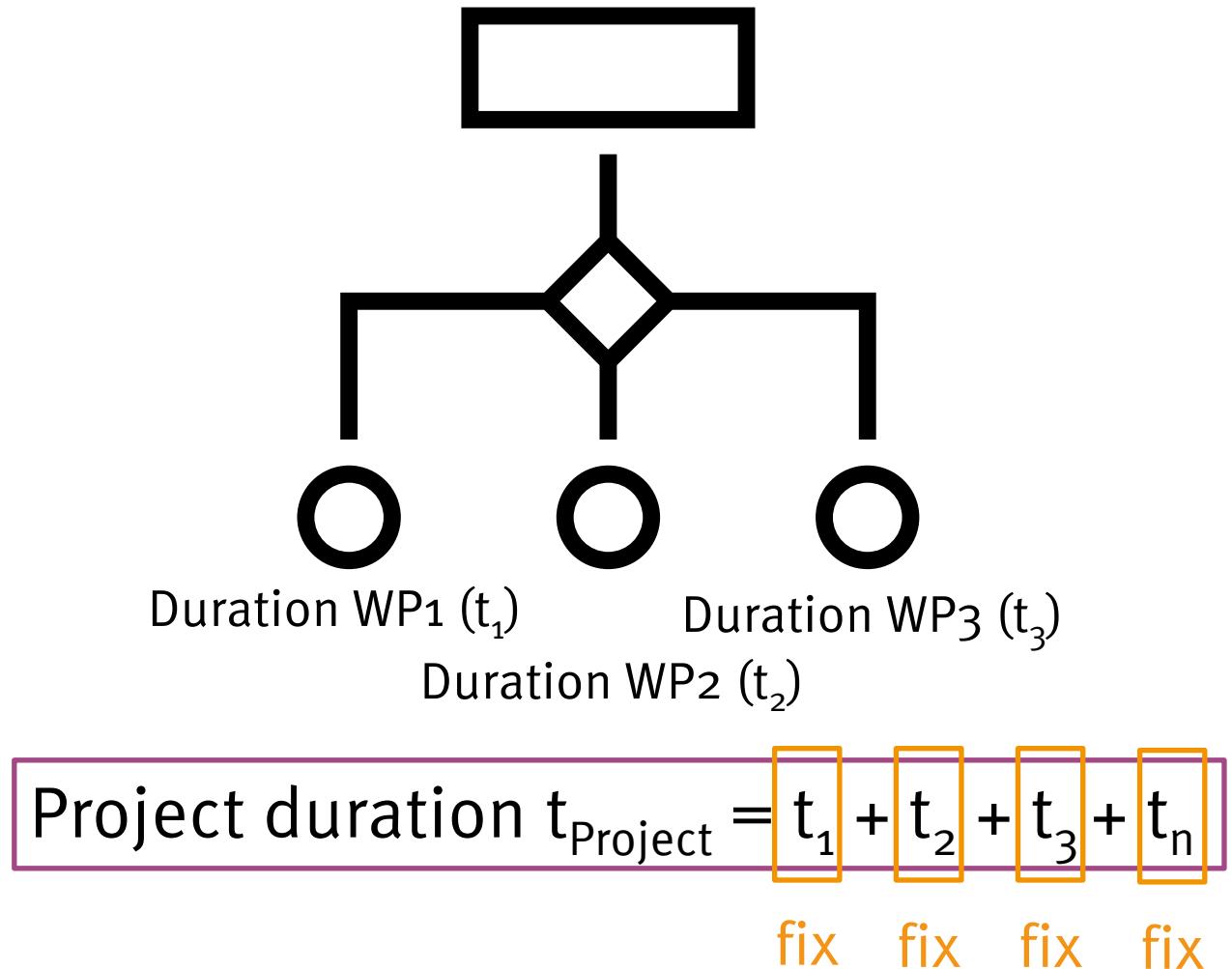
Source: <https://www.projectmanager.com/blog/project-estimation-techniques>

# Project Plan

## Bottom-Up Estimation

---

- Each WP is estimated separately and combined into an estimation for the whole project.
- Advantage: More accurate than Top-Down.
- Disadvantage: This estimation technique takes more time.



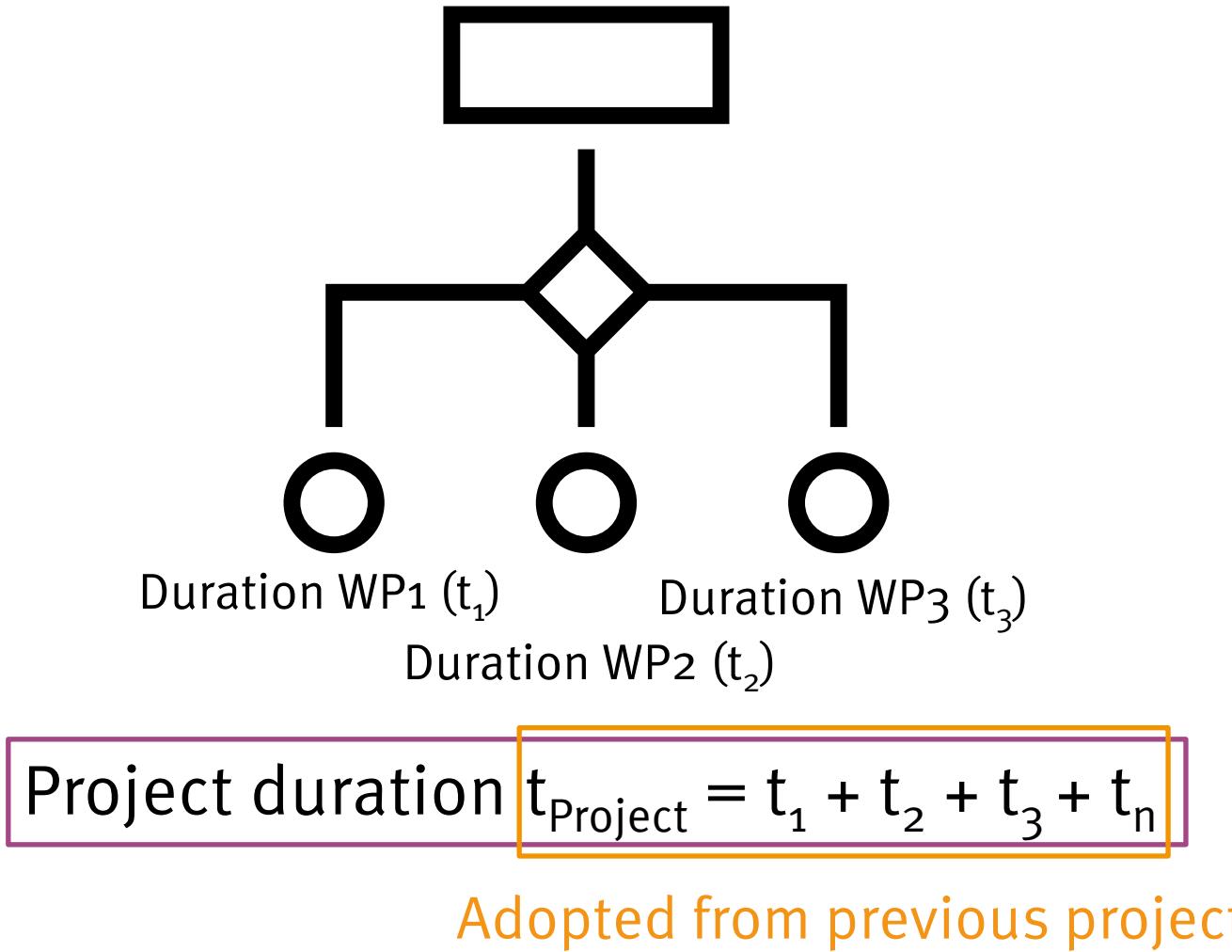
Source: <https://www.projectmanager.com/blog/project-estimation-techniques>

# Project Plan

## Analogous Estimation

---

- Analogous Estimation is based on previous, similar projects.
- Project Manager analyses a previous, similar project and comes up with an estimation for the new project.
- Advantage: Project experience included.
- Disadvantage: same errors could happen if there was no well performed Closure at previous project.



Source: <https://www.projectmanager.com/blog/project-estimation-techniques>

# Project Plan

## Three-Point Estimation

- Used in combination with Bottom-Up technique.
- Three estimations are applied:
  - Optimistic
  - Most likely
  - Pessimistic
- Average of the three estimations is used.

WP	Optimistic	Most likely	Pessimistic	Average
WP1	1 PM	2 PM	3 PM	
WP2	2 PM	3 PM	5.5 PM	Results?
WP3	4 PM	5 PM	9 PM	

PM = Person Month

Where from can I get the estimations?



# Project Plan

## Expert Judgement Estimation

---

- Experts are asked for their estimation.
- Most common technique: fast and easy than making calculations.
- Can be used for Top-Down and for Bottom-Up Estimation.



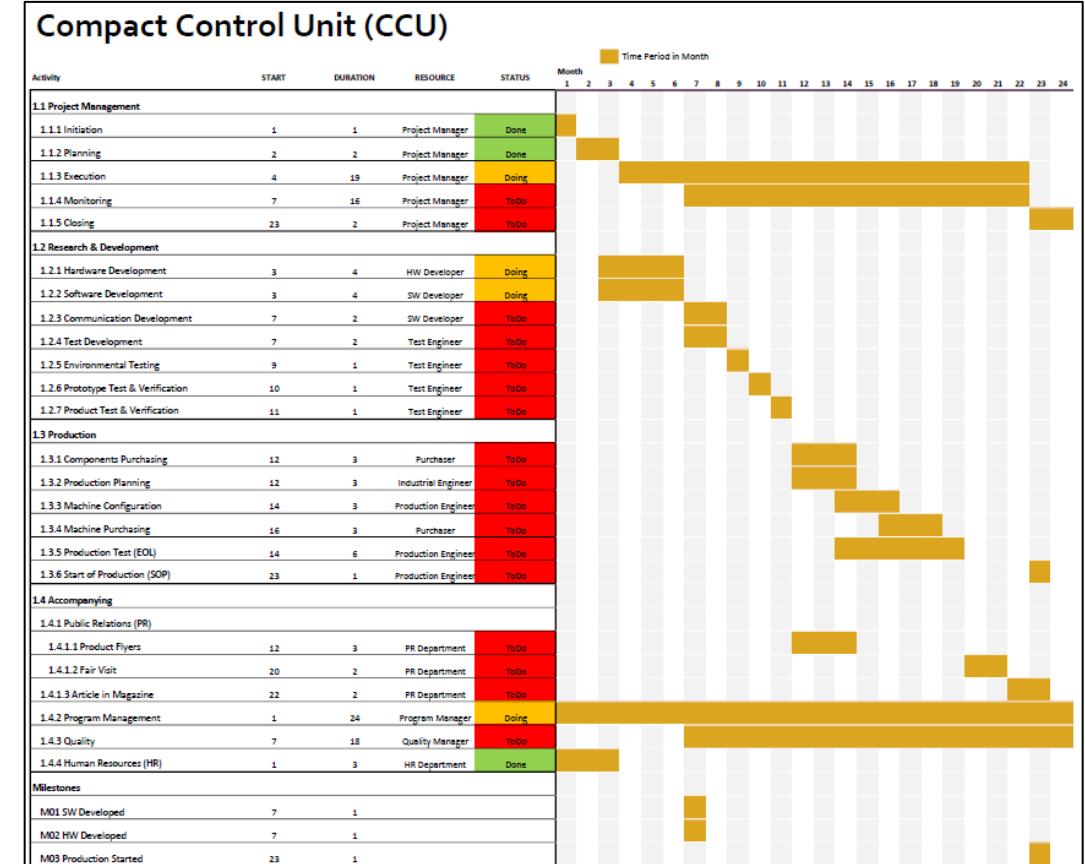
Source: <https://www.projectmanager.com/blog/project-estimation-techniques>

# Project Plan

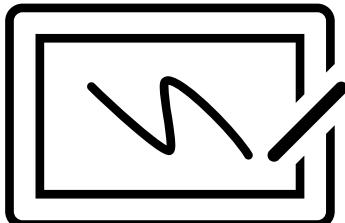
## Example: CCU70

- Work Package (WP) Name
- WP Start
- WP Duration
- WP Resource
- WP Status

What should a (simple)  
Project Plan contain?



## Presentation of Example Project Plan (CCU)



# Project Plan

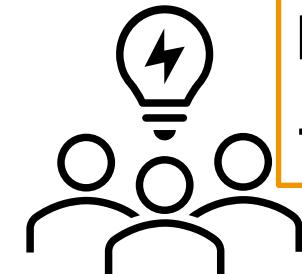
## Apply to your project

---

- Task: **Perform a Project Plan + Gantt Chart to your project.**
- Use one of the provided templates:



- Find the presented example in Moodle:



Preparation: 30 min  
→ short presentation

Hint:

WBS is a good base for a project plan.

# Cost-Benefit Analysis (or Scoring Method)

## German: Nutzwertanalyse

---

- Evaluation based on economic, technical, psychological and social evaluation criteria.
- 5 process stages (sometimes 6 in literature):
  1. Determination of the **evaluation criteria**
  2. Determination of the **weighting factors**
  3. Evaluation of **alternatives**
  4. Determination of **utility value**
  5. Determining the **ranking** or selection

Use if you need to decide between at least two things.



Source: 2010 Schenk - Instandhaltung technischer Systeme, <https://tipps4gruender.de/scoring-verfahren>

# Cost-Benefit Analysis

1. Determination of the **evaluation criteria**
2. Determination of the **weighting factors**
3. Evaluation of **alternatives**
4. Determination of **utility value**
5. Determining the **ranking** or selection

Evaluation from 0-6

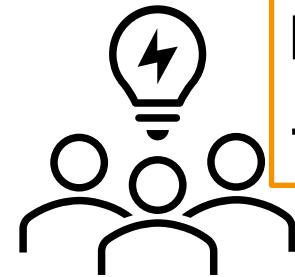
Evaluation Criteria	Weighting factors	Evaluation	Idea 1	Idea 2	Idea 3
			Partial utility value	Evaluation	Partial utility value
Strategy	0,2	5	1	2	0,4
Product attractivity on market	0,25	4	1	4	1
Market attractivity	0,15	4	0,6	3	0,45
Doability	0,2	3	0,6	2	0,4
Synergy effects	0,05	4	0,2	4	0,2
Return on Invest	0,15	4	0,6	3	0,45
<b>Total utility value</b>			<b>4</b>	<b>2,9</b>	<b>3,65</b>
<b>Ranking</b>			<b>1.</b>	<b>3.</b>	<b>2.</b>

Must be 1 in total

# Cost-Benefit Analysis

## Apply to your project

- Situation: You want to start with your Start-up, but you are not sure if you should use Windows or Mac computers for your business.
- Task: **Perform a Cost-Benefit Analysis (Windows, Mac) to your project.**

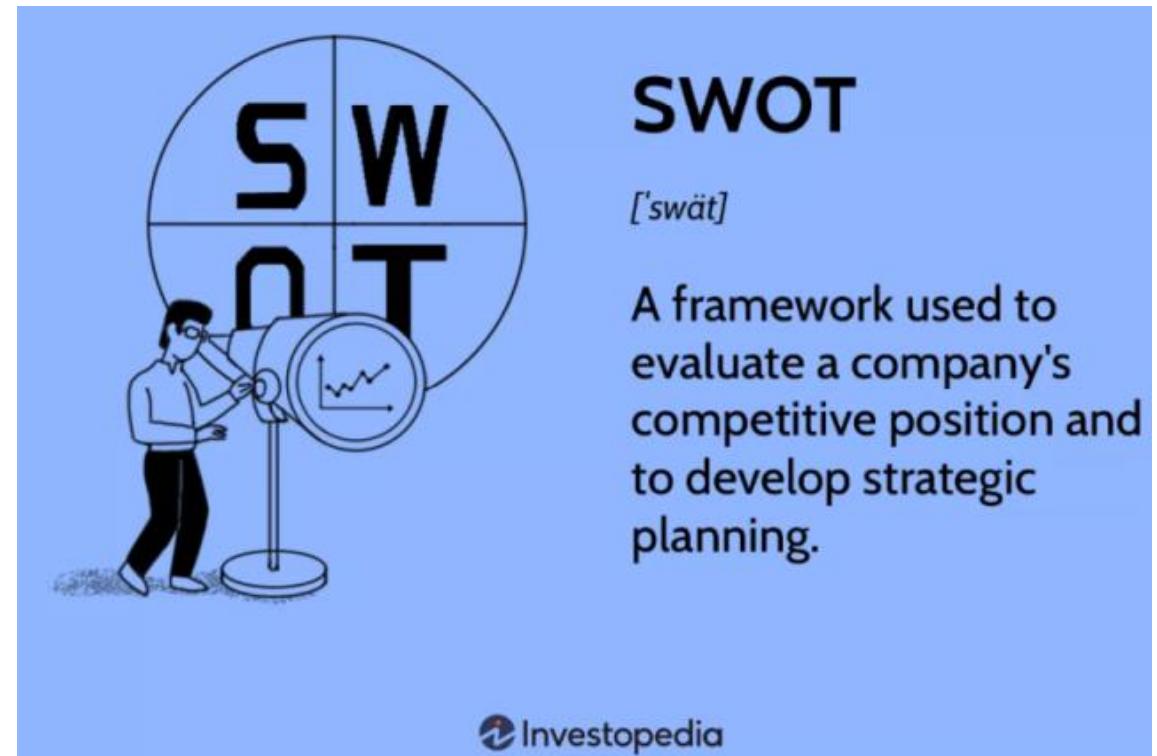


Preparation: 15 min  
→ short presentation

# SWOT Analysis

---

- SWOT analysis is a technique for assessing the performance, competition, risk, and potential of a business, as well as part of a business such as a product line or division, an industry, or other entity.



Source: <https://www.investopedia.com/terms/s/swot.asp>

# SWOT Analysis

## Internal Factors

---

- (Strength) What are we doing well?
- (Strength) What is our strongest asset?
- (Weakness) What are our detractors?
- (Weakness) What are our lowest-performing product lines?

### Strengths

- Strengths describe what an organization excels at and what separates it from the competition: a strong brand, loyal customer base, a strong balance sheet, unique technology, and so on.

### Weaknesses

- Weaknesses stop an organization from performing at its optimum level. They are areas where the business needs to improve to remain competitive: a weak brand, higher-than-average turnover, high levels of debt, an inadequate supply chain, or lack of capital.

Source: <https://www.investopedia.com/terms/s/swot.asp>

# SWOT Analysis

## External Factors

---

### Opportunities

- Opportunities refer to favorable external factors that could give an organization a competitive advantage.
- For example, if a country cuts tariffs, a car manufacturer can export its cars into a new market, increasing sales and market share.

- (Opportunity) What trends are evident in the marketplace?
- (Opportunity) What demographics are we not targeting?
- (Threat) How many competitors exist, and what is their market share?
- (Threat) Are there new regulations that potentially could harm our operations or products?

### Threats

- Threats refer to factors that have the potential to harm an organization. For example, a drought is a threat to a wheat-producing company, as it may destroy or reduce the crop yield. Other common threats include things like rising costs for materials, increasing competition, tight labor supply, and more.

# SWOT Analysis

S	W	O	T
STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
<ul style="list-style-type: none"><li>• Things your company does well</li><li>• Qualities that separate you from your competitors</li><li>• Internal resources such as skilled, knowledgeable staff</li><li>• Tangible assets such as intellectual property, capital, proprietary technologies etc.</li></ul>	<ul style="list-style-type: none"><li>• Things your company lacks</li><li>• Things your competitors do better than you</li><li>• Resource limitations</li><li>• Unclear unique selling proposition</li></ul>	<ul style="list-style-type: none"><li>• Underserved markets for specific products</li><li>• Few competitors in your area</li><li>• Emerging need for your products or services</li><li>• Press/media coverage of your company</li></ul>	<ul style="list-style-type: none"><li>• Emerging competitors</li><li>• Changing regulatory environment</li><li>• Negative press/media coverage</li><li>• Changing customer attitudes toward your company</li></ul>

 WordStream

Source: <https://www.wordstream.com/blog/ws/2017/12/20/swot-analysis>

# SWOT Analysis

## Example

---

Apple SWOT Analysis			
Strengths	Opportunities	Weaknesses	Threats
<ul style="list-style-type: none"><li>• Brand recognition</li><li>• Innovative products</li><li>• Ease of use</li></ul>	<ul style="list-style-type: none"><li>• Expand distribution options</li><li>• Create new product lines</li><li>• Technological advancements</li></ul>	<ul style="list-style-type: none"><li>• High prices</li><li>• Closed ecosystem</li><li>• Lack of experimentation</li></ul>	<ul style="list-style-type: none"><li>• Tough competition</li><li>• Lawsuits</li><li>• International Issues</li></ul>

Source: <https://blog.hubspot.com/marketing/swot-analysis>

# SWOT Analysis

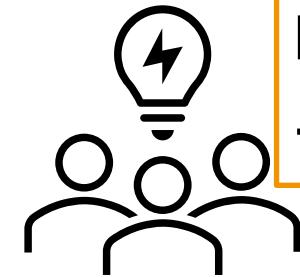
## Apply to your project

---

- Task: **Regard your company and your project and perform a SWOT analysis to your project.**
- Template available on Moodle:



Template SWOT-Analysis



Preparation: 20 min  
→ short presentation

# Reflection of the learning objectives

Well...

---

- Understand how the **Work Breakdown Structure (WBS)** works.
- Are familiar with **Project Plan** and **Gantt Chart**.
- Got to know what **PM KPIs** are available and how to interpret them
- Know several **PM Methods**, e.g. SWOT, PEST, Pareto, etc.

