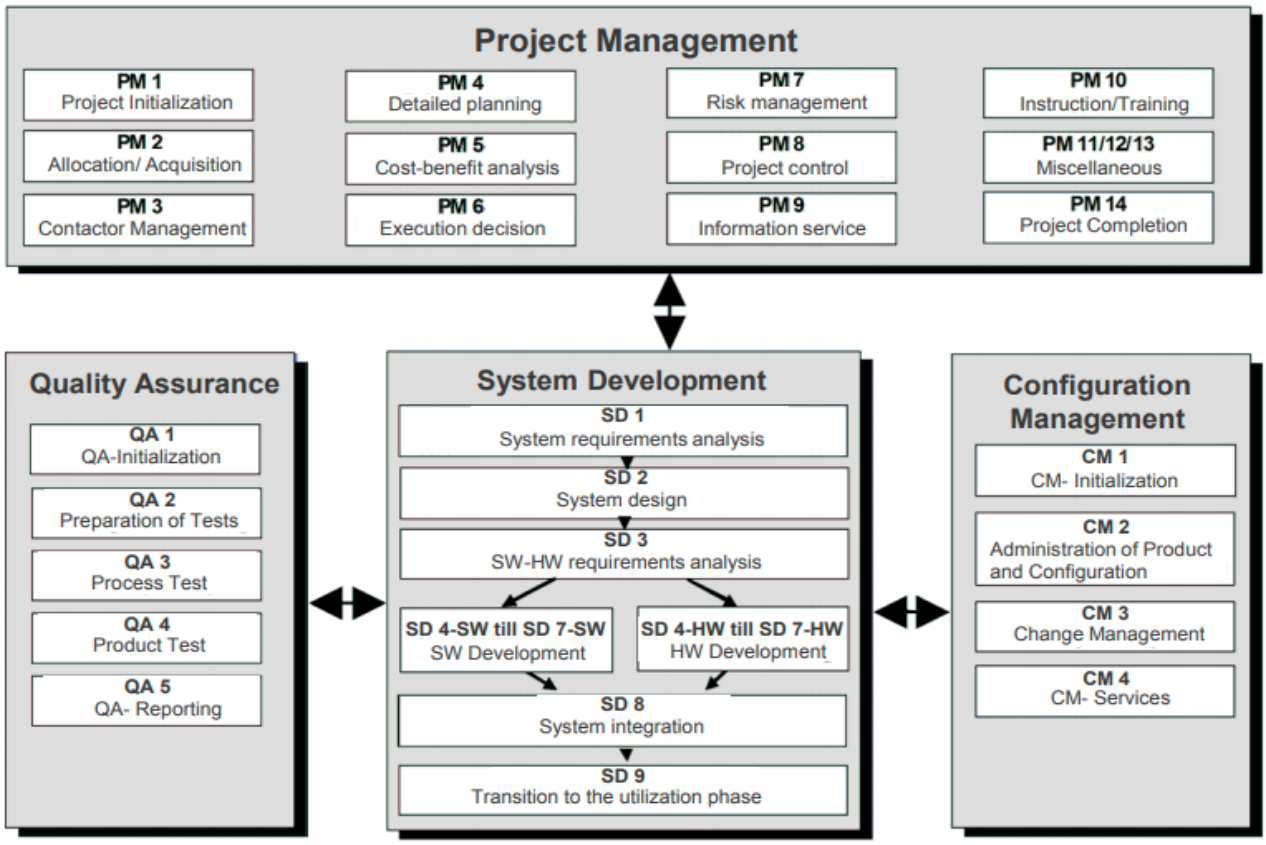
Quality Management of Software and Systems (WS19/20)

Problem Set 3

Problem 1: V-Model XT

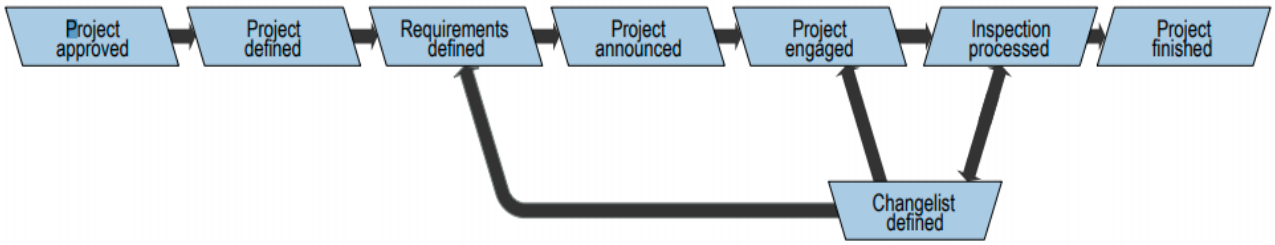
1.a) What is the V-model XT? (Explain it in your own words)



1.b) What are the goals of the V-model XT?

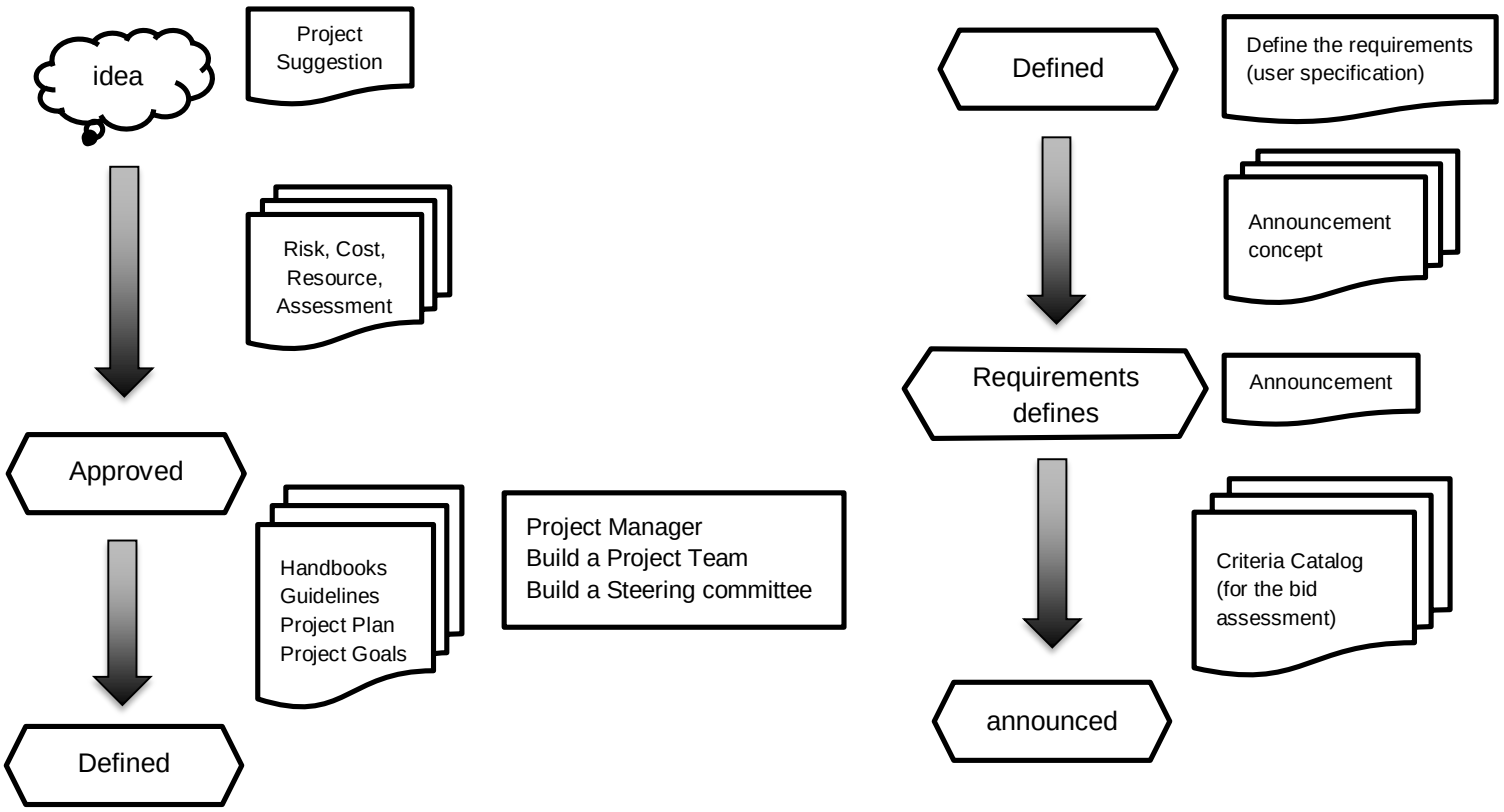
1. Enhance support for adaptability, practicability, scalability, changeability and expandability of V-Model
2. Consider state of the art and adapt current regulations and standards
3. Expand application range with respect to consider the whole system lifecycle in scope of development projects
4. Introduce a process of organizational improvements for process models

1.c) The company “Truck Corp.” will purchase a new information system to get a better overview of the actual positions of their trucks. After cost estimation and a risk assessment the project, named “DRIVE”, was approved. The company uses the V-model XT to handle such projects. Which steps have to be executed related to the V-model XT from the view of the “Truck Corp.” organization (client)?
Hint: Remember the execution strategy for clients in the V-model.



1. Tailoring delivers
   • Strategy for project operation
   • Process modules (if necessary supplemented)
2. Process modules define the project’s activities and products
3. The strategy for project operation has to be instantiated concretely for a specific project

1.d) Please give an overview of the documents (output products of the model steps) which should be produced by the project team of “DRIVE” during the project life cycle.
Make a Relation between the documents and the V-model steps.



Problem 2: Extreme Programming

2.a) Give a brief overview of XP.

- Extreme programming is an agile technique to deliver a software product.
- It's a very lightweight methodology:
  - Simplicity is the Key (find something complex in a review ⟶ replace it something simple)
  - Refactor whenever and wherever it is possible.
  - Code the test first (for all code, when a bug is found tests have to be created)
  - Use coding guidelines.
- This method produces a running version of software in very short time intervals.
- In the foreground of XP stands the problem and the most efficient solution of it.

2.b) What are the advantages and disadvantages of XP?

Advantages:

- Delivers a working product from a start of the development.
- Unnecessary work (documenting writing) is reduced to a minimum.
- Delivers a product of high quality.
- Well suited for projects with unstable requirements.

Disadvantages:

- It could end in a chaotic situation.
- It's only useful for smaller and medium projects.
- You could not use it in safety critical projects, because it produces no or not enough documents.

Problem 3: CMM

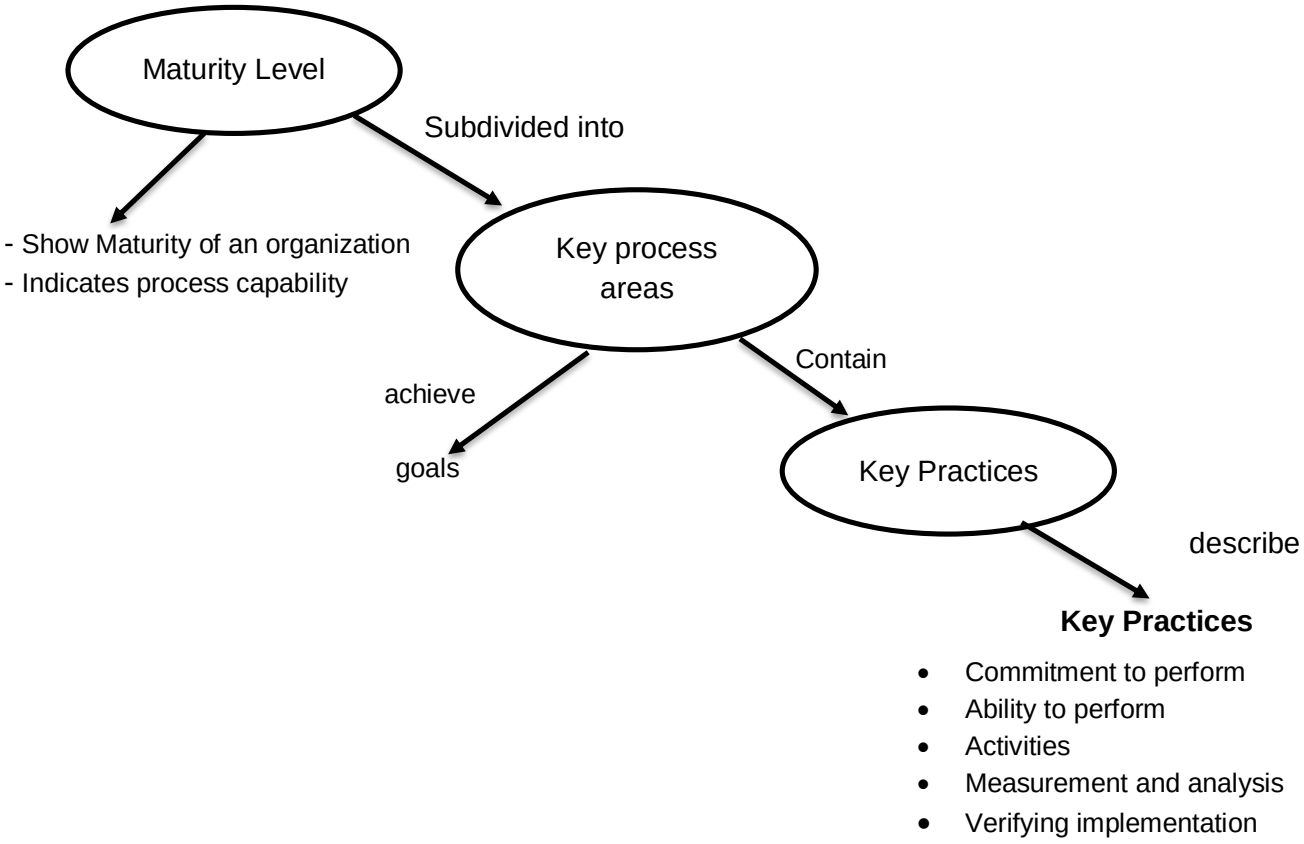
3.a) What's the purpose of CMM?

- To evaluate the level of maturity of software processes in an organization.
- With CMM you could rank companies and compare them.
- CMM is a proof of qualification for the software companies and provides a systematic opportunity for the increase of quality and productivity in the software development.
- CMM helps companies to improve their processes.
- It distinguishes the "good" from the "bad" software developing companies but no guaranteed interrelation between high CMM-level and successful software production.
- Some surveys show a good costs-benefit balance.

3.b) Give an overview of the CMM levels and the meanings behind? **** Exam: Explain in your own words*

Level	Process characteristics	Technique	People
5: Optimizing	The process improvement is an activity executed continuously.	Techniques and process support each other.	Problems are prevented, assistants improve activity.
4: Managed	The product and the process are under quantitative control.	Quantitative basis for techniques exists.	Comprehension of interrelations exists.
3: Defined	The technical procedures are institutionalized together with the Project Management Practices	Quantitative basis for techniques for exists.	Process is defined, assistants know and follow it.
2: Repeatable	The Project Management Practices are institutionalized	Techniques support some activates.	Experienced assistants keep the process alive.
1: Initial	Informal ad hoc process	Introduction of new techniques is risky.	Regular chaos elimination, low efficiency.

3.c) How is a CMM level structured?



3.d) Work out a questionnaire for the KPA (Key Performance Area) “Software Project Planning” of maturity level 2?

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The purpose of Software Project Planning is to establish reasonable plans for performing the software engineering activities and for managing the software project.

Software Project Planning involves developing estimates for the work to be performed, establishing the necessary commitments and defining the plan to perform the work.

Goal 1: Software estimates are documented for use in planning and tracking the software project.

Question 1: Are estimates (e.g. size, cost and schedule) documented for use in planning and tracking the software project?

Goal 2: Software project activities and commitments are planned and documented

Question 2: Do the software plans document the activities to be performed and the commitments made for the software project.

Goal 3: Affected groups and individuals agree to their commitments related to the software project.

Question 3: Do all affected groups and individuals agree to their commitments related to the software project?

Commitment 1: The project follows a written organizational policy for planning a software project

Question 4: Does the project follow a written organizational policy for planning a software project?

Ability 1: A documented and approved statement of work exist for the software project.
Ability 2: Responsibilities for developing the software development plan are assigned.
Ability 3: Adequate resources and funding are provided for planning the software project.

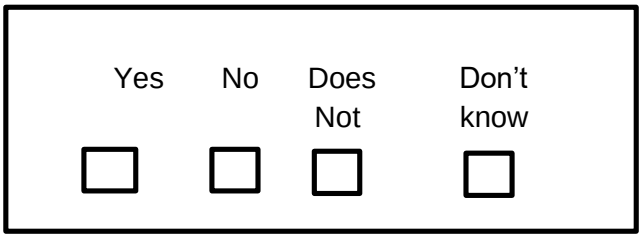
Question: Are adequate resources provided for planning the software project?

Measurement 1: Measurements are made and used to determine the status of the software planning activities

Question: Are measurements used to determine the status of the activities for planning the software project (e.g., completion of milestones for the project planning activities as compared to the plan)?

Verification 1: The activities for software project planning are reviewed with the project manager on both a periodic and event driven basis.

Question: Does the project manager review the activities for planning the software project on both a periodic and event-driven basis?



Key Practices of the Capability Maturity Model Version 1.1 http://resources.sei.cmu.edu/library/asset-view.cfm?assetID=11965