Foundations of Software Engineering (SS19)
Problem Set 1

Task 1: Process models

a. Specify at least two areas that a process model determines for software development.
   - The respective activities to be performed
   - The sequence of the workflow
     - Development steps
     - Phase concepts
   - The definition of the partial products, including layout and content
   - Completion criteria
   - Required staff qualifications
   - Responsibilities and competencies
   - Standards, guidelines, methods and tools to be applied

a. 1. A system to control anti-lock braking in a car.
   - Embedded system in a car -> Safety of passengers -> High quality requirements + Clear system requirements -> V-model

   2. An interactive system for railway passengers that finds train times from terminals installed in station. Railway passengers have various backgrounds and preferences. Usability of the system is a big concern.
   - Usability and customer satisfaction are the main drive in this system -> We need to involve the users of the system (railway passengers) ASAP -> Prototype model + (V-model / incremental model)

   3. A university accounting system that replaces an existing system. An alpha version with the basic functionality should be available before the beginning of the next semester. Additional functionality can be added afterwards.
   - Clear requirement + Alpha version first -> Incremental model

   4. A smart phone app with a novel concept. This app could be a big breakthrough for a startup company. It should be done and available before the competitors' version.
   - Couldn't take picture

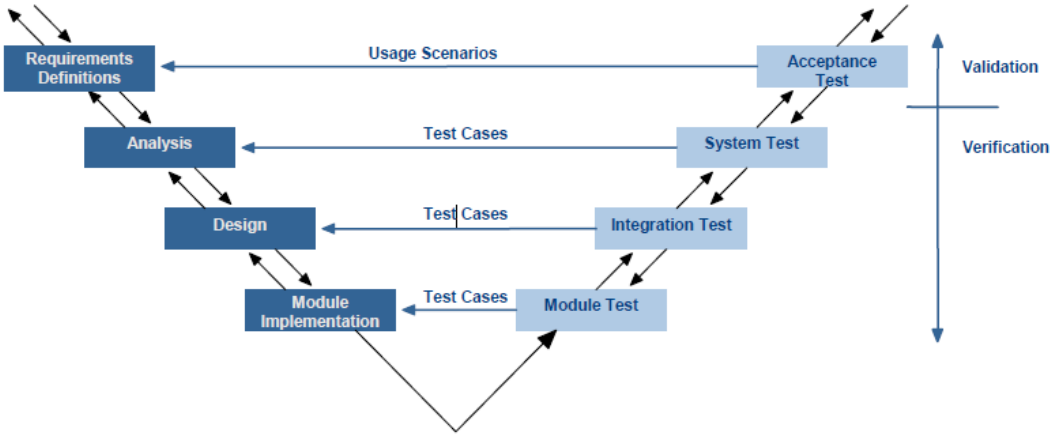
   5. An existing e-shop, which already has a working website, needs two additional front ends: (1) an android mobile application and (2) an iOS mobile application.
   - Two new apps + clear core requirements -> Concurrent model

Task 2: V-Model

a. Explain, in the context of V- Model, the difference between verification and validation.

   - Verification: Compliance of the developed product with the specification (correct product).
   - Validation: Compliance of the specification with the requirements and customer expectations (the right product).

b. Draw the V-Model as introduced in the Lecture.



Task 3: Prototype model

a. How does the prototype model differ significantly from the V-model?

- Feasibility can be checked beforehand.
- Various possible solutions can be tested experimentally and discussed with the client.
- Gathering practical experience for later "real" implementation.
- Early feedback.
- End users are (more) involved in the development process.

b. Compare the individual prototype types and name their characteristics.

1. Demonstration prototype
   a. Demonstration object for the client
   b. Used for order acquisition
2. Lab Sample
   a. Technically comparable to a productive system
   b. Not intended for the final customer
   c. Answers design related questions
3. Prototype
   a. Created together with the modeling of the application area.
   b. Helps to analyze the scope of application
4. Pilot system
   a. Forms product core
   b. Used in the production system
   c. Design and implementation is suitable for productive system