The company KOA tries to develop a tool for another company. The tool should support business processes. The team of KOA applies the waterfall model

(a) Name all phases, which are applied during the development and specify (1 2 sentences) the result of each phase as the waterfall model is to restrict, the team of KOA tries to update the process to the V Model.

Waterfall Model:
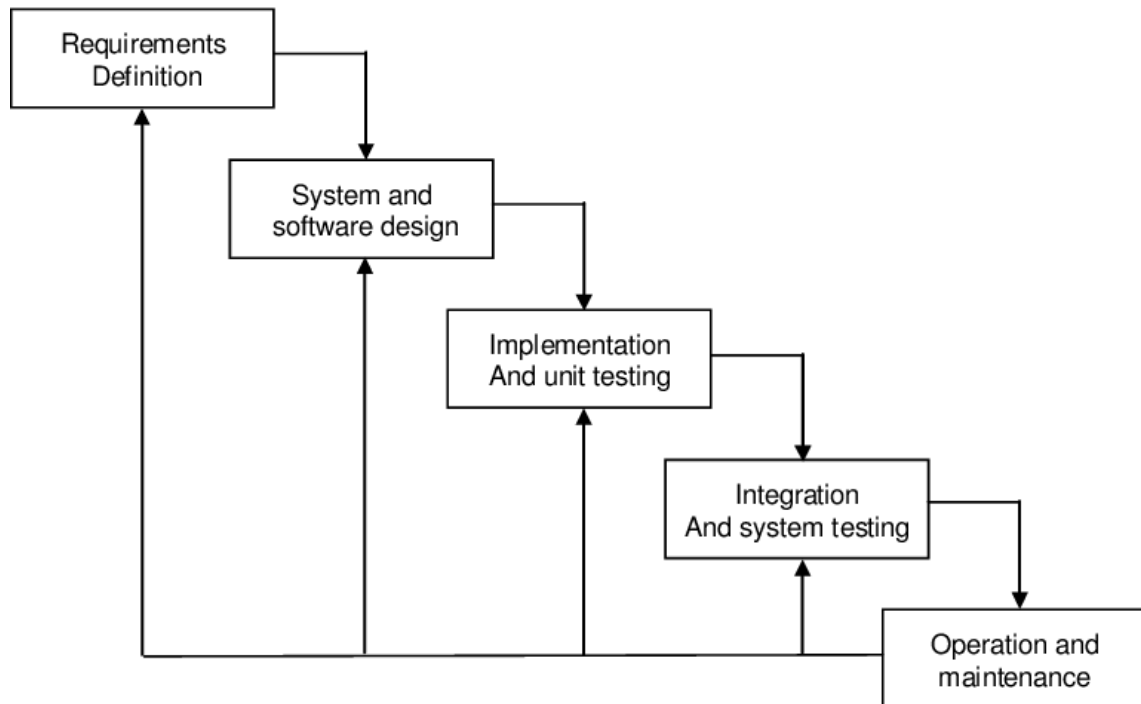
1. **Requirements:** At first KOA's manager (+expert team also) will discuss with the customer to get a specific idea of requirements, the problems that the software will resolve, and the desired functionalities. Overall, during this phase, detailed requirements of the software system to be developed are gathered from client.

2. **System and software design:** In this phase the KOA's team start solving the problems logically, they can use data flow, UML diagram etc. to make it clear. They also plan the programming language, database, higher-level technical details etc. of the project.

3. Implementation and unit testing: In this phase, the design is converted into actual software with complete coding. Since, software is usually built-in units and at the end integrated into a whole, testing is required to verify that everything is working according with the requirements. In the testing part of this phase the project team may select a pilot group of people to test the software.

4. Integration and system testing: In this phase the software is deployed into the respective technology environment.

5. Operation and maintenance: In this phase, any issue remained is resolved. KOA can change the codes as per customer request.

As the waterfall model is to restrict, the team of KOA tries to update the process to the V Model.

b) Name the additional phases of the V Model and argue the pros.

In V-Model, we also have a linear approach like waterfall model. That is, the next phase will only start if previous phase is completed. But unlike Waterfall model, V-model implements two lines: Verification and Validation.
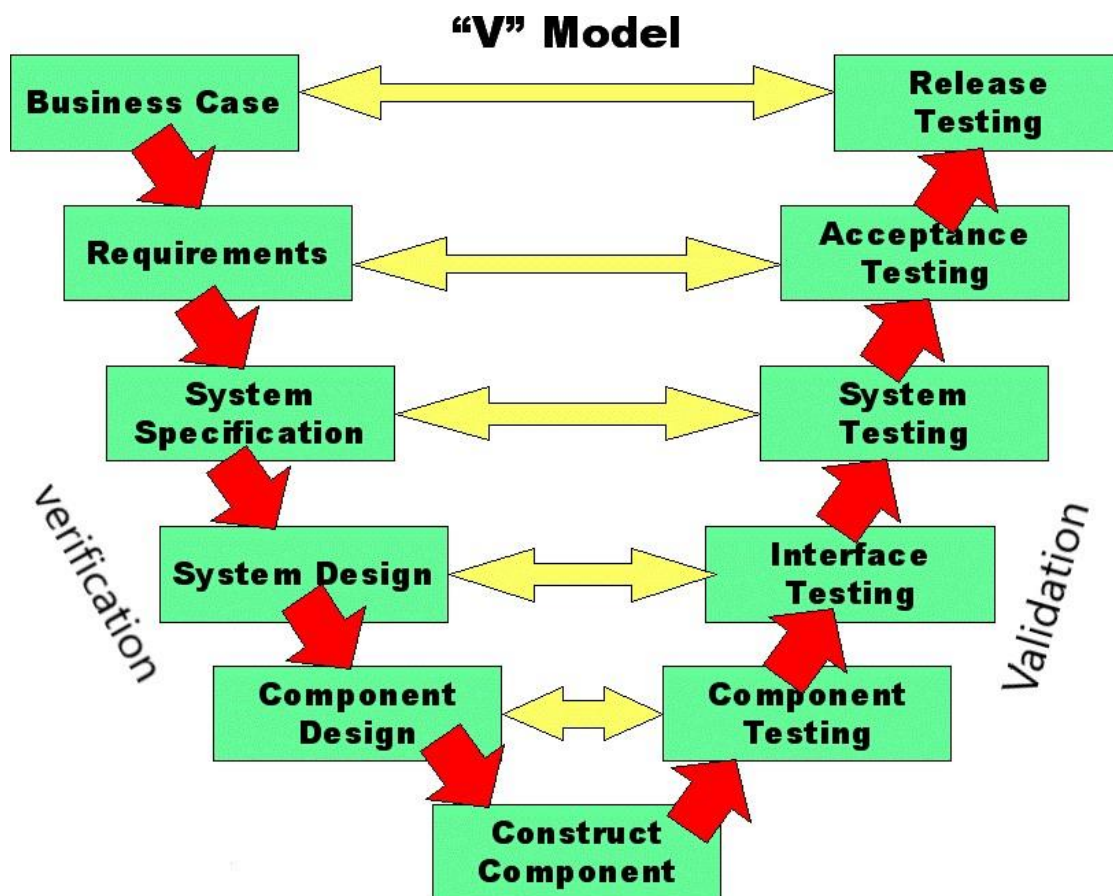
"V" Model

V-Model: Pros

(1) Less bugs: Do testing in every layer

(2) Provide an explanation of problems involved in detail.

(3) Emphasizes the importance of testing and makes sure that testing is planned.

Waterfall Model vs. V-Model

Since v-model is an extended version of waterfall. It shares similar characteristics to each other, for example, processes are executed sequentially, and requirement is needed in the beginning. But there are some different between them.

- **V-Model tests at the first stage.** while Waterfall tests after the development stage.

- **V-Model costs higher.** Since the process is more complex than waterfall. development cost is expensive.

The KOA company recognizes that they are not familiar with procedure models. You are the export.
Assess the process models of the lecture by the following characteristic:

a) Size of the developer team
b) Complexity of the project
c) Known requirements
d) Change of requirements
e) Time To Market
f) Knowledge of IT (customer)
g) Average number of iteration

Models discussed in lecture are:

Agile Model

Waterfall Model

V model

➢ Agile model:

1. Agile experts are not all completely aligned on the optimal agile team size. Most agile enthusiasts will refer to the 7 +/- 2 rule in training, that is, agile or Scrum teams should be five and nine team members.
2. Agile is quite a flexible method which allows changes to be made in the project development requirements even if the initial planning has been completed.
3. Known requirements are user stories, user acceptance test, workflow, details, wireframes.
4. Agile is quite a flexible method which allows changes to be made in the project development requirements even if the initial planning has been completed.
5. Agile methodology works exceptionally well with Time & Materials or non-fixed funding. It may increase stress in fixed-price scenarios.
6. Agile introduces a product mindset where the software product satisfies needs of its end customers and changes itself as per the customer's demands.
7. Agile is quite a flexible method which allows changes to be made in the project development requirements even if the initial planning has been completed.

➢ Waterfall Model:

• Waterfall teams are usually quite large. They include more than 15 people.
• Waterfall is a structured software development methodology so most times it can be quite rigid.
• Known requirements of this model are system design, implementation, Integration and testing, deployment of system and maintenance.
• There is no scope of changing the requirements once the project development starts.
• Reduces risk in the firm fixed price contracts by getting risk agreement at the beginning of the process
• This model shows a project mindset and places its focus completely on accomplishing the project
• The method is ideal for projects which have definite requirements and changes not at all expected.

➢ V model:

- As this model is an extension of waterfall model the developer team size is same.

- It is also software development model, but development and testing are not concurrent.

- System Design, Architecture Design, Component Design, Implementation are required requirements.

- Change in requirements is little flexible compared to waterfall model.

- Development team and testing team don't interact much with end users

- Software made using V-model, the number of defects are greater in comparison of software made using Waterfall model.

- There is no iteration in this model.