

Engineering processes

a) Waterfall phases

1. **Requirements:** All requirements of the system to be developed are added to a requirement specification document.
2. **System design:** Requirements are studied. System design helps in specifying hardware and system requirements and helps in defining the overall system architecture.
3. **Implementation:** With inputs from the system design, the system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality, which is referred to as Unit Testing.
4. **Verification:** All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.
5. **Maintenance:** There are some issues which come up in the client environment. To fix those issues, patches are released. Also to enhance the product some better versions are released.

b) V-model additional phases

1. **Acceptance Testing:** UAT is performed in a user environment that resembles the production environment. UAT verifies that the delivered system meets user's requirement and system is ready for use in real world.
2. **System testing:** System testing test the complete application with its functionality, inter dependency, and communication. It tests the functional and non-functional requirements of the developed application.
3. **Integration testing:** The modules are integrated and the system is tested. Integration testing is performed on the architecture design phase. This test verifies the communication of modules among themselves.
4. **Module testing:** Unit Test Plans are developed during module design phase. These Unit Test Plans are executed to eliminate bugs at code or unit level.

Pros of the V-model:

- This is a highly disciplined model and phases are completed one at a time.
- V-model is used for small projects where project requirements are clear.
- Simple and easy to understand and use.
- This model focuses on verification and validation activities early in the life cycle thereby enhancing the probability of building an error-free and good quality product.
- It enables project management to track progress accurately.

- a. Size of the developer team?
 - Should be no more than 7 people.
- b. Complexity of the project?
 - 1. Duration of the schedule
 - 2. Cost of the project
 - 3. Risk of the project
 - 4. Technology readiness
 - 5. Visibility
 - 6. Authorization basis
- c. Known requirements
 - The main requirements should be known before the first sprint from the client needed features.
- d. Change of requirements
 - Using agile method after every sprint small requirements can be added.
- e. Time to Market
 - When the stakeholders confirm their satisfaction after the final phase.
- f. Knowledge of IT (customer)
 - As the customer is a part of the development process in the agile method so it's needed to have a knowledge of IT.
- g. Average number of iteration
 - Each sprint usually takes from 2-4 weeks depending on the project, also extreme programming might require several iterations each sprint.