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SEPM

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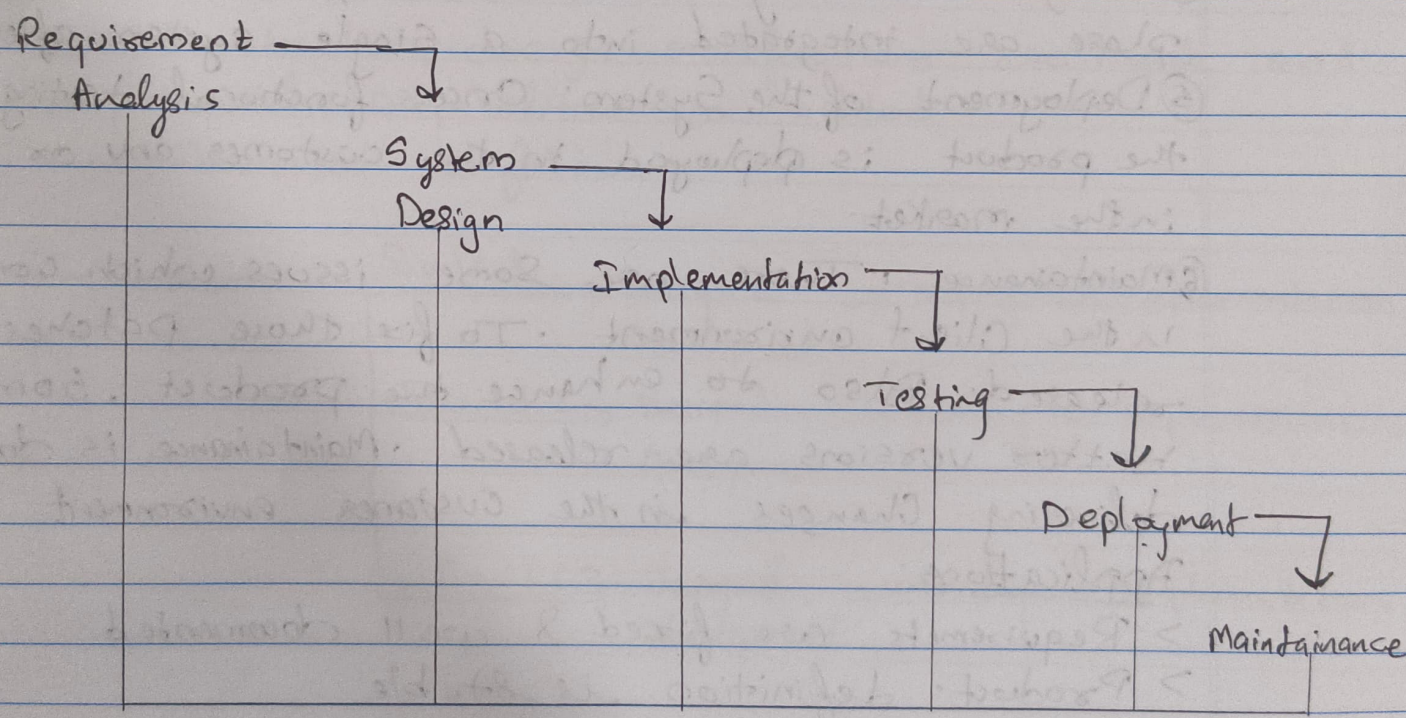
Assignment No. 1

Explain Software Development Models.

① The waterfall Model : It is a breakdown of developmental activities into linear sequencial phases. Each phase is passed down to the next and depends on the deliverable of the previous one. It is represented as follows.



It has the following phases

① Requiremet gathering & analysis : All possible requirement of the system to be developed are captured in a document.

② System design - The require specification from the previous phase are analysed thoroughly. Using this

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the System is designed. It helps in specifying hardware requirements and defining overall system architecture.

③ Implementation: With inputs from existing design the system is first developed in small programs called units which are integrated in the next phase. Each unit developed is tested for its functionality known as unit testing.

④ Integration & testing: All units developed in the implementation phase are integrated into a single system after testing.

⑤ Deployment of the System: Once functional testing is done the product is deployed in the customer env or released in the market.

⑥ Maintainance: There are some issues which come up in the client environment. To fix those, patches are released. Also to enhance the product, some better versions are released. Maintainance is done by delivering changes in the customer environment.

Applications:

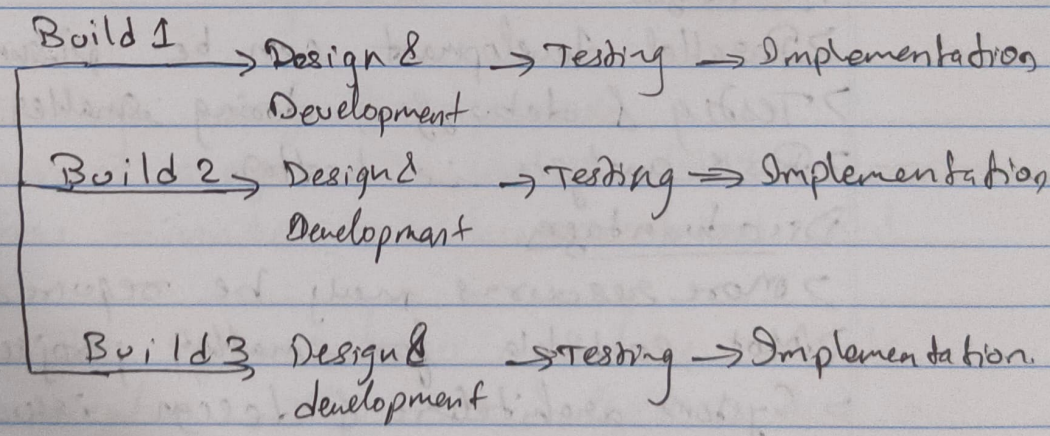
> Requirements are fixed & well documented
> Product definition is stable
> Technology is understood & not dynamic
> There are no ambiguous requirements.
> Ample resources with required expertise are available.

Advantages:

> Phases are processed & completed one at a time
> Clearly defined stages & well understood milestones
> Easy to arrange tasks.

Disadvantages:
> High amounts of risk & uncertainity
> It cannot accomodate changing requirements
> Adjusting scope can lead to termination of the project.

II Iterative Model Design: Iterative process starts with a simple implementation of a subset of the software requirements & iteratively enhances evolving versions, until the full system is implemented
At each iteration, design modifications are made and new functional capabilities are added.
It is illustrated as follows:



Iterative is a type of incremental development. During Software development, more than one iteration of the software development cycle may progress at the same time. These process is described as evolutionary acquisition or incremental build approach.
During each iteration, model goes through the requirements design, implementation and testing phase.

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Each subsequent release adds functions to the previous release. The key to a successful usage is rigourous validation of requirements verification & testing of version against those requirements. As the software evolves through successive cycles, tests must be repeated or extended to verify them.

Applications:

> Requirements of the complete system are clearly defined and understood
> major requirements must be defined
> There is a time to market constraint

Advantages:

> Parallel development can be planned
> Testing & debugging during smaller iterations is easy
> Risk analysis is better

Disadvantages

> More resources may be required
> Not suitable for smaller projects
> System architecture & design issues may arise

III V-Model : The V model provides a systematic visual representation of the software development process

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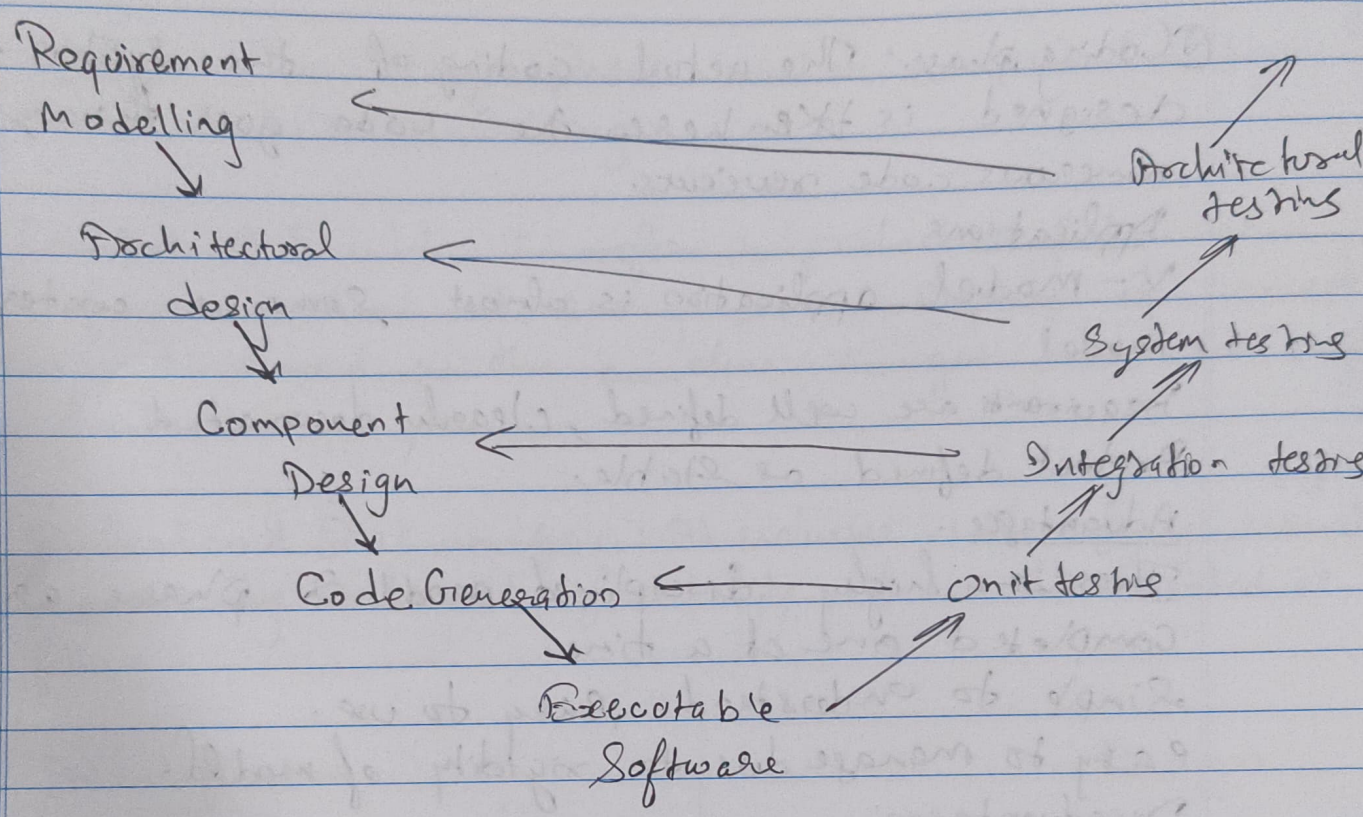

It has the following verification process

① Business Requirement analysis : It involves detailed communication with the customers to understand his expectations and exact requirement.

② System Design : The System design will have complete hardware & Communication setup. The system test is planned based on this.

③ Architectural Design - Usually more than one techical approach is proposed & based on the technical & financial feasibility the final decision is taken. This is also refered to as HLD (High level Design)

④ Module Design - In this phase the detailed internal design referred to as the low level design (LLD) is specified

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(V) Coding phase: The actual coding of the system modules designed is taken here. The code goes through numerous code reviews.

Applications

V-Model application is almost same as waterfall model

Requirements are well defined, clearly documented

Product defined as stable.

Advantages:

This is a highly disciplined model & phases are completed one at a time.

Simple to understand, easy to use.

easy to manage due to rigidity of model.

Disadvantages:

High risk & uncertainity.

- Not good model for complex projects.
- Poor model & long ongoing projects.
- Once application is in testing stage, it is difficult to go back & change.

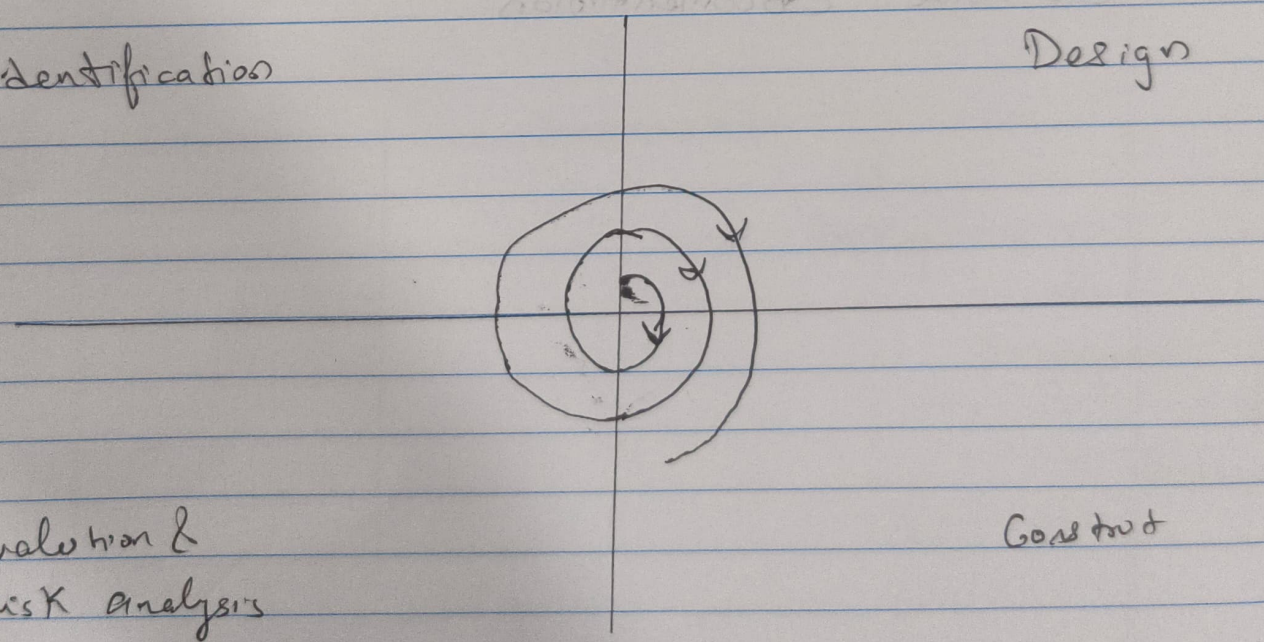
IV Spiral Design: It combines the idea of iterative development with systematic controlled aspects of waterfall model. Its design is divided into the following phases.

(1) Identification: This phase starts with gathering requirements in the baseline spiral. In the subsequent spirals, as the spiral matures, identification of system & subsystem requirements is done in this phase

Design: The Design phase involves conceptual design and architectural design.

Construct or Build: It refers to production of the actual software product at every spiral. A proof of concept is developed in the baseline to get customers feedback.

Evaluation & Risk analysis.: It includes indentifying estimating & monitoring technical feasibility. It is illustrated as follows



Applications:

> For a large scale systems or enterprises application Spiral modal helps manage complexity.

> It is useful for medium - high risk projects

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> long term project commitment because of potential changes to economic priorities as requirements chang with time

Advantages

> Changing requirements can be accomodated
> Allow extensive use of prototypes
> Requirements can be captured effectively.

Disadvantage

> Management is complex.
> End of the project can be known earlier
> large number of intermediate stages require extensive documentation.