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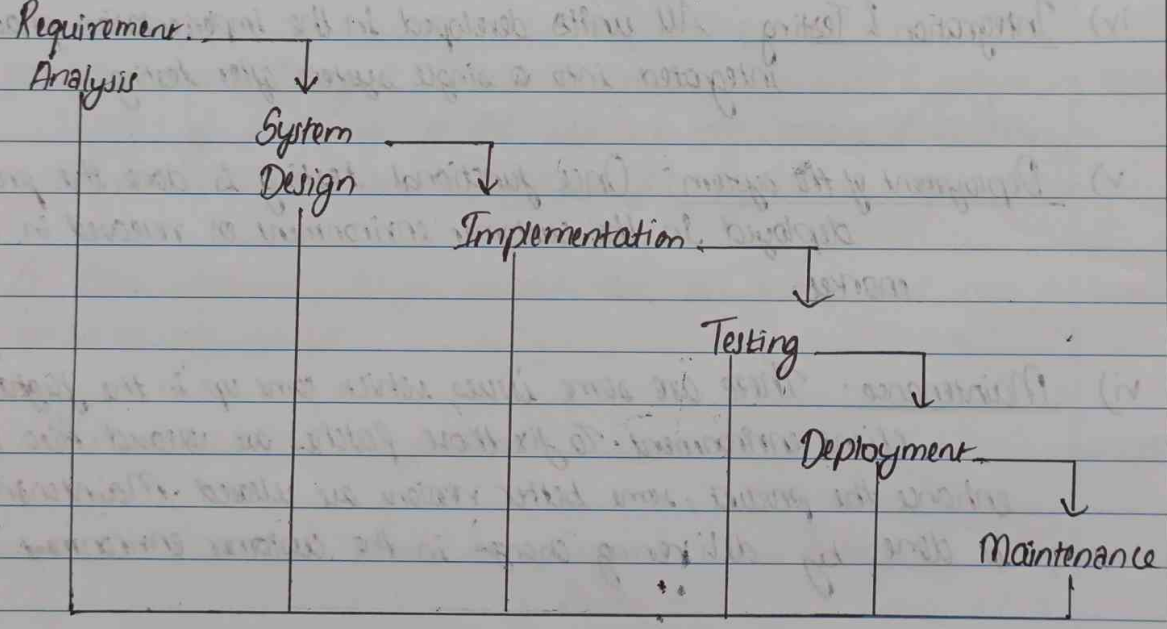
SEPM

Assignment 1

Explain software development models

(i) The Waterfall Model: It is a breakdown of developmental activities into linear sequential phases. Each phase is passed down to the next and depends on the deliverables of the previous one. It is represented as follows:



It has the following phases:

i) Requirement gathering and analysis: All possible requirements of the system to be developed are captured in a document.

ii) System design: The required specifications from the previous phase

are analysed thoroughly. Using this the system is designed. It helps in specifying hardware requirements and defining overall system architecture.

iii) 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.

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

v) Deployment of the system: Once functional testing is done, the product deployed in the customer environment or released in the market.

vi) Maintenance: There are some issues which come up in the ~~flight~~ client environment. To fix those, patches are released. Also to enhance the product, some better version are released. Maintenance is done by delivering changes in the customer environment.

Applications:

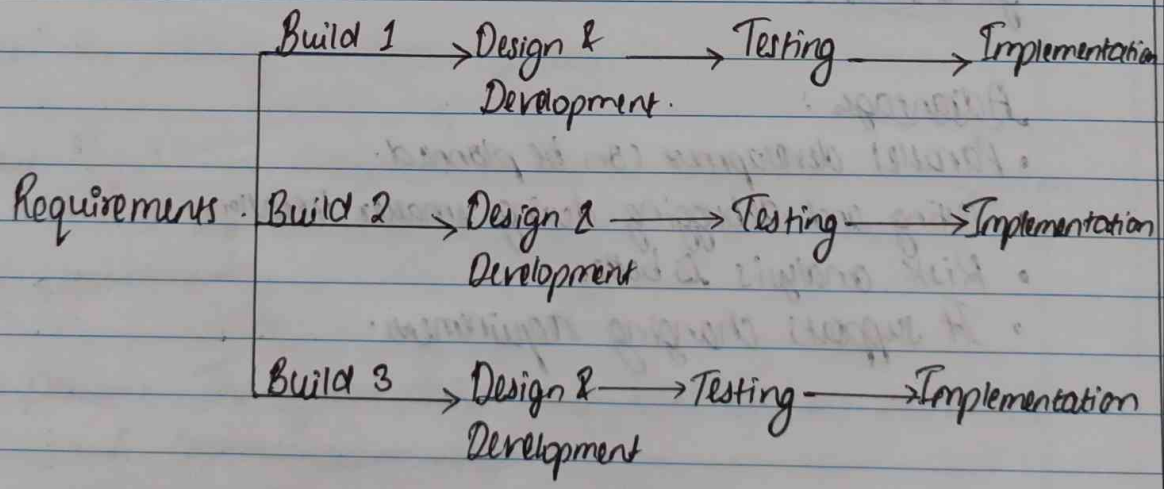
- Requirements are fixed and well documented
- Product definition is stable
- Technology is understood & not dynamic
- There are no ambiguous requirements.
- Ample resources with required expertise are available.

Advantages
- Phases are processed & completed one at a time
- Clearly defined stages & well understood milestones
- Easy to manage 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 involving 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. This process is described as 'evolutionary acquisition' or incremental build approach

During each iteration, the model goes through the requirements, design, implementation and testing phase. Each subsequent release adds function to the previous release. The key to a successful usage is rigorous validation of requirements validation of requirements verification of testing of version against those requirements. As the software evolves through successive cycles, tests must be repeated or extended to verify them.

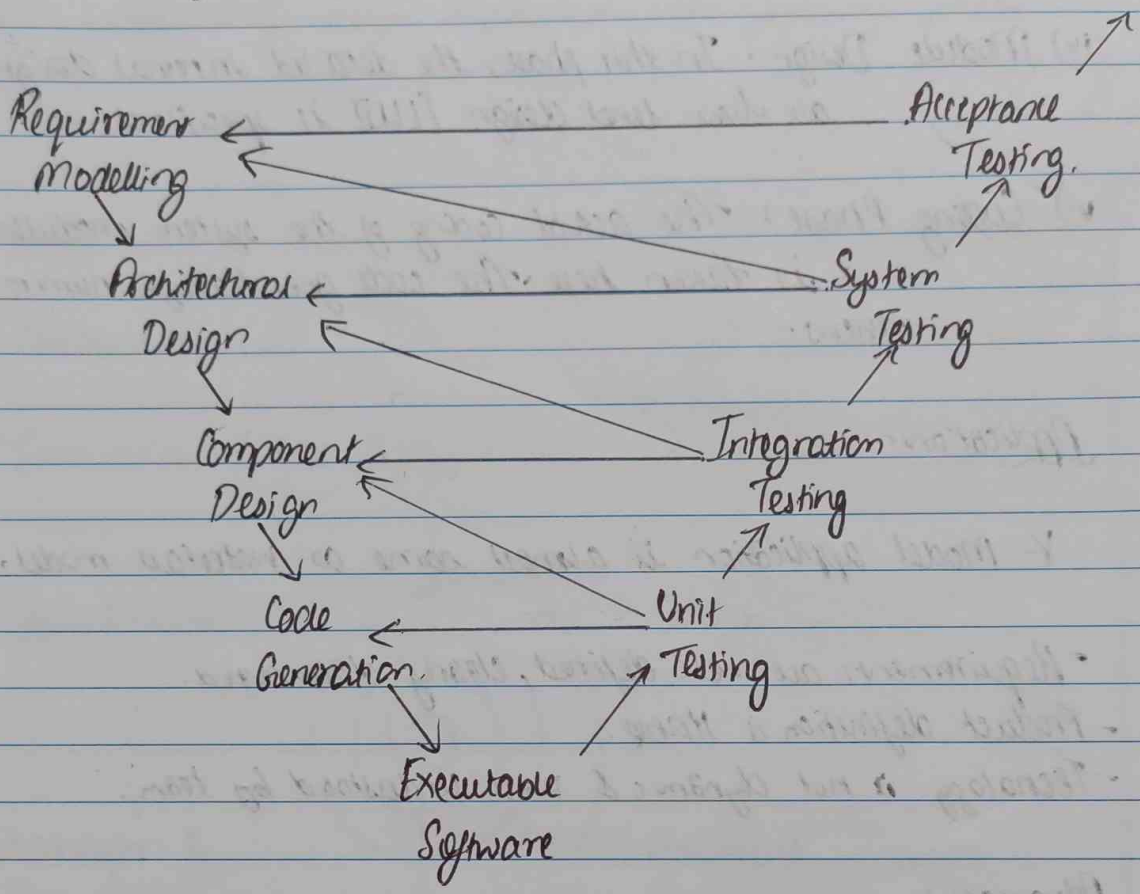
Application :

- Major requirements must be defined.
- There is a time to market constraint.
- Early iterations can help in creating prototype that demonstrate key functionality.

Advantage :

- Parallel development can be planned.
- Testing and debugging during smaller iterations.
- Risk analysis is better.
- It supports changing requirements.

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



It has the following verification phases

i) Business Requirement Analysis : It involves detailed communication with the customer to understand the expectations and exact requirement.

ii) System Design : The system design will have complete hardware & communication setup.

iii) Architectural Design:- This also referred to as High level Design [HLD].

iv) Module Design:- In this phase, the detailed internal design, to as low level design [LLD] is specified

v) Coding Phase:- The actual coding of the system modules designed is taken here. The code goes through numerous reviews.

Application:-

V- Model application is almost same as waterfall model.

- Requirements are well defined, clearly documented.
- Product definition is stable.
- Technology is not dynamic & well understood by team.

Advantages:-
- This is a highly disciplined model and phases are completed one at a time
- Simple to understand, easy to use.

Disadvantages:-
- High risk of uncertainity.
- Not a good model for complex projects.
- Poor model for long ongoing projects.

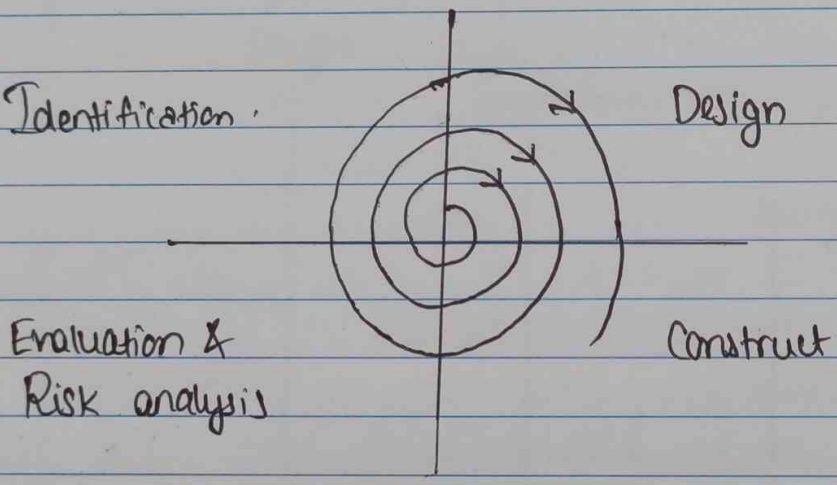
IV) Spiral Design: It combines the idea of iterative development with systematic controlled aspects of waterfall model. The design is divided into following phases.

I) Identification

II) Design

III) Construct or build

IV) Evaluation & Risk analysis.



Applications:

- For large scale systems or enterprise applications, spiral model helps manage complexity.
- It is useful for medium-high risk projects.
- Long term project commitment because of potential changes to economic & priorities as requirements change with time.

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Pros:

- Changing requirements cannot be accomodated
- Allows extensive use of prototypes.
- Requirements can be captured effectively.

Disadvantages:

- Management is complex.
- End of the project can't be known earlier.
- Large numbers of intermediate stages require extensive documentation.