

Module 1

IEEE Definitⁿ of Software Engg

The applicatⁿ of systematic, disciplined, quantifiable approach to the development, operatⁿ & maintenance of software.

There are 6 phases involved: (Iterative process)

- (i) Resource gathering / Requirement gathering
 - Takes most time ~ 40%.
 - Time required to understand the problem.
- (ii) Planning
- (iii) Designing
- (iv) Coding / Development
- (v) Testing
- (vi) Maintenance

Essence of Practice

- (i) Understand the problem
 - Done by interactⁿ b/w users & developers
 - Requirements are gathered.
 - Interview / Survey
 - Comp
 - Brainstorming
 - Research about existing systems
- (ii) Planning
 - Technically solve the problem
 - Analyze the requirements.

Requirements

Functional

Non-functional

(iii) Design

- Design an outline/prototype

(iv) Coding

- Code the problem using standard methods

(v) Testing

- Find out the errors → White box testing
→ Black " "

(a) Unit Testing → Software is divided into modules. Each unit is tested separately.

(b) Integrated Testing → Units are tested together.

Black box → give some i/p, see if you get some o/p

White " → " " " , " " " " " & how it is obtained.

(vi) Maintenance → Manual → (Detailed description) given to customers.

Scope of SE

(i) History aspects → Pergerammer's Motto: Correct, on-time, under-budget. 1968 Conference NATO

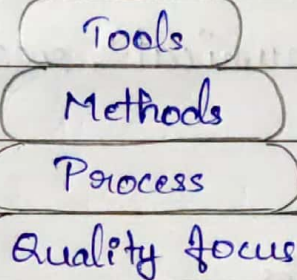
(ii) Economic aspects → Simple design is preferred over complex design

(iii) Maintenance aspects → Need to check the cost. Only good softwares are maintained.

Maintenance cost must be less than new system cost.

- (iv) Specification & Design → Largest programs will have more errors.
- (v) Team Programming aspect → Proper delegatⁿ of work reduces total build time.

Software Engg as a Layered Technology



- Each layer has to be completed to go to the next layer.
- Base Layer → Quality focus. It is the bedrock that supports software.

TQM (Total Quality Mgmt)

ISO 9001, ISO 9003

- Process → It can be defined as a framework for a set of key process areas that must be established for an effective delivery of software. It is a foundation for software engg.
 - Methods → How to solve problem. 6 steps → Analysis, Planning, Design, Coding, Testing & Maintenance.
 - Tools → For implementing the methods. They are automated or semi-automated. CASE (Computer Aided Software Engineering) tools.
- Software tools provide automated/semi-automated support.

for methods & processes. When tools are integrated so that the info created by 1 tool can be used by others. A system for the support of a software development called Computer Aided Software (CASE)

Software process can be a collectⁿ of activities, tasks & actⁿs.

Activities → communicatⁿ, resource collectⁿ
Tasks → Testing
Actⁿs → Design
Umbrella Activities

} Umbrella activities

(i) Software project tracking & control

Team leader assesses the project. It enables the software team to assess the project progress against the project plan.

(ii) Risk Management

~~It~~ Risk affects the quality of product. A team assesses the risks associated with a project.

(iii) Software Quality Assurance

It defines the activities required to ensure the quality of software product.

(iv) Technical Reviews

Analyses the progress & checks for errors.

(v) Measurement

Measures the time required to complete the project.

(vi) Software Config. Mgmt → Manages changes throughout development of software

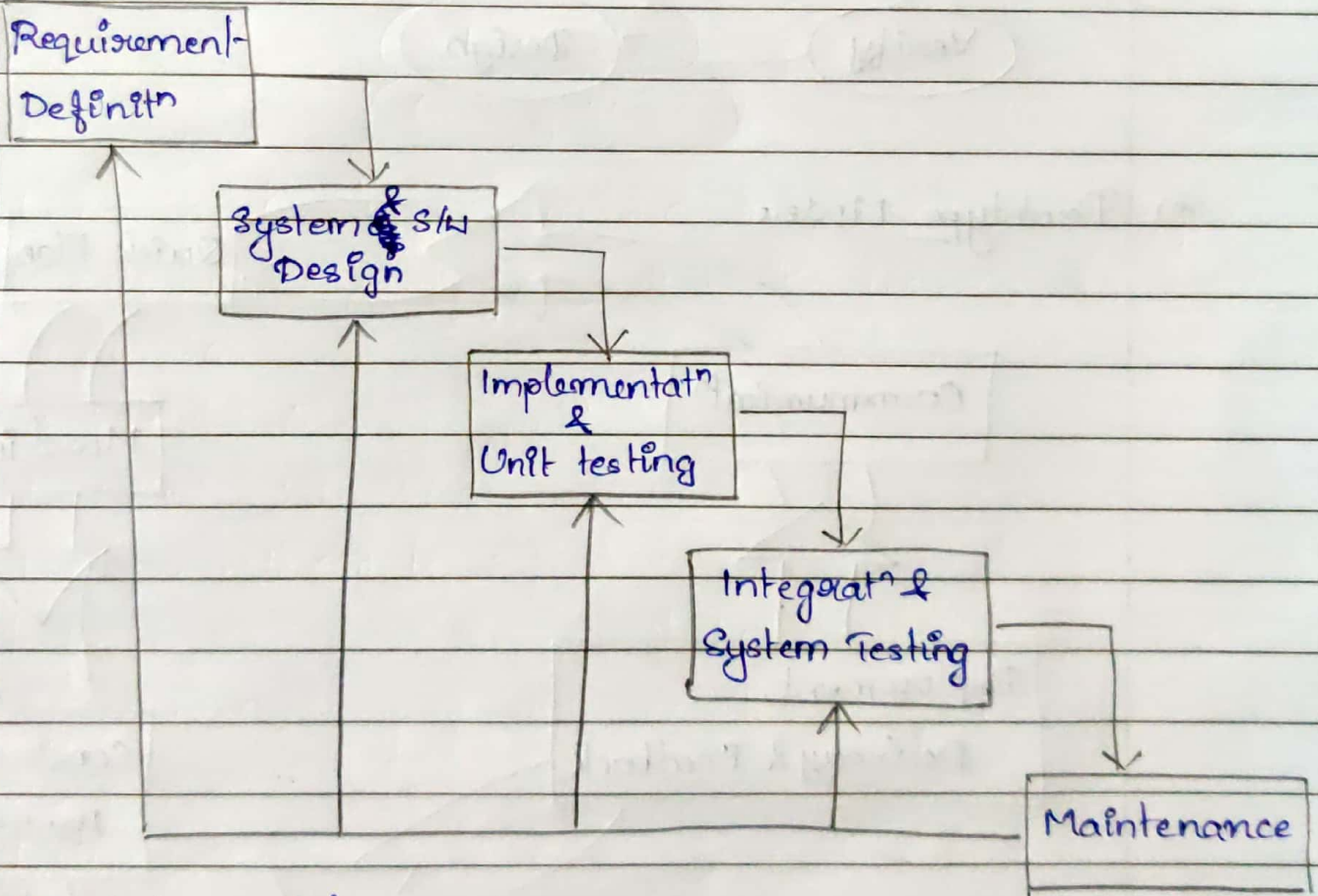
- (vii) Reusability Mgmt → Checks for reusability of product
- (viii) Work Product preparatⁿ & productⁿ → The document associated with a product.

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Software Process Models

Software Life Cycle Models

Project plan = Process models + Project parameters

- (i) Waterfall Models

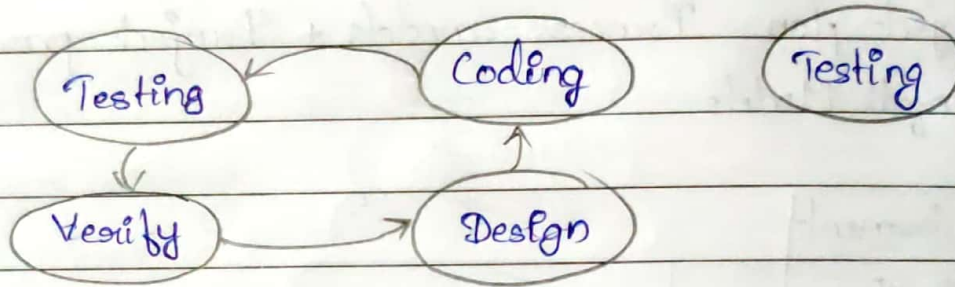


- Simplest model
 - Mostly used in all projects
 - Adv
- Works well with most projects
- Support inexperienced teams

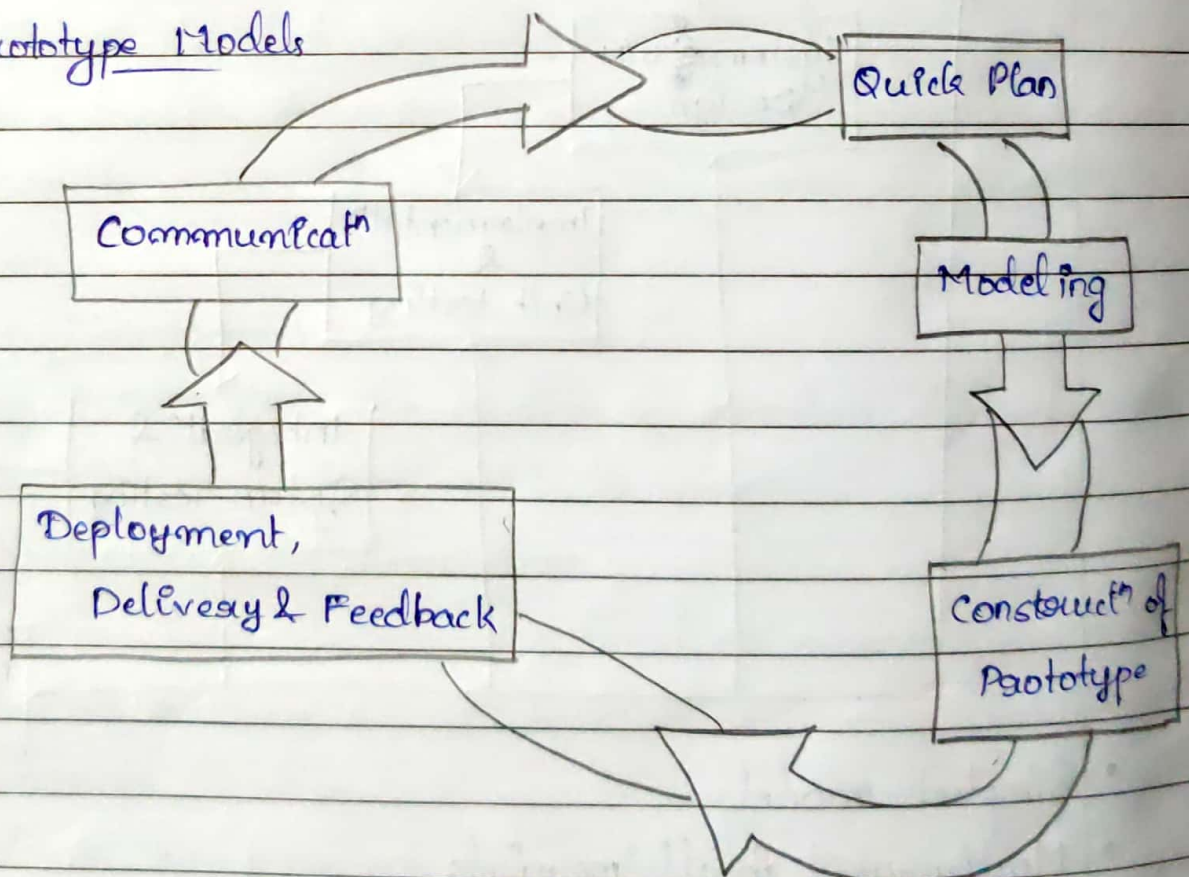
• Limitat^{ns}

- Difficult to specify all requirements of a stage completely
- Requirements are frozen which may not meet all the requirements of the user.

(ii) Iterative Model



(iii) Prototype Models



• Adv

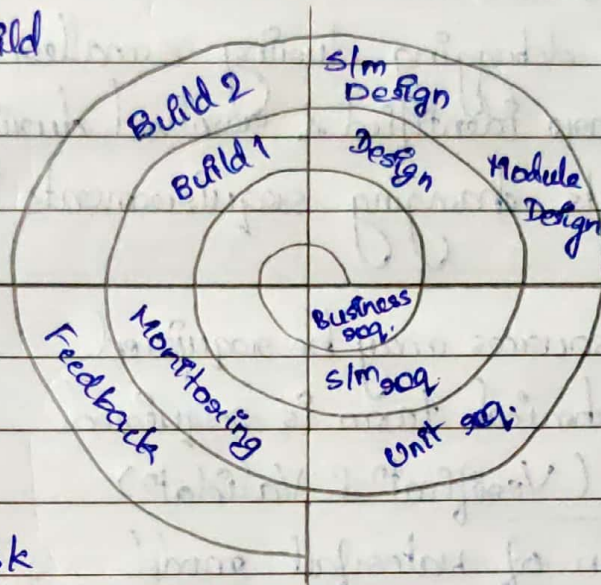
- Cyclic
- Errors can be detected & corrected at each stage

(iv) Spiral Models

- Mainly used for risk mgmt
- 4 stages

② Construct & Build

③ Design



④ Evaluatⁿ & Risk Analysis

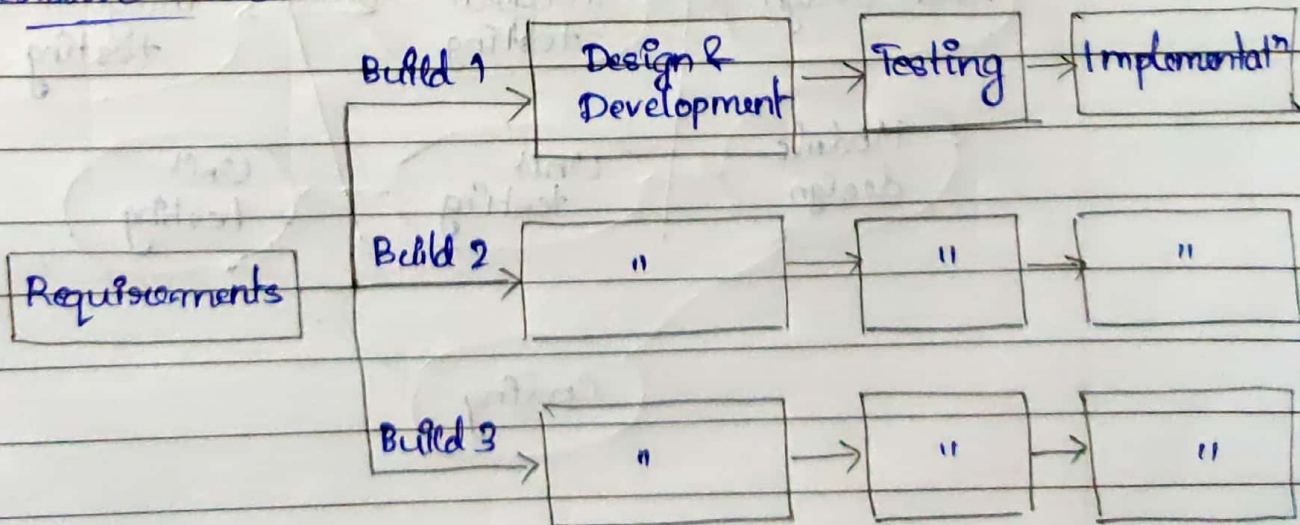
① Identificatⁿ

- Mainly used for large projects

• App

- When there is a budget constraint & risk evaluatⁿ is important
- It is mainly used for large projects.

(v) Iterative Models



- Adv
 - Parallel development can be planned.
 - Progress can be measured.
 - Testing & debugging during smaller iteration is easy.
 - Errors are identified & resolved during iteration.
 - It supports changing requirements.
- Disadv
 - More resources may be required.
 - Highly technical team is required.
- (v) V Model (Verification & Validation)
 - Extension of waterfall model

