

18/01/23

Software Engineering (1st class)

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Books:

Fundamentals of SW Eng. by Rajib Mall (3rd Edition) —

Tan Guinnarville
Pressman

Program	Product

Program - It is small in size compare to.

SW project product

And SW product is a group of programs designed for specific task.

Program	Product
→ No documentation is done.	→ Proper documentation is required.
→ Intended for single user	→ intended for a group of users
→ It takes less time	→ It takes more time
→ takes less resources	→ takes more resources

factor which drives for demand of SW engineering
reliable, efficient, cost-effective

long-term

It uses assets

19/01/2018

Art → Craft → Eng.

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Software -

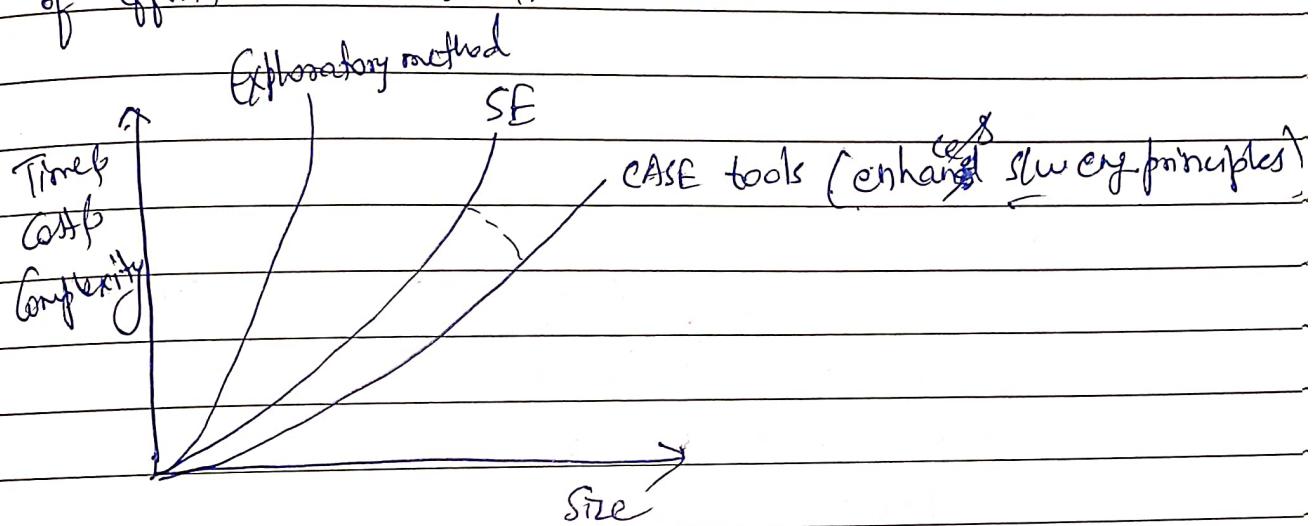
Exploratory styles - free way of writing a code

Problem

exp style was purely art.

it is not easy to understand

it hampers the time, cost (cost will increase) & takes lots of efforts to understand.



Software Engg. Why?

- Large SW products → How to develop?
 - How to represent this in a abstract way?
 - How to decompose the large SW product into small modules
- How to handle complex SW development
- Team Work

Software Life-Cycle Models

Requirement phase → SRS | SW Analyst

Design phase — SW architect

Coding/Development phase — SDE (Developer)

Testing phase (th. Tester)

Deployment & Maintenance phase (Interns)

SW failure

i) not able to adapt new technology

(i)

(ii)

pre-eliminary analysis whether we can take up the project or not

Feasibility study — analysis before taking up the project.

ii) financial feasibility (cost)

iii) Technical feasibility

Feasibility study involves 3 phases/stages

i) Define a problem

ii) find solutions

iii) Evaluate the solutions & choose the best one

S1 - own resource

S2 - outsourcing

S3 - hiring new team

S4 - training the existing employee

SRS - SW Requirement Specification

Requirement → Requirement gathering & Analysis
 → Requirement Specification

Req. analysis to filter out relevant or irrelevant information, redundant, missing

Components of Req. Specification

- ↳ functional → processing info
- ↳ non-functional (Performance issue)
- ↳ Goals of Representation

Design Phase

^{SRS}
 Ifp → Design Phase → Design Documents

Coding - Unit Testing

Ifp - design documents

Olp - source code

Testing Phase

- ↳ α-testing (development team is involved)
- ↳ β-testing
- ↳ Acceptance testing (done by user/client)

Maintenance - Comes after project's deployment

Ifp - test reports → after deployment & fix bugs

→ corrective maintenance (upgrading)

→ perfective → we want to make our SW robust

→ Adaptive → want to move in new environment

Compatible with new env.

SDLC why? SW Development life-cycle

→ To develop efficient and systematically sw.

Who invest project development financially?

The Management people

Management people (M)

Project Manager (PM) AM

Team Leader (TL)

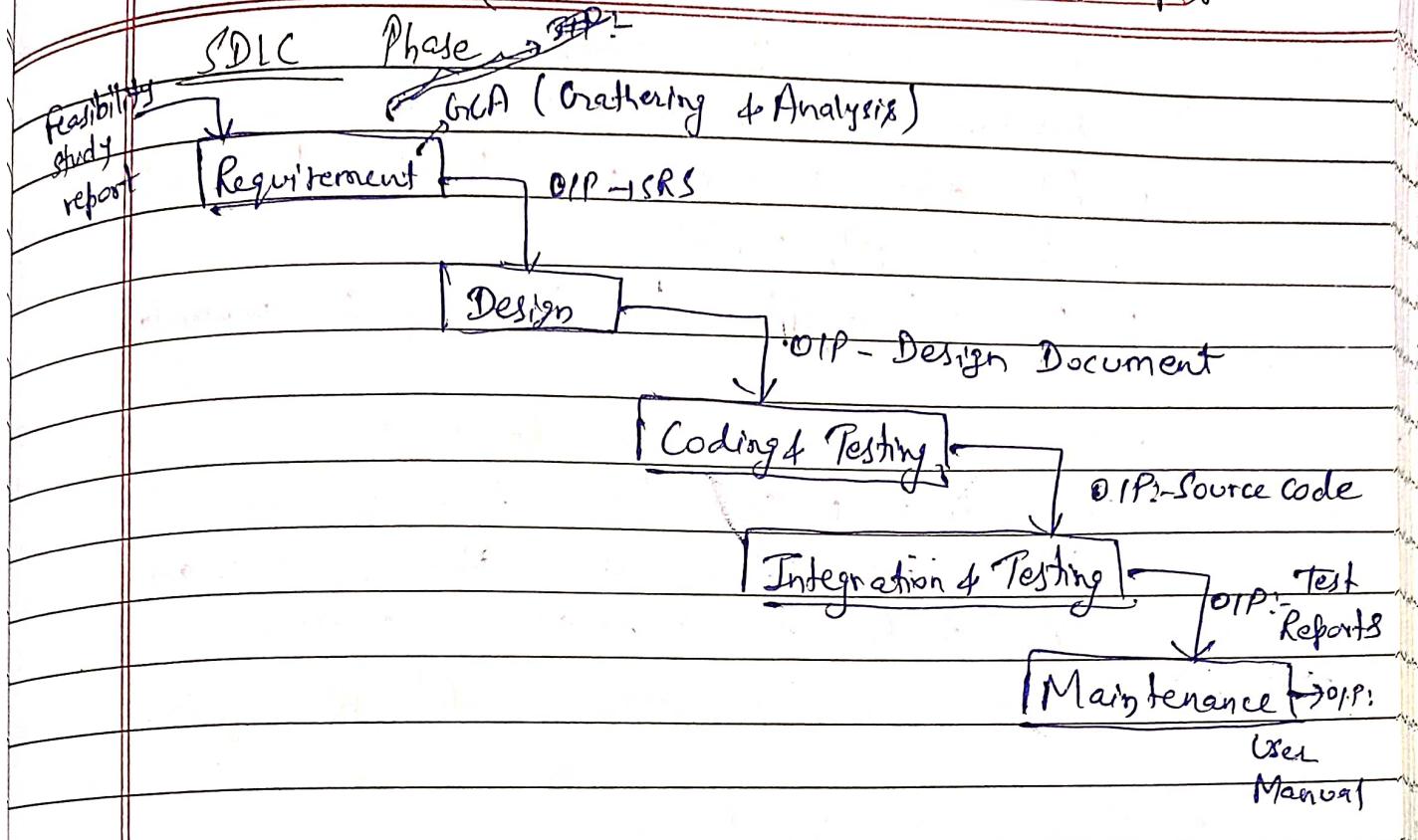
EE (Employee Engineers)

99% complete syndrome It is problem which is created when in testing phase, we got bugs in requirement phase, develop phase, Coding phase for which lot of work has to be done,

Soln:- Phase factory & Exist Criteria to avoid 99% complete Syndrome

→ It is believed that 99% work is complete but later we find that we require some other requirement in requirement phase.

→ 1st Model which has been given proposed



Drawback

Given model is a sequential model. (1-directional flow)

1. Any change made in any phase then we need to go back to earlier phase but we can't go back to previous phase.

So, we can say that this is a rigid model.

(wantage)

2. Under-utilization of resources

Cost, man-power, system, software, time, infrastructure.

3. It assumes that all the phases are being collected/gathered/executed completely.

4. Risk Modeling is not handled.

Why to read this model?

Nowhere used to developing.

1. All other models are based on this model.
- It is 1st model.
- 2 It is adopted for preparing SW documents.

Why it is necessary to document SW?

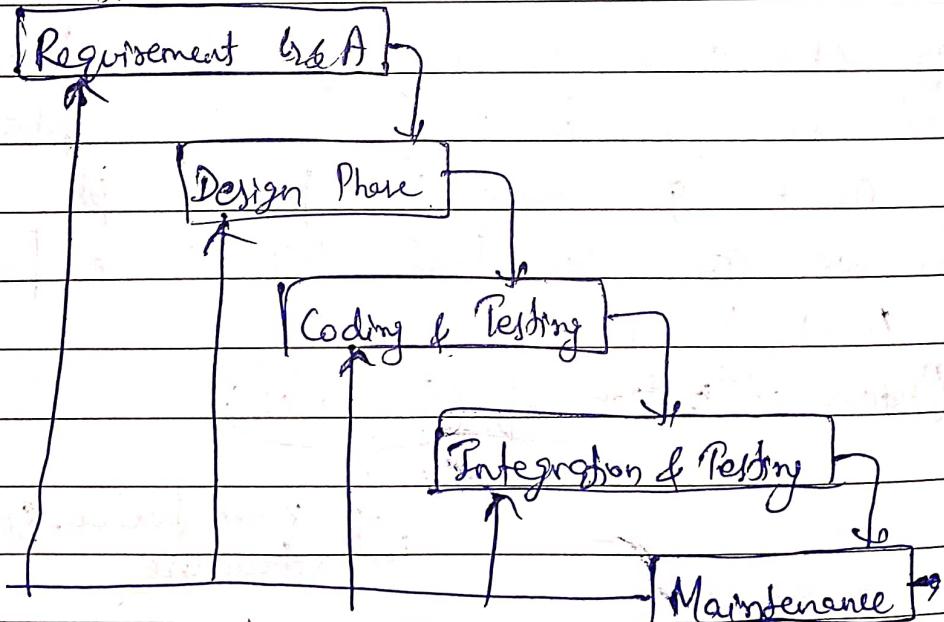
for reference If current workers leave, then we can & understandability collect information about the reference and give it to internal & external workers.

To overcome this other model is proposed.

2) Incremental WF Model -

Feedback is given to each path.

feasibility study



Disadv

- 1. Time-consuming
- 2. Rigid Model
- 3. Wastage of Resources
- 4. Risk Modeling not handled.

~~This model is~~

~~This model is used for developing small project, well-known project, or if we have experienced team.~~

~~used for SW documentation, for conceiving other models.~~

~~2/03/23~~

1. CWF^M - Classical Waterfall Model → Basic SDLC model

2. IWF^M - Iterative

↳ Error propagation is done

Have feedback to previous phase

Prototype Model :

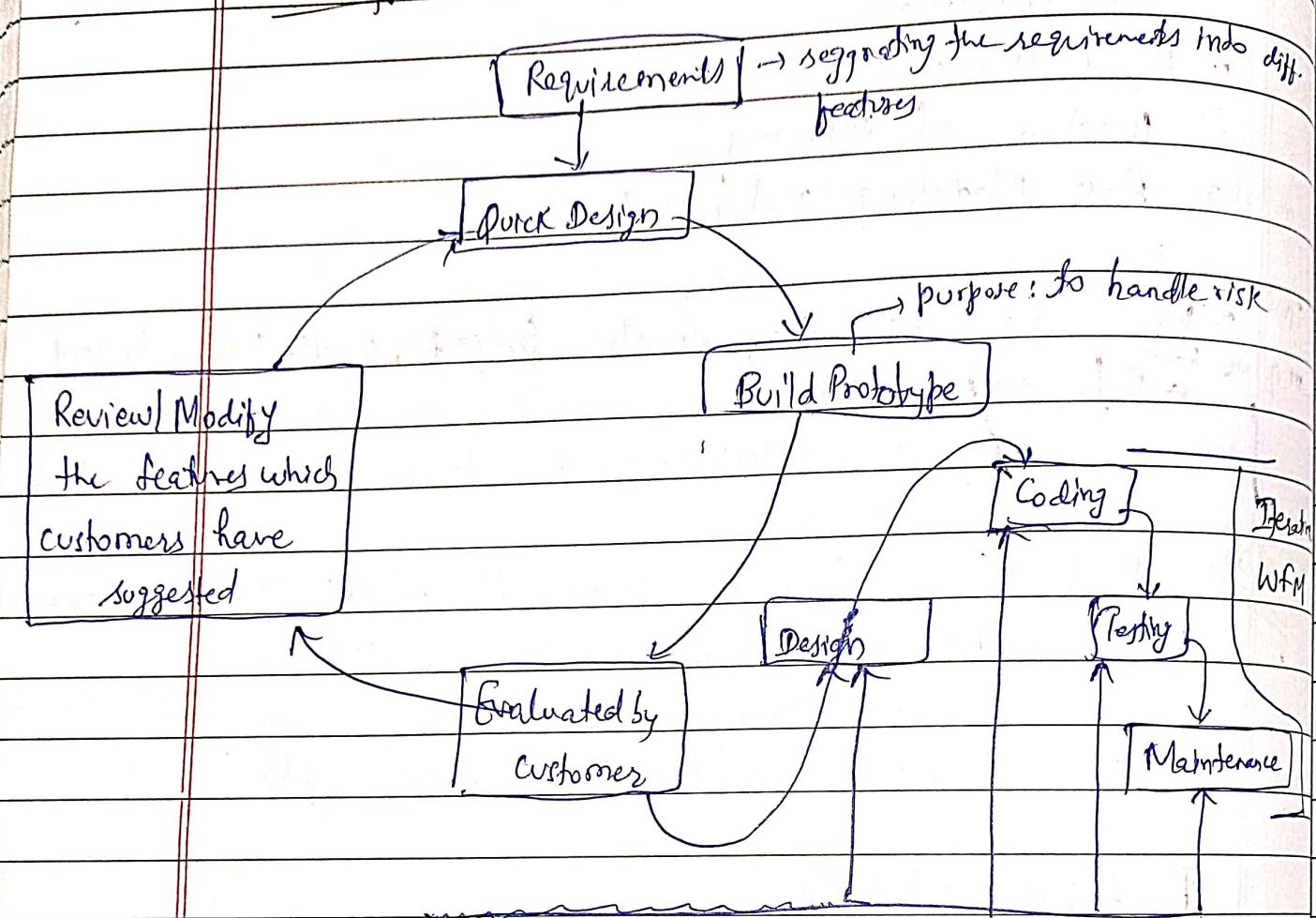
1. Costlier than earlier models (glimpse)

Prototypes gives the first hand experience to user about how the structure is looking.

Cost incurred in implementing change in prototype is

lesser than cost incurred in implementing changes in actual model.

Prototype Model



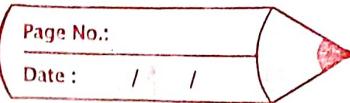
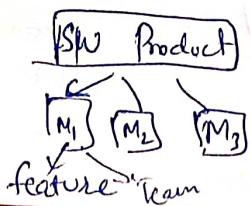
Adv

1. Risk handling
2. Customer Satisfaction
3. Time & Cost efficient compare to changes

Disadv

1. Time & Cost is more in comparison to IWFPM.
2. not suitable for very complex problems.

We are using prototype for designing the features.



Evolutionary Model - not confuse it with prototype model
 → ↳ also called Incremental Waterfall Model

Adv:

1. Changes can be done.
2. Customer need not wait for completion of product.
3. It makes the features robust.

Requirements

Identify Core Modules

Develop Core modules

Collect feedback from customer

Develop the identical features using IWFPM

Maintenance

4. No financial burden on either side

Customer Development Team.

Disadv

1. More time.
2. All products/problem may not be decomposable into core modules.

→ bcz it incorporates all other models.

Outsourcing
Hiring New People
Training Existing People
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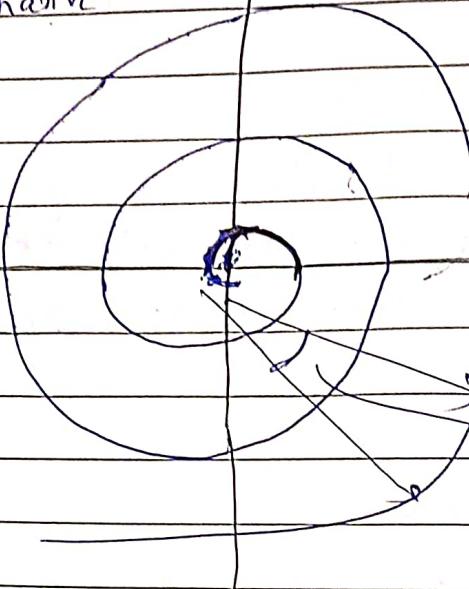
Spiral Model / Meta Model

1. Determine objectives and identify alternative solutions

2. Identify & resolve delays
By developing proto of features

3. Review for & plan for the next phase

3. Develop new level product
represents progress & effect of project



→ iterative

Each feature is developed using IWFPM.

(Spiral) Used for very complex slw problem development
It goes as long as project manager is satisfied.

Radius denotes cost incurred in developing features.

It incorporates other model like -

① IWFPM

② Prototype Model

③ Incremental Model bcz we develop one feature at a time & other feature at other time

Adv

1. Used for complex slw problem

2. Risk handling is done thoroughly



Disadv

1. Needs experienced people
2. Time Consuming

~~8/02/23~~ Why Bother

Requirement Analysis & Specification

Many projects fail:

- Bcz they start implementing the system
- w/o determining whether they are building what the customer really wants

Goals of Req. Specification

Why Bother about requirements?

- Improper req. increase the no. of iterative changes made in ^{phase of} life-cycle
- Imp. req. leads to increase in costs
- leads to dissatisfaction of customer
- To clearly understand customer req.
- systematically organize req.

System Analyst - Person who gathers info from customer, analyze, conceptualize it & projects it in understandable way

During : inconsistency, anomalies, incompleteness

Qualities of s/w analyst:

Some desirable attributes of a good s/w analyst:

→ Good interaction skills

→ Imagination & creativity

→ Experience

→ Once the SRS is done, it is given to customer for review.

→ When the customer agrees to it, it forms the base for all future development activities & serves as a

Req. gathering: done in 9 ways!

→ studying the existing documentation,

→ Interview

→ Task Analysis

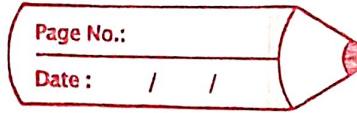
→ Scenario Analysis

→ Form Analysis

Req. gathering & analysis

Req. specification

9/02/23



Formal model - to identify small-small errors.

Noise - irrelevant data, redundant data

Silence - missing info.