

SEPM

UNIT 1-

Software Processes.

- by Ass.t Prof. Madhavi Netke.

* Software Engineering is the systematic design & development of software products & the management of the software process.

It basically comprises a process, a set of methods & a collection of tools for managing & developing a software system.



⇒ fig. Software Engineering & its layers.

[SEPM by- Madhav.]

1] Quality →

Quality focus is an organisation's goal that aims at improving software engineering process.

2] Process →

A framework which must be established for the effective delivery of the software that includes the timely development of software, management & control of software projects.

3] Methods -

It provides Technical aspects i.e. how to build software.
i.e. requirement Analysis, testing support maintainability etc.

4] Tools -

It provides automated / semi-automated support for the implementation of pm & methods.

SEPM - by - Madhu

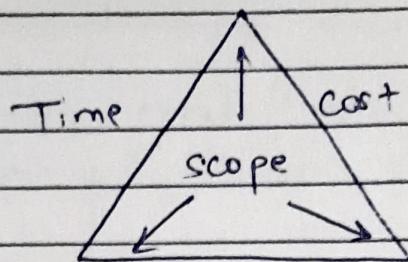
Tools helps in development of software applic

* Attributes of Software Engineering -

• Following attributes are considered as key pillars of software Engineering

- a. maintainability.
- b. Reliability.
- c. Efficiency.
- d. Reusability.
- e. flexibility.
- f. Correctness
- g. portability
- h. Effectiveness.

* Software project management-



Quality.

- software project management is essential to incorporate user requirements along with the cost & Time constraints.

The above fig. shows triple constraints for slw projects. It is essential part of slw organisation to deliver quality products, keeping the cost within clients budget constraints triangle.

[SEPM - by - madhav]

- Any of the three factors can severely impact the other two.

* Software project manager-

- It is a person who undertakes the responsibility of executing the slw project.
- It is aware of all the phases of SDLC that the slw would go through.
- He/she is never directly involve in producing the end product but he controls & manages the activities involved in production.

* phase 1 → planning & Analysis.

- most fundamental phase in whole SDLC process
- Business & SW Requirements are compiled analyzed by a business analyst, domain expert & project manager SEPM-by-Madhavi.
- They also write use cases & share this info with the project team.

* phase 2 → Designing product Architecture

- During this phase, lead developer, arch creates initial HLD plan for SW & system
- It includes the delivery of req. used to design Design Document Specification (DDS).
- This document details Database + table be added.

* phase 3 → Developing & Coding.

- In this, database admin creates & imports necessary data into the database
- programming languages are defined by requirements
- Imp. phase for developers.

* Phase 4 → Testing.

- Testers test the SW against the req to make sure that the SW is solving needs addressed & outlined during the



planning phase

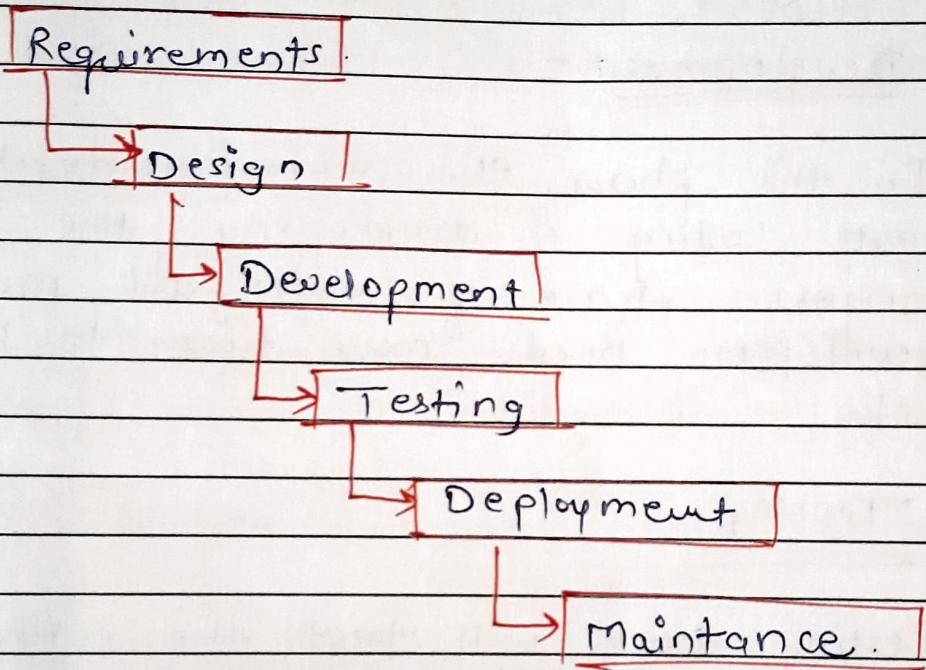
→ All test like unit Testing, integration Testing, System Testing, acceptance Testing are conducted as functional Testing.

5. Maintenance-

- live software Env. i.e. the system is in maintenance mode
- last & imp phase of SDLC.

i) Waterfall Model -

- Simplest model used by an IT industry to develop the software [NPM - by - Maslani]
- It represents real life scenario.



+ Requirements -

- Requirements include the client's needs about building the SW as well as the company will collect the information about the from client & prepare the Documentation Accordingly.
- Once it is performed, design phase get started

* Design -

- Here, we prepare High level & low level
- UI needs to be verified & it should be user friendly. SEPM - by - madhavi.
- Once this is completed, development will get started.

* Development -

- In this phase, the software development starts coding & developing the software.
- longest phase of waterfall model a developer need more time to build slow.

* Testing -

- Testing team will test the software, any bug found, they informs developer about issue they found & make that the bug is fixed.

* Deployment -

- In this project is deployed so that becomes live to real time users.

* Maintainance -

- In this, project is available to the



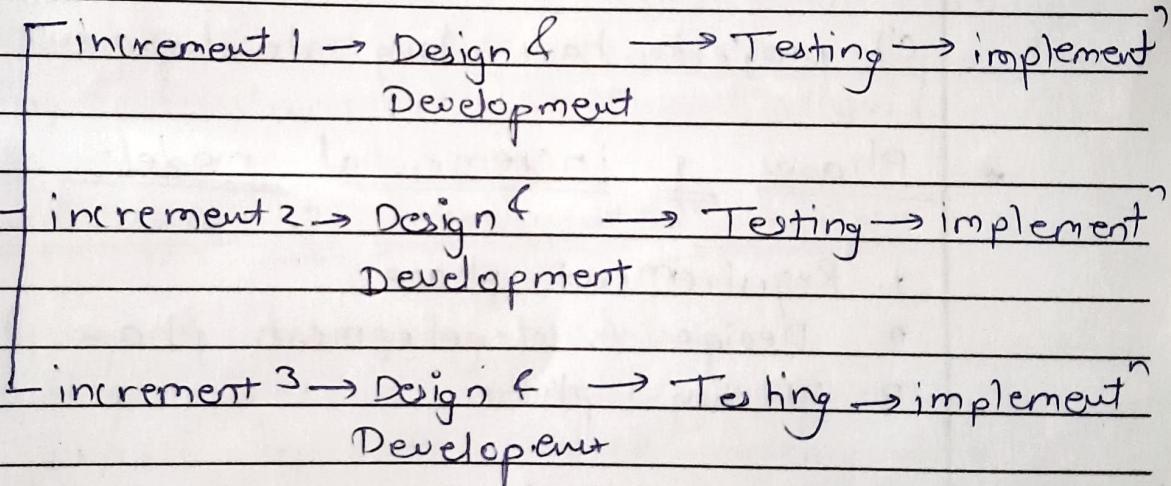
Advantages -

- Simple & easy to understand & to use.
- specific deliverables & review process.
- phases do not overlap. SEPM-by-madhuri

Disadvantages -

- Sometimes Unexpected Results.
- Not suitable for changing Requirements.

2] Incremental Model -



Widely accepted model of software development process, where the software Requirements are broken down into multiple separate modules / increments in SDLC.

SEPM-by-madhuri

Each increment is treated as sub-project & goes through all phases of SDLC incremental model.

- In this type of model, instead of making great achievement, we achieve it by divide in small steps.

| SEPM-by-Madhavi |

- * Used Incremental model is used when-

- Requirements are clearly specified & Un & are known up-front. Certain require however require time
- product based companies develop their product.
- projects have long development schedule

- * Phases of incremental model-

1. Requirement phase
2. Design & development phase
3. Testing phase

- 1. Requirement phase-

→ incremental model starts with this phase because developing a solution that gives to clients is impossible without understanding initial requirements.

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- 2. Design & Development phase -

→ During this phase, the product architect



an optimized product architecture by using SRS document.

SEPM-by-Madhavi.

- product architects creates a raw design, working models, specifies how the software works, how the new design look, how the control flows from one screen to another.

3. Testing phase -

- Once the code is written, it is tested to determine whether it works as expected.
- But for that, developer performs initial testing such as Unit Testing & application Testing.
- If all goes well, the code is moved to testing Environment.

SEPM-by-Madhavi.

Advantages of incremental model -

- verifying & debugging is easy.
- Identifying errors becomes easy.
- It enables us to produce working software earlier & more rapidly during product.

Disadvantages of incremental model -

- requires high level of planning & designing.
- Iteration phases are rigid & they don't overlap each other.

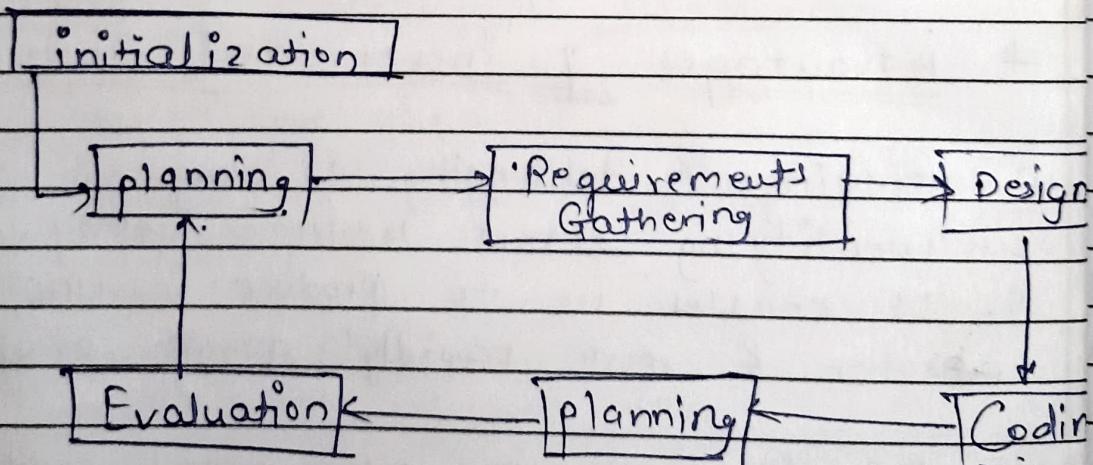
4. Implementation phase

- In this phase, the product is ready to live after it has been tested & has each testing phase. TSE Pm. by - Madhan
- After the SW is fully tested & is errors & defects, the clients reviews the test results & approves the deployment.

5)

Iterative Model -

- In iterative model, the functionality of project increases incrementally.
- with continuous improvements, it helps lower down the chances of risks



+ phases have already explained before



* Applications of Iterative Model-

- 1) It is used by many engineering teams to develop new features & apply problem-fixing techniques.
- 2) The development of mobile phones throughout the years, how speakers have gotten smaller & more portable over time SEPM-by Madhavi.

* Advantages of iterative model-

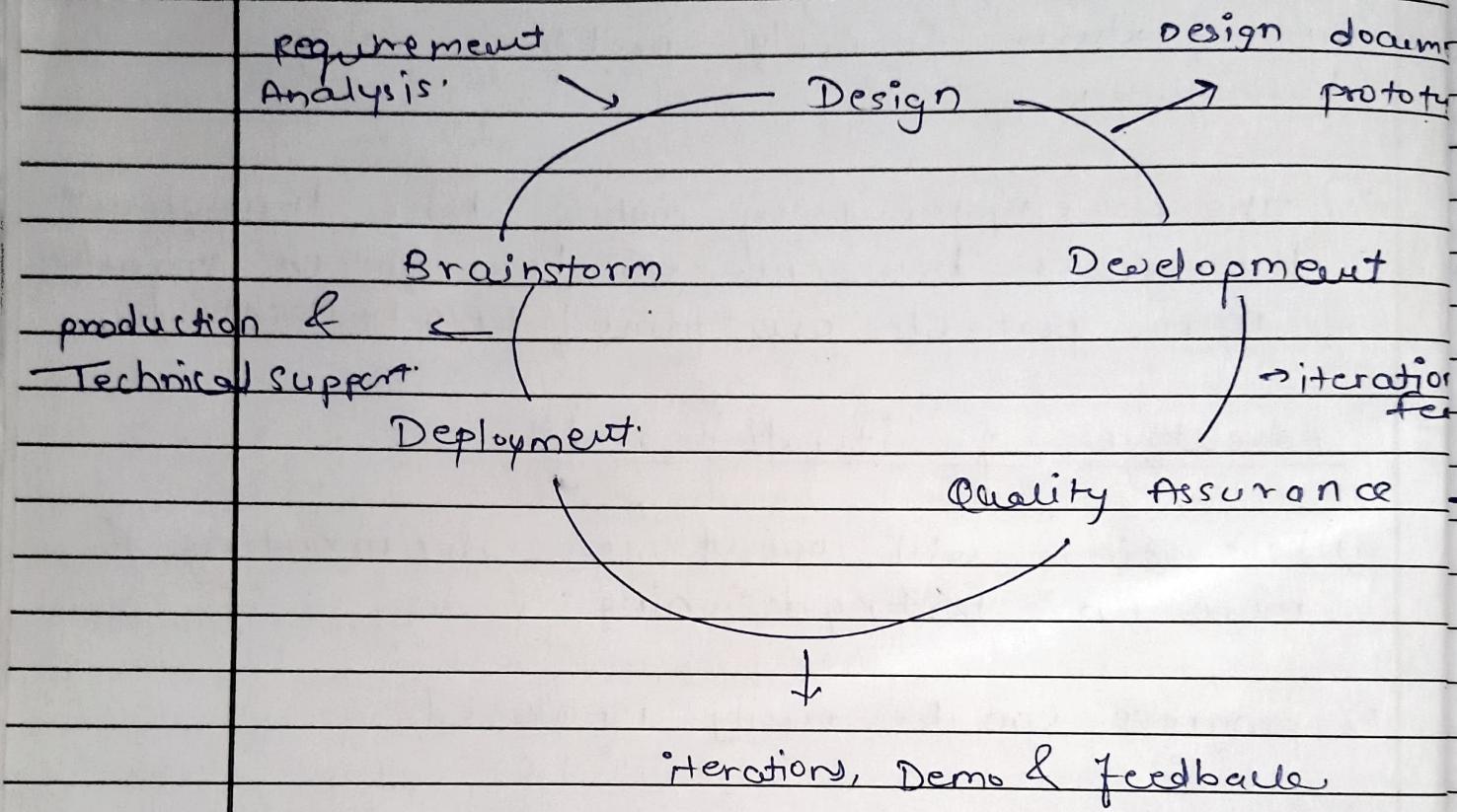
- 1) less time will spent on documenting & more on testing designing.
- 2) progress can be easily measured.
- 3) Operating time is reduced.
- 4) functional prototypes are developed early in project life cycle.

* Disadvantages of iterative model-

- 1) Sometimes more resources may be required.
- 2) Highly skilled knowledge is required for risk analysis.

4]

Agile Development Model -



+ phases inclu

- The meaning of Agile model is versatile
- Agile process model means a slow development approach based on iterative development **[SEPM- by-madhavi]**
- Agile model breaks tasks into smaller iterations, or parts, it never involves long term planning
- Each iteration is considered as a short frame, in agile model, which lasts from one to four weeks.



+ following phases in Agile model -

1. Requirements Gathering
2. Design the Requirements.
3. Iteration.
4. Testing / quality Assurance
5. Deployment.
6. feedback

Explanation is discussed earlier.

+ Agile Testing Methods -

- 1) Scrum
- 2) XP (extreme programming)
- 3) DSDM (Dynamic s/w development method).

1) Scrum -

[Scrum - by - Madhavi]

It focuses primarily on ways to manage tasks in team based development conditions.

There are three roles -

- a) scrum master
- b) product owner
- c) Scrum Team.

a) Scrum master -

Scrum can set up the master team,

arrange the meeting & remove obstacles
the process.

b) product owner -

The product owner makes the product backlog, prioritizes the delay & is responsible for the distribution of functionality each repetition.

c) scrum Team -

The team manages its work to complete the sprint or cycle.

2] XP -

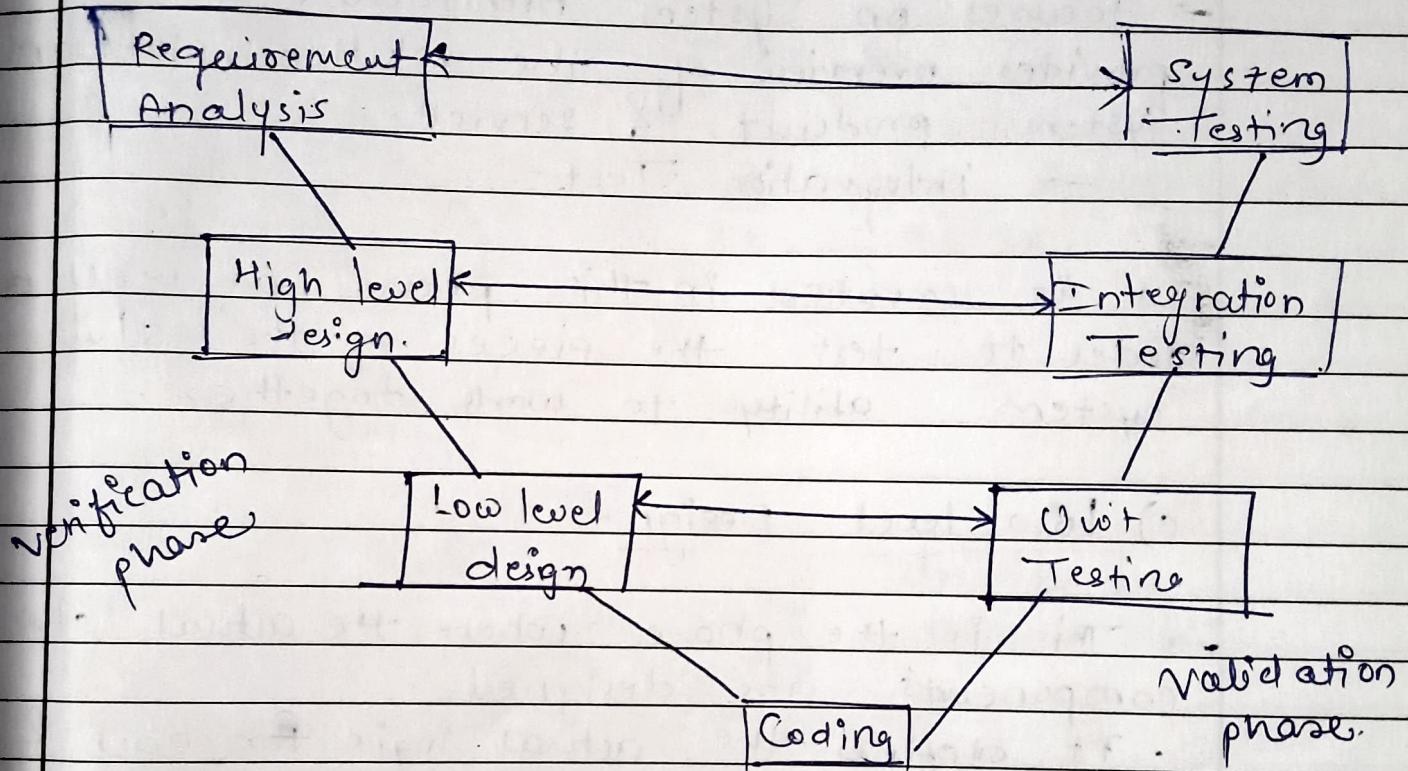
This type of methodology is used when customers are constantly changing demands or requirements or when are not sure about the system performance.

3] DSDM -

It is a rapid application development strategy for slow development & giving an agile project distribution structure. The essential features of DSDM are that users must be actively connected & teams must have submitted proper outputs.

V Model-

- V model is an extension of waterfall model where slow development & testing is executed in sequential way.
- It is highly disciplined model.



Explanation:-

V model includes verification & validation phase.
[SEPM- by - Madhavi.]

Verification phase - Done based performs based upon the pre phase i.e. requirements & related po

Validation phase - Totally based upon diff. Testing.

System Testing plan is created & focus upon functionality & meetings specified in the requi. gathering.

RAISE

a) Requirement analysis -

→ It is like SRS documentation which specifies which Requirements need to be mentioned.



b) High level Design -

→ focuses on System Architecture & design provides overview of the solution, platform system, product & service.

→ integration Test -

It is created in this phase as well order to test the pieces of the sub systems ability to work together

c) Low level Design -

→ This is the phase where the actual sub components are designed.

• It defines the actual logic for each component of system.

→ Unit Testing

[SEPM - by - Madhaw]

It is the phase where each & every component is tested individually.

d) Coding -

→ This is at the bottom of V - shape model



+ Advantages of V-model-

- 1) Simple & Easy to Use
- 2) saves a lot of time
- 3) works well for the small projects where Requirements are easily understood

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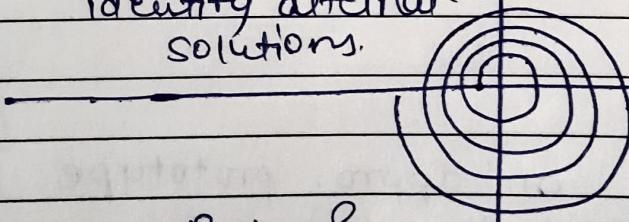
Disadvantages of V-model-

- 1) Very Rigid & least flexible
- 2) If any changes happen in midway, then the test documents along with Requirements documents has to be updated,

6] Spiral Model-

1. Objectives
determining &
identify alternate
solutions.

2. Identify &
Remove Risks.



4. Review &
plan for the
next phase

3. Develop next
version of Doc.

- spiral model supports Risk handling.
- The exact No. of loops in the spiral is unknown & can vary from project to project.
- Each loop of the spiral is called phase of SDLC
 - Radius of the spiral at any point represents expenses (cost) of the project so far.
 - angular dimensions represents progress made so far in the current phase.

- phase 1 -

Objectives are investigated, elaborated & analyzed.

possible alternative solutions are proposed.

- phase 2 -

By developing an appro. prototype best possible alternative solutions are evaluated.

- phase 3 -

Developing & verifying the next level product.

Phase 4 -

Reviewing the result of stages transversed for with the cut & planning the next iteration.

Advantages -

- 1) flexible to reuse.
- 2) Gives confidence in the project.

Disadvantages -

- 1) knowledgeable & experienced staff is reqd.
- 2) for developers, it is complicated & risk driven

+ COCOMO Model -

→ · COCOMO (constructive cost model).

· Regression model based on Lines of Code (LOC) i.e.

· It is procedural cost estimate model for small projects & it's often used as a process of reliably predicting the various parameters associated with making a project like size, effort, cost, time, & quality.

· COCOMO is primarily based on Effort & Schedule :-

· Effort - Amount of worker that will be required to complete a Task.
It is measured in person month units.

· Schedule - Simply means the amount of time required for the completion of the job which is proportional to the efforts in.