

## Software Eng.

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### # Software life cycle Models:-

A software life cycle model is a standerdized format format for planning, organizing a new project.

There are 100's of diff. kinds of models which are known and used.

step by step and well defined

A software lifecycle model is a description of sequence of activities carried out in a software project.

Categories of models:

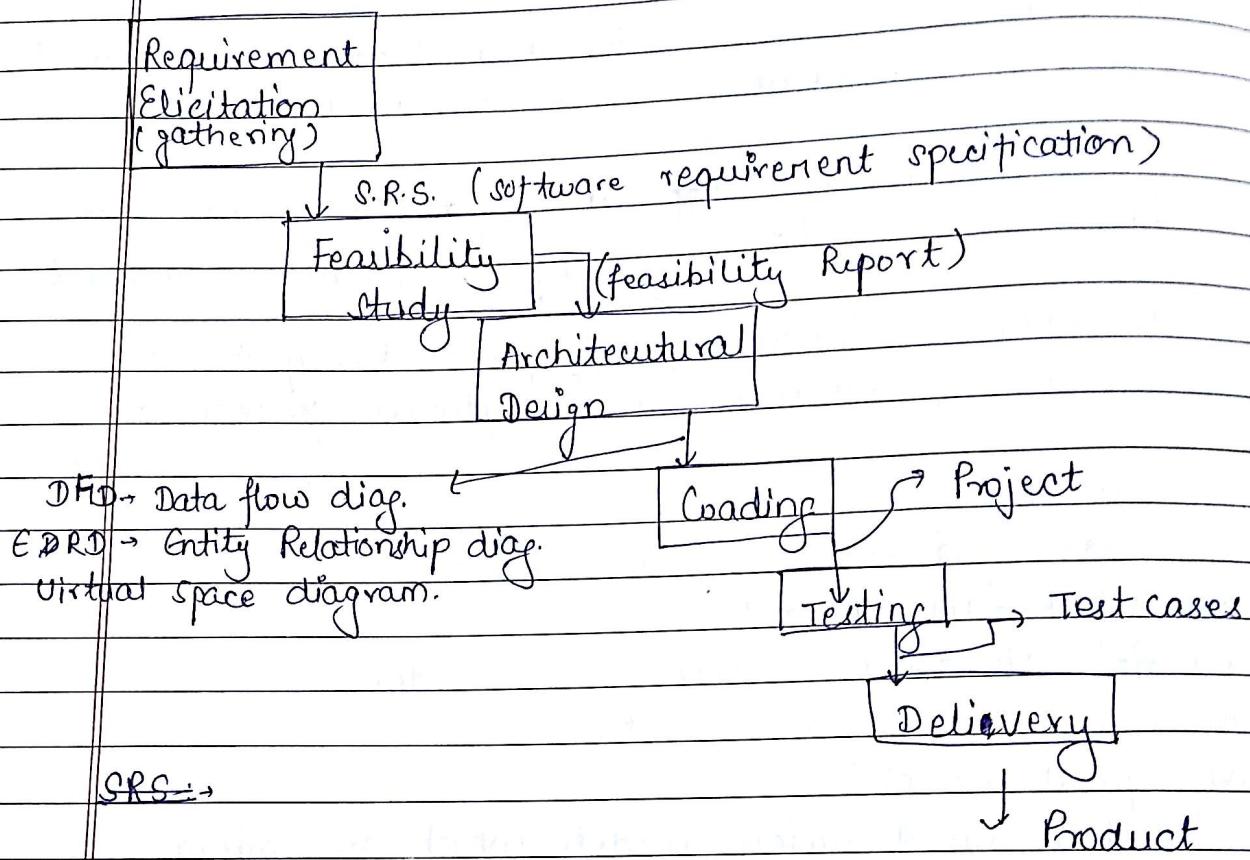
- (i) Code and fix. (Build and fix).
- (ii) Waterfall Model.
- (iii) Iterative Enhancement model.
- (iv) Rapid prototype model.
- (v) Spiral model.

And a no. of various models which are minor variations on these basic models.

While changing the life cycle models we can improve and/or tradeoff.

- ) Development speed
- ) Product quality.
- ) Project visibility.
- ) Administrative overhead.
- ) Risk exposure.
- ) Customer relations.
- etc.

### 1) Waterfall Model :-



#### Advantages :-

- (i) Easy to understand & implement.
- (ii) Widely used and known in theory.
- (iii) Identifies deliverables & milestones.
- (iv) Works well on mature products & weak teams.

#### Disadvantages :-

- (i) It doesn't match reality.
- (ii) It doesn't reflect iterative nature of development.
- (iii) Unrealistic to expect accurate requirement so early in project.
- (iv) Software is delivered late in project which delays delivery.

of serious errors.

- (v) Difficult to integrate risk management.
- (vi) Difficult and expensive to make changes to documents (or products). → **Swimming Upstream**
- (vii) Significant administrative overhead, which might be costly for small teams and projects.

## # Prototype Model :-

- key idea behind this model was "customers are non-technical & usually don't know what they want or what they can have."

Requirement gathering

Feasibility Study

Quick design

build prototype

Customer Evaluation  
Prototype

Engineer final design

Testing

Archives  
Coding

Delivery

Advantages:-

- i) Reduces risk of incorrect user requirements.
- ii) Good, where requirements are changing (uncommitted).
- iii) Early Product Marketing (support)

Disadvantages :-

- i) Unstable or badly implemented prototype often becomes the final product.
- ii) Requires extensive customer collaboration, which may
  - .) cost customers money.
  - .) needs committed customers.
  - .) difficult to finish if customers withdraw.
- iii) Difficult to know how long the project will last.

25/07/17 Spiral Model:-

This model follows the concept that end user requirements are hard to obtain or to be defined. So, it is natural to develop software in an experimental way i.e.

- (i) build some software.
- (ii) see if it meets customer requirements.
- (iii) If no go to step 1.
- iv) The loop approach gave rise to structured iterative life cycle models

In 1988, Boehm developed the spiral model as an iterative model which includes

- a) risk analysis.
- b) risk management.

The key idea behind this model is to identify and solve sub-problems with the highest risk on each iteration.

Each cycle follows a waterfall model by

- (i) determining objectives. (requirement gathering)
- (ii) specifying constraints (feasibility study)
- (iii) generating alternatives.
- (iv) identifying risks.
- (v) resolving risks.
- (vi) developing next level product.
- (vii) planning next cycle.

Advantages :-

- (i) Based on reality i.e. the model accurately reflects the iterative nature of software development, on projects with unclear requirements.
- (ii) flexible, as it incorporates advantages of Waterfall model & rapid prototype model.
- (iii) It decreases risk of failure.

Disadvantages :-

- (i) Needs technical expertise in risk analysis.
- (ii) This model is poorly understood by non technical management & so not widely used.
- (iii) Complicated model & needs competent professional management with high administrative over rank.

# Agile Methodology :-

Agile software development describes a set of values & principles for software development under which requirements & solution evolve through the collaborative effort of self-organizing cross functional teams.

It advocates adaptive planning, evolutionary development, early delivery and continuous improvement.

It encourages rapid and flexible response to changes.

# Quality Management :-

It's a, or an umbrella activity that is applied throughout the software process. It involves doing the software development correctly v/s doing it over & over.

It reduces the amount of rework which results in lower costs and improve time to market.

Quality Management includes :-

- (i) software quality assurance process.
- (ii) specific quality assurance, and quality control tasks.
- (iii) Effective software eng. practise
- (iv) Control of all software work products and the changes made to them.
- (v) A procedure to ensure compliance with software development standards.
- (vi) Measurement & reporting mechanisms.

There are two types of quality :-

- (i) quality of design
- (ii) quality of implementation. (conformance)

) Quality can also be defined in terms of user satisfaction.

User satisfaction - Compliant product + good quality + delivery within budget & schedule

# Cost of quality :-

"It takes less time to do a thing right than to explain why you did it wrong."

- i.) It includes all costs incurred in the pursuit of quality. (or in performing quality related activities). It increases dramatically as the activity progresses from prevention → reduction → Internal failure → external failure.

# Kinds of quality costs :-

- (i) Prevention cost
- (ii) Appraisal cost.
- (iii) failure cost.

|                           |                           |
|---------------------------|---------------------------|
| internal<br>failure cost. | external failure<br>cost. |
|---------------------------|---------------------------|

# ISO 9001 :-

ISO 9000 is a series of documented standards describing quality management written by international organization for standardization (ISO). It was established in 1997.

More than 226000 organizations in 169 countries had received ISO 9000 registration by the end of 1997. ISO 9000 and ISO 9004 are guidelines for quality management & are not mandatory for certification.

ISO 9001, 9002, 9003 are quality system standards. ISO 9001 is the broadest standard & provides a model for design, development, production, installation & servicing.

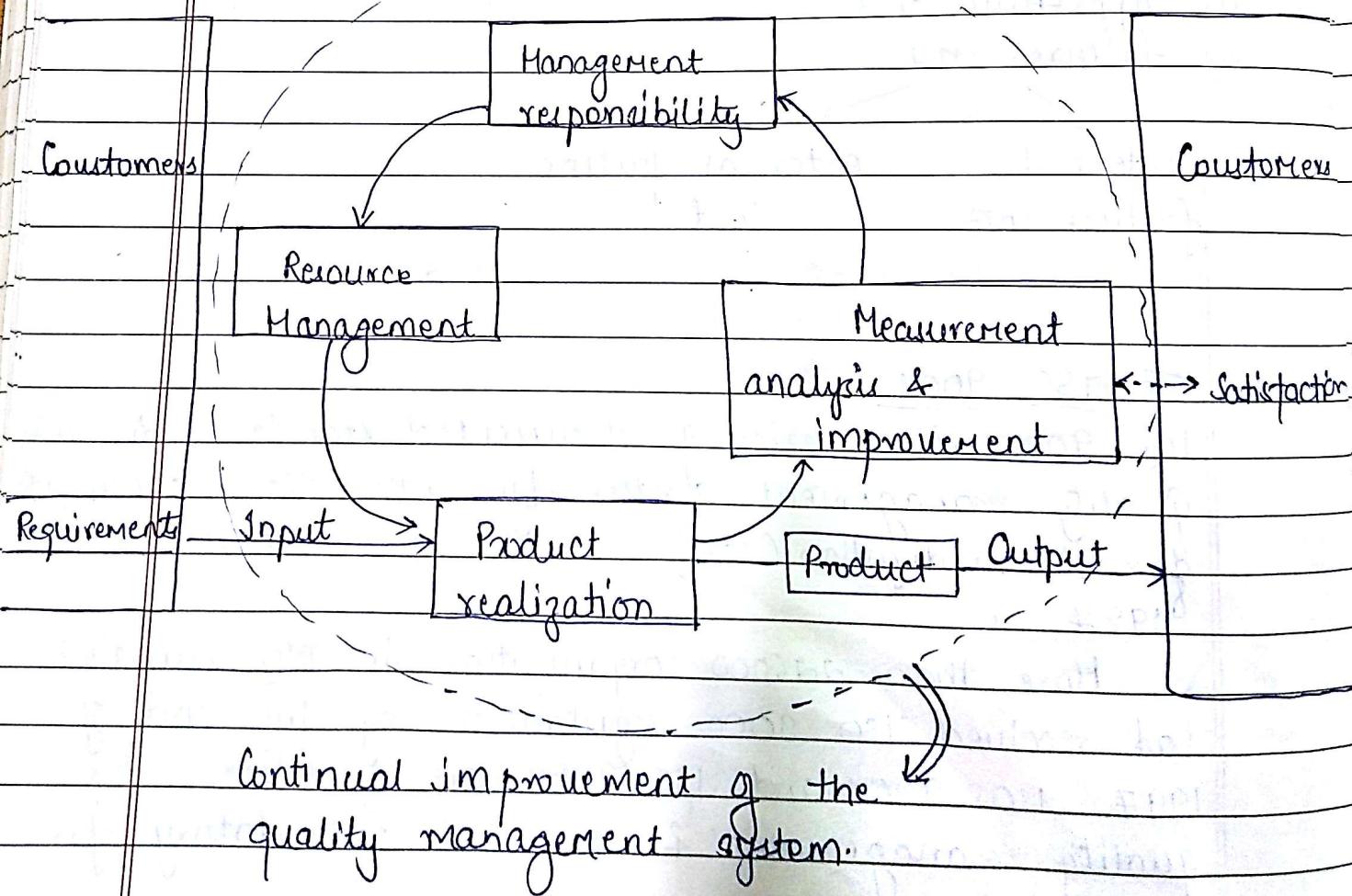
ISO 9002 is limited to production, installation & servicing.

ISO 9003 is further limited to inspection & testing.

\* Life cycle Model

\* Spiral Model

\* Short note: quality control



ISO 9001 sets out the criteria for a quality management system. It can be used by any organization, large or small, regardless of its field of activity.

This standard is based on number of quality management principles including a strong customer focus, the motivation and implication of top management, the process approach and continual improvement.

An ISO quality Management System requirements for all areas of the business, including:-

- .) Facilities.
- .) People.
- .) Training.
- .) Services.
- .) Equipment.