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Software evolution

Sof. Maintenance

It is a crucial phase in the software development cycle, that involves modifying and updating software after it has been delivered to the customer.

Software Categories

Corrective Maintenance: This involves fixing bugs or defects that are identified after the software is deployed.

Preventive

Adaptive Maintenance: This involves

- updating software
- improve or enhance performance

(based on user feedback)

Adaptive: This maintenance is needed when before needs to be made to work in a new or changed environment

(New updates and also Maintenance)

Perfective Maintenance: This aim to improve the future maintainability and reliability of the software often by optimizing code without changing behaviour.

Re-Engineering

Freedom of soft development that is done to improve the maintainability of soft. system.

Re-engineering means CS & progms are New form update.

[It is the process of analyzing, designing, and modifying existing software system to improve their quality, performance and

Maintainability.]

* update error, add new features or improving the

Software:

Software ^{system} renovation system because

for improve the existing software [5].

Existing soft code, design are error free or update ~~software~~ way to repaired error]



Def.

Process of Re-Engineering

① Planning → Plan for the existing Software.
↓
improve maintainability

② analysis ↓

③ Design.

④ Implementation.

⑤ Testing

⑥ Deployment.

⑦ Before re-engineering
the cost effective way to
improve the Quality and
functionality of
Existing Software System.

→ objective

The primary goal is to improve the Quality and maintainability of the software system while minimizing the risk and cost associated with the development of system.

Seg 8 Soft. management

Software estimation techniques

Empirical - G² factor expert for project size
[impractical way to]

Heuristic - speed of increase size
[solution based size] [problem size size] [Cocomo model]

Analytical - research based size size
[used to measure work]

Empirical estimation Models

→ These techniques are usually based on the Data that is collected previously from a project and also based on some guesses.
It uses the size of the software to estimate the effort based on common sense.

Ex - Delphi, expert judgement.

Cocomo

Based on Loc (Number of lines in code). This process reliably predicting the various parameters, associated with managing a project such as size, effort, cost time, and quality.

Characteristics

Organic - small team development.

Ex - application program, library management.

Semi detached: 20% organic & Embedded 80% 20% team size, experience, knowledge

Ex - Compilers

Embedded: Larger team size become complex model.

70% and 30%

Ex → OS, real time system.

Stages of model

Basic model: predict the effort and cost of project.

estimate based on size of the
Soft Line in code (Loc)

$$E = a (K \text{Loc})^b$$

$$\text{time} = c (\text{Effort})^d$$

$$\text{person required} = \text{Effort} / \text{time}$$

Intermediate: Extension of the basic model

It considers additional factors like

Complexity.

required reliability

experience of programmer

Detailed: Its extension of intermediate. Its phase sensitive, doesn't depend on any phase used to calculate the amount of effort to complete each phase and cost drivers.

$$\text{Effort} = a \times (\text{Size})^b \quad \left. \begin{array}{l} \text{Size} \\ \text{Uloc} \end{array} \right\} a, b \text{ constants}$$

6 phases

- planning and requirements,
- System design
- Detailed "
- Module code & test
- Integration & test.
- Cost Constructive model.

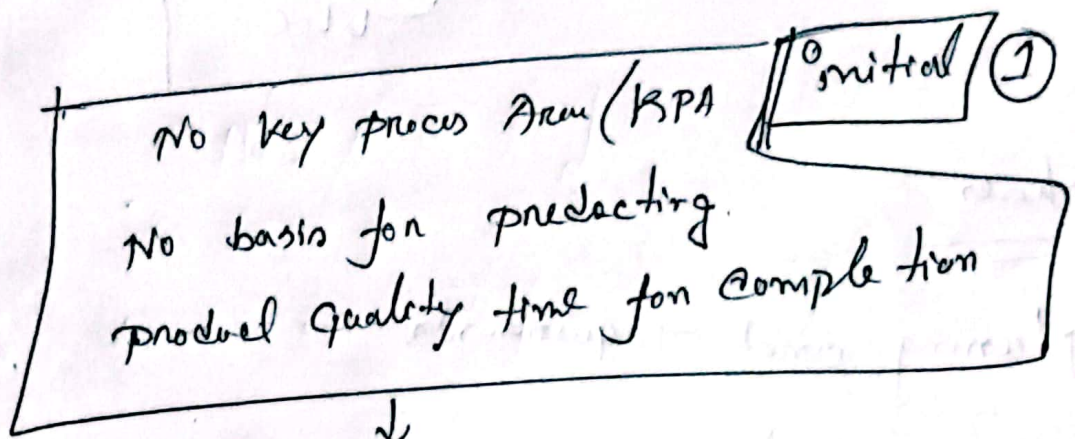
(Capability maturity model)

CMM

It is a strategy for soft. process improvement that should be followed by.

5 Levels.

It just ck/verify the maturity levels.



- project planning
- Configuration management
- Requirement
- Sub contract
- Soft quality Assurance.

② Repeatable

• Peer reviews.

• Intra group Coordination. — fullfillment
of needs

• organization process definition.

• " " " " focus.

• Training program.

Level 3
Defined
Well

④ Soft Quality management.

④ Quantitative management.

Level 4
managed.

• process change management

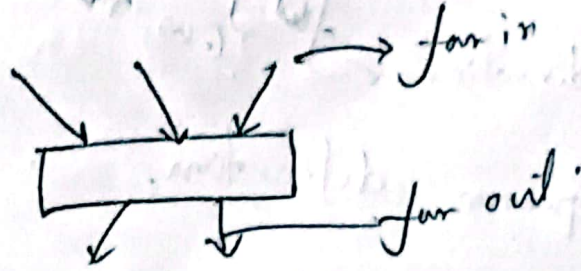
• Technology " "

• Defect prevention.

Optimizing
Level 5

for continuous
process improvement.

③ Fan in Fan out:



Complexity = 5 modules.

Fan in is the Supordinate module

Fan out " " " " " " " " " " " "

Henry & Kafuris Metric

also known as Information flow metric.

Designed to measure complexity.

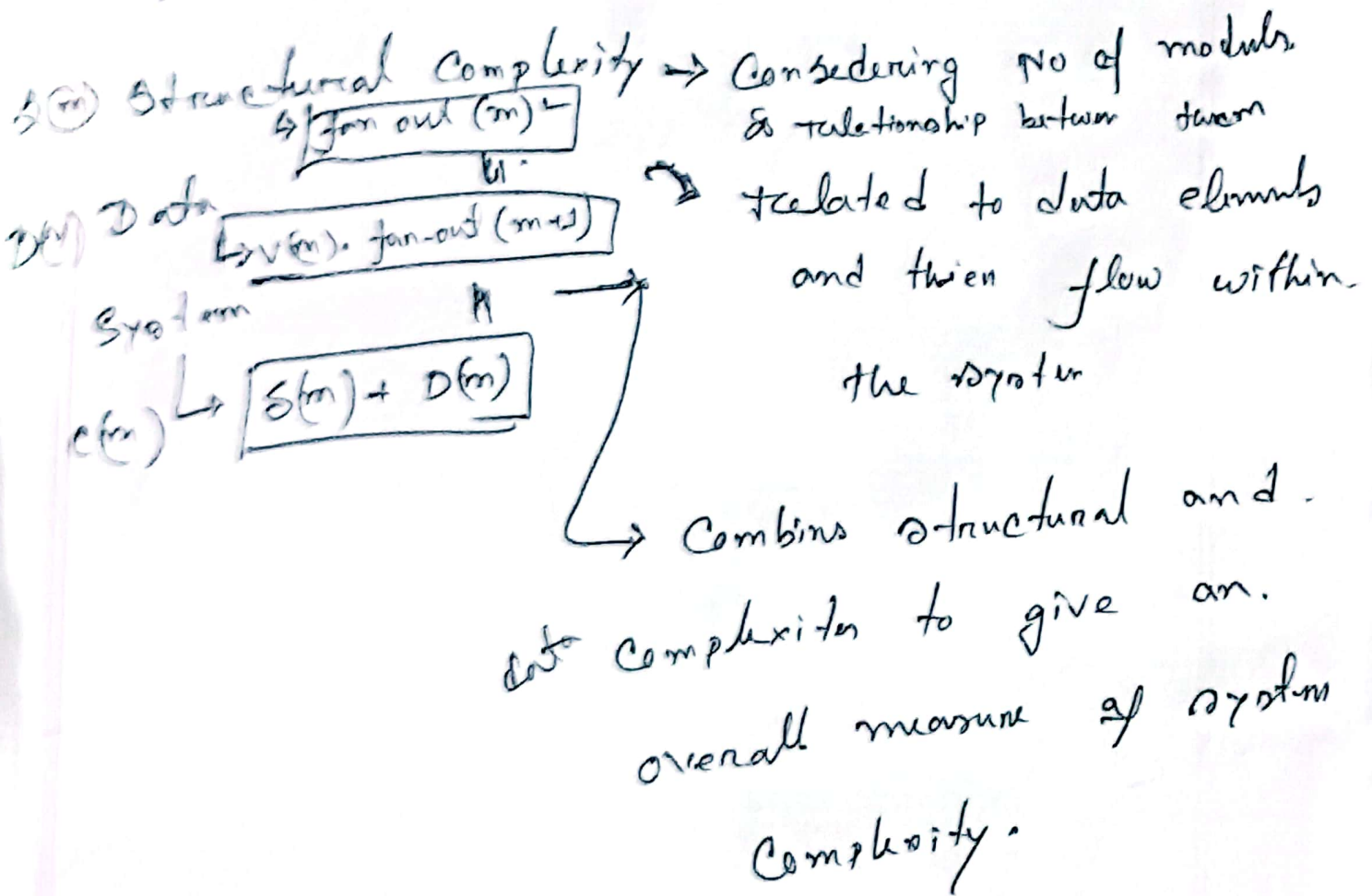
$$C(M) = \underbrace{FAN_{in}(M)}_{\text{Local flow in}} \times \underbrace{FAN_{out}(M)}_{\text{Local flow out}}$$

Useful for Interaction in
different parts of System

~~Design~~

Card and glass system

It's developed a metric to measure the complexity of system based on structure, focus on design.



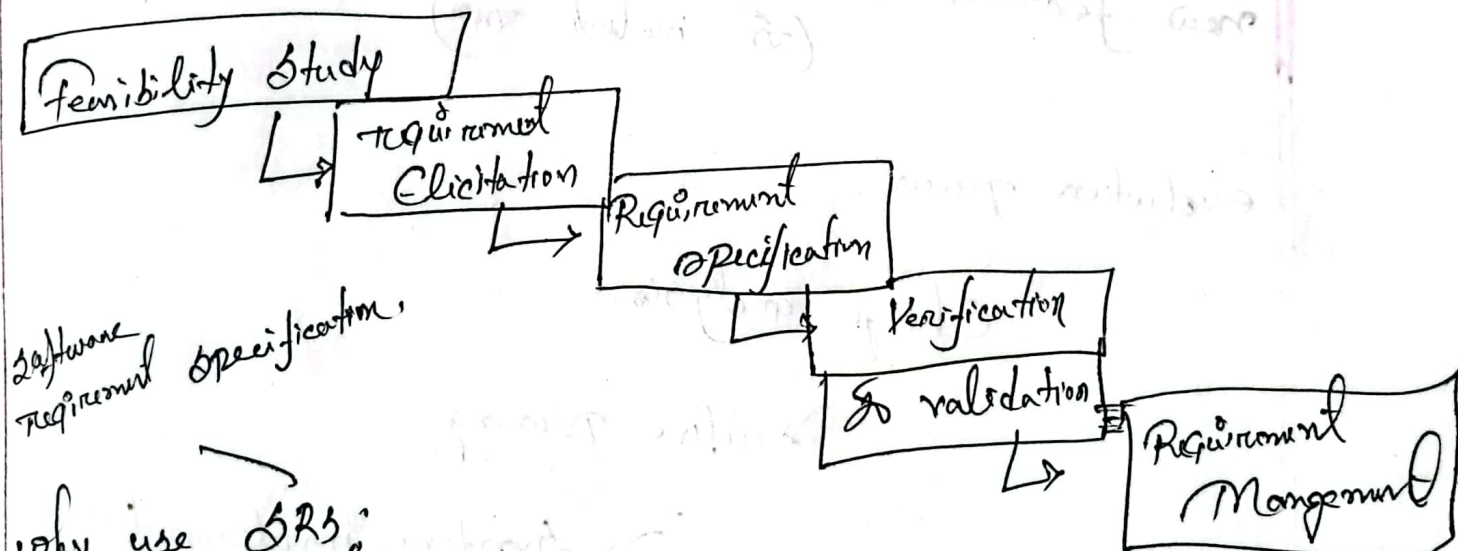
Se final

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Requirement process

A systematic approach to the definition, creation, and verification of requirement for the software system is known as requirements engineering.

↓
step process step



why use SRS:

→ It gives us a complete picture of your entire project
It's detailed description of what a software will do, how it should perform.

Requirement Validation & Evolution

- Validation ensures the Software being developed meets the needs and expectation of its stakeholders.
(Customer from BPRC from 22/12/2017) ← valid check.
- Evolution is a term which refers to the process of developing Software initially, timely updating & add new features and remove unused function etc.
(can include also)

evolution process

Change analysis:

→ release planning

→ System implementation.

→ releasing system.

Customers.

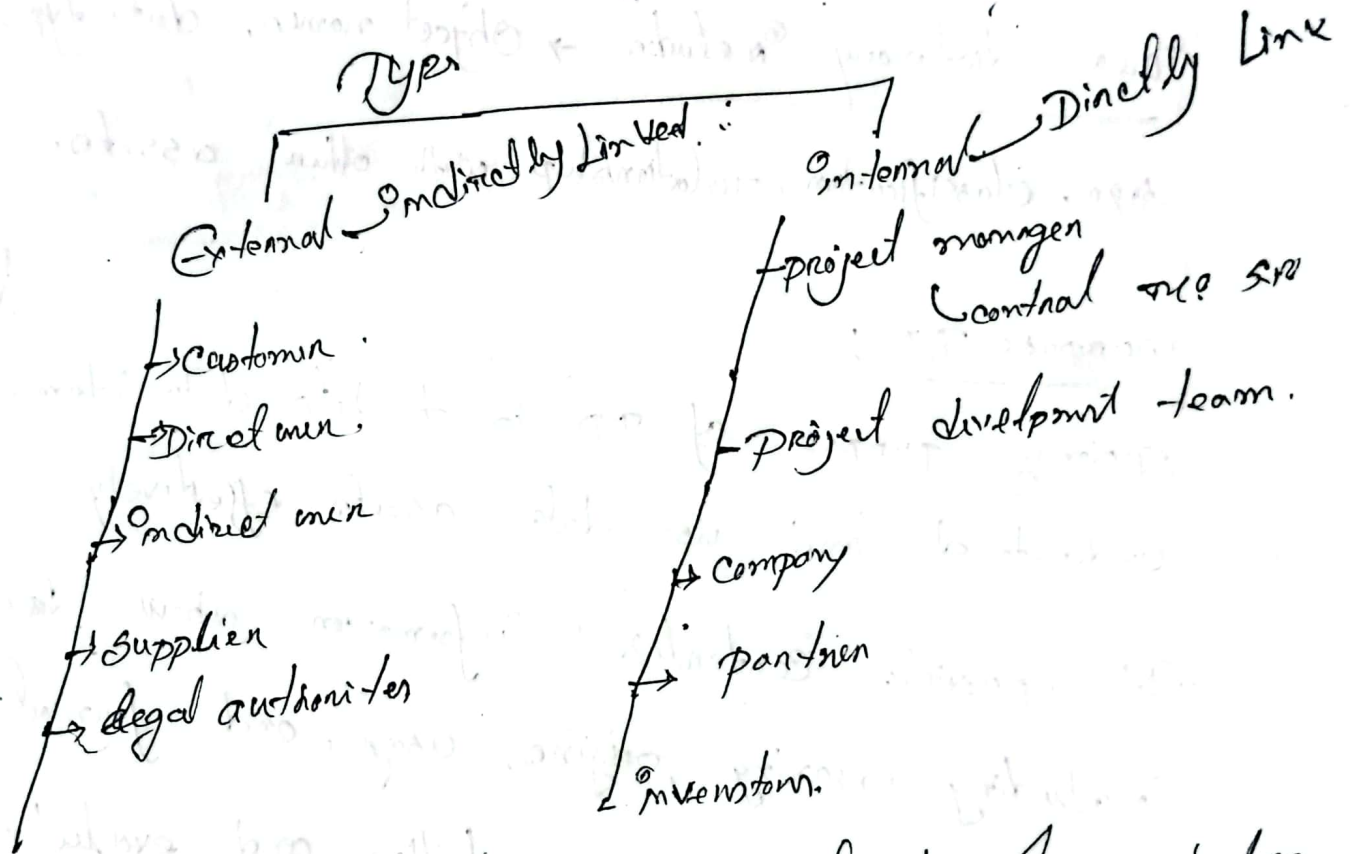
Stakeholder

Term "stakeholder" refers to the people of group involved by a software development project

[Indirect, direct or external]



Types



• socio technical and social activities of mankind
 and their

#Data Dictionary

• It is a collection of meta-data that provide information about data stored in computer system.

Meta data data understand to help us

Data dictionary includes → Object names, data types, size, classification, relationship with other assets.

Purpose DD :

Primary purpose of DD is to help data terms understood and use data assets effectively

DD provides centralized information about data, including meaning, origins, usage, and format, which helped planning, controlling, and evaluating the collection.