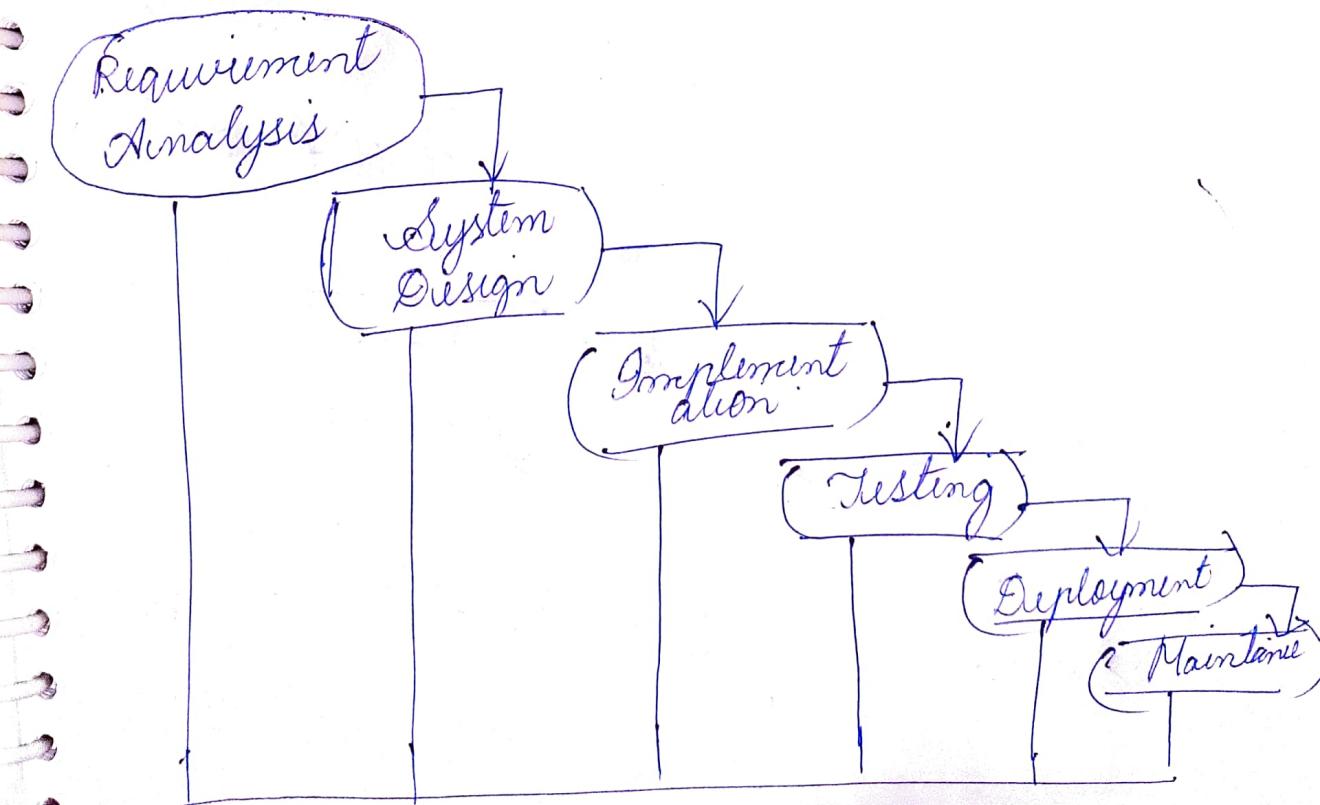


SE

- \* Engineering - Application of science, tools & methods to find most effective soln to problems
- \* SE = Systematic disciplined & quantifiable approach for development, operation & maintenance of SW

### 1) Waterfall Model (RA, SD, I, T, D, M)

- \* 1st SW ECM to the user SE
- \* The outcome of 1 phase acts as input to the other phase



## Prototyping Model.

### The Changing Nature of Software

- \* System software.
- \* Application software.
- \* Engineering or Service software.
- \* Embedded software.
- \* Product-line software.
- \* Web-application
- \* AI software

1) SS.

- \* Collection of program written to service other program.

Eg:- OS.

2) AS.

- \* Is a prog or group of progs designed for end users.

Eg:- Email apps, spreadsheet.

3) EAS.

- \* This software is used to facilitate

the engineering fun

Eg: CAD.

④ Embedded : It resides in ROM, used to control products & sys for consumer & industrial markets

Eg: GPS, factory robots, smart watches, calculat

⑤ Web applications : It is client-server. computer prog which a client runs in a web browser.

Eg: Online auctions  
Emails

⑥ AI : m/c includes alg that can dev to tell a computer how to respond to something by example  
- Structure as close as possible to human brain

Eg: speech recognition, problem solving  
Games, planning

## SEI-CMM

- \* Software Engineering Institute developed capability Maturity Model helped organizations to improve the quality of SW they developed.
- \* Adoption of SEI-CMM has significant business benefits.

\* 2 ways

capability evaluation

provides a way  
to assess SW  
process capability

SW process assessment

II

It is used by  
an org with the  
objective to improve  
the process capability

- \* SEI-CMM. SW an industries into 2 maturity levels.

## Level 1 : Initial

A software org at lev 1 is characterized by adhoc activities

## Level 2 : Repeatable

At this level, the basic project management practice such as tracking cost & schedule are established

## Level 3 : Defined

At this level, process for both management & development activities are defined as documented

## Level 4 : Managed

At this level, the focus is on S/W metrics

## Level 5 : Optimizing

At this stage, process & product metrics are colld

# Evolving role of Software

## changing role.

- ① Software as product.
- ② Software as vehicle.
  - a) Information transfer :
    - b) producing, managing, acquiring, modifying, displaying or transmitting info.
    - The control of the computer (as).
    - The communication of Info (Network)
    - Helps build other software (Software Tools)

## Evolution Role of SW

### Dual Role

product

process

1) SW was product.

Produces, manages & displays info.

2) SW was vehicle.

\* Info transfer  
(single suit info/multimedia)

\* It supports or directly provides  
System functions:

Controls other programs. (OS).

Affects communication (ctrl).

Helps in building other software (SW tools).

Software Myths

-③ myths

① :

- ① Management Myth
- ② Customer Myth
- ③ Developer Myth

### ① Management Myths

- Available standards as produces defined in book are enough  
Reality (is that book recent, incomplete).
- we can add workers when we get behind the schedule.  
Reality (training new people ... not me, other work who will do?)
- we can outsource the project to third party as relax, they will take care of project  
Reality (we have to keep on following & checking them)

### ② Customer Myths

- General statements of projects is enough. Details can be filled later

Reality: (Customer has to give all details about of the project & continuous communication should be there).

- Software requirements can be changed easily b/c sof sw is flexible  
Reality (when we change the requirement, the cost is increased)

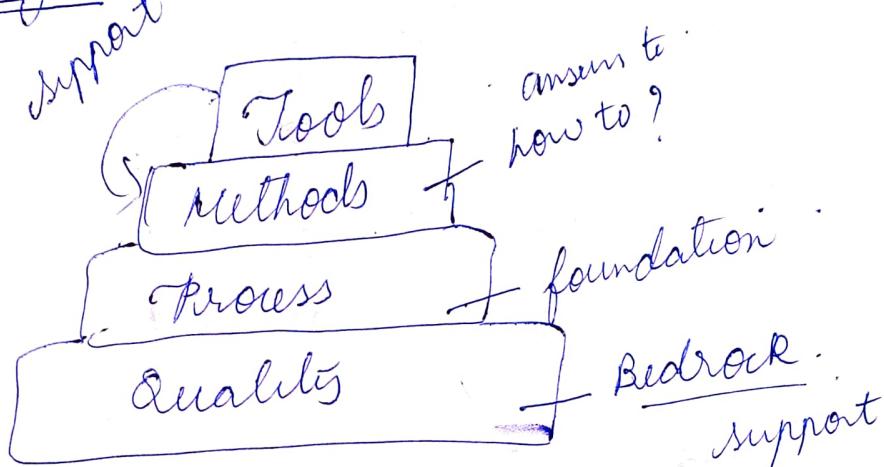
### ③ Developer Myths

- Once the program is written, job is done  
R (Till deployment, maintenance has to be there)
- Until the program starts to run, there is no way to assess quality  
R (We can check in b/w).
- The only deliverable work product is the software program code  
R (Description, documentation, illustrations used).

# Software Engineering

## A layered Technology: (TMQ)

3 layers



Tools provide support → Automation, semi auto

## Software Risks

They are uncertainty things that may occur in software. It leads to heavy losses.

## \* Strategies for Managing Risks

a) Reactive Risk Strategy

b) Pro-active Risk Strategy

a)

\* we will react only when SW enters risk.

\* No preventive care

\* Corrected only after occurrence.

\* Older risk management approach

\* If they can not solved, the project is in danger.

b).

\* Begins before risk occurs.

\* First identify the risks

then, we assess the impact of these risks on SW, then SW is risks are prioritized.

\* High priority risks are managed first.

## Types of Software Risks

- ① Project Risk - budget, staff, schedules
- ② Technical Risk - implementation, interface modules
- ③ Business Risk
  - market risk - no customers
  - strategic risk - no foll company policies
  - management risk - when senior leaves
  - sales risk - not clear on how to sell
  - Budget risk - loss in budget
- ④ Known Risk
- ⑤ Predictable Risk
- ⑥ Unpredictable Risk

## \* Risk Management

Process of making decisions so that risks can be reduced.

### Activities of Risk Management

- |                        |                        |                    |        |
|------------------------|------------------------|--------------------|--------|
| 1) Risk Identification | 2) Risk prioritization | 3) Risk refinement | 4) RMM |
|------------------------|------------------------|--------------------|--------|

## a) Risk Identification

We identify risk and list them based on 2 approaches.

- 1) General risk Identification
- 2) Product specific risk identification

### 1). Steps in Risk Identification

- 1) Prepare the risk item check list
- 2) Creating risk components & drivers list
  - \* Risk items can be identified based on
  - \* Product size - Risks asst with size
  - \* Business impact - cond of orgmt
  - \* Customer characteristics - choices of cm
  - \* Process definition - agree to which std. follow org std.
- \* Development environment - availability of tools.
- \* Staff size & experience
- \* Technology to be built.

2) Creating risk components ~~as~~ ~~delays~~  
list

RC & RL are prepared along with  
their probability of occurrence.

### Risk Components:

- ① Performance Risk. (what purpose?)
- ② Cost Risk. (Budget).
- ③ Support Risk (manpower).
- ④ Schedule Risk (time).

### b) Risk Perception

2 methods

- ① probability that risk is real.  
② consequences with that risk

\* Steps involved.

- My project planner, technical staff etc
- 1) Building risk table.
  - 2) Enlist the consequences of risks.
  - 3) Estimate the impact of those risks on

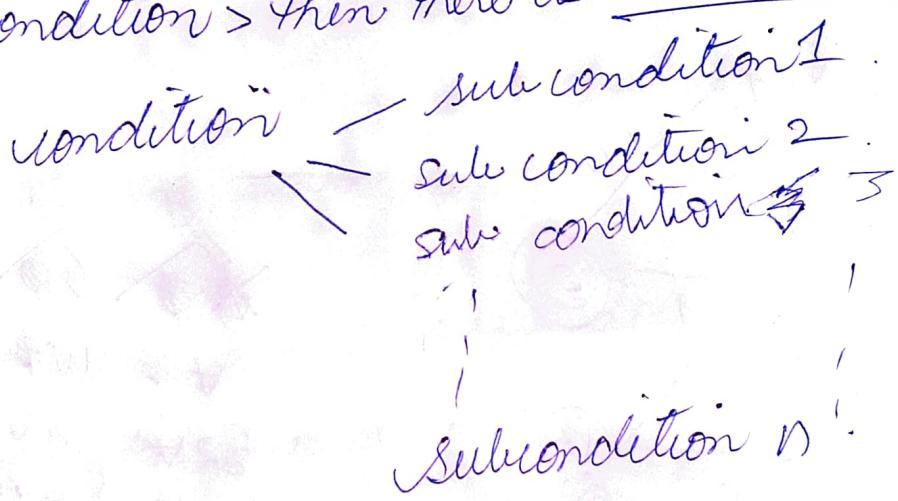
our project

- \* Maintaining overall array of risk projection

## c) Risk Refinement

- Process of explaining the risk in detailed way

- Represented by CTC format  
 $\leftarrow$  condition > then there is consequence



Then assess the consequences of sub conditions in project

cannot be eliminated  
but can be refinement

helps in early analysis

# R A M M

Risk Mitigation, Monitoring, management

## 1) Risk Mitigation

Preventing risks from occurring.

- 1) Communicate with staff to find risks.
- 2) Eliminate the causes for risk by project starts.
- 3) prepare a policy so that the project continues even if the staff leaves in b/w.
- 4) maintain all relevant doc.
- 5) conduct reviews on time.

## 2) Risk Monitoring

Project manager will monitor the foll.

- ① Behaviour of team as pressure.
- ② Spirit of teamwork.
- ③ Co-operation among team members.

- \* Problems that may occur
- \* Availability of job in case out of org

### 3) Risk Management

done by project manager when risk becomes reality

if mitigation is done properly,  
management becomes easy

#### \* RMM Plan

- document in which all risk analysis activities are described.

each risk is described using RIS.

Risk Info sheet is maintained