① Software is a collection of programs, software documents, user manual, installation Guide and Implementation Guide.

Programs
Software Documents
User manual   } SOFTWARE
Installation Guide
Implementation Guide

② SDLC (software development life cycle) is a 5 step life circle.

Requirement
Analysis
Implementation   Design
Testing ← coding
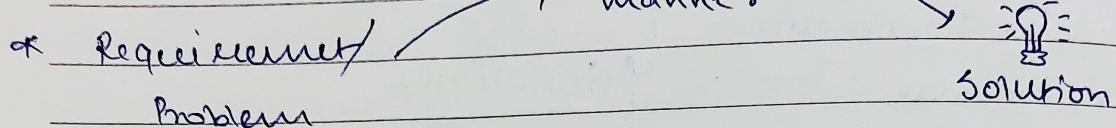
At first, It is analysed and marked that what are requirements of the software to be developed. Once the requirement are analysed, It holds towards the design ~~for when~~ phase, where the features and interface is designed, then its get coded. Once coding is done, Testing is started, The testing phase is all about figuring out and finding errors. If it is all good, then it gets Implemented.

* Software project :- Generating solution to a given requirement or problem in a systematic manner.

* Requirement/
    Problem → systematic manner → Solution

* objectives of SPM:-
  - Effective & efficient development of project.
  - Quality assurance.
  - proper scheduling.
  - Maintaining the quality of the component shelf settability, reliability
  - planning to reduce risk.

* Principles of SPM:-
  - Team work
  - documented requirements.
  - well defined problem.
  - static & dynamic testing points.
  - pre-required cost & time estimation.
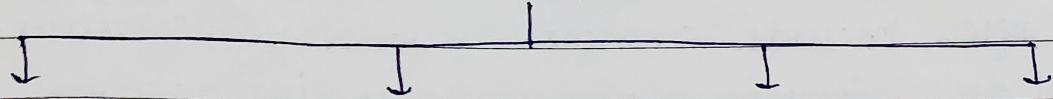
All these principles are the base work for a successfull software development. problem should be well defined and well documented. also the testing should be both static & dynamic.

*

Software project Development.

```
         ┌──────────────┬──────────────┬──────────────┐
         ↓              ↓              ↓              ↓
     Project        Scope of       Project       Testing
     Planning       Project & future  Risk          &
         │           work.          Analysis      Implement
    ┌────┴────┐         │              │
    ↓         ↓         ↓              ↓
```

Requirements	Estimation	• Marketing	• Ident. of Risk
• Problem	of time &	◦ Pre-Scheduling	• Avoidence of Risk
defination	cost.	◦ Pre-cost	• Mitigation of Risk
• Principles	◦ Document	◦ future Sched.	RMM mgt.
of project	of timeline		Risk | Mitigatio
• documents	◦ Table of		Monitoring
(SRS).	timeline		
	◦ timeline chart		

* Software Project	other Project
* Require technically skilled people.	* May & may not required technical skills.
* needs to be uptodated to the current tachnology.	* May & may not.
* more specific	* more generic.
* requiers multi-level collaborations.	* does not.

Software projects are different from other projects due to its unique characterstics and requirement. They often include complex technology, specilized knowledge, specific approach types like agile to adjust between multiple requirement.

* Importance of SPM:
→ helps in avoiding risk by RMM mangeuent.
→ helps in quality ayurance.
→ helps in scheduling project phases.
→ effective & efficient development of project.

* Disadvantages of SPM:-
→ Much costly
→ requires team that is trained.
→ needs technical knowledge.

* SPM managee:-
→ Duties includes→ overseeing planning, execution, and delivery of software team coordination, managing resources, setteing project goals, timely completion of tasks.

→ Qualities includes→ leadership, communication, organisational skills, ability to adapt changes, technical knowledge, problem solving, team motivation & inspiring them.

* objectives of Activity planning:-
→ Identify and define tasks & activities.
→ scheduling activities
→ estimation of resources requirement.
→ allocation of resources.
→ Timely completion.

* Parameter of estimation:-
↳ feasibility
  ↳ Techical
  ↳ economical
  ↳ time
  ↳ Resource.
  ↳ financial
↳ Scalability

(phases of project dev.)
or

* work-Breakdown structure & (lifecycle of project dev.)
1. Needs/ requirement analysis.
2. feasibility study
3. Developpment (includes design, code & strategy of deliverables).
4. Implementation and testing.
5. project acqusition. (includes final product delivery and feedbacks).

→ Network Planning Models
                          ↓
CPM
                ↙
critical   PERT   PDM.
Path   Program   Precedence
method   evaluation   Diagraming
             & review   method.
             technique

1. **Critical Path method :** → scheduling method
   This is an estimation model for effort estimate
   and scheduling. It plans for critical & non
   critical tasks for preventing the occurrence
   of problems during the project development.
   The method analyze plans and schedule for
   large project. It also controls time & cost
   while scheduling.

2. **PERT (Program evaluation & Review technique):**
   It is a methodology to define or monitor
   the possibility of the program to finish
   in time and within budget. It has two
   approach.
                    ↙   ↘
        Pesimistic   optimistic.
   un-limited resources,   limited resources,
   yet unsuccessful   yet satisfied
   planning.   planning.

Program Evaluation & Review technique.
(project finish on time & in budget)
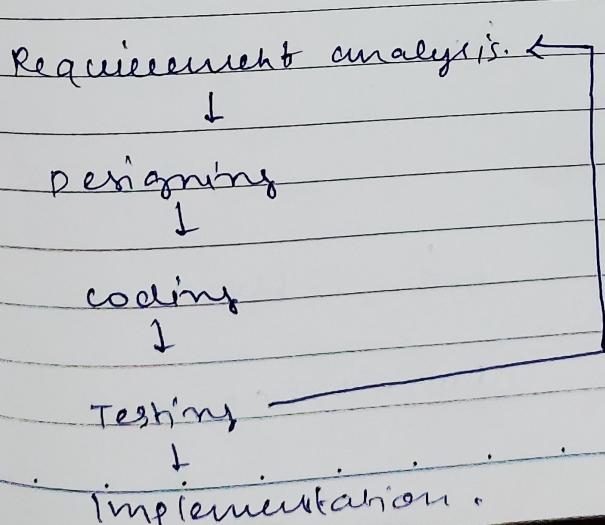
PERT

non-functional / Pesimistic   optimistic \ functional
Parameters   Parameters.

○ configuration of system   ○ function Points (input output)
○ size of organization   ○ size of project (LOCs)
○ working culture.   ○ human efforts.

○ unlimited Rsources   ○ limited Resources
○ unsuccessfull planning   ○ satisfied planning.

3. PDM (Procedence Diagramming method). It is a Graphical
tool for scheduling the activities of project planning.
It creates a visual representation of CPM & PERT.
It creats the network of schedule.

* Project development models :⌐→ wateefall model
                      spiral model └→ Prototype model

1. wateefall model.

Requirement analysis.
        ↓
    Designing
        ↓
     coding
        ↓
    Testing
        ↓
Implementation.
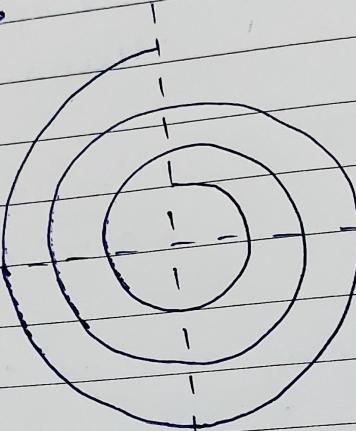
* prototype model :- Developing dommies. It fails in managing all customer requirement & Quality assurance.

* spiral model:
Implementation
& review.
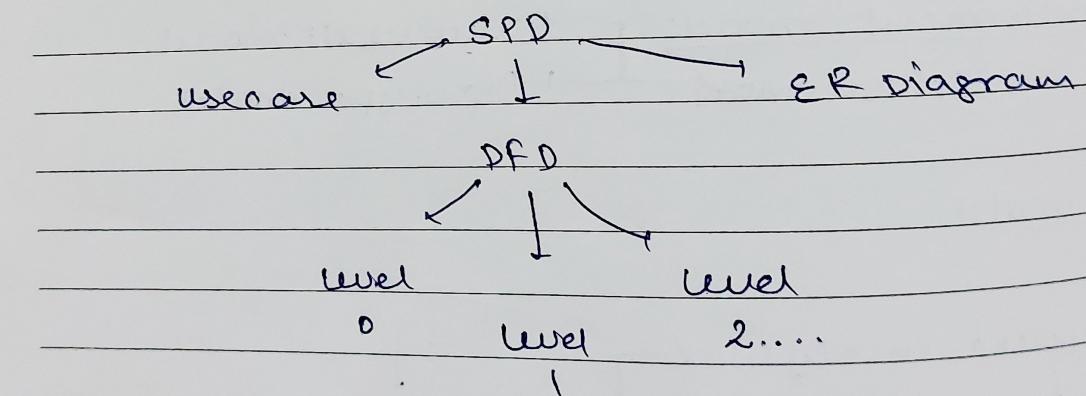
Planning
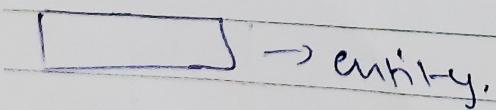
feasibility
Design study

1.

Risk
Analysis

* Software project Diagrams.

SPD

usecase

ER Diagram

DFD

2

level
0

level
1

level
2.....

* DFD symbols :-

→ entity.

⇄ → flow
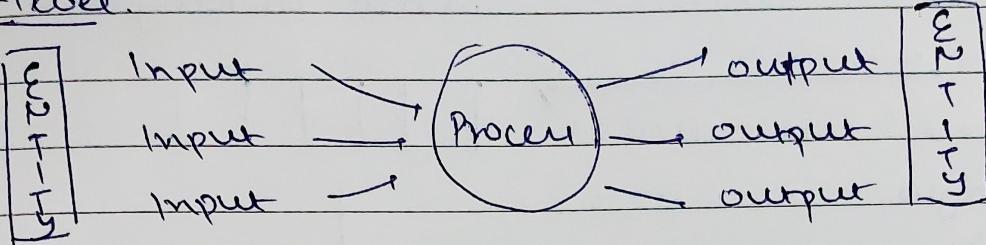
→ process

DBMS → Database

0-level.

DBMS

* 1-level.

DBMS
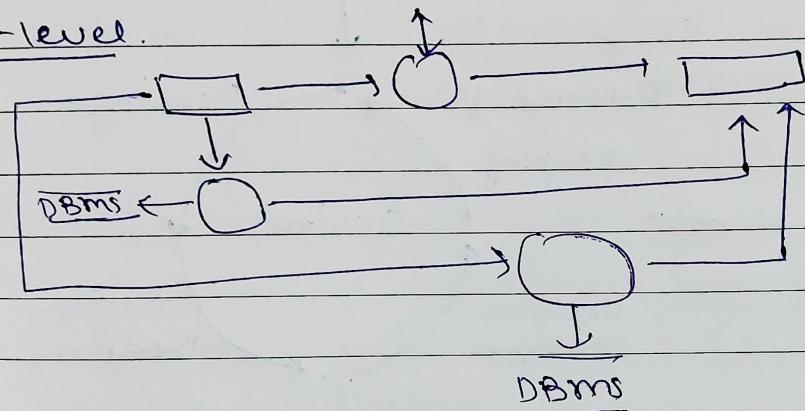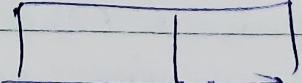
* **Agile development :-** this is an software deve.
approach based on collaborative team work to
adapt and quickly respond to the changes.
It is based on iterations. Each iteration includes
planning, analyzing, design, develop & testing.

Produce
Backlog (deliverables)   sprint Backlog
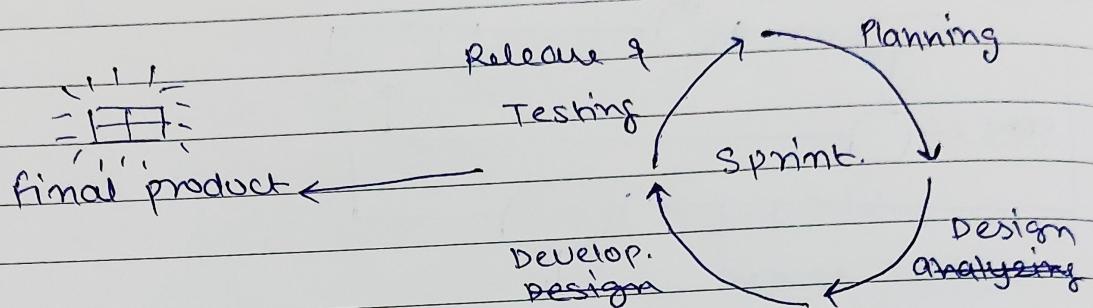
Sprint Backlogues.

Product Backlogue
(Deliverables)

final product ←

Release &
Testing

Sprint.

Planning

Design
analyzing

Develop.
Design

* <u>Software effort estimation techniques:-</u>

1. Effort Judgment
2. Analogy- based estimation
3. Parametric estimation.
4. Algorithmic estimation.
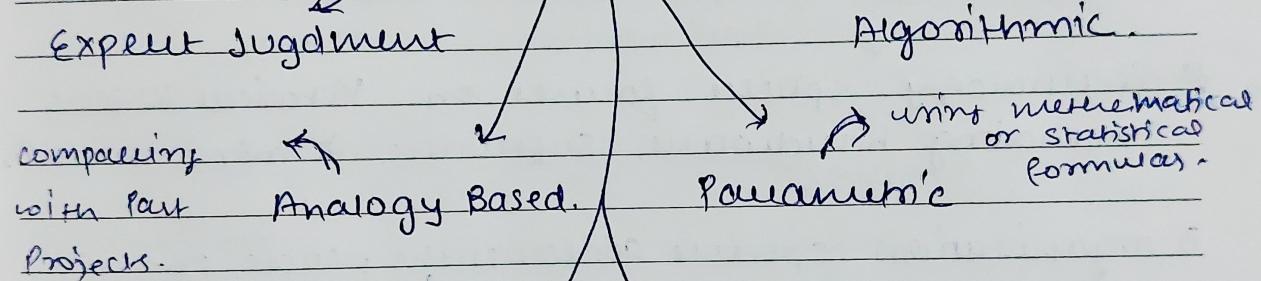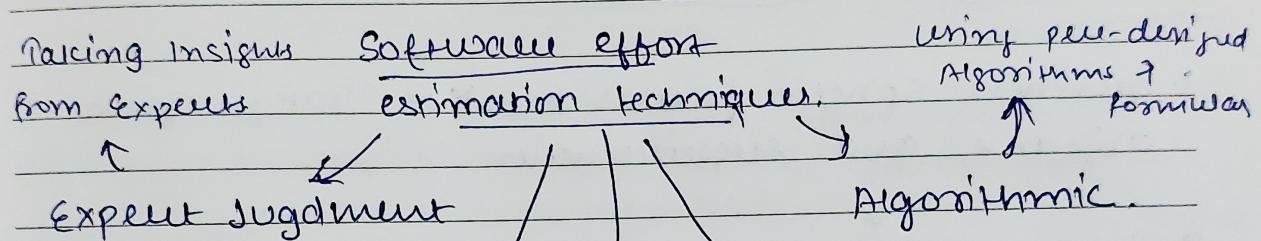
→ Expert judgment includes taking input from experienced Individuals who have knowledge and expertise in a current similar project. Their inputs are Insightful based on their past experience.

→ Analogy based is where you compare current project with some similar project you've completed in the past.

→ parametric estimation is about applying mathematical and statistical analysis to estimate the efforts required for the software development.

→ Algorithmic estimation is about using pre-defined algorithms or formulas to estimate the efforts for development.

Taking insights from experts

Software effort estimation techniques.

using pre-defined Algorithms + formulas

Expert Judgment

Algorithmic.

comparing with Past Projects.

Analogy Based.

Parametric

using mathematical or statistical formulas.

| Top-down	Bottom-up.
•here the estimation starts from higher level or major components.	•here the estimation starts from lower level or minor components.
•here the project is breaked into small peices and each peice gets estimated.	•here the detailed estimation is done of each level, and then summed up.
•It is used when we don't have limited info about tasks.	•It is used when we have detailed Info. about tasks.
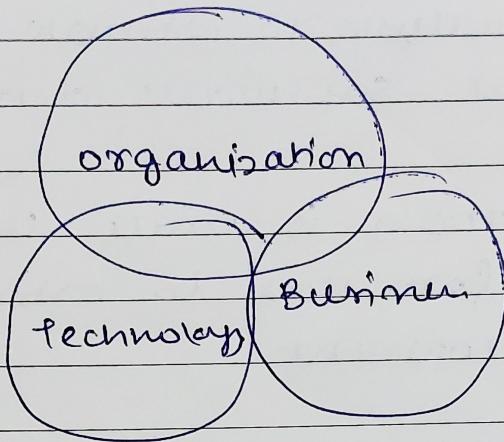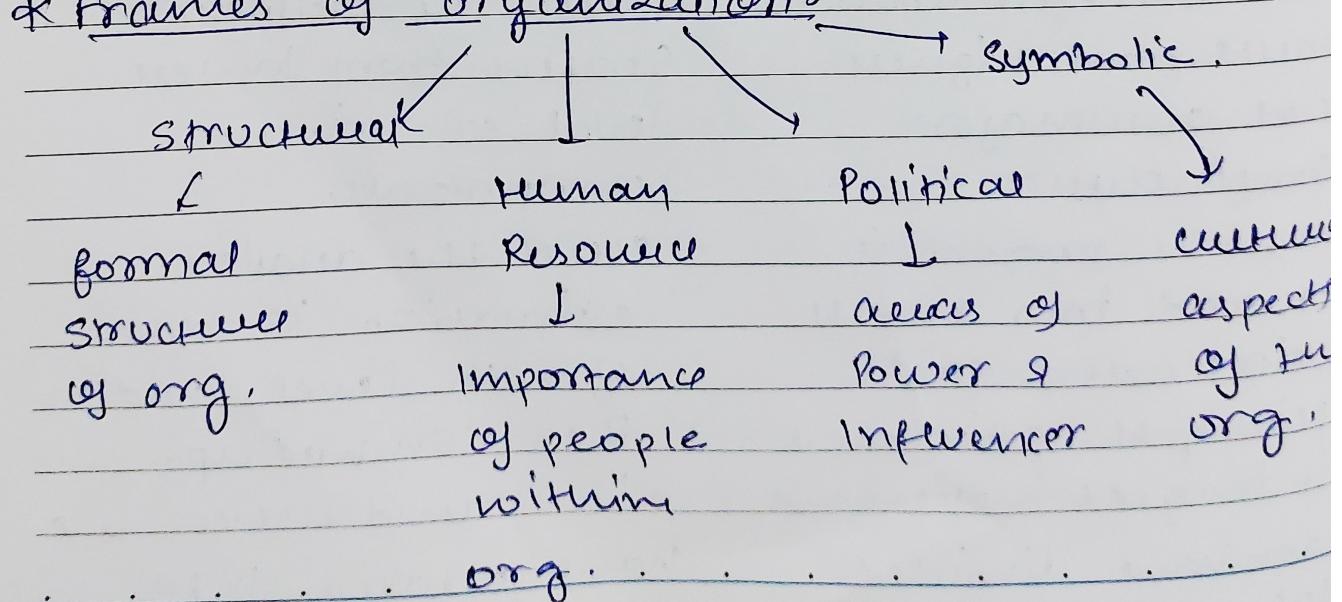
* The three Sphere model of System management.

1. Business sphere focuses on the strategic goals, objective, and requirements.

2. Technology sphere focuses on technical aspects Including hardware, software, & Infrastructure

3. organisation sphere addresses the people, process, and structure within organization.

* Frames of organization :-

Structural

↙

formal
structure
of org.

Human
Resource
↓
Importance
of people
within
org.

Political
↓
areas of
Power &
Influencer

Symbolic.

↓
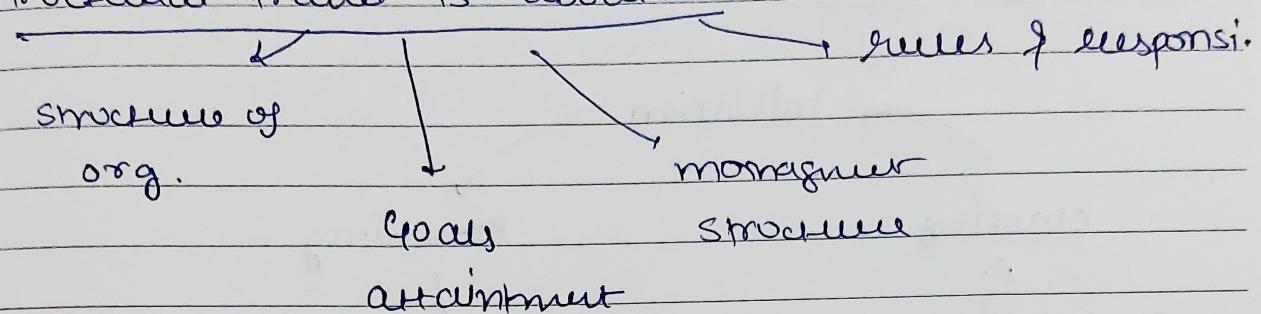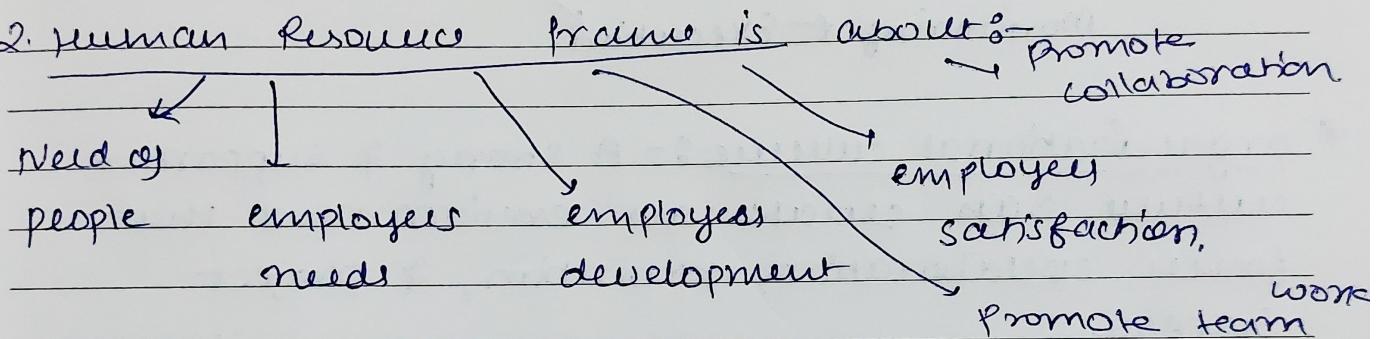
cultur
aspect
of the
org.
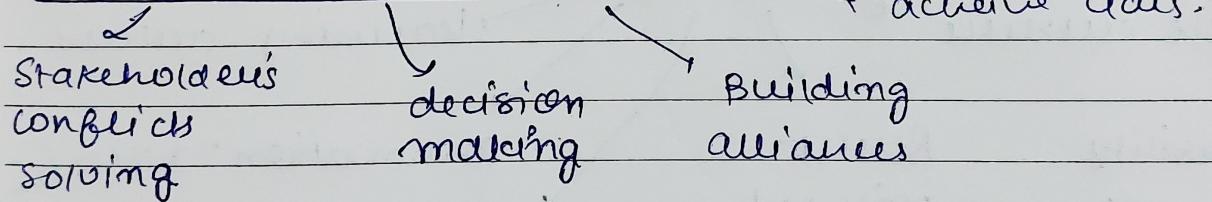
1. Structural frame is about:-
   → rules & responsi.

   structure of org.

   Goals attainment

   management structure
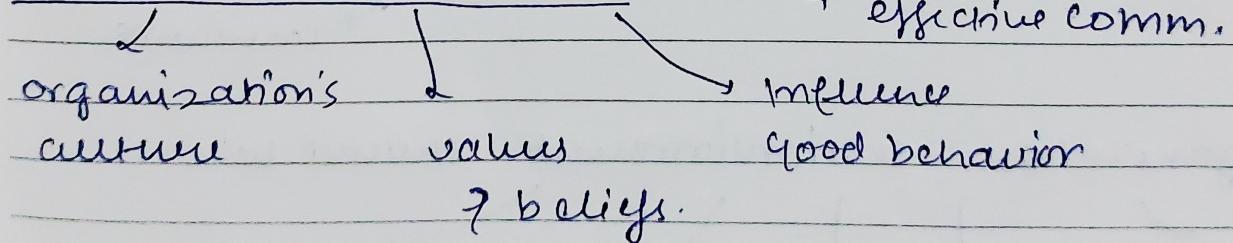
2. Human Resource frame is about:-
   → Promote collaboration

   Need of people

   employees needs

   employees development

   employee satisfaction.

   Promote team work

3. Political frame is about:-
   → acheive Goals.

   Stakeholder's conflicts solving

   decision making

   Building alliances
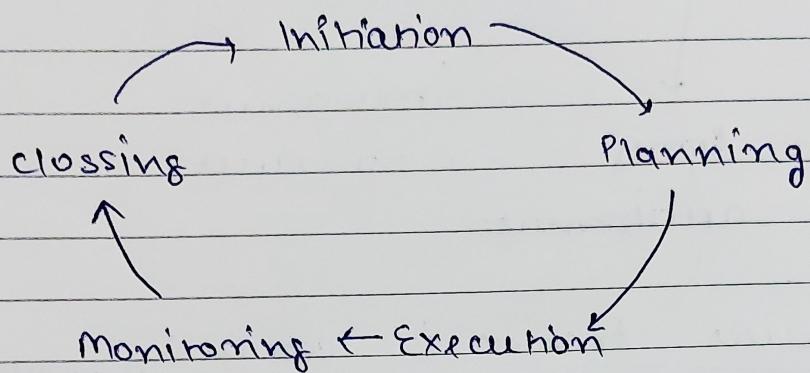
4. Symbolic frame is about:-
   → effective comm.

   organization's culture

   values & beliefs.

   influence good behavior
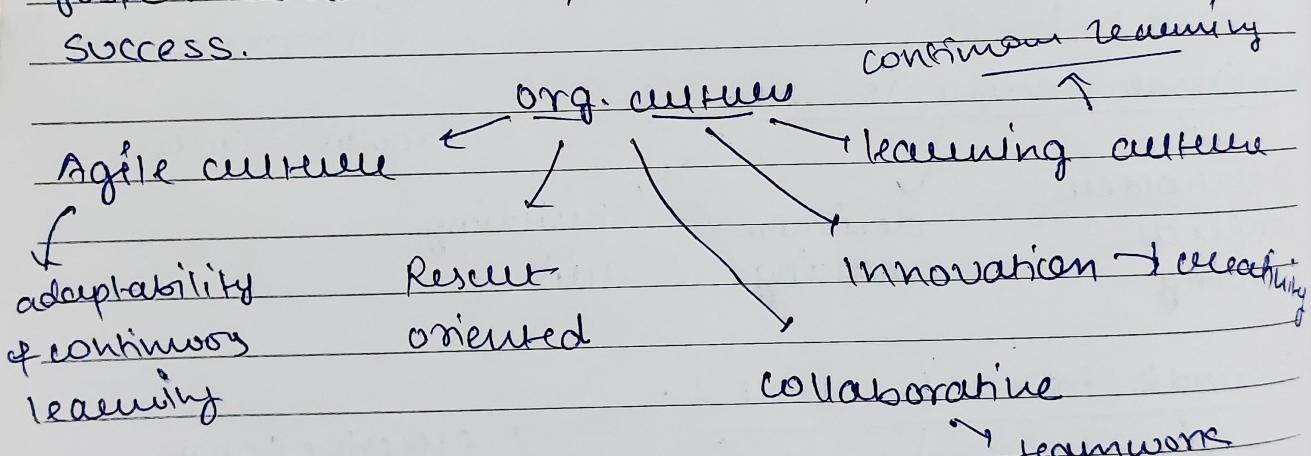
* Project life-cycle:-

* organizational culture:- A strong & supportive culture can create an enviornment that foster collaboration, innovation, & projects success.

* organization enviorniomment should be:-