

Special

~~Information~~ ~~Security~~



Software Engineering

~~x~~

→ is a branch of computer science which deals with design, developed testing and maintenance of software applications.

→ it apply engineering and knowledge of coding language to build software solution.

→ aim to build a fault free software according to satisfaction and deliver in time within budget.

→ objective of software engineering :-

- ① understand user & conceptual model to develop
- ② to improve design language
- ③ to satisfy user & requirement
- ④ to achieve low maintenance
- ⑤ to provide the software within budget

○ principal of S/W Engineering :-

① modularity :- Breaking software into smaller & reusable component that can be developed and tested

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Spurts

② abstraction :- Hiding the implementation detail of a component and exploring only necessary.

③ incapsulation:-

④ Reusability :- Creating component that can be reused into multiple project.

⑤ Maintenance :- Updating software regularly within a week or within a month to fix the bug and add new feature of security.

⑥ Testing :- for bug free and compatible with user need.

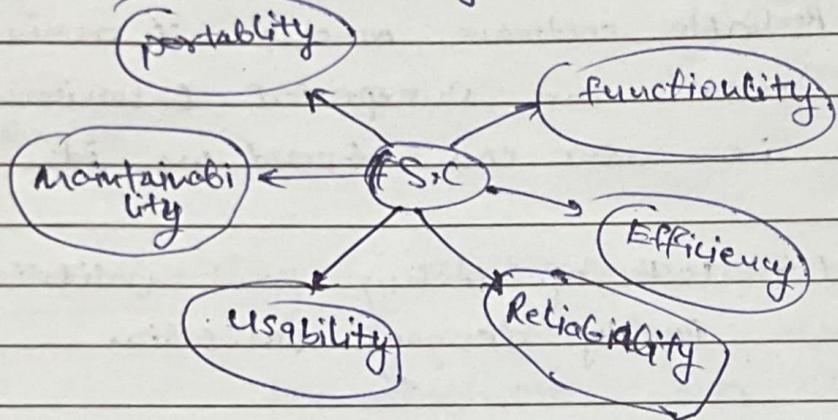
⑦ continuously integration } and development } integrate the changes and deployment into the environment

Software

Software characteristics :-

software = collection of computer program, rule and data

it has six major component :-

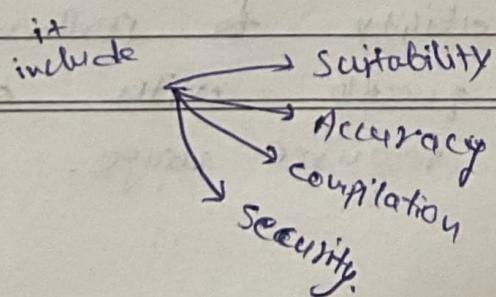


(1) functionality :- it refers ability of software to perform its intended task or functions.

→ it includes features like calculn, data processing, user interface

→ good functionality means which meet user requirement effectively and efficiently.

- Data storage
 - Data processing
 - Data processing and manipulation.
- of functionality



Spices

② Reliability → means the software you have made should be able to perform consistently and predictably under various conditions.

→ Reliable software means it avoids errors and unexpected behaviour i.e. user can depend on it.

c.f. → lack of testing and validation
poorly designed validation

③ Usability → go for easy development of software so that user can easily understand the functionality.

include → aspect like user interface designed migration, accessibility and user experience

→ reduce time in using and understanding the software,

④ Efficiency → ability to perform task quickly with minimal resource usage.

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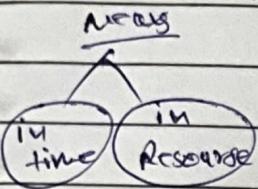
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include :- optimising algorithm, utilising system and reducing overhead.

These can effect efficiency → ① poorly designed algorithm and data structure

② unnecessary computation

③ unoptimised code



⑤ maintainability :- Stand for How easy it is to maintain and update the software over its life cycle.

includes → code readability, documentation and use of best practices.

→ Maintainable Software easier to debug/ enhance and scale.

key testability, stability, changeability, openability

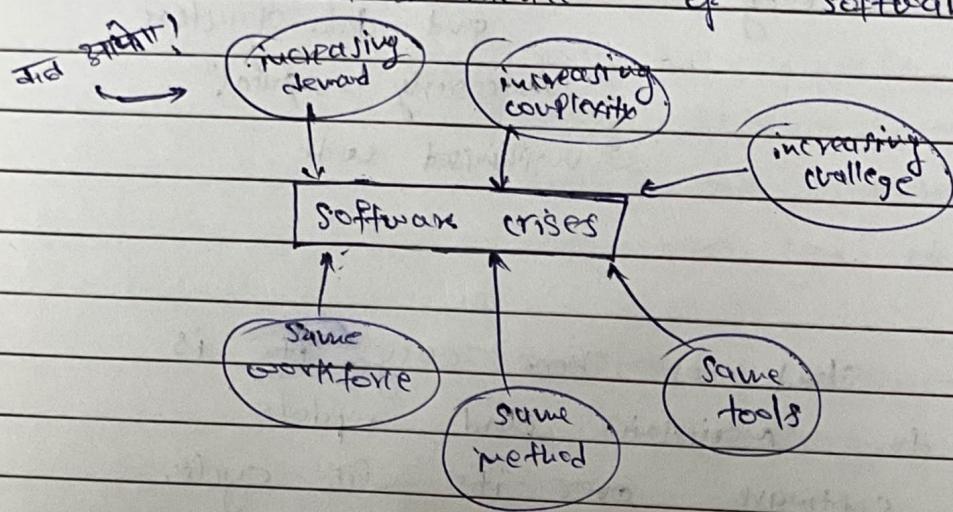
⑥ portability :- It refers to the software ability to run on different platforms.

Sprial

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Software crises →

Set of challenges, and issues that arise in the development and maintenance of software system.



Some causes

- → do not complete at demand time
- → Quality was low
- → Software can't fulfill user requirement
- → at the fine software never delivered
- → lack of optimisation
- → lack of communication b/w user and client

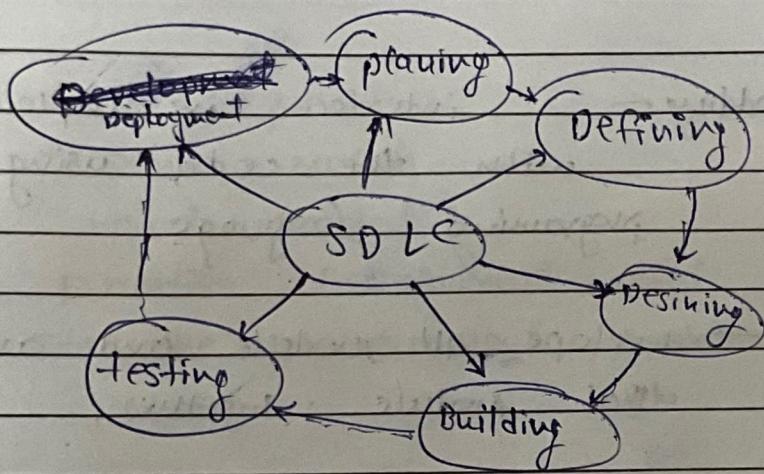
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SDLC

* Stand for software development life cycle.
it is "Diagrammatic representation" of software life cycle.

→ SDLC used by software industry to design, develop and test software.



Planning → gather the necessary information from customer
understanding the project

Defining & feasibility → important phase discuss about the profit cost and company loss

→ measure the benefit of project for Organisation

Steps

(+) Design :- work with logical designing

→ language, database, modular design etc.

→ provide a prototype of final project

(+) Building & coding :- interface is implemented with the code using programming language

→ develop all module and arrange that module together.

→ largest phase have a big work.

(+) Testing :- → testing team start testing the functionality of the entire system

→ software is checked for bugs/error if found then send to coder to fix it

→ again re-test. and refix.

Spiceball

④ Maintenance :- look over the software use and user's feedback

→ bug fixing update and enhancement of the software

S.D.L.C modules :-

- ① Waterfall model
- ② Prototype model
- ③ Spiral model
- ④ Evolution Development model
- ⑤ Iterative enhancement models.

① Waterfall Model :-

→ here each state depends on the previous state except first state

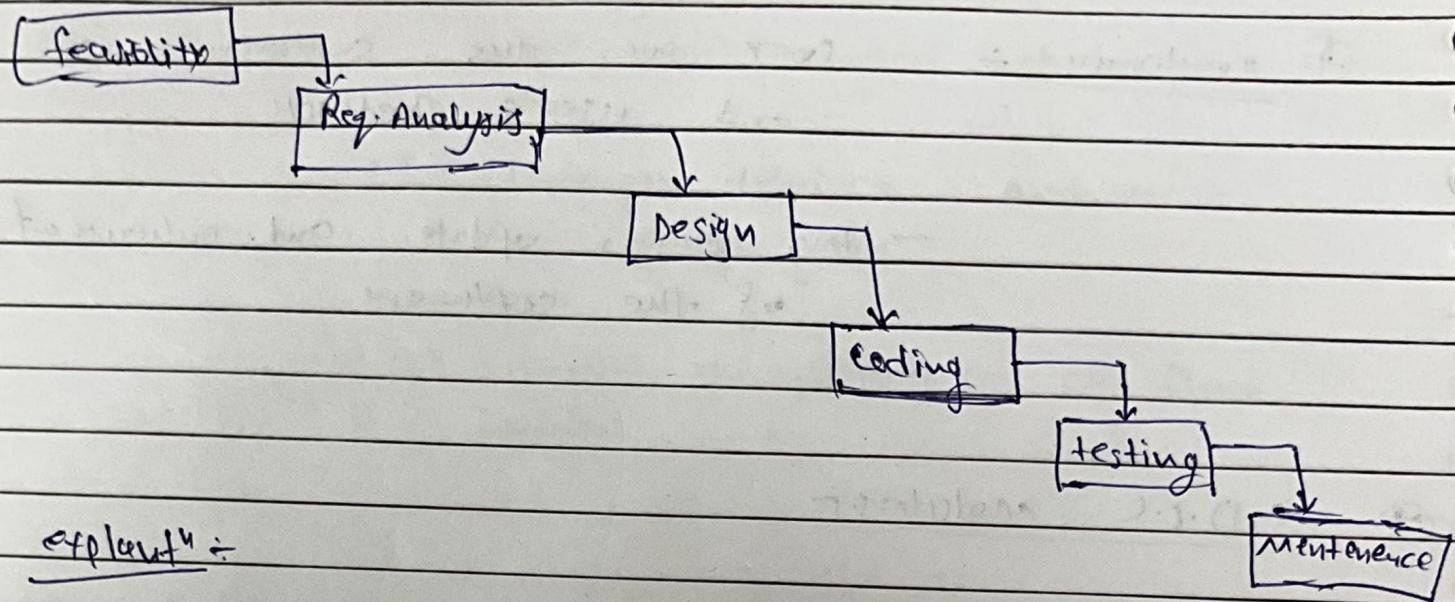
→ because of its diagrammatic representation resembled as like a waterfall

→ technologies should be well known or stable

→ project should be of minimal changes are expected during the deployment.

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Spiral Model



explain :-

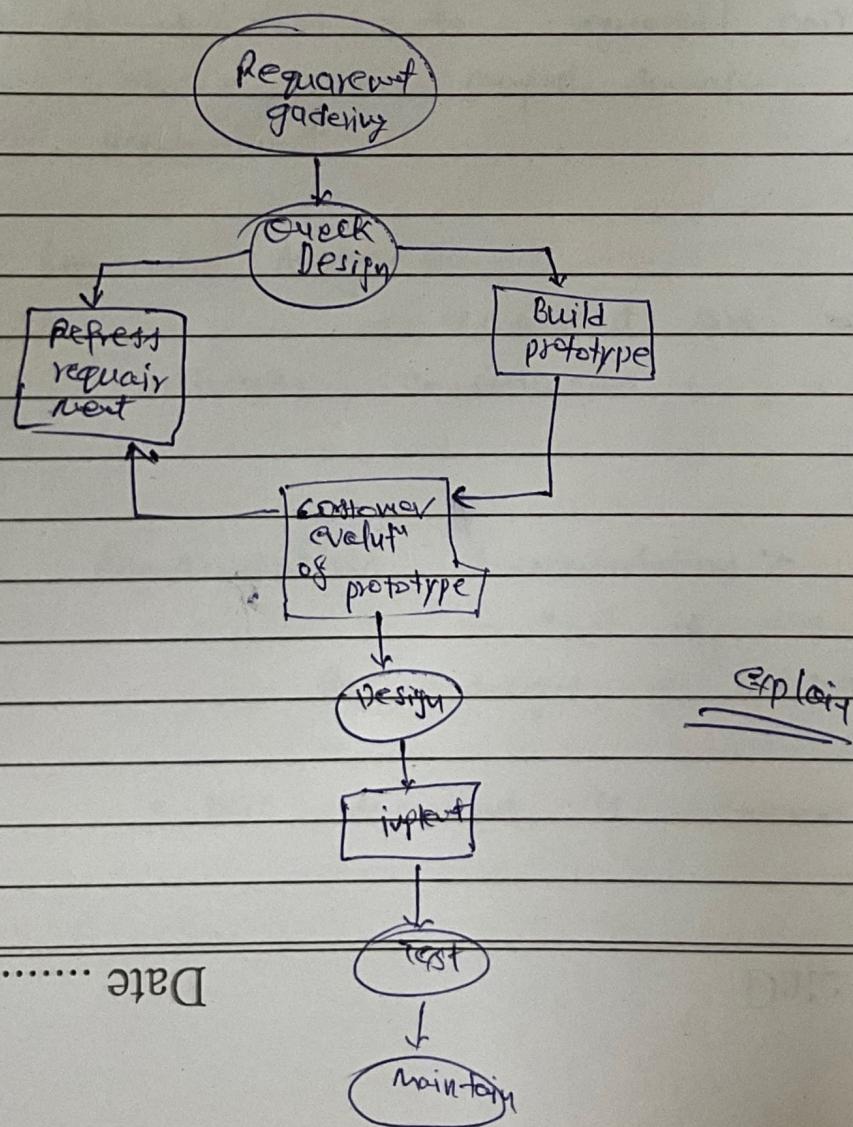
Spicule

PROTOTYPE MODEL

Some or most of the ~~the~~ customer are not sure about the functionality they require from the software.

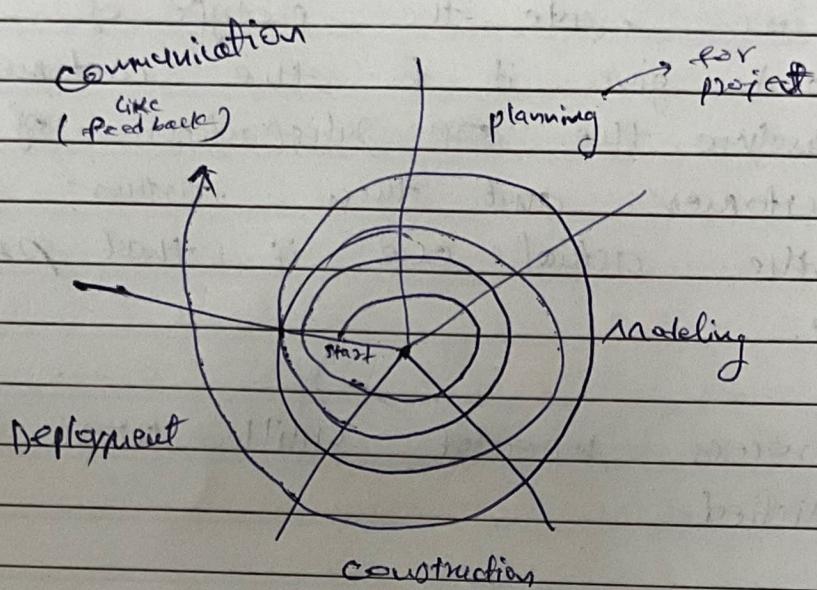
Here we create the prototype of model and give it to the customer and analyse the ~~the~~ satisfaction of the customer and then further build the actual one if that prototype satisfies.

This process repeated until user get satisfied.



Spiral model

Spiral model is a combination of a waterfall model and iterative model known as meta model.



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Requirement Engineering process :-

- it refers the process of defining, maintaining, designing, documenting requirement in engineering.
 - it provides appropriate mechanism to understand what the customer desires specifying the solution clearly.
- ⇒ Process :-

(1) Requirement Elicitation :-

- gathering of requirement
- if it is related to required fair knowledge about the project domain and requirement.

(2) Requirement Analysis :-

Requirement are analyzed to maintain consistencies

(3) Requirement documentation :-

- it is the foundation for design of software

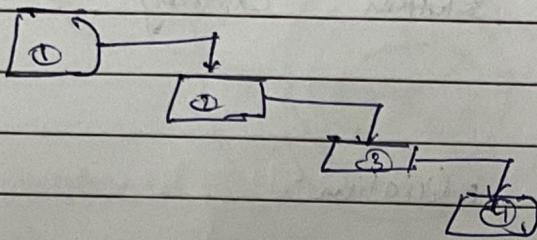
- Here document is known as SRS

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(4) Requirement review :-

- Review process is carried out to improve the quality of the SRS.
- ↳ (Software Requirement)
System

if it is done only at the end
of production of SRS
also called requirement verification.



Method of requirement elicitation :-

(i) interview :-

- Both parties move like to understand each other
- it is of two type
- open ended → where no preset agenda, free question can ask
 - structured interview → preset agenda

(ii) Brain storming :-

- A kind of group discussion which Date

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lead to idea very quickly.

all participant are encouraged to say whether which idea come in their mind.

(3) Delphi technique :-

Here some participant are very sri so they write the idea into the paper and distribute them among all.

(4) FAST :- Here customer + developer make a team and build a fast together.

(5) prototyping :- to gather the feed before development

(6) Feasibility study :- Here we specify whether the software product / project is practically possible or not

there should be a valid reason to create the software that accept the user.

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Notes

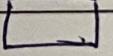
→ Diff tool which is being used.

- ① Data flow diagram
- ② control flow
- ③ ER Diagram

① DFD :-

- Data flow diagram is a graphical representation of the flow of data within a system.
- also known as Bubble chart through which we track the flow of data graphically.
- By the help of this we can easily understand the flow of data.

Component of DFD :-

① processes :- functionality that are perform in data it represented by  or 

② Data stores :-  or 

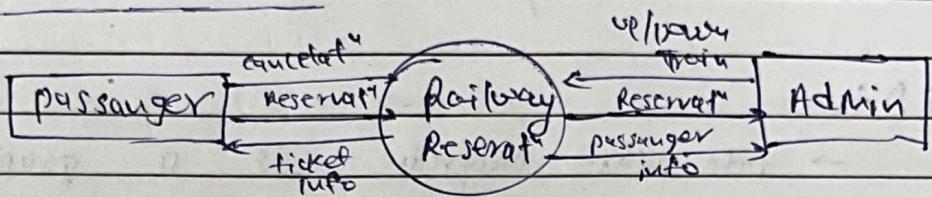
③ Data flow :- → denotes flow of data between processes, and direction,

④ External Entities :- Represent source or destiny of data outside the system.

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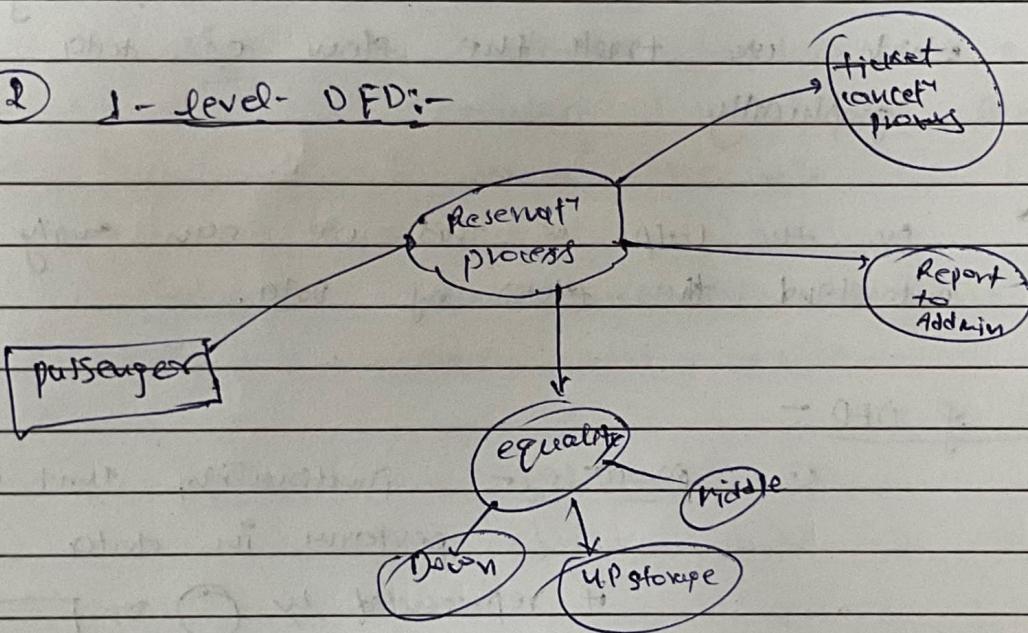
④ Level of DFD → understand with this example

① 0-level DFD :-

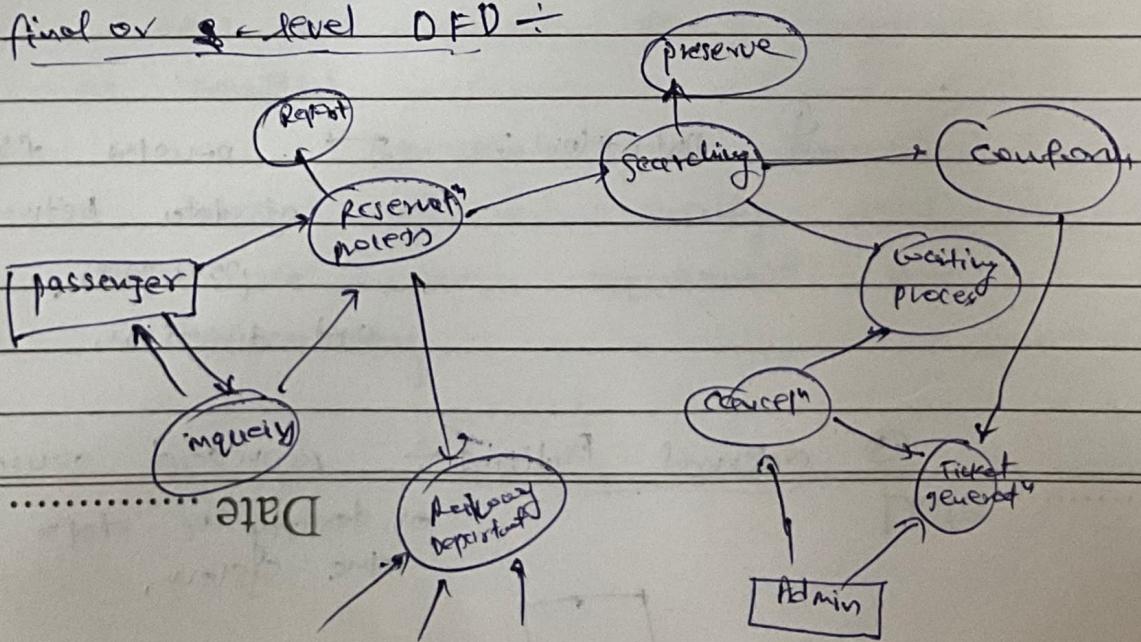


Now convert into
1-level DFD

② 1-level DFD:-



③ Final or 2-level DFD :-

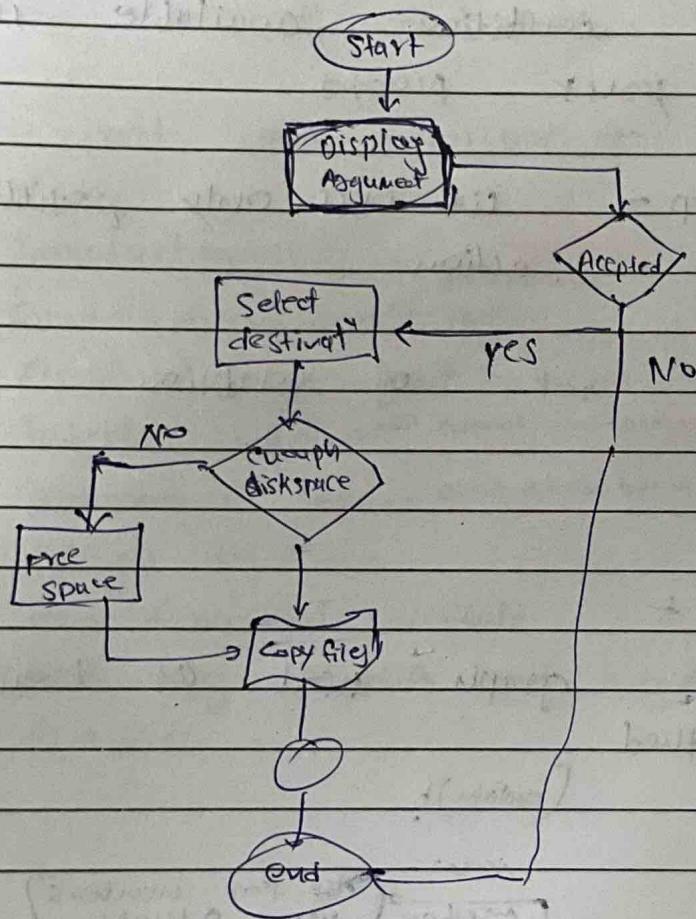


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Control Flow Diagram

A flow chart is the graphical representation of how control flow during the execution.

(f) Flow chart of software installation



ER Diagram :- entity Relatⁿ Diagram, as I know

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Design Table :-

- Tabular Represent" of action and condition
- used when logic is very complicated

⑤ cond step :- list out all the condition available in your process

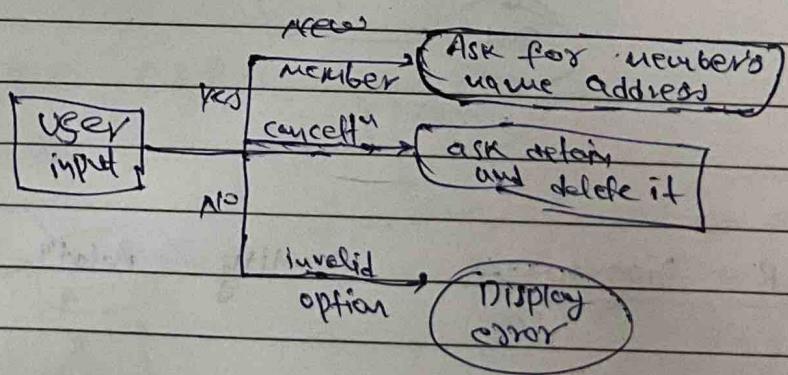
⑥ act step :- list out only possible action

⑦ Rule :- set of condition

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Design Tree :-

graph used as branching method
(explain) t.

Example

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Spec SRS Document

(Software Requirement Specification)

It describe the nature of a project software or application
purpose of SRS is to provide the detail overview of our software product.
it describe the user interface and software requirements.

its part and structure →

- ① introduction
- ② General description ← characteristics features
- ③ Functional requirement ← description cost and schedule
- ④ interface requ → How software communicate with each other (GUI, CLI)
- ⑤ performance requ → event driven type of work
- ⑥ design constrain
- ⑦ non-functional attribute
- ⑧ preliminary schedule and budget
- ⑨ Appendices