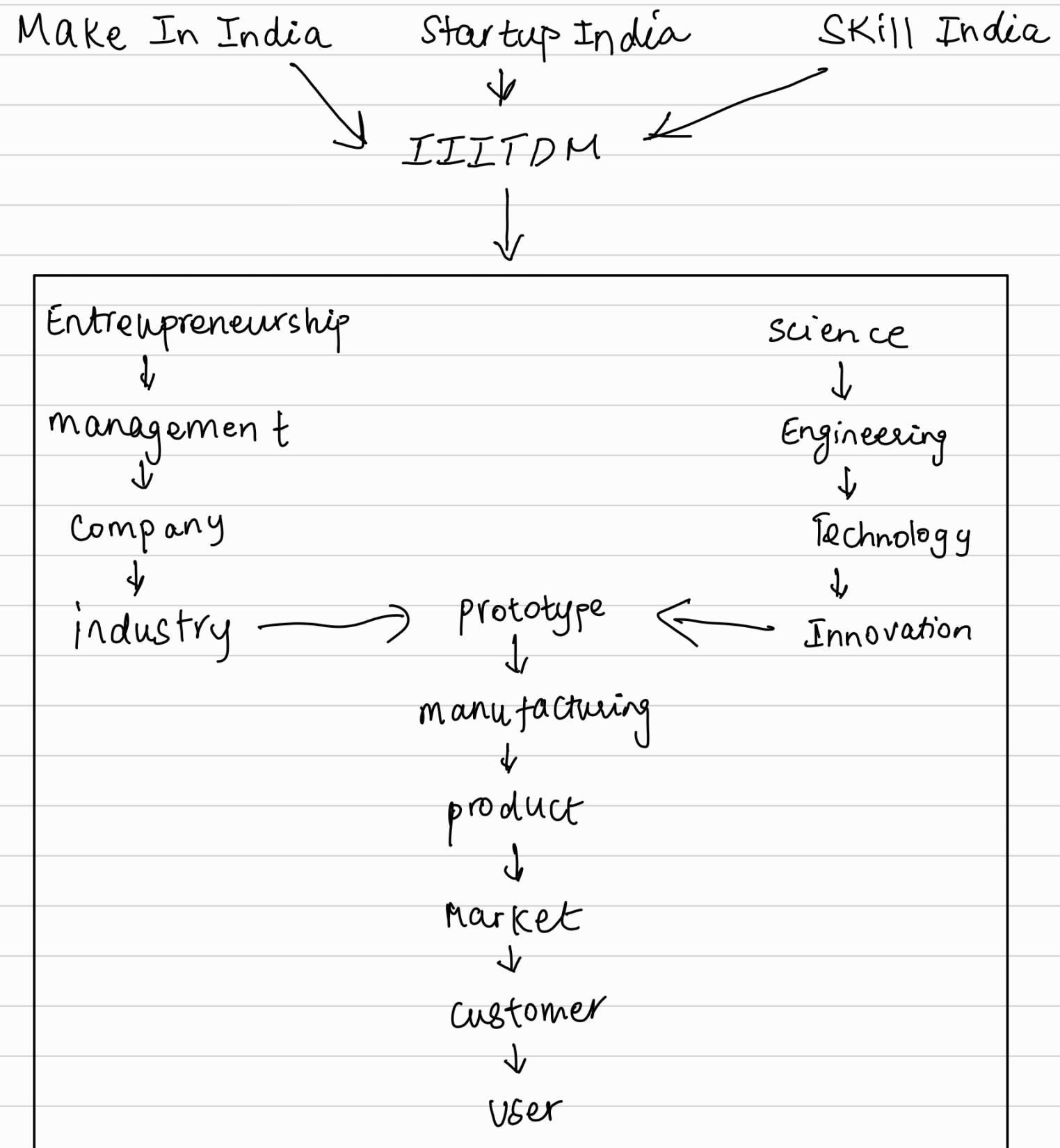
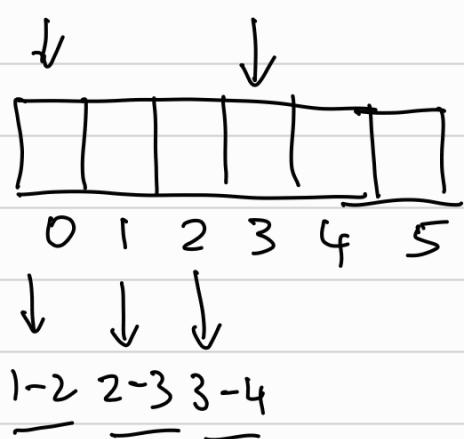
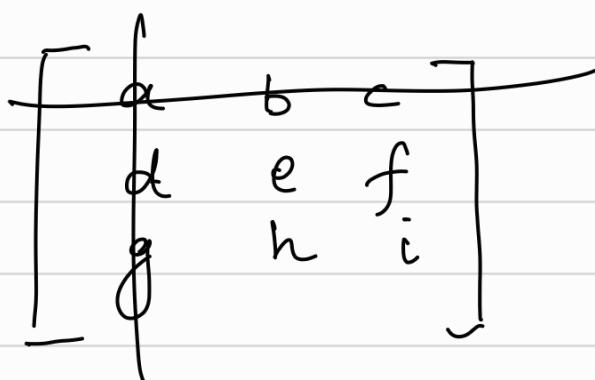


WEF2023 Job report



- 2) lateral thinking - edward de bono
3) textbook of creativity



WATCH: A Beautiful Mind.
Watch → The Secret Life of Machines
- TIM HUNKIN.

→ PICK a problem

→ do literature survey (how have ppl. in the past tried to solve the problem)

(don't try to REINVENT?)

* Research ACM

* SCIMAGO ~ to check reliability of journals.

Not everyone wants to go to hospitals...
what if we bring the doctors to them...
online hospital ?

PRODUCT - PROCESS LANDSCAPE

Function (What it does — WHAT is ITS PURPOSE?)



Form (Shape, size, genre?)

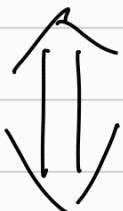
Structure (how are multiple things connected to each other → parts - relations → ASK at WHAT LEVEL)

Content (material / info , for service - info. is

↓ content)

medium (devices / tools -

↓ process (making)



performance
over a period
↑ of time

BEHAVIOR (quality f reliability)



Context / Environment

Behavior emerges from the pattern that integrates multiple dimensions.

WHAT IS :

Innovation, Design f system - define wself.
(b/w sun & earth) also matters)

d (b/w sun & earth) ← but global temp → ! only f(CO₂ / CH₄)

✗ Reductionist thinking - limited / narrow

disciplinary view. (like saying - $\text{CO}_2 \rightarrow$ global warming)

- * There's a challenge of integrating inter-disciplinary concepts (incompatibility while solving together)
- * deal with socio-technical problems (like language)

(?)

Deduction - specific to Engg.

Induction - specific to generalization

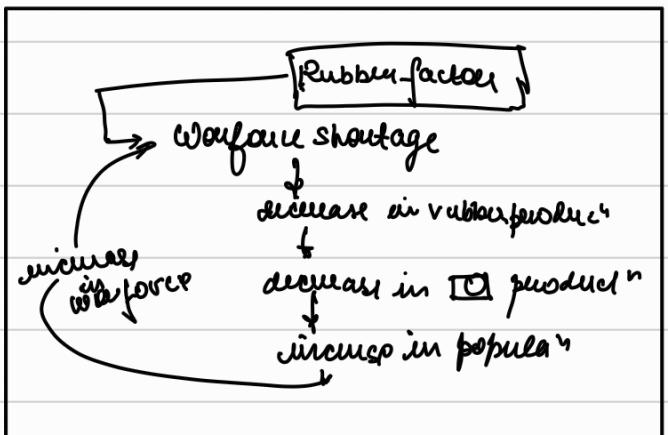
Abduction - make Analogies b/w 2 entities
(e.g. time & money)

demand driven

- * take an EXTREMELY complex phenomenon & explain it using limited parameters - reductionist
→ reduce complexity coz unable to understand in detail.

↳ e.g. cause of earthquake COULD BE because of a butterfly flapping its wings - the effect might be JUST ENOUGH to offset the balance - BUTTERFLY EFFECT.

PARTH →
PANDEY
(CS23I1064)



incommensurability - conflicts b/w multiple disciplines while integrating them during pdt. formation

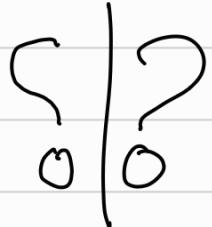
INSIGHT : one-one mapping b/w real-life situation with a known scientific one (vehicle traffic \equiv water flow)



ANALOGY : make models based on the scientific model.



RIGOROUS FORMULATION :



ILLUMINATI

IIT MNA LLU
IIT Multi National Association of
Lucky Losers in Various Unives

N - Nodes / Elements

K - Relations b/w nodes

C - content

"Assemblage?"

LANGUAGE of SYSTEMS - - - . complexity

* We need complexities to survive

(We live in Dynamic environment)

* Complexities != complications

U

Coherent Adaptive phenomenon

* Bad vs good complexities ???

VARIETY as a measure of complexity

Increasing number won't increase
the variety
you have to ↑ the diversity

Collection of
partial similars
(variety ↓)
(n_A , n_B)

→ Collection of (n_A, n_B, n_C, \dots)
dis-similars
(variety ↑)

Assemblage of
↓
dis-similar

$$\frac{n(n-1)}{2}; n \rightarrow \text{nodes}.$$

(permutations) directed

$$\Rightarrow \frac{n(n-1)}{2}.$$

Dynamic System
(Variety = 2^K)
 $K \rightarrow$ no. of edges

$$\dots, 2^{n(n-1)}$$

RUPERT GOLDBERG MISSION.

HOMEOSTASIS — perfect example of assemblage of dissimilars?

SYSTEMS — for design & innovation

SYSTEM: A pattern that is coherent & has emergent properties $>$ than the sum of parts
(?) $\{ \Delta \phi = \text{const} \}$

DESIGN: A pattern that is distinctive, yet contextual-engaging & empathetic.

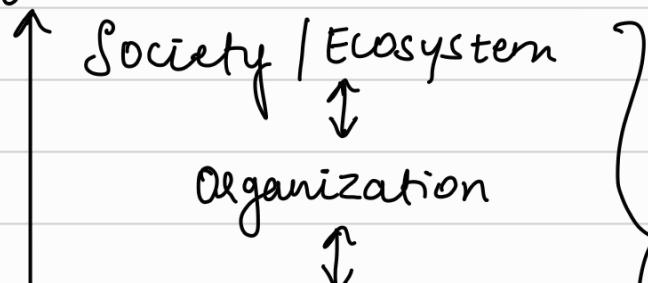
INNOVATION: A pattern that has become an attractor-dynamic & growing.

patterns differ in terms of the degree of complexity $\rightarrow f(n, k, c)$

Design is contextual.

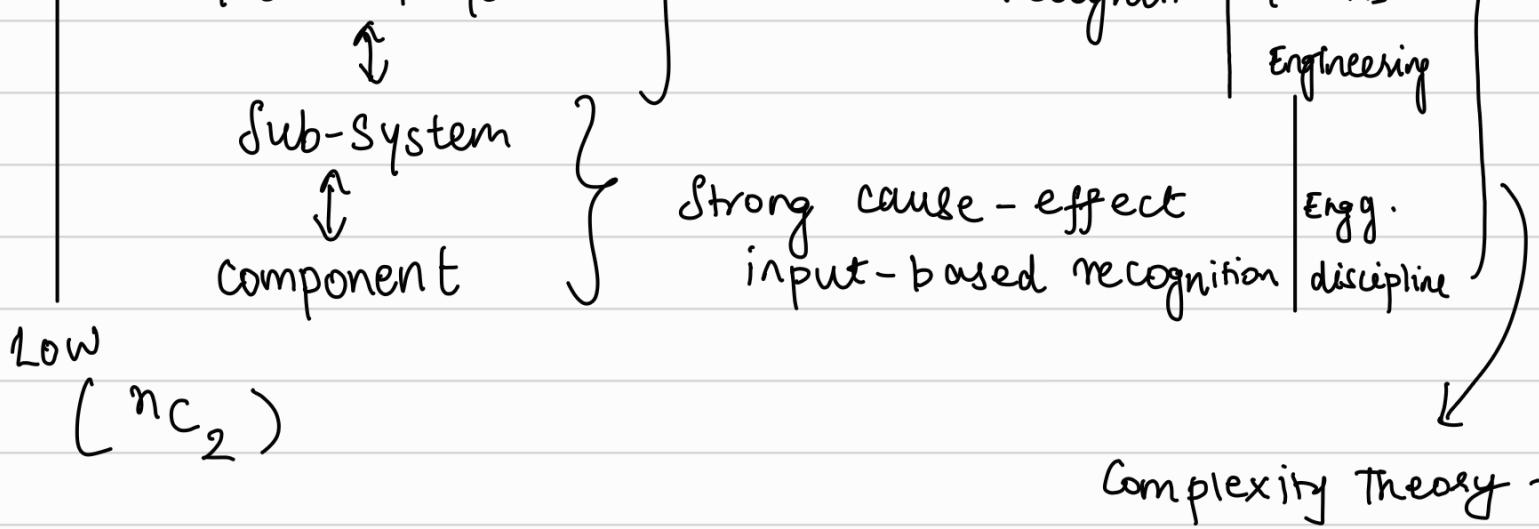
minimalistic — plain? simple?

High-complexity (2^k)



Weak Cause-Effect
Outcome Based

Innovation
Design
Thinking
Recognition Systems



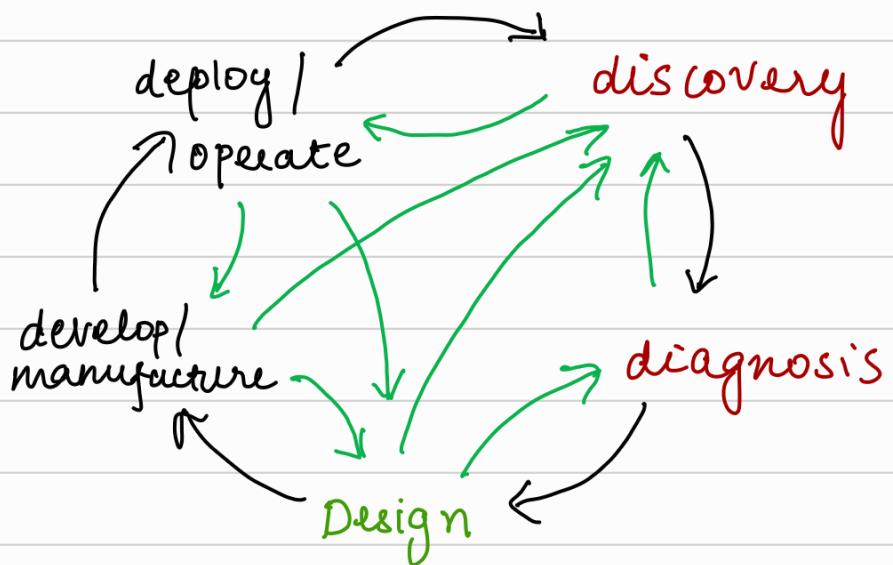
Write Algorithms - do biomimicry?

(V-shape : pilots \equiv V-shape : birds?)

BOUNDARY : * allows / prohibits exchange of matter, energy (or) information with environment.

* boundary judgements (What's inside = sacred, outside = profane, sort of).

FUZZY-FRONT END

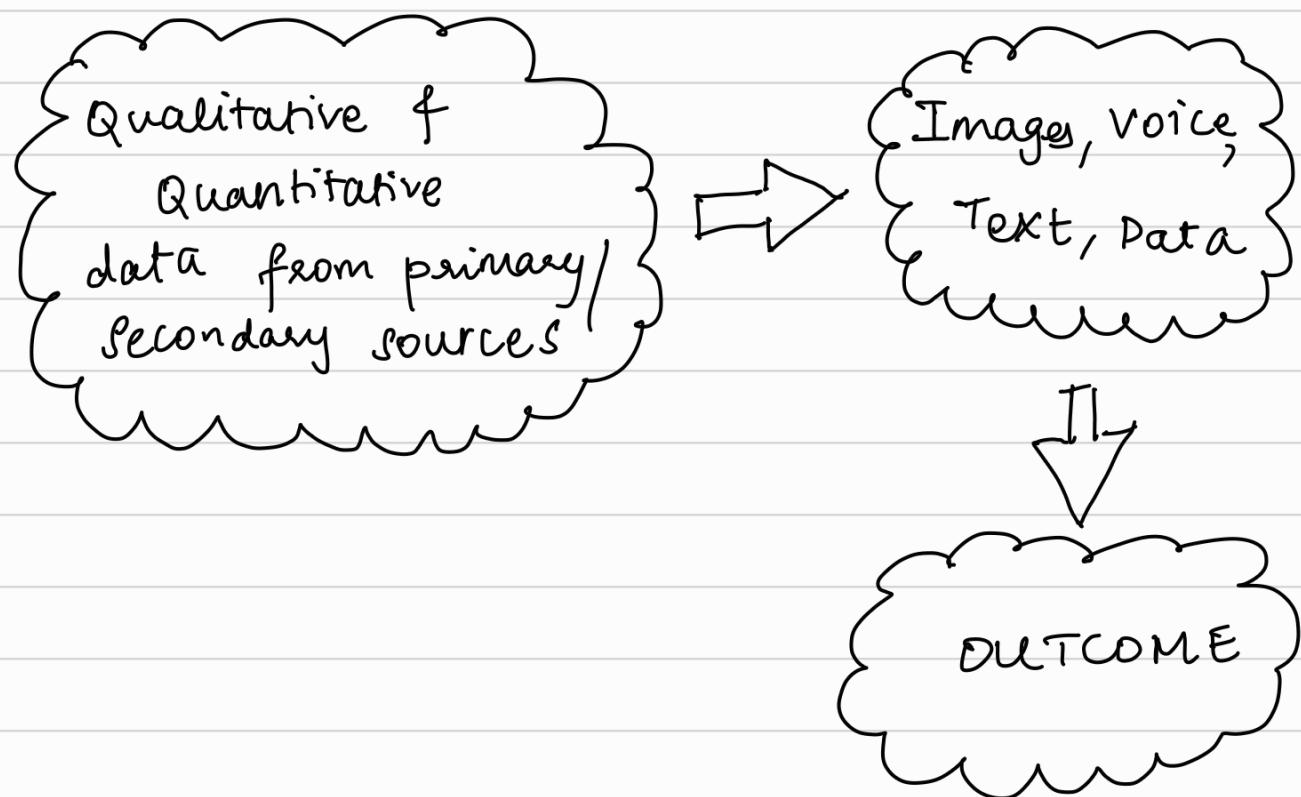


DESIGN is NON-LINEAR. (That's why we use graphs. O.O)

▲ Chaotic phase with no clear cause-effect rules

Change for the sake of change is the ideology of the cancer cell.

- * be tool agnostic.
- * be sensitive to the problem you discover.

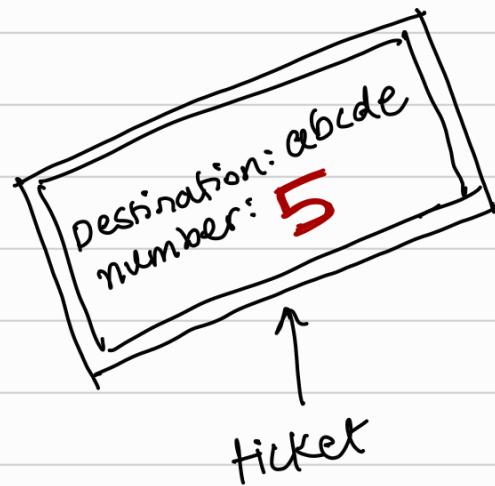


DISCOVERY MATRIX - $n \times n$ MATRIX.

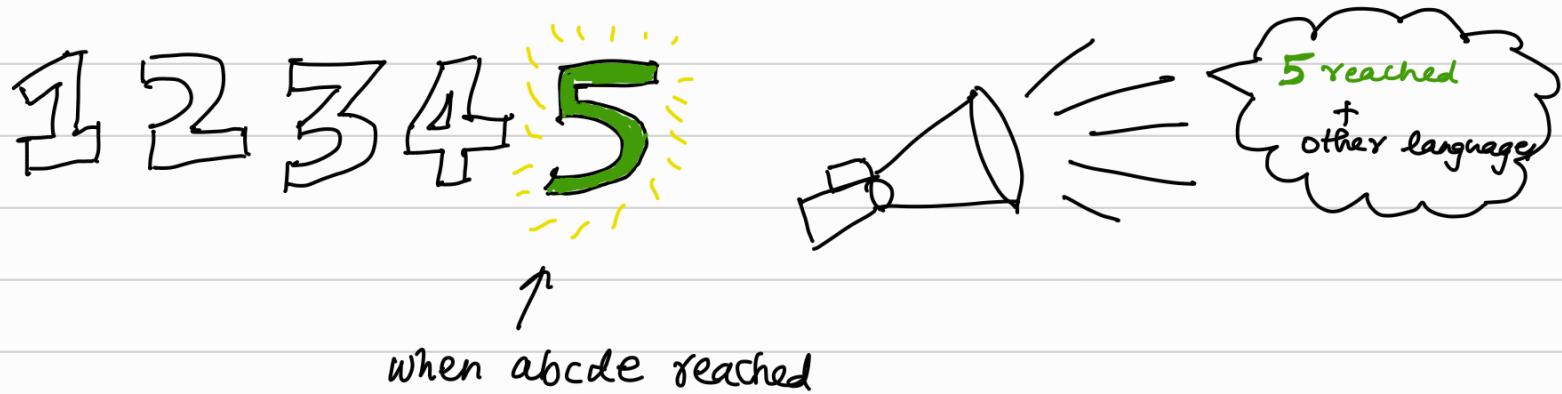
CRUCIAL TO IDENTIFY Patterns → to SOLVE problems.

- Given :
- ① person doesn't know local language -
 - ② reduce hassle of tracking using phone.
 - ③ names of places aren't reliable.

1st iteration idea :



ON conductor's / drivers prompt,



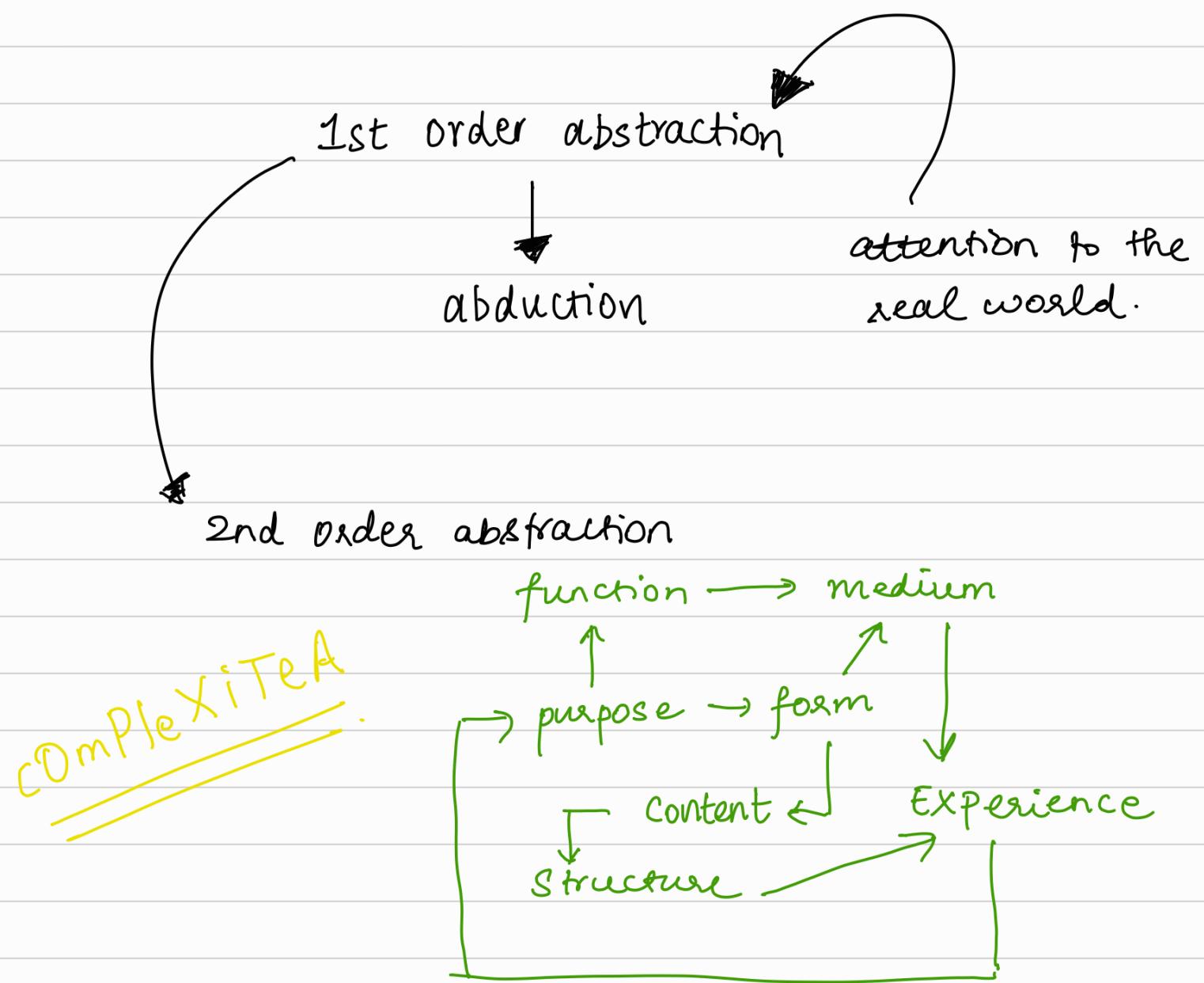
benefits :

- ① unique, universal, visual repr.
- ② unique, audio repr (in probably, 3 common langs.)
- ③ no need of internet - human doing it - can automate, if reqd.
- ④ possibly low cost - if no MPMCs.

complexity $\rightarrow f(n(\text{parts}), n(\text{rels.}), \text{nature of parts/rels.})$

- \hookrightarrow inherent to the object & may be desirable for its existence. (esp. natural)
- \hookrightarrow dependent on observer.

purpose → goal-directed behaviour.



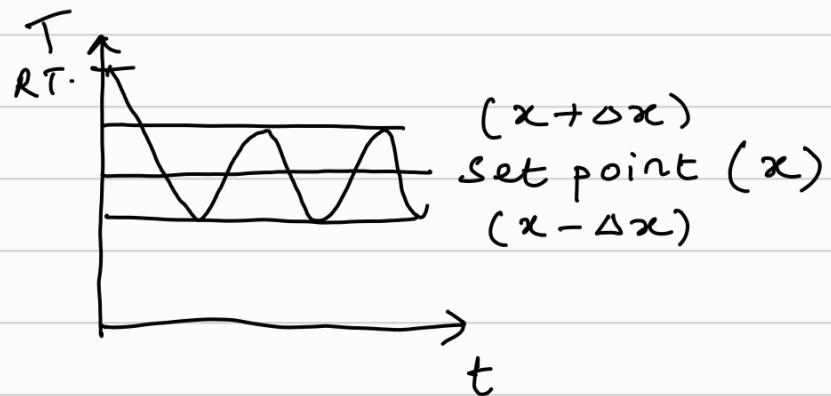
System of systems

Boundary → fixes problem?
(since itself becomes a boundary if my problem is to find it?)

Hierarchy → depends on indegree & outdegree.

+ve feedback \rightarrow deviate from the norm.
-ve feedback \rightarrow stabilise the system

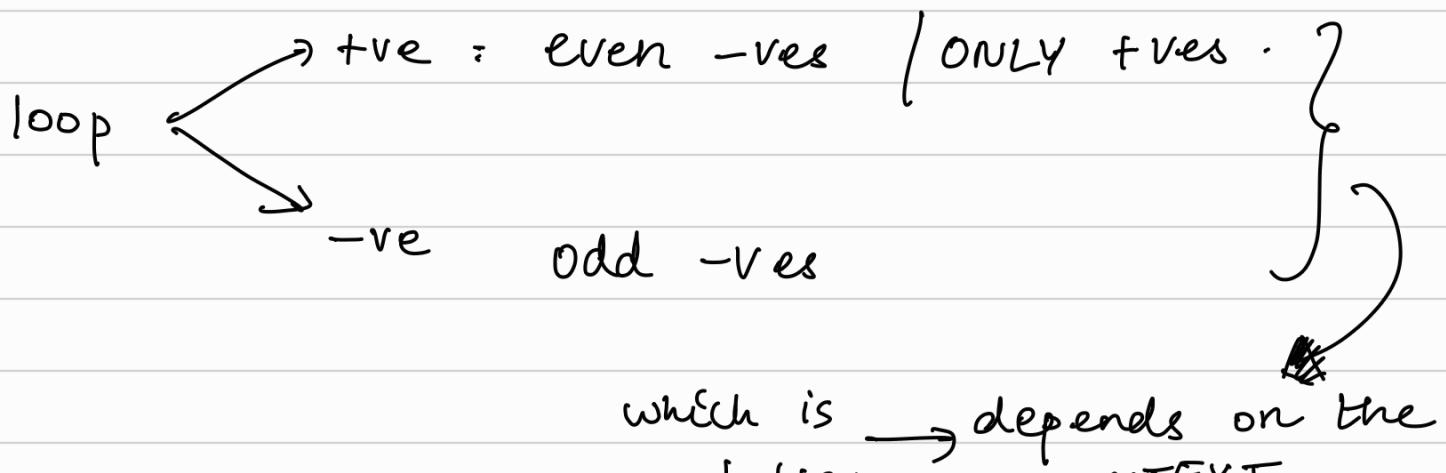
Air Conditioner -



A good system \downarrow the Δx .

\hookrightarrow reduce bandgap.

1000s of feedback loops could be there in a single system.



feedback loops.

variety of response \geq variety of stimulus

working on FMCAs \rightarrow profitable ?

↓
fast moving
consumer goods

incentivise.

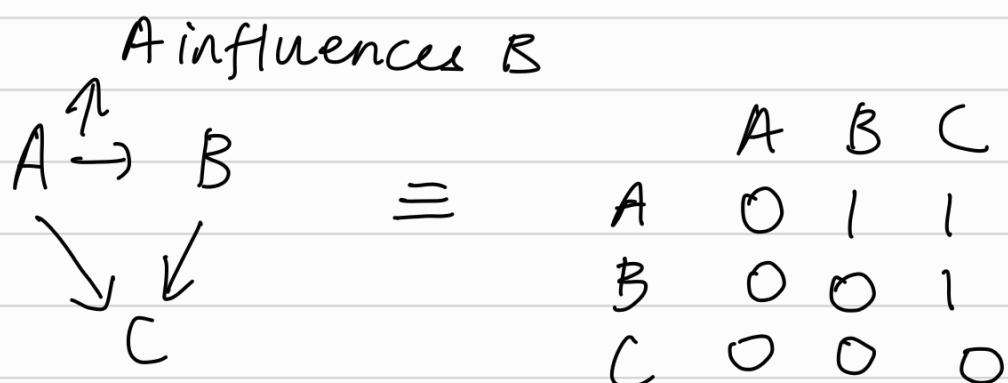
- K.C.

"Badeinath"

- also K.C.

at least 20-25 moves | columns
 $n = 20/25$

construct an $n \times n$ matrix



Adjacency MATRIX !!!!

DON'T JUMP INTO THE SOLUTION SPACE.

↳ understand the problem

↳ find stakeholders (entities that get affected?)

DIAGNOSIS : finding problems in a system?

* fix stakeholders?

* find central node?

S N A C : Stakeholder
Need

A Iterable - parameters / events that

CAN BE changed, in a small window of time.

Constraint - parameters / events that

CAN'T BE changed, in a small window of time.

SKEUOMORPHISM - make icons of an app which resemble its real-life counterpart?

95th percentile - consider middle area in the normal distribution curve. can't

satisfy 100% of ppl {ppl. in extremes}

- non-inclusive design - consciously let go of 5% of ppl.
- else, have a dynamic design - COMPLEX design.

~~JEE~~
prep.

better to : Start with problem space & then move onto solution space.

fuzzy front end →
(confused - where

to start?)

* DO LITERATURE SURVEY

complexity - result of interactions among stakeholders.

/ I1014
flies - biggest enemy.
- makes you humble.

↑
K.L

meet needs by changing alterables, around the constraints.

Constraint IS an Alterable, with a HUGE window of time.

Read the book - BIG DATA.

NEEDS - depend on diff. stakeholders.
alignment of purposes - important for existence of system

New Product Development



DEPLOYMENT : helps us understand things
(like where a system slacks).
so, go back to discovery phase.

BENCHMARKING : comparison with competitors.

CYBERNETICS: Science of control & communication

SYSTEM's ABILITY to CHANGE - complexity.
(good if ↑↑)

+ve feedback → deviate from the mean

↳ disrupt

↳ good for creating new things.

System → Has a boundary

Network → blurred boundary (?)

in a network → some nodes might be more imp.
than the others.

new pdt dev

* discovery (where do I start?)

* diagnosis (requirements, doing/not doing,
how to do with least effort,
what? why am I doing? - switch
b/w engg.- & design hats)

conceptual vs detail design

↳ can i do so and so? (dk how, but
have concept)

Conceptual → embodiment

HOW?