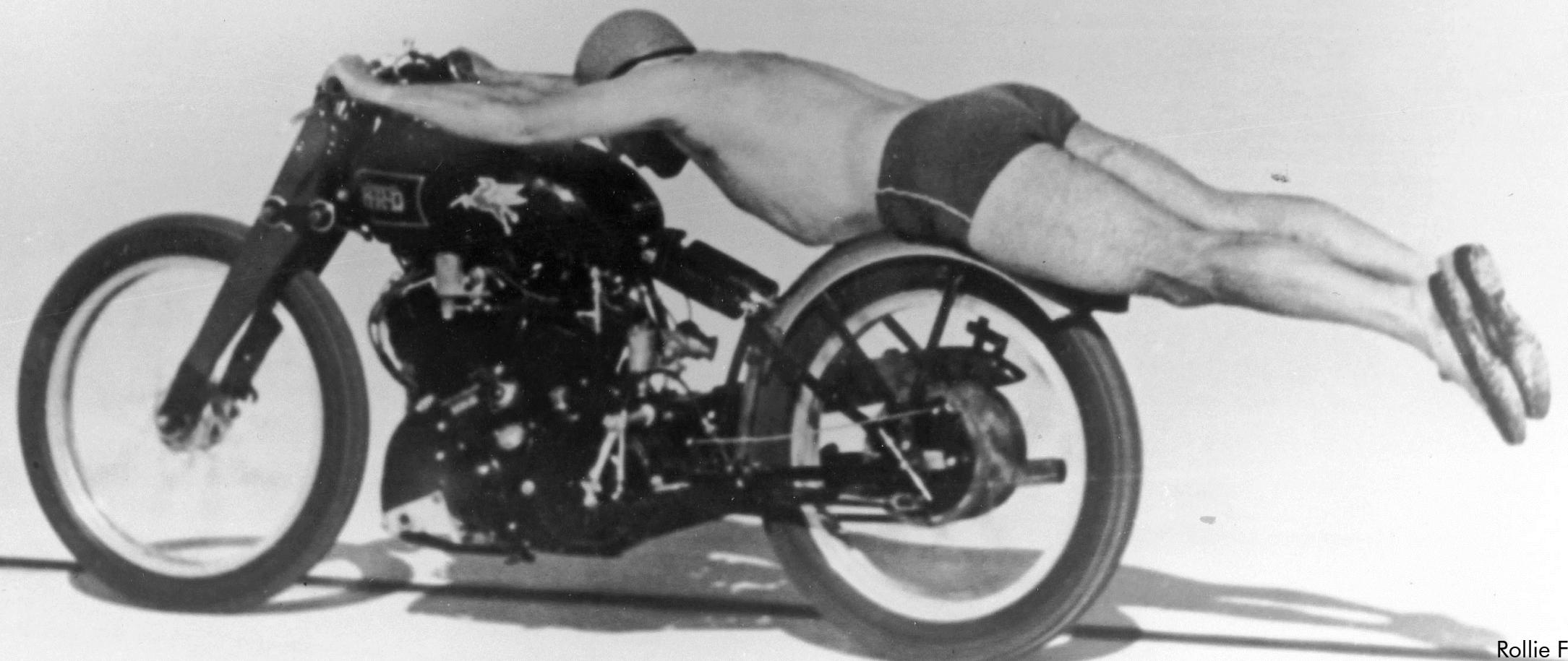


DESIGN THINKING

ITX2005 WEEK 7 – **IDEATE + PROTOTYPE**



Rollie Free
'Freeriding', 1948

AGENDA

ICEBREAKER	IDEATE + PROTOTYPE	PROTOTYPE
<ul style="list-style-type: none">• Clap/Switch Games• Debriefing	<ul style="list-style-type: none">• Definition• Brainstorming• Matrix/Classification• Design Ideas	<ul style="list-style-type: none">• Definitions• Prototype• Fidelity• Types of Prototypes

----- **BREAK** -----

SPECULATIVE DESIGN WORKSHOP

- Ideas Generation
- Prototype Development

SIDENOTES

Before We Start

SIDENOTES

Who is this guy?



SIDENOTES

Rollie Free



LIFE

Rollie Free
'Freeriding', 1948

SIDENOTES

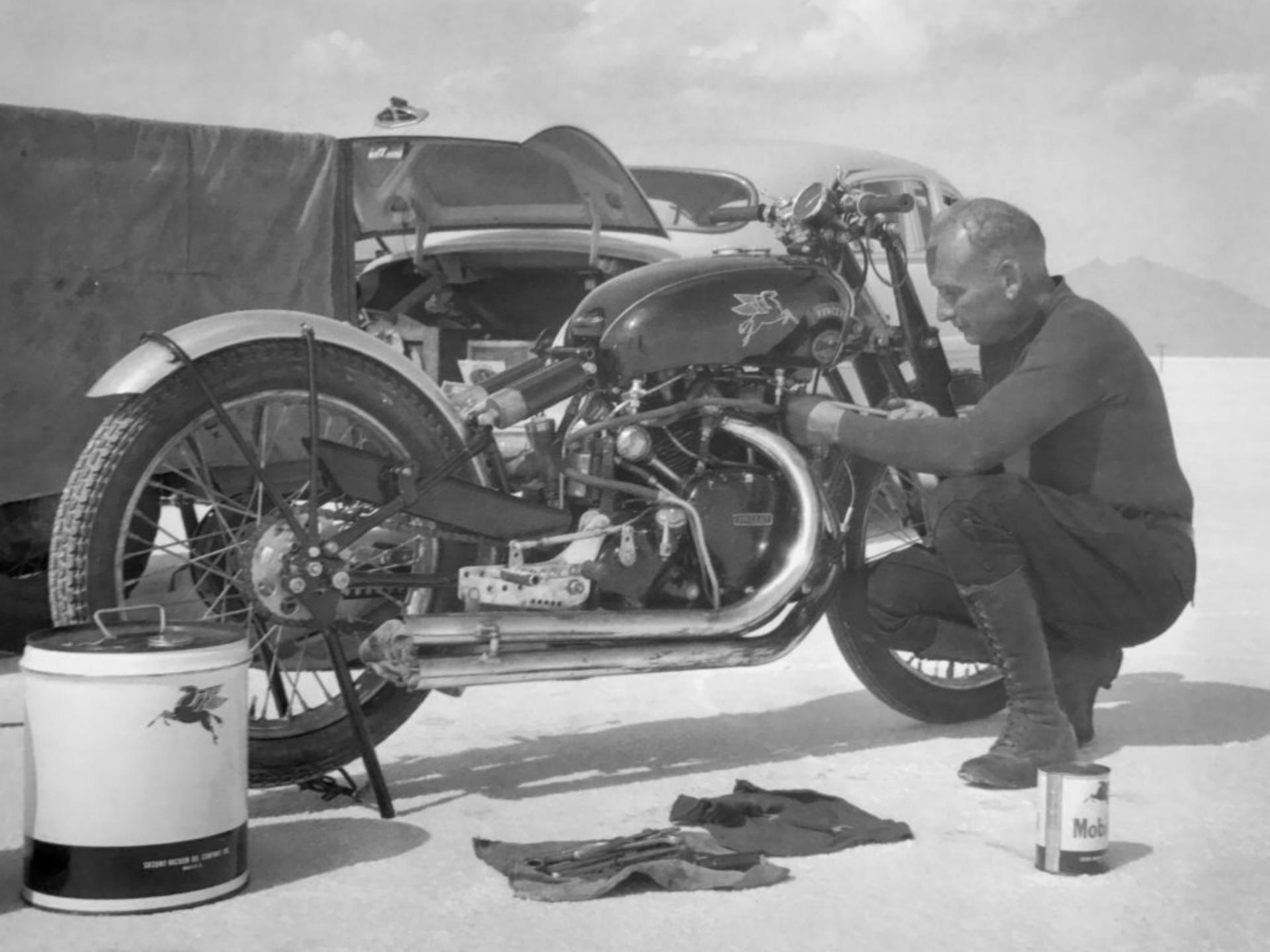
Why he's riding the
bike like that?



LIFE

SIDENOTES

Vincent Black
Shadow / Black
Lightning



SIDENOTES

Bonneville Salt Flats



SIDENOTES

Bonneville Salt Flats



SIDENOTES

Bonneville Salt Flats



SIDENOTES

Bonneville Salt Flats



SIDENOTES

NASA



SIDENOTES

Neil Armstrong
testing the X-15



SIDENOTES

Back to our Class!

IDEATE + PROTOTYPE

- Icebreaker Activity
- What is to ideate?
- Definitions



CLAP/SWITCH

- **Team Up** (2 people/team)
- Face each other
- Speak for & against the topic provided (on screen)
- 1st Person = **Speaker**
- 2nd Person = **Clapper**
- Whenever the clapper claps, the speaker need to switch the side of the narrative he/she is speaking for/against.



CLAP/SWITCH

Demo

CLAP/SWITCH
WARM-UP

Apple is better than orange



CLAP/SWITCH
WARM-UP

Your turn!

CLAP/SWITCH WARM-UP

Beach vs. Mountain



CLAP/SWITCH WARM-UP

**Private car is better
than public transport**



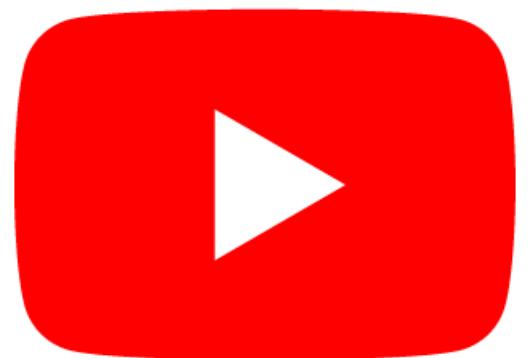
CLAP/SWITCH WARM-UP

**Having a celebrity as a
boyfriend/girlfriend**



CLAP/SWITCH
WARM-UP

Netflix vs. YouTube



YouTube

CLAP/SWITCH

Debriefing

DEBRIEF

- **Fast** ideas
- **Not fixating** on ideas
- Be **flexible/creative**



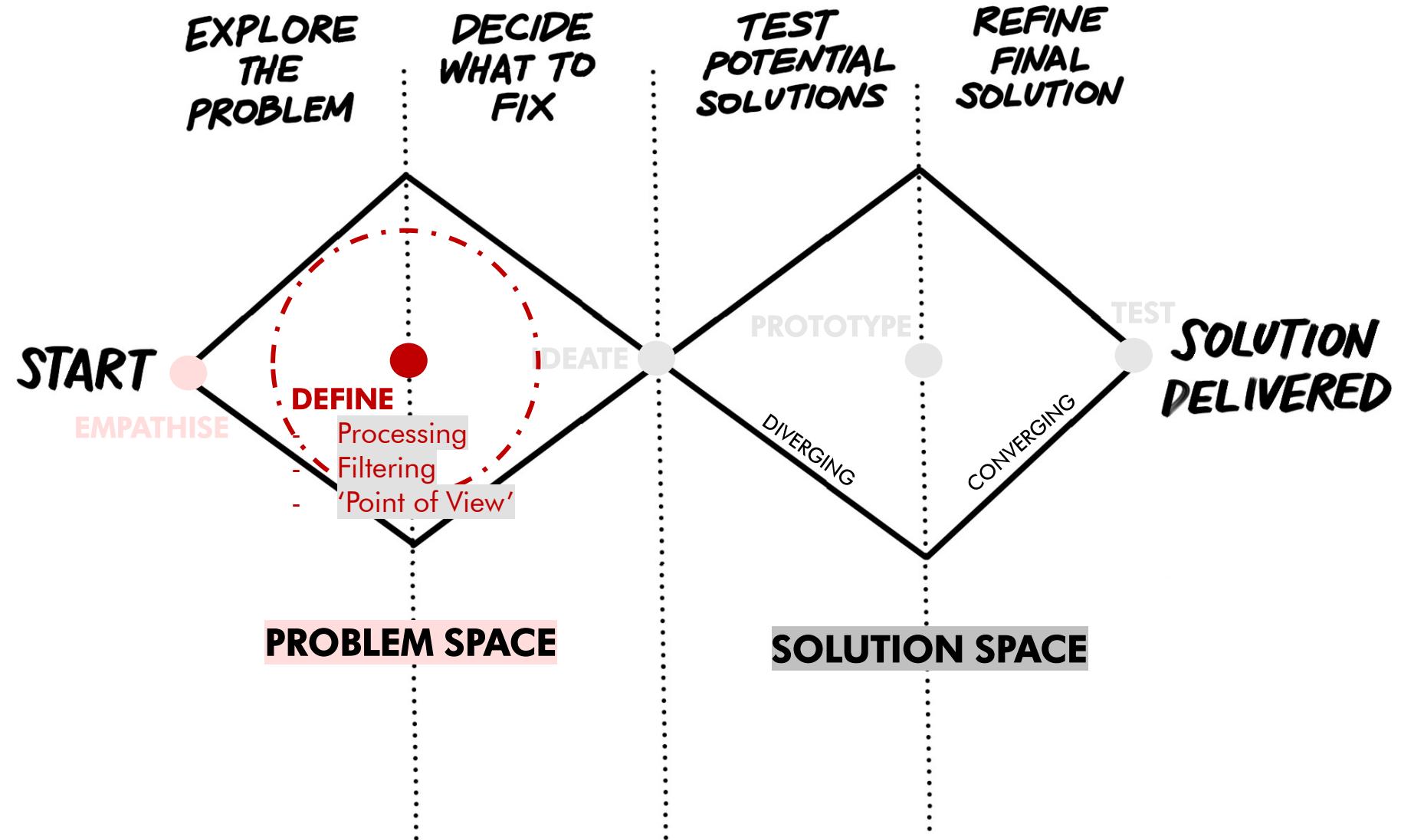
Apollo 11 crew debriefing the mission while in quarantine, 1969

Ideate + Prototype

DESIGN THINKING

Design Thinking *Process*

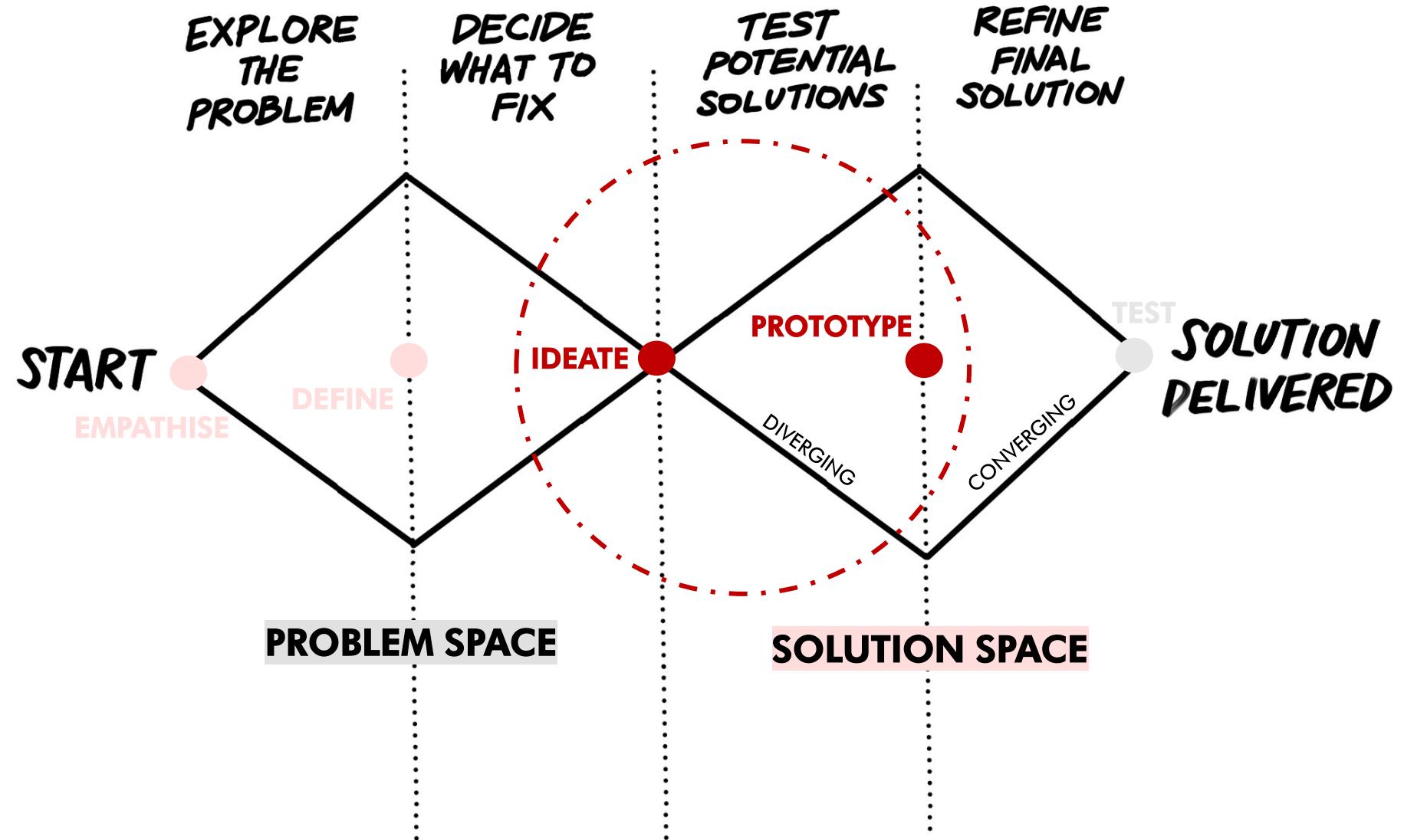
1. Empathise
2. Define
3. Ideate
4. Prototype
5. Test



DESIGN THINKING

Design Thinking *Process*

1. Empathise
2. Define
3. Ideate
4. Prototype
5. Test

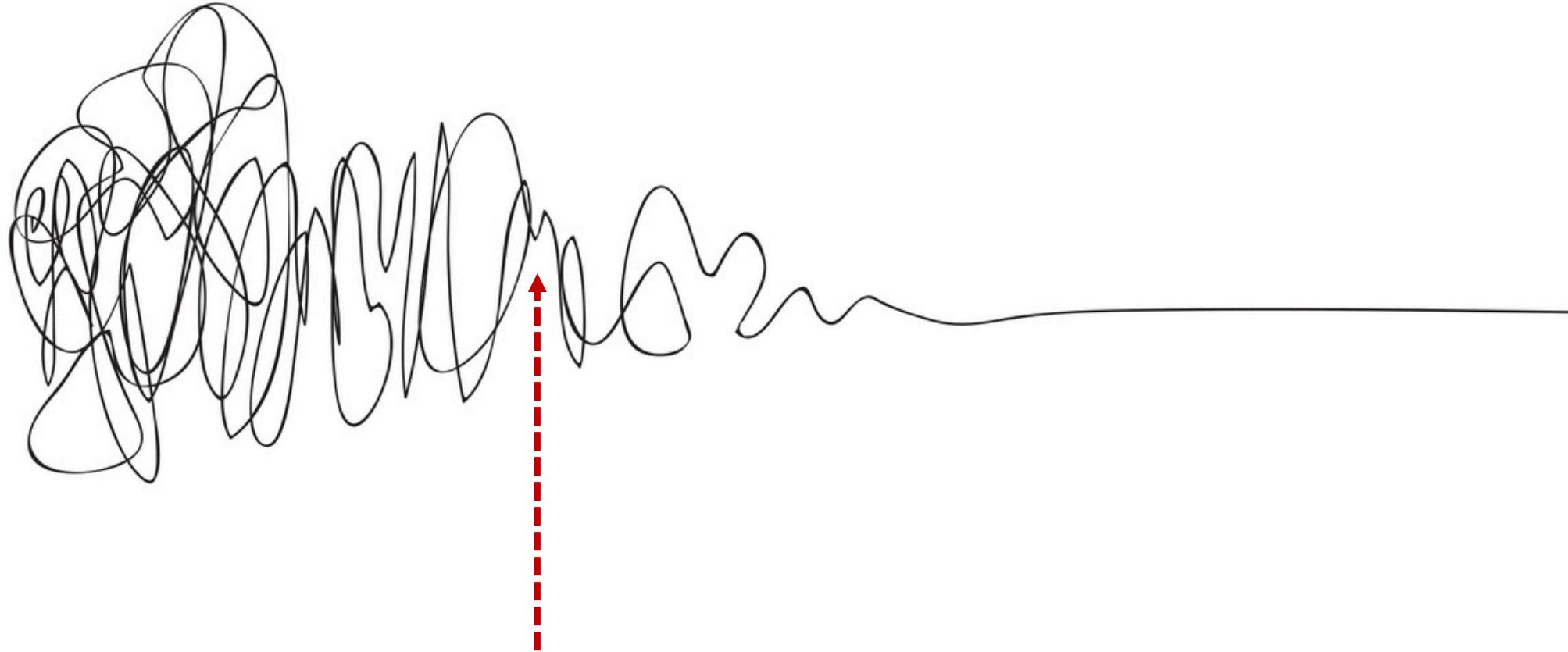


DEFINITION

Ideate (verb) /'ɪdē,āt/ (Oxford)

1. form ideas; think

DESIGN THINKING



IDEATE

What should we ***think about*** (ideate) in ***Design Thinking***?

IDEATE

Problems

Concepts

Design

Gap of
Improvement

Ideas

Causations

Reality

Context

Market

Possibilities

Solutions

Definitions

IDEATE

'Fun Part'

- Creativity is very critical
 - Be Avant-garde



Charles and Ray Eames posing with chair bases

IDEATE

Idea Generation

- Generate as many ideas as possible
 - Selection of ideas
(going forward)



BRAINSTORMING

'Brainstorming'



BRAINSTORMING

3 Major Rules

1. Generate numerous ideas
2. Be creative without regard to constraint
3. Question everything!



BRAINSTORMING

#1

1. *Generate Numerous Ideas*

BRAINSTORMING

#1

Be Fluid/Flexible

Don't fixated on 1 or 2 ideas



BRAINSTORMING

#1

Surround yourself in the
'right environment'

- Mentally



Grumpy Dwarf

BRAINSTORMING

#1

Surround yourself in the
'right environment'

- Physically



Aston Martin Design Studio

BRAINSTORMING

#1

Right Tools



BRAINSTORMING

#1

Right Environment

- Curate ideas
- Be inspired
- Be engaged/focused



BRAINSTORMING

#2

2. *Be Creative Without Regard to Constraint*

BRAINSTORMING

#2

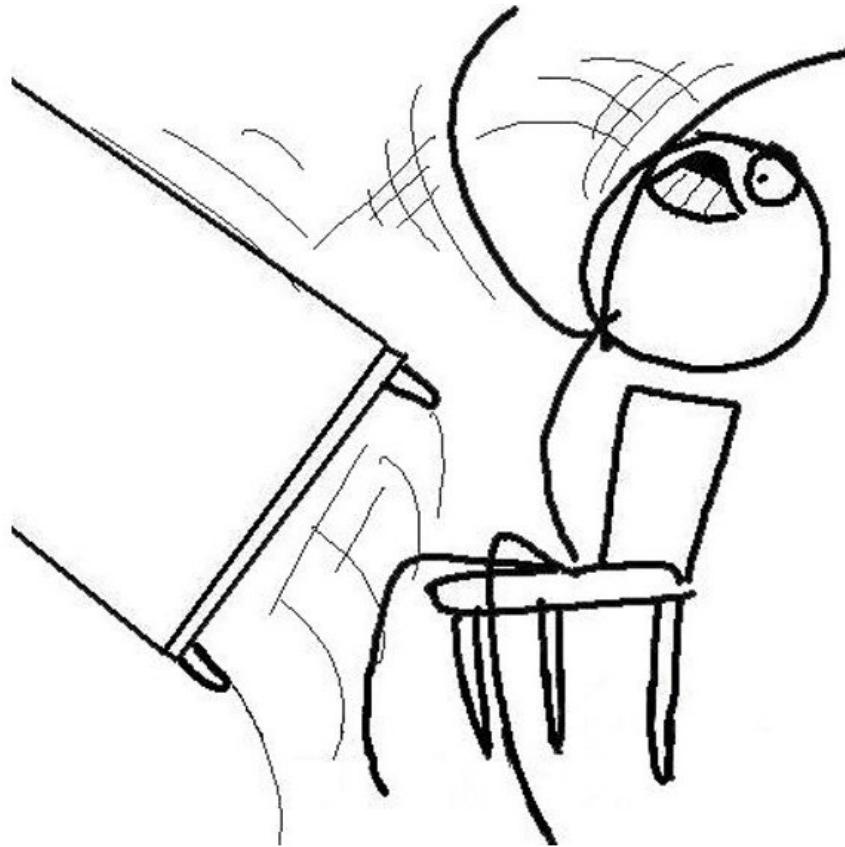
Avoid criticising ideas

(Your own/other)



BRAINSTORMING #2

Avoid **dismissing idea**
too early



BRAINSTORMING #2

Keep the **weird/crazy**
ideas

- Most of the time they can be
applied/extracted for good
use



BRAINSTORMING

#2

Great **Inventions/Ideas**

- Most of them sound absurd/crazy at first



Saturn V Rocket, Launch Pad 39A, 1969

BRAINSTORMING

#2

Great Inventions/Ideas

- Most of them sound absurd/crazy at first



First Generation iPod, 2001

BRAINSTORMING

#2

Great Inventions/Ideas

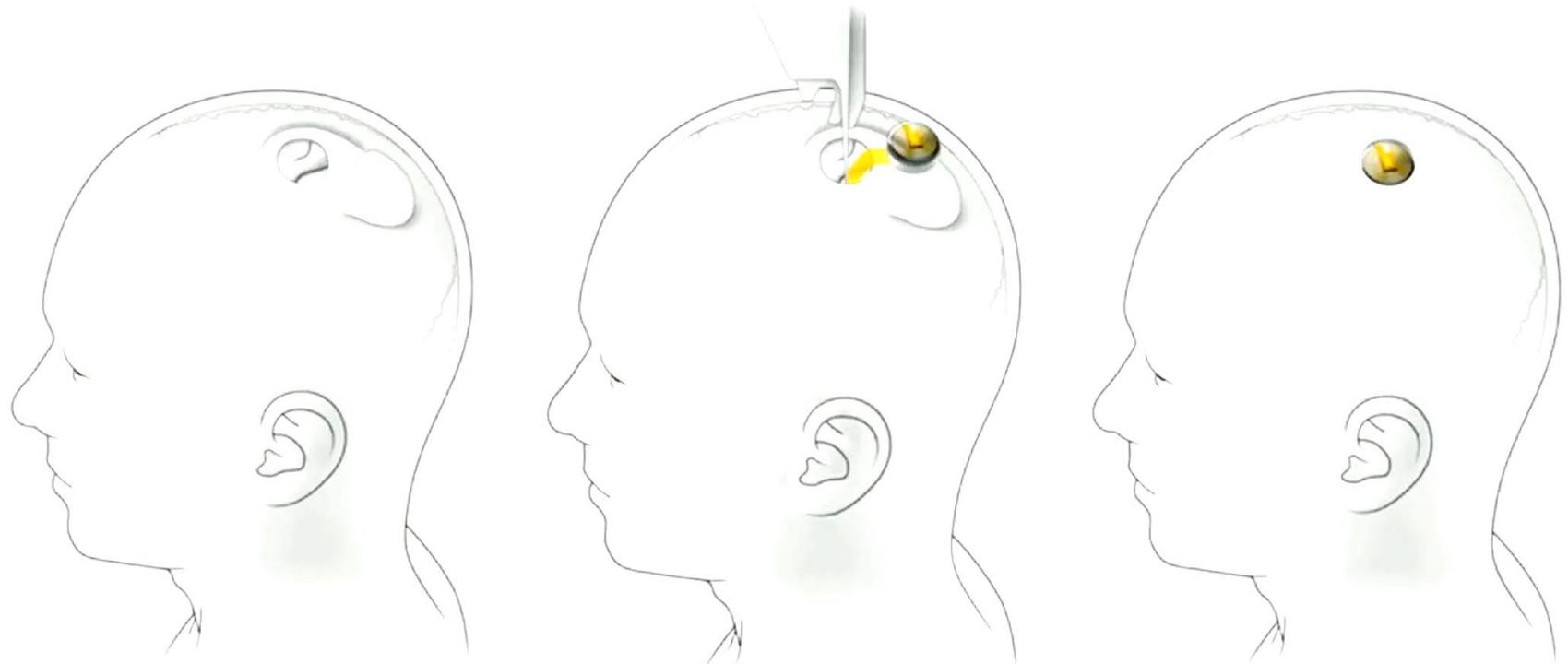
- Most of them sound absurd/crazy at first



Amazon Warehouse Robots

BRAINSTORMING

#2



Great Inventions/Ideas

- Most of them sound absurd/crazy at first

BRAINSTORMING

#2

Great Inventions/Ideas

- Most of them sound absurd/crazy at first



NEURALINK Brain Implant

BRAINSTORMING

#3

3. *Question Everything!*

BRAINSTORMING

#3

Ask Questions

- 5W+1H
- 5Whys



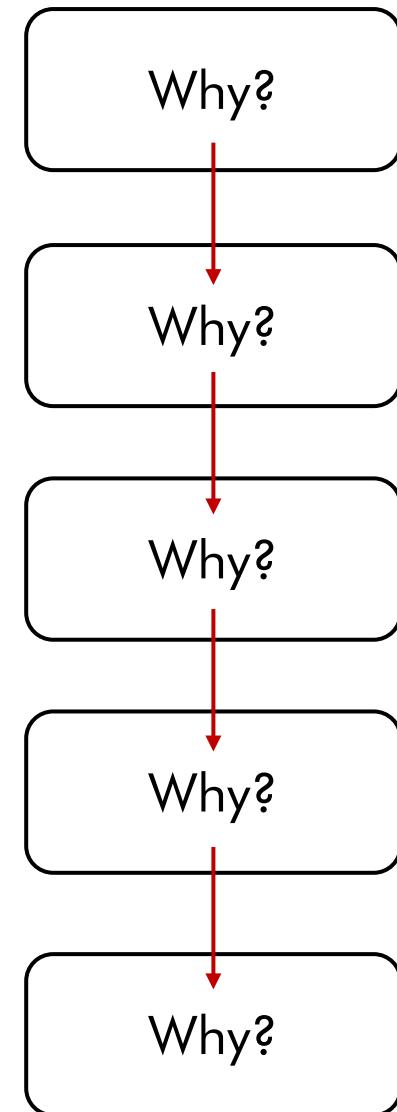
Sherlock Holmes sitting on LC2 armchair by Le Corbusier

BRAINSTORMING

#3

5 Whys

- Root-cause analysis



BRAINSTORMING

#3

Root-cause Analysis

"People don't want to buy a quarter-inch drill. They want a quarter-inch hole!"

Prof. Theodore Levitt,
Harvard Business School



BRAINSTORMING

#3

Ask **Stupid Questions!**

- People tend to assume stuffs
- Stupid question can be really interesting/profound
- Unexpected question can sometimes lead to an unexpected solutions.



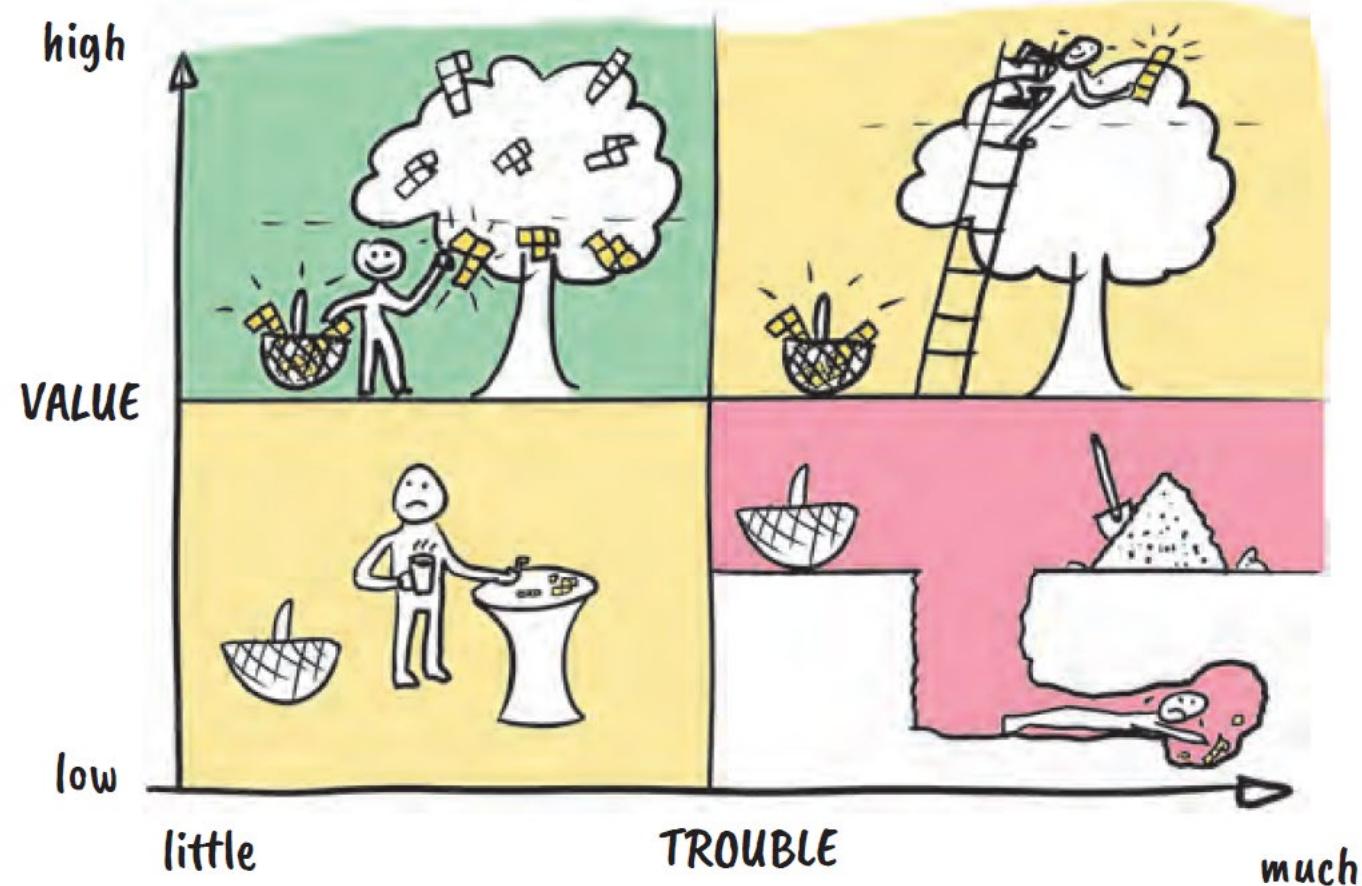
Homer Simpson

IDEATE

How do we effectively organise those generated ideas?

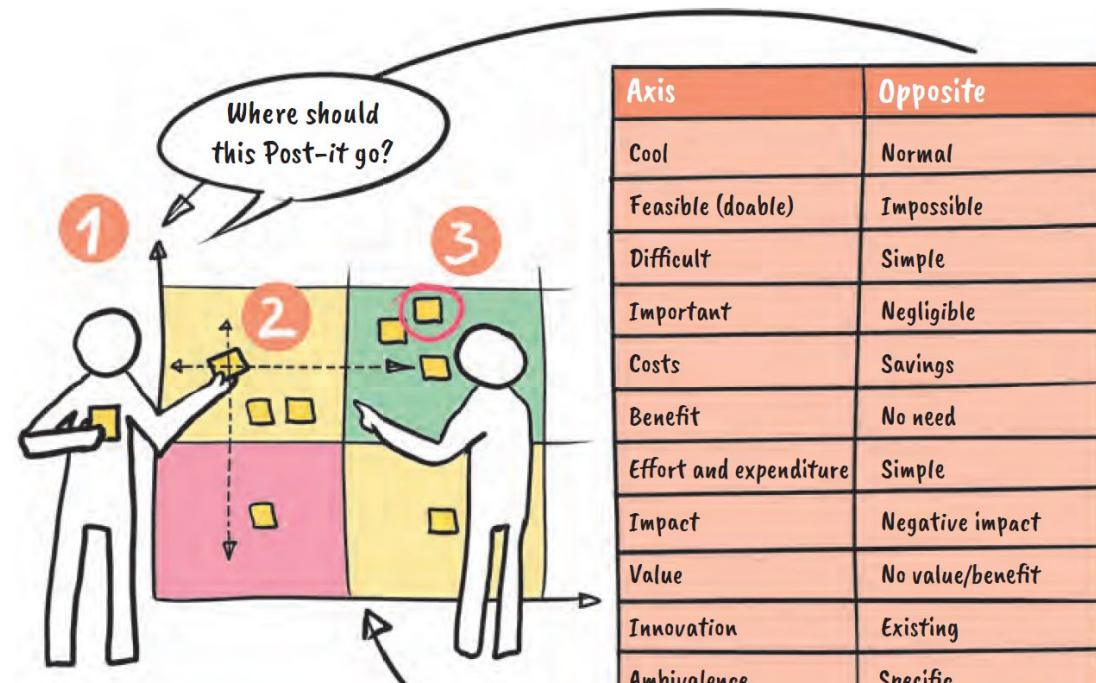
IDEA SELECTION

2x2 Matrix

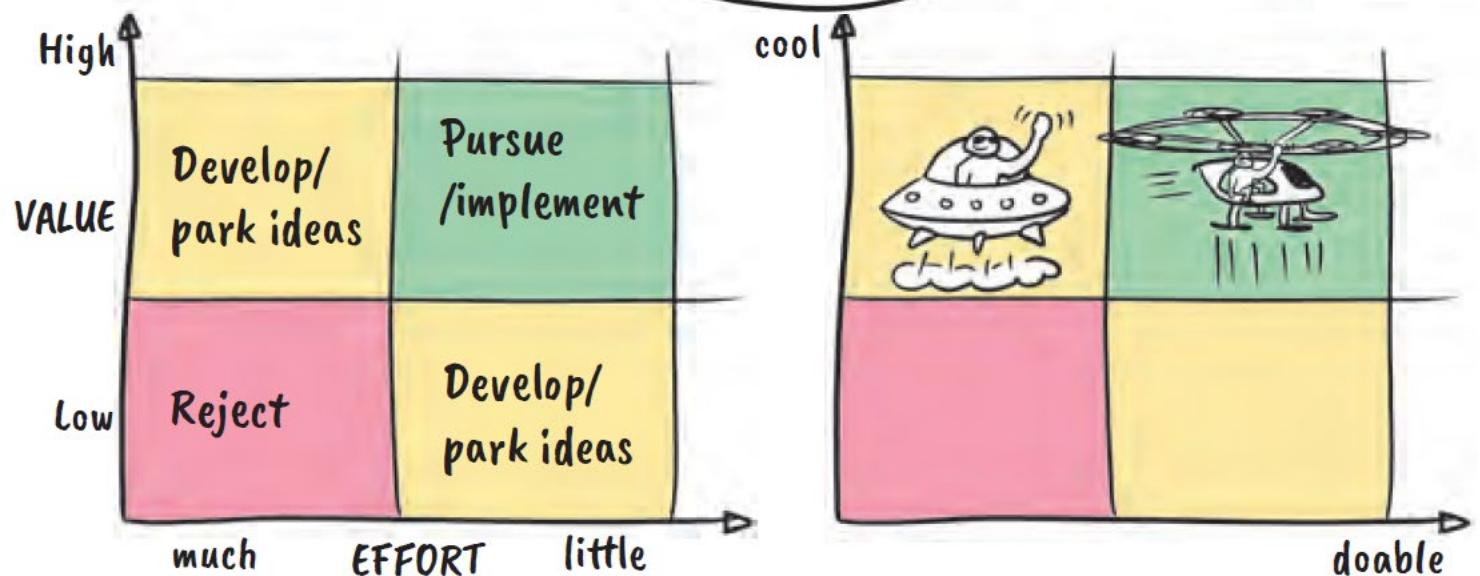


IDEA SELECTION

Classify each axis



Axis	Opposite
Cool	Normal
Feasible (doable)	Impossible
Difficult	Simple
Important	Negligible
Costs	Savings
Benefit	No need
Effort and expenditure	Simple
Impact	Negative impact
Value	No value/benefit
Innovation	Existing
Ambivalence	Specific



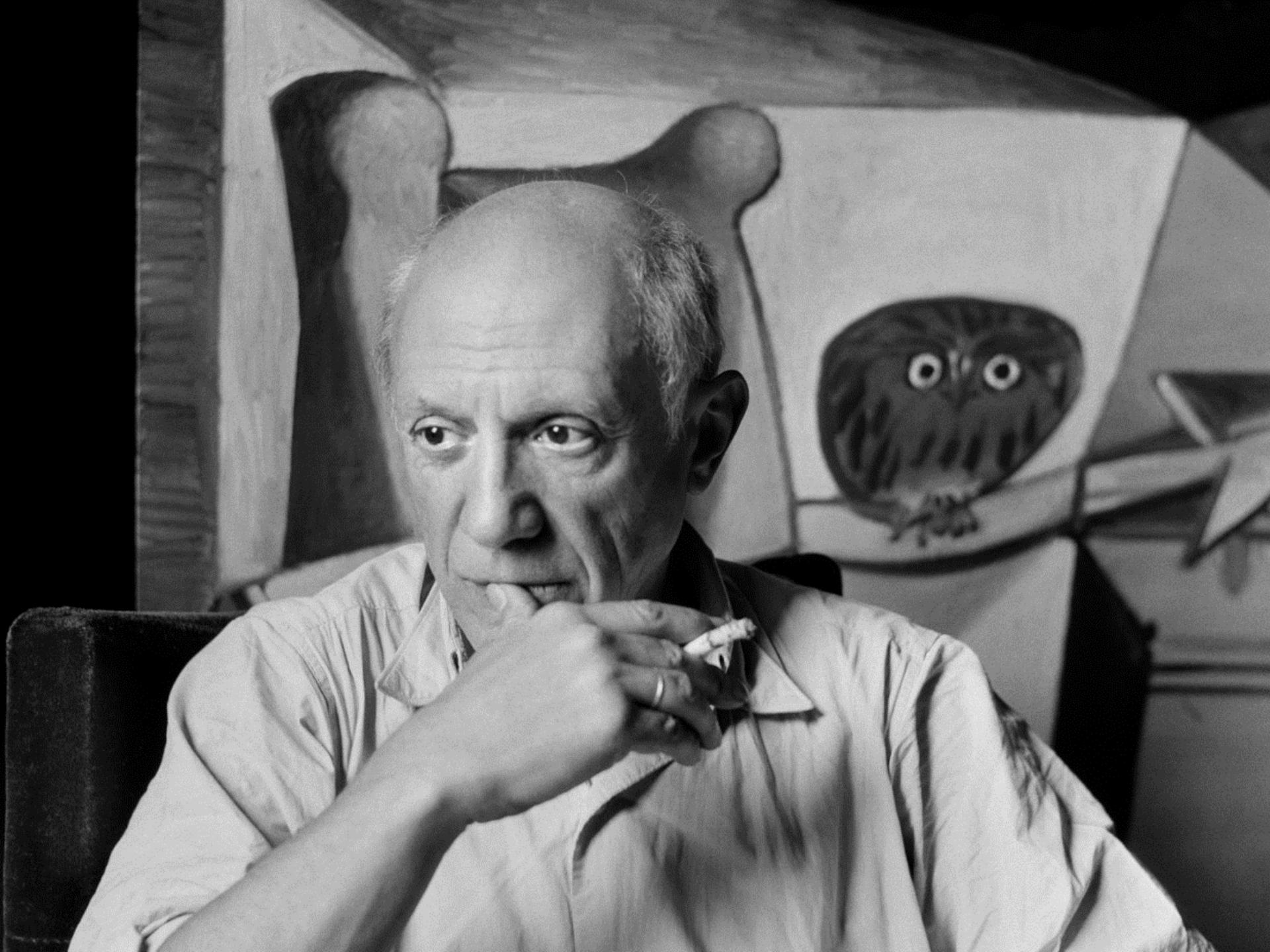
IDEATE

*Where can we get our **design ideas** from?*

Mimicking

- “Good artists copy, great artists steal.”

Pablo Picasso



DESIGN IDEAS



DESIGN IDEAS

Biomimicry



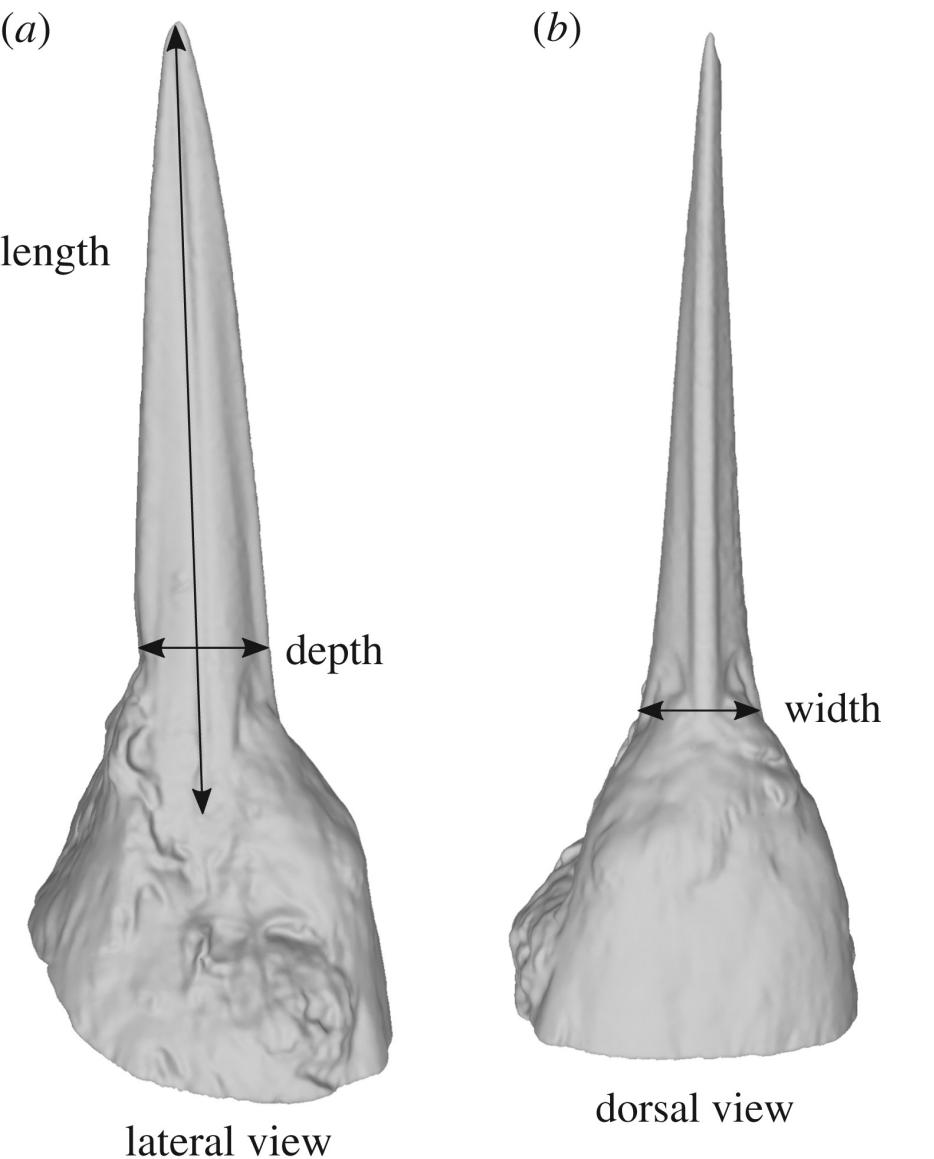
Shark Skin Denticles



Speedo LCR Suit

DESIGN IDEAS

Biomimicry



Kingfisher Beak



DESIGN IDEAS

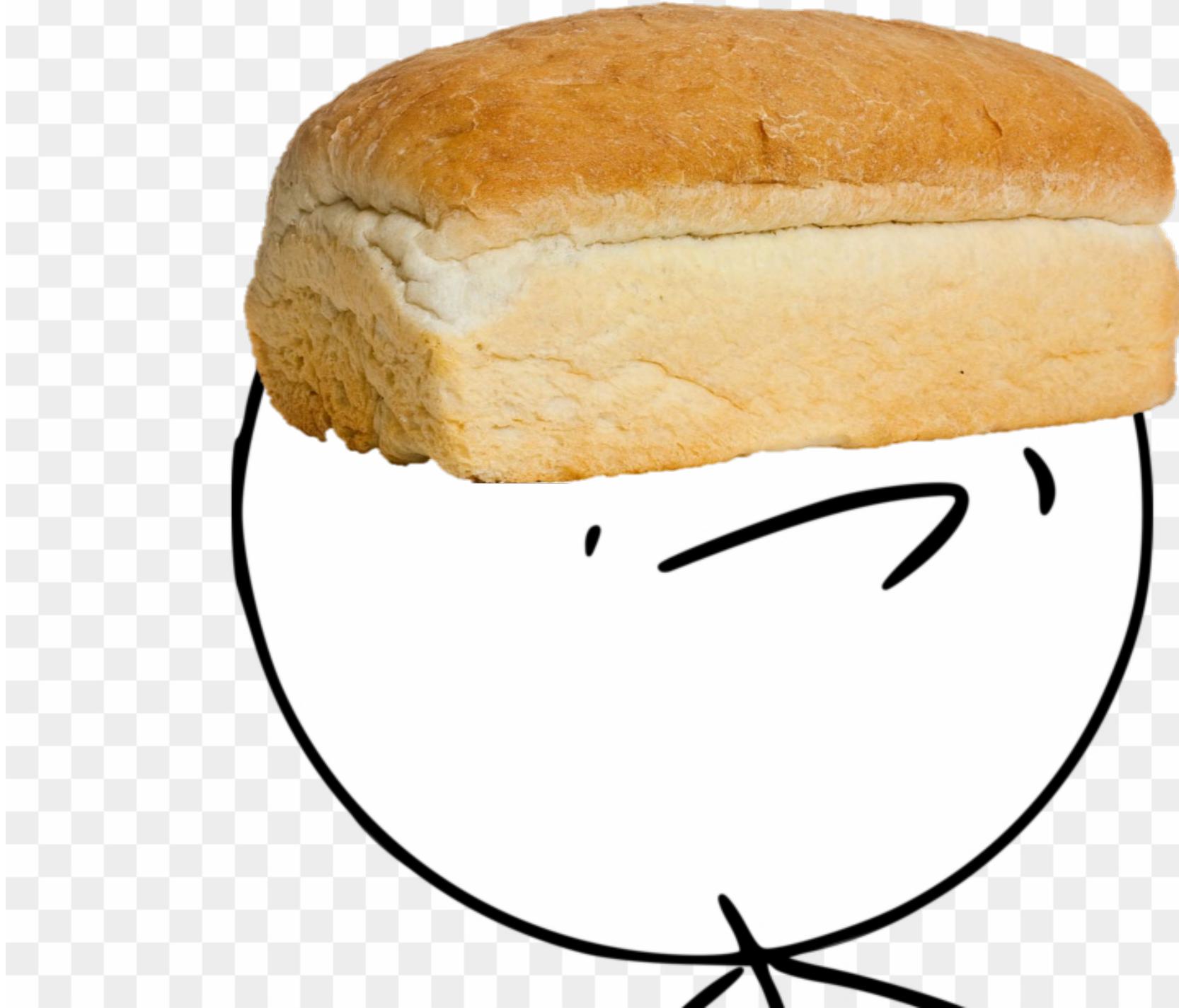
Data-Driven Design

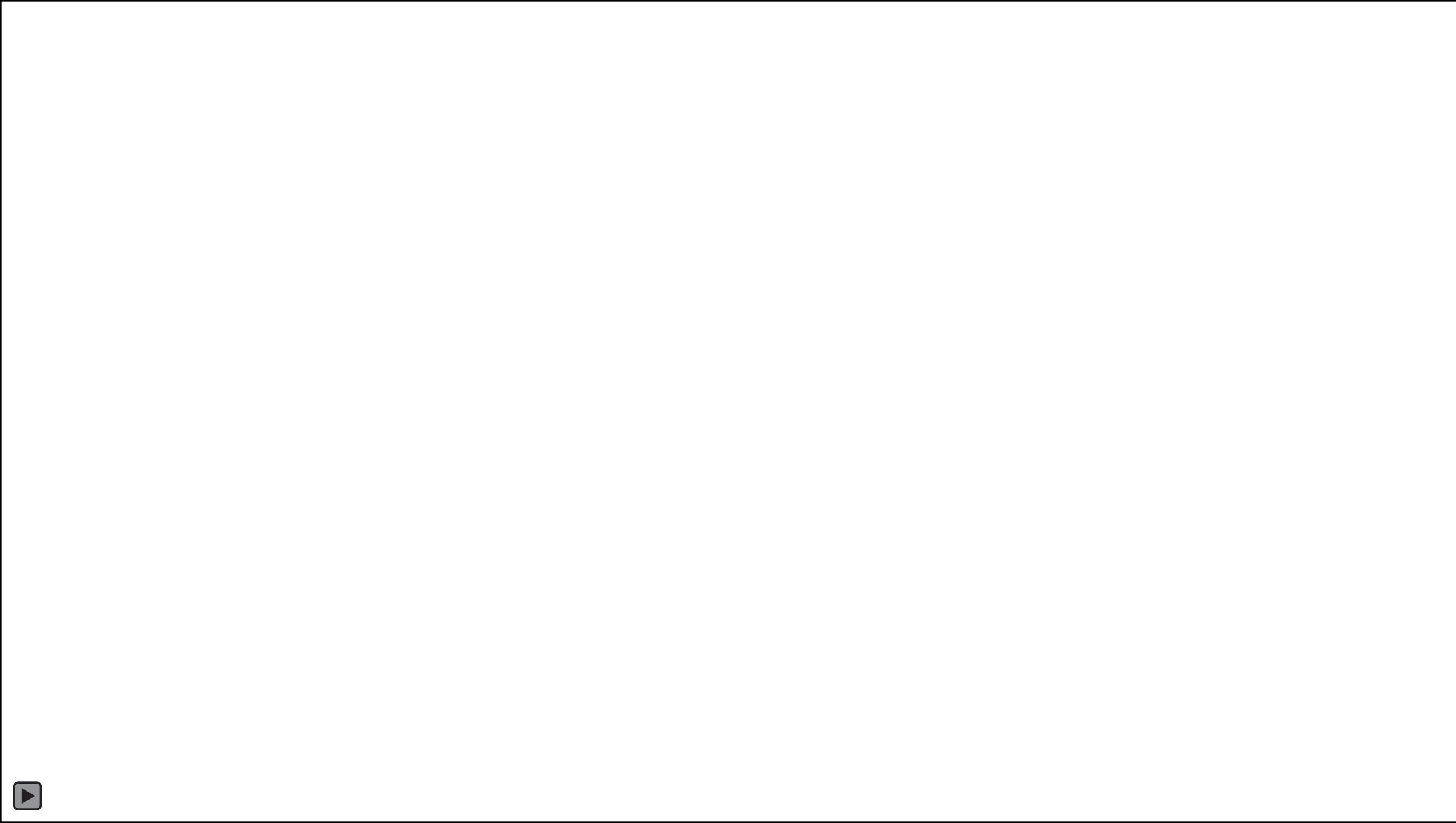


Microsoft HoloLens 2

DESIGN IDEAS

Data-Driven Design





DESIGN IDEAS

Data-Driven Design



PROTOTYPE

- Definitions
- Prototype
- Fidelity
- Types of Prototype



Boston Dynamic's Robots Dancing

PROTOTYPE

What is a prototype?

DEFINITIONS

Prototype (noun) /'prōdə,tīp/ (Oxford)

1. a first, typical or preliminary model of something.
2. the archetypal example, (**mock-up**)

Prototype (verb) /'prōdə,tīp/ (Oxford)

1. make a prototype of (a product)

PROTOTYPE

What do we prototype in Design Thinking?

PROTOTYPE

Test out your ideas

- Transform the
selected ideas / potential solutions



- **Tangible / Perceptible**



PROTOTYPE

Test out your ideas

- Transform the
selected ideas / potential solutions



- **Tangible / Perceptible**



PROTOTYPE

Range from

- Simple Critical Function
- Formal Observation
- Refined/Final Prototype



PROTOTYPE

Range from

- Simple Critical Function
- Formal Observation
- Refined/Final Prototype



PROTOTYPE

Range from

- Simple Critical Function
- Formal Observation
- Refined/Final Prototype



Clay Model of Land Rover Defender

PROTOTYPE

Range from

- Simple Critical Function
- Formal Observation
- Refined/Final Prototype



Tesla Cybertruck Demo, 2019

PROTOTYPE

Range from

- Simple Critical Function
- Formal Observation
- Refined/Final Prototype



Marc Marquez Testing Honda RC213V, 2023

PROTOTYPE

Range from

- Simple Critical Function
- Formal Observation
- Refined/Final Prototype



PROTOTYPE

Value time & efficiency

- Prototype a lot of ideas
- Spending minimum time
- Avoid unnecessary effort



- Readily-available material
- Material with high workability
 - Efficient techniques



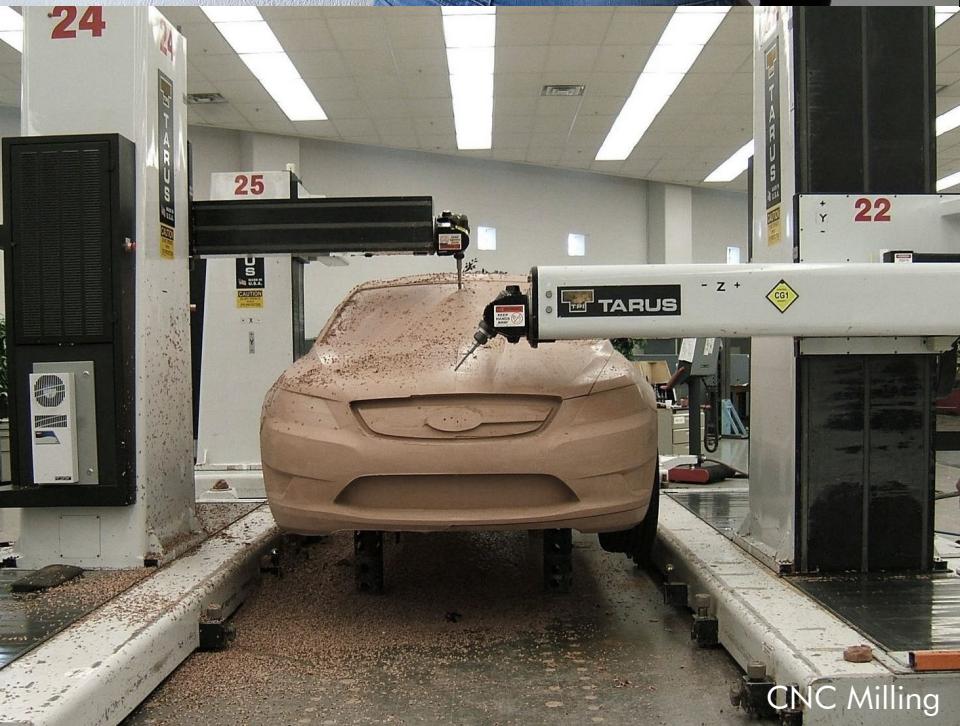
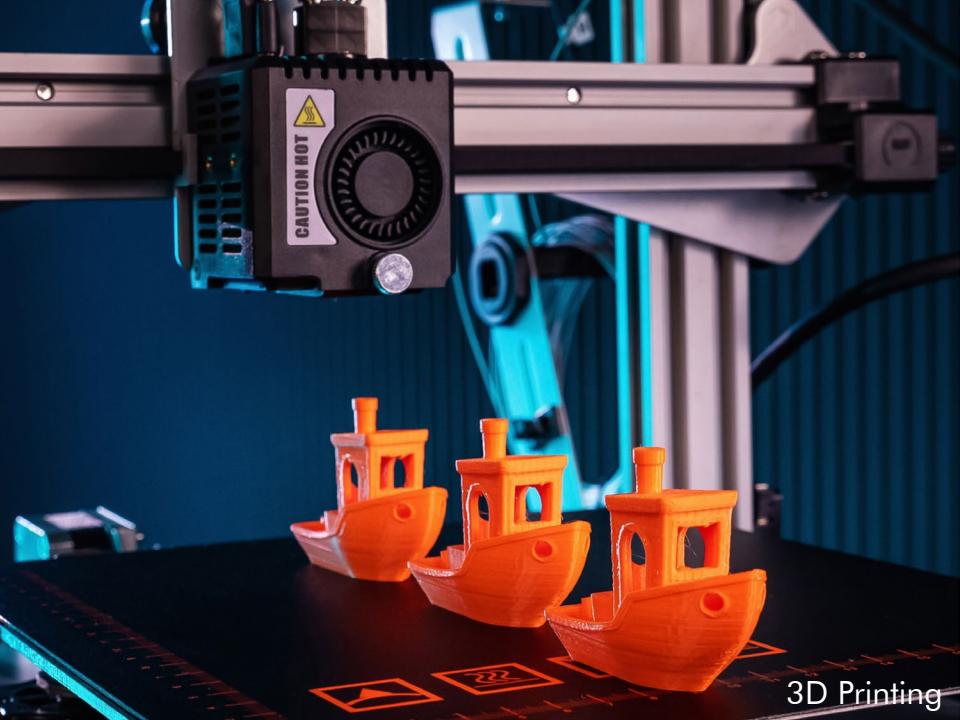
PROTOTYPE

Value time & efficiency

- Prototype a lot of ideas
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- Avoid unnecessary effort



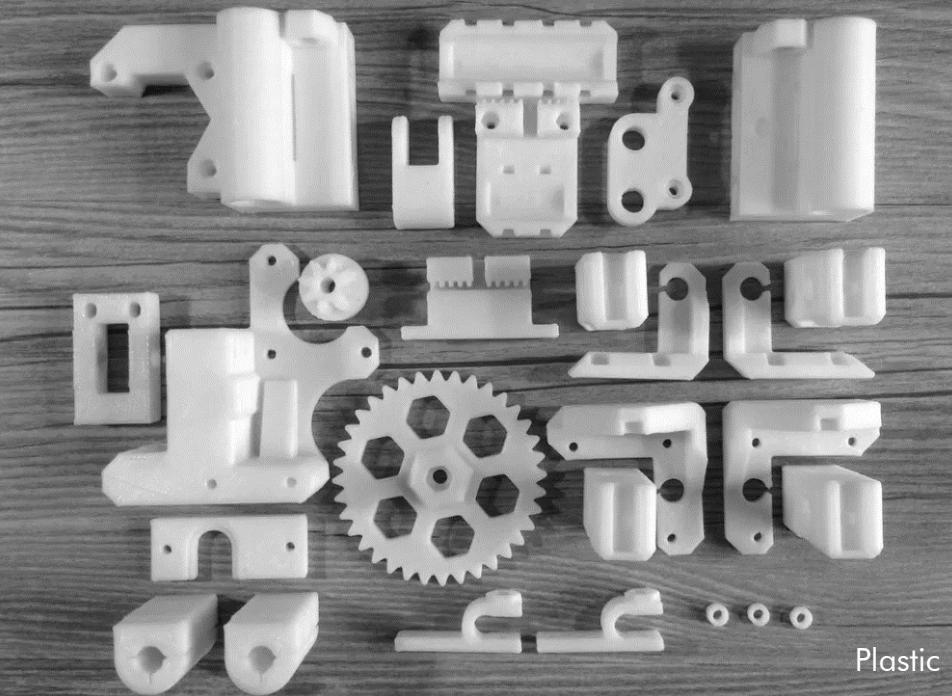
- Readily-available material
- Material with high workability
 - Efficient techniques



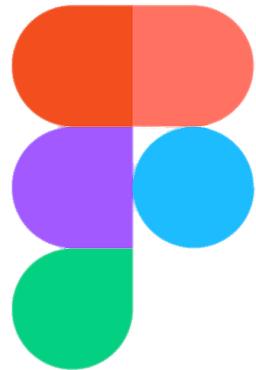
PROTOTYPE

Prototyping Material

- Paper / Cardboard
 - Foam / Clay
 - Plastic / Resin
 - Wood / Plywood
 - Fabric



PROTOTYPE



Figma

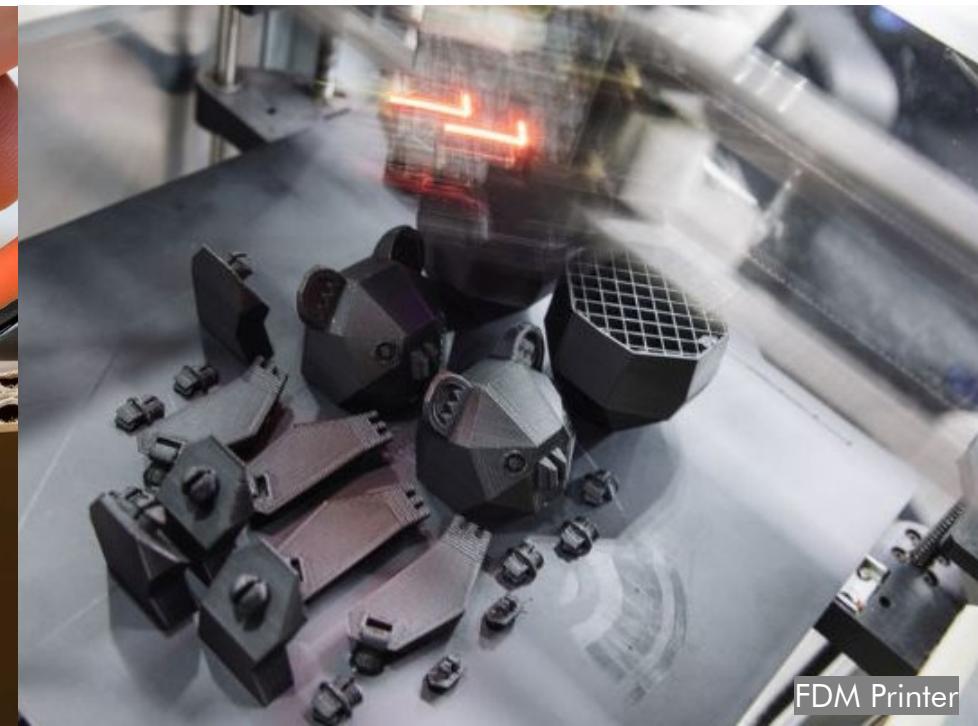


Adobe XD

Prototyping Tools



Cutting Knife and Cardboard



FDM Printer

PROTOTYPE

Why do we prototype stuff?

PROTOTYPE

Testing / Experimenting

- Ensuring the concept **work as intended**
- Checking **production feasibility**
- Learning from **real-world interaction**
- Identifying the **gap of improvement**



Feedback



CT Scan of Nike Vaporfly



Nike Vaporfly Next% Section

PROTOTYPE

Feedback

Provides

- Better understanding of the design
 - Insights for further improvement

'Fail early and re-iterate'



Nike Breaking 2



Nike Vaporfly Prototype



Nike Vaporfly Next%

PROTOTYPE

Feedback

Provides

- Better understanding of the design
 - Insights for further improvement

'Fail early and re-iterate'



Nike Breaking2



Nike Vaporfly Prototype



Nike Breaking2, 2017

PROTOTYPE

'Fail early and re-iterate'



PROTOTYPE

'Fail early and re-iterate'



Nike AlphaFly Next% 2, 2022

PROTOTYPE

'Fail early and re-iterate'



Eliud Kipchoge, Ineos 1:59 Challenge, 2019

PROTOTYPE

Types of Prototype

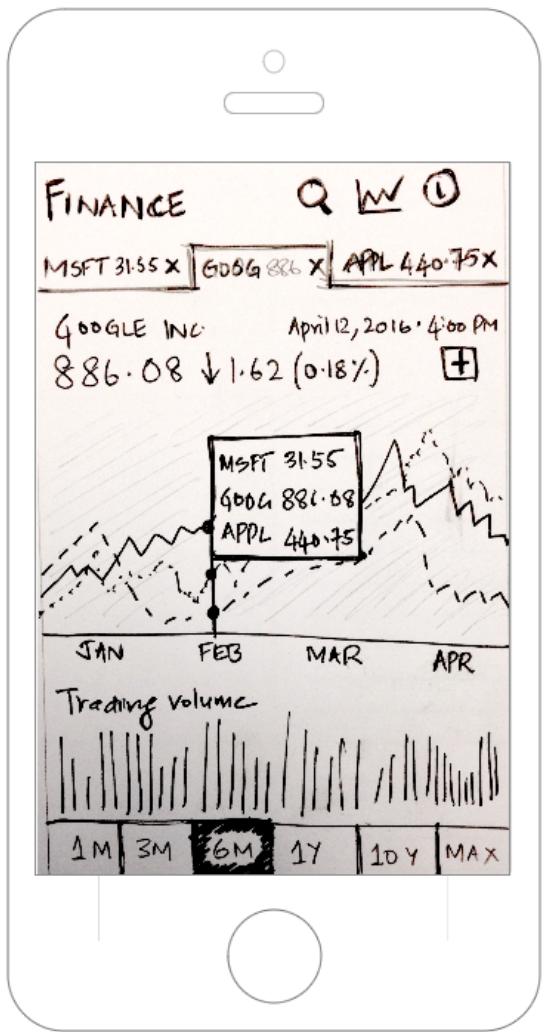
PROTOTYPE

'Fidelity'

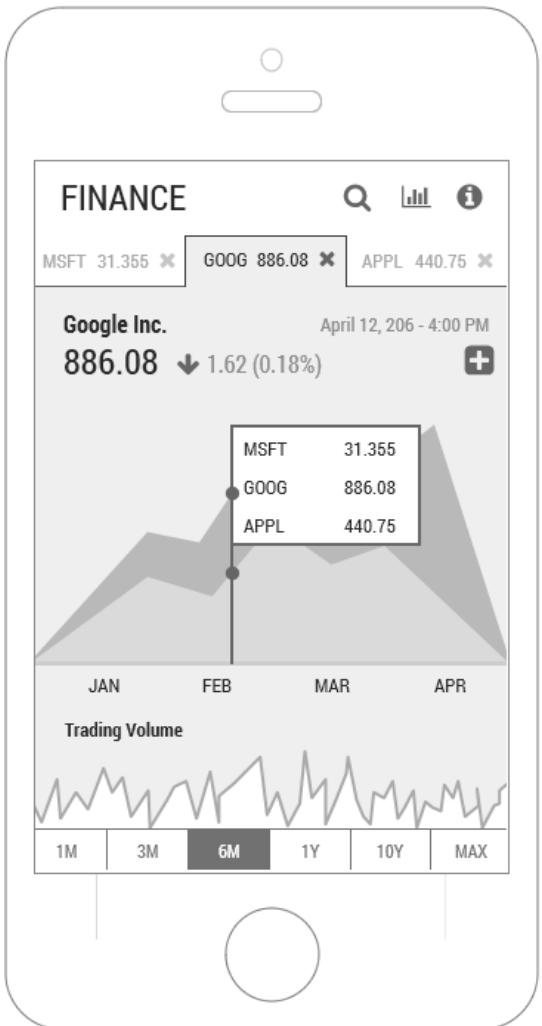
PROTOTYPE

Fidelity

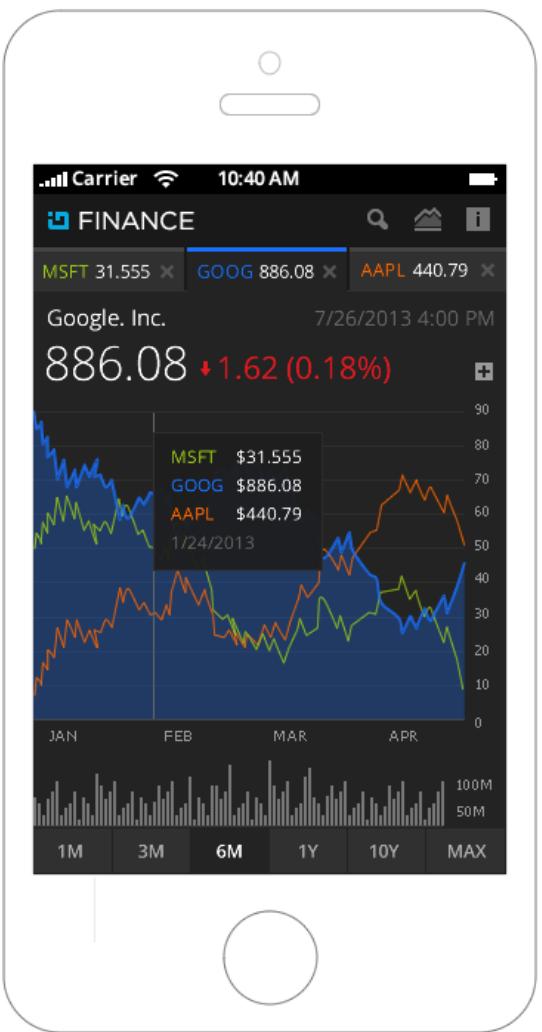
- The fidelity of a prototype refers to how it conveys the **look-and-feel** of the final product
- Level of **detail and realism**
- Fidelity typically increase from **low to high** as the design progress



Low Fidelity



High Fidelity

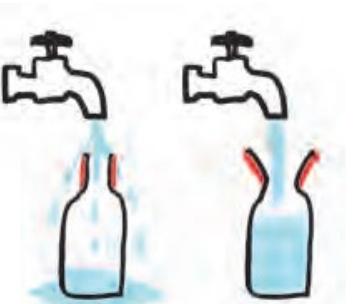


PROTOTYPE

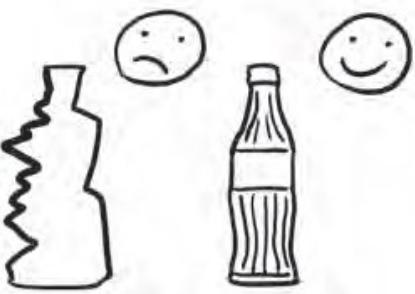
Critical Experience Prototype
(CEP)

/

Critical Function Prototype
(CFP)



Critical Experience - **Filling**



Critical Experience - **Forms**



Aston Martin Valhalla

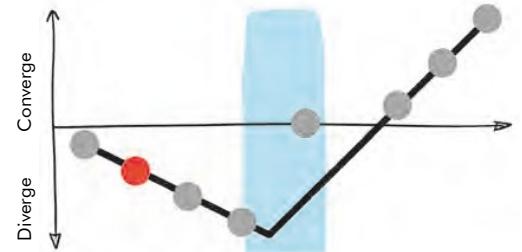
- Use for testing the critical function or critical experience of the design
- Provoke general understanding (tactile/formal understanding)



Critical Function - **Griping**



Critical Function - **Opening**

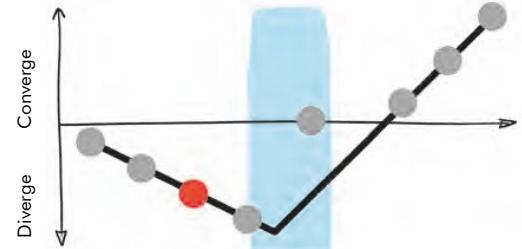
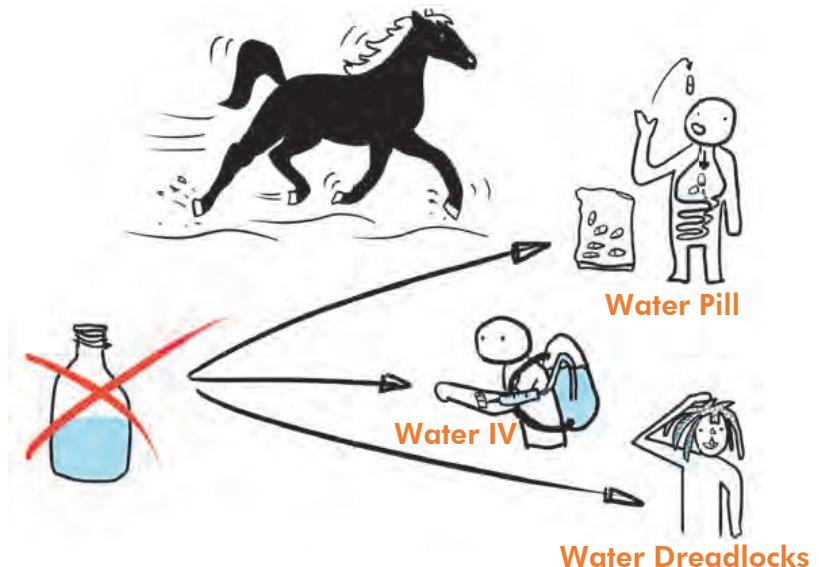


BMW 5 Series Mule Car

PROTOTYPE

Dark Horse Prototype

- Try out unorthodox ways/solutions to the problem
- Break away from the norm or comfort zone
- Be creative/speculative



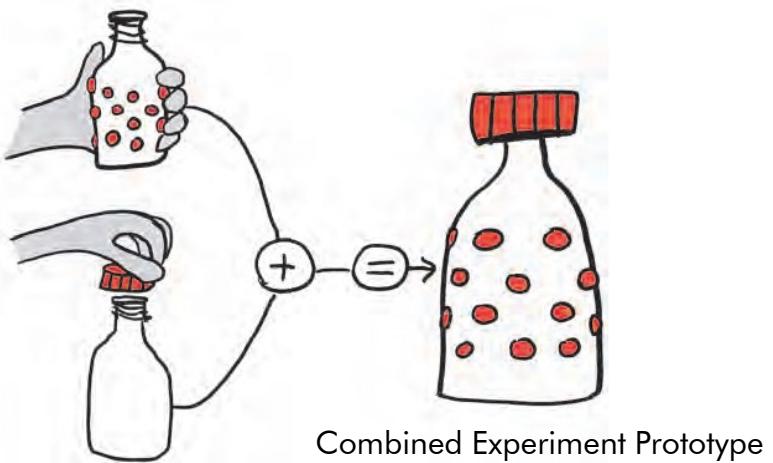
PROTOTYPE

Combined Experiments Prototype

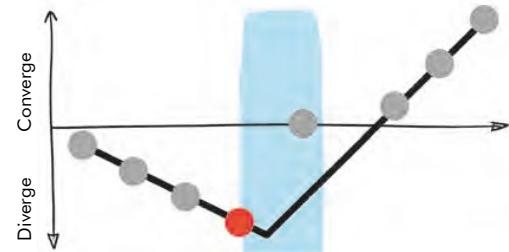
'Funky Prototypes'

- Combined testing of the features
 - Initial vision of the final objective/design
- Gain more certainty about the critical elements of the solution

Critical Function - **Gripping**



Critical Function - **Opening**



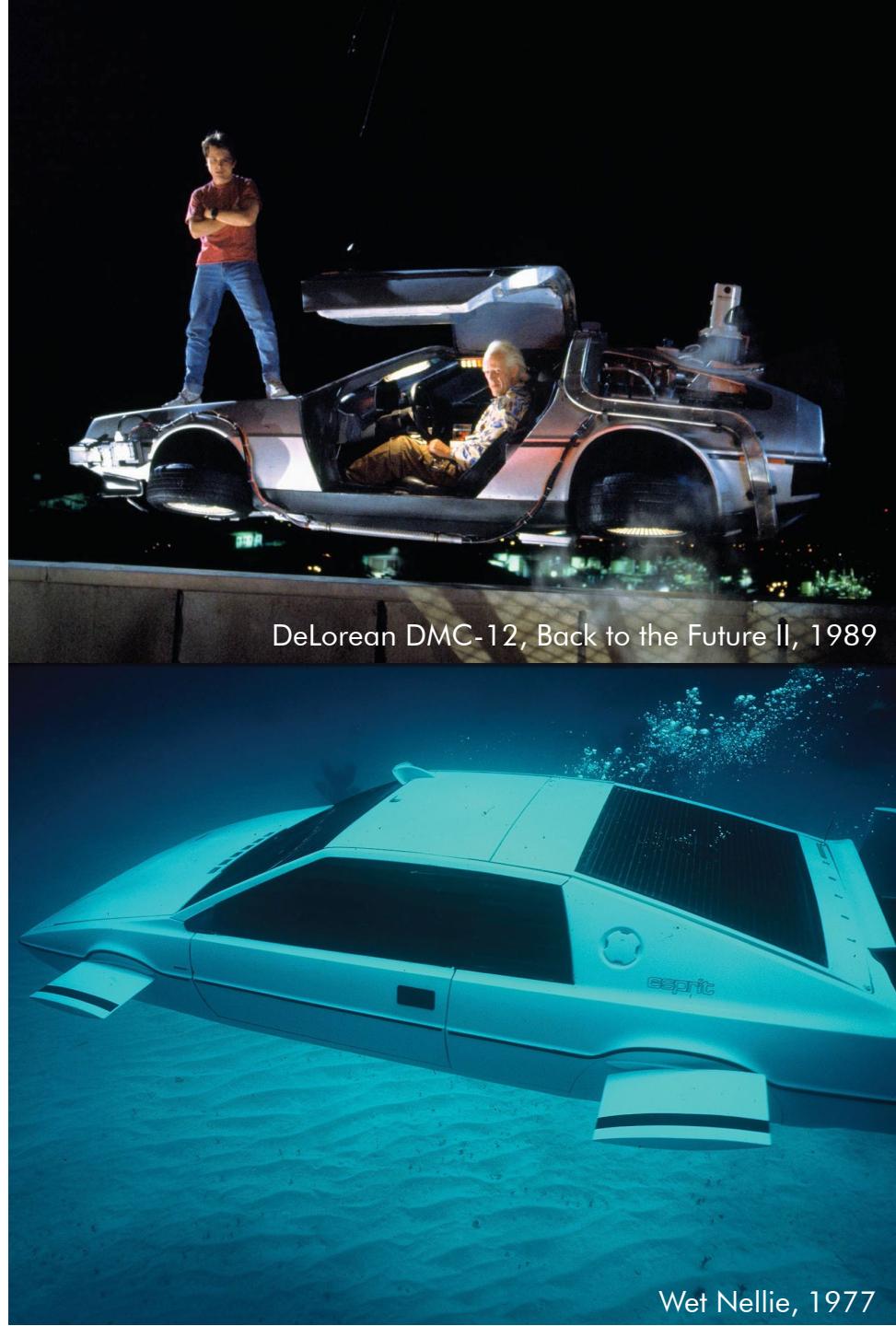
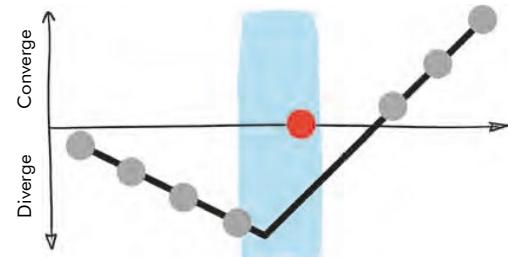
PROTOTYPE

Vision Prototype

- Visions or concepts on how to solve/address the problem
 - Yet to address all of the feasible aspects
 - Transition from problem exploration to problem solution



Vision – Water companion,
lightweight, always available



DeLorean DMC-12, Back to the Future II, 1989

Wet Nellie, 1977

PROTOTYPE

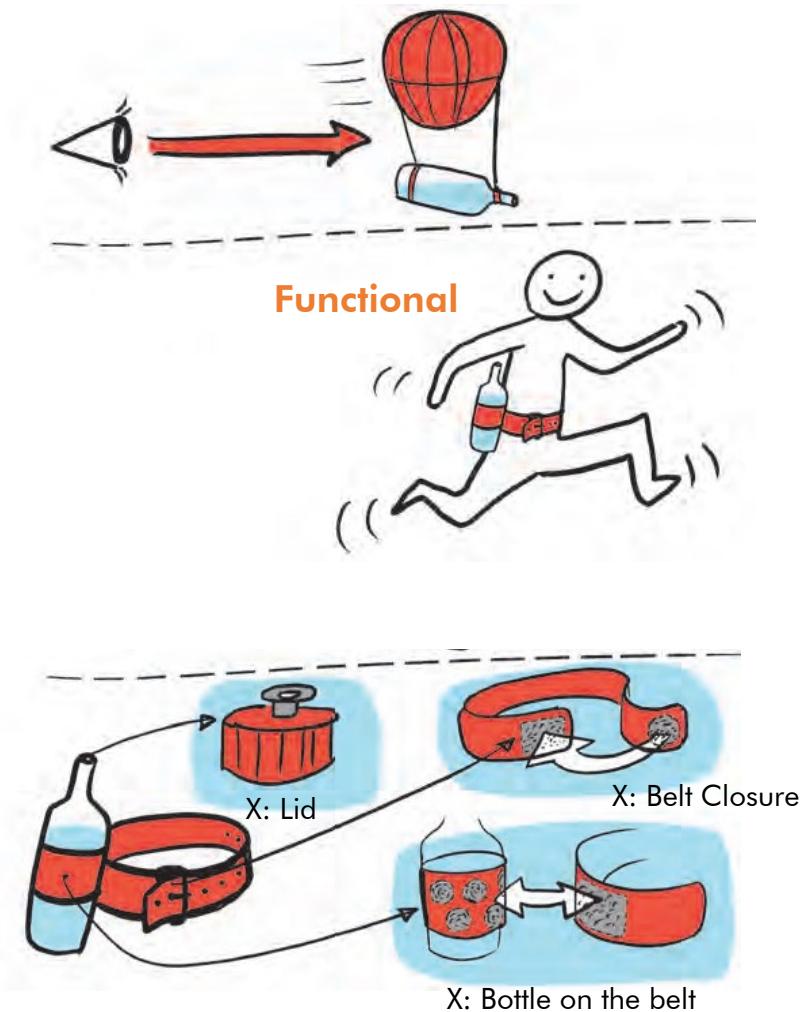
Functional Prototype

/

X is finished Prototype

- Implementing the first steps of the described vision
- A step closer to the minimum viable product (MVP)

-
- Gain certainty about important sub-functionalities
 - Describe the elements that are essential for the overall function of the solution in as much detail as possible.



BMW Vision Next 100, 2016

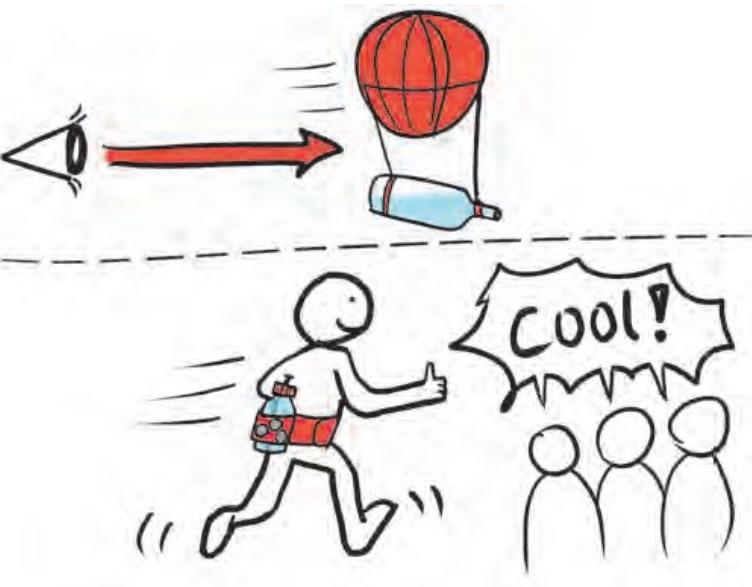


BMW Vision Next 100 Interior, 2016

PROTOTYPE

Final Prototype

- The final prototype concludes the phase of problem solving
- Create an elegant ultimate solution for the needs and problems
 - Achieve the minimum viable product (MVP)



Tesla Cybertruck Prototype, 2019



Tesla Roadster II Prototype, 2018

PROTOTYPE

'You either love it, change it, or leave it.'

BREAK

SPECULATIVE
DESIGN

WORKSHOP

SPECULATIVE DESIGN

WORKSHOP

- Project group
- 2 Submissions at the end of the session
 - Everyone needs to submit

IDEAS
GENERATION
PART I

PROTOTYPES
DEVELOPMENT
PART II

Imagine the year
2040

2006



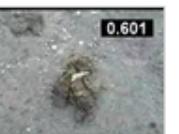
The Original iPhone, 2006

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[of London](#)
01:16
From: TVTRecords



[Space Camp](#)
02:05
From: mylkhead

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[man catches cobra in mouth!](#)

00:12

A preformer in Thailnad cathches a cobra in his mouth.

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[Impersonation](#)

01:16

Impersonation of celebs.

Tags: [Celebrities](#) [Impersonation](#) [Forest](#) [Gump](#) [Shawn](#) [Cannery](#) [Seinfeld](#) [Matrix](#) [Agent](#) [Smith](#) [Mr.](#) [Anderson](#)

Added: 2 months ago in Category: [Comedy](#) [Entertainment](#)

From: [chameleonfx611](#)

Views: 28,724



576 ratings



[Peixes ao redor](#)

01:45

Cardume de peixe em uma das praias de Pernambuco. Eles comem em nossa mão. Férias em dez 2005

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Big Bang, 2006

Imagine the year
2040



Blade Runner 2049, 2017



Blade Runner 2049, 2017



Back to the Future Part II, 1989



HER, 2013

SPECULATIVE DESIGN

In the year
2040



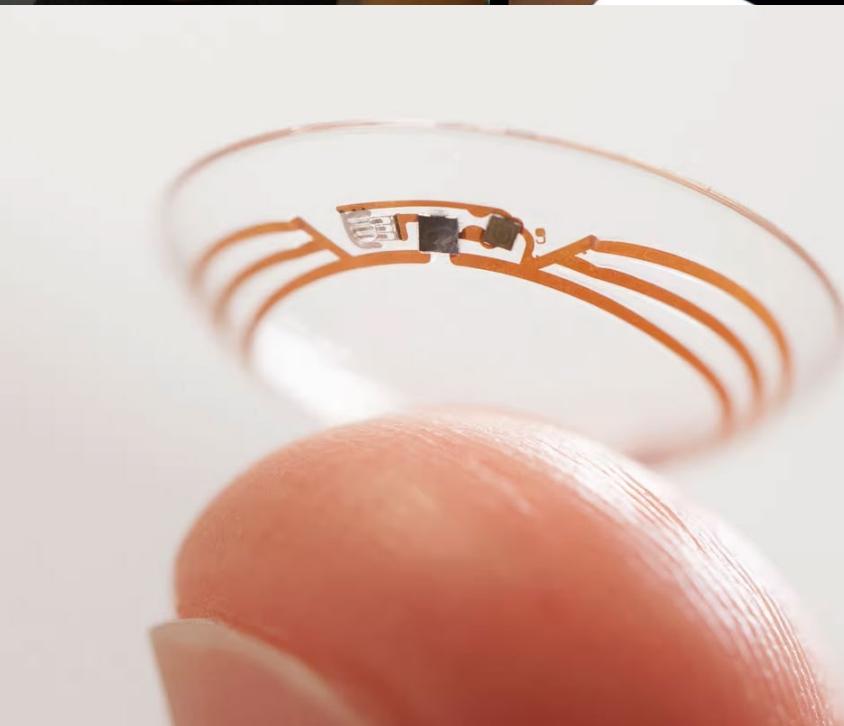
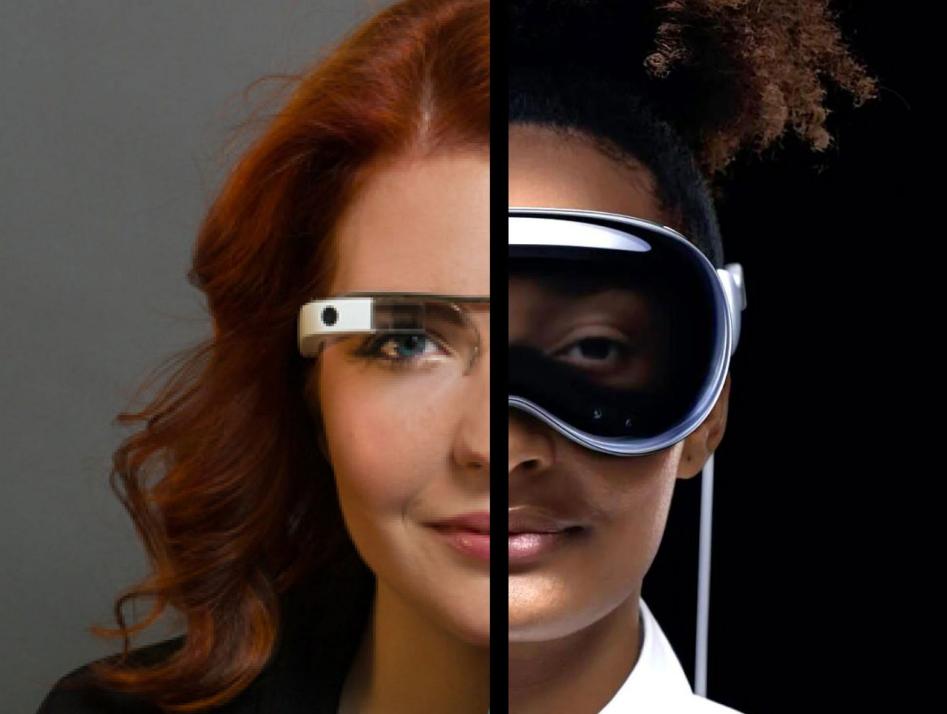
Blade Runner 2049, 2017

TOPIC

#1

Future

'Mobile Phone Device'



TOPIC

#2

Future
'Transportation'



TOPIC

#3

Future
'Food'



TOPIC

#4

Future
'Education'



TOPIC
#?

Future

'.....'

?

IDEAS
GENERATION
PART I

IDEAS
GENERATION

BRAINSTORMING

IDEAS
GENERATION



IDEAS GENERATION

Topic discussion/ selection	Research on selected topics	'Speculated Designs' proposals	Identify Problems & Causations	Create & Rate Solutions
5 Mins	10 Mins	10 Mins	10 Mins	10 Mins

IDEAS GENERATION

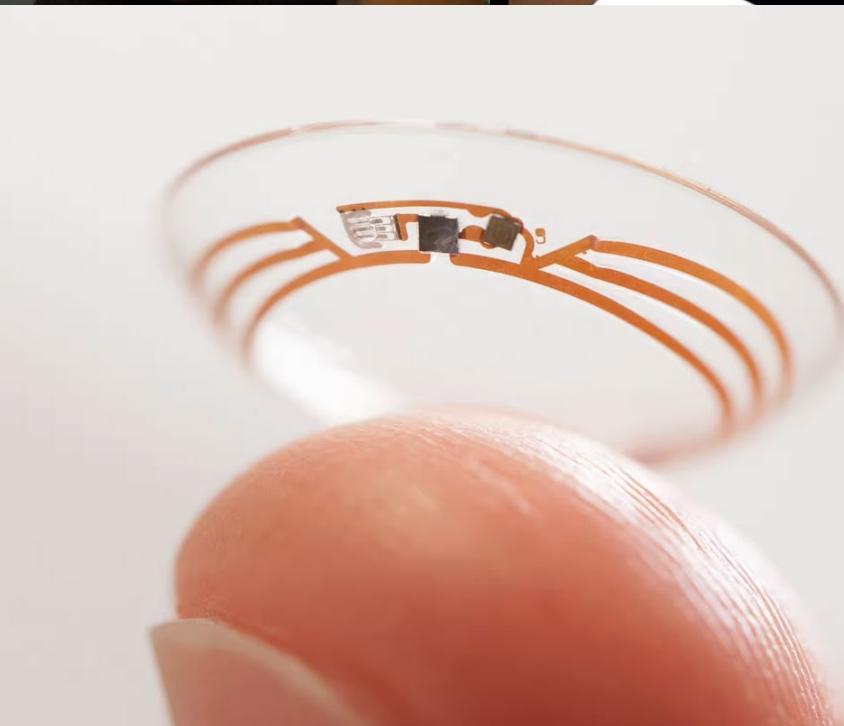
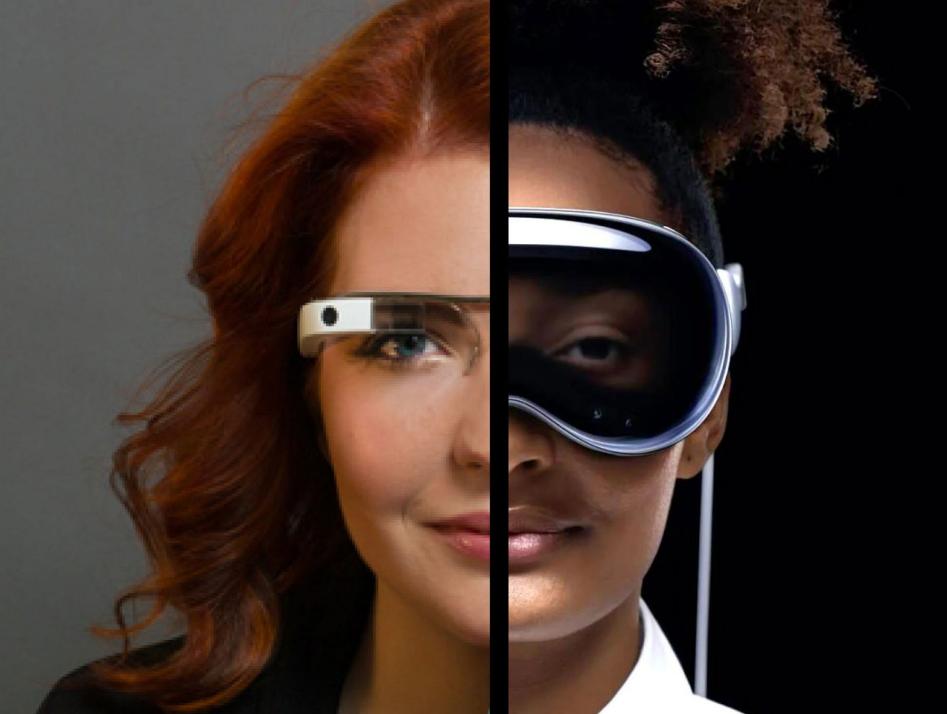
Topic discussion/ selection	Research on selected topics	'Speculated Designs' proposals	Identify Problems & Causations	Create & Rate Solutions
5 Mins	10 Mins	10 Mins	10 Mins	10 Mins

TOPIC

#1

Future

'Mobile Phone Device'



TOPIC

#2

Future
'Transportation'



TOPIC

#3

Future
'Food'



TOPIC

#4

Future
'Education'



TOPIC
#?

Future

'.....'

?

IDEAS GENERATION

Topic discussion/ selection	Research on selected topics	'Speculated Designs' proposals	Identify Problems & Causations	Create & Rate Solutions
5 Mins	10 Mins	10 Mins	10 Mins	10 Mins

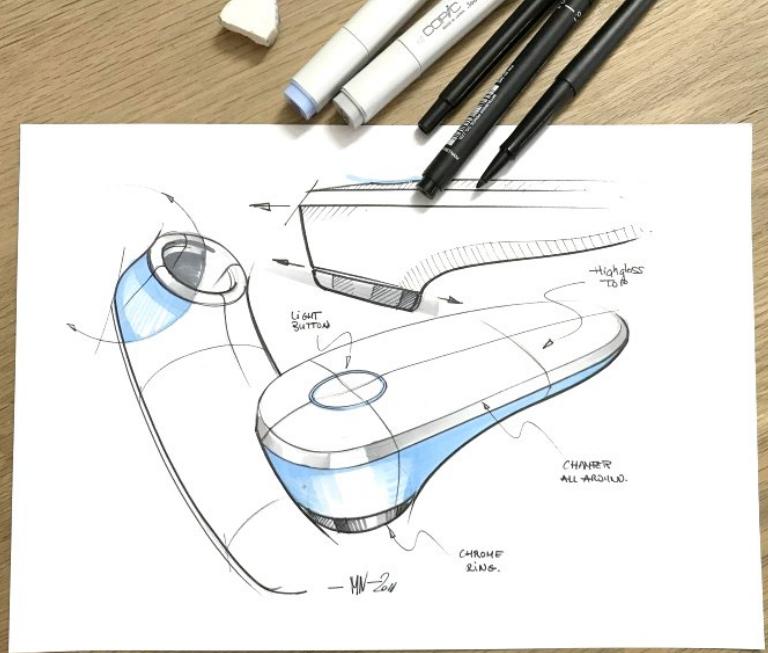
IDEAS GENERATION

Topic discussion/ selection	Research on selected topics	'Speculated Designs' proposals	Identify Problems & Causations	Create & Rate Solutions
5 Mins	10 Mins	10 Mins	10 Mins	10 Mins

SPECULATED DESIGNS

Come up with at least 3 design variations/concepts

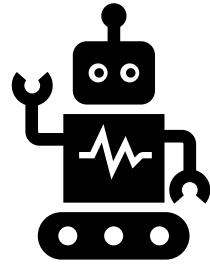
- Concept Sketches
- Simple Collages
- Verbal Descriptions



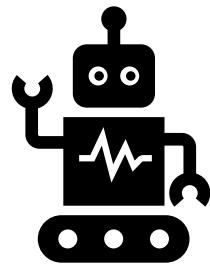
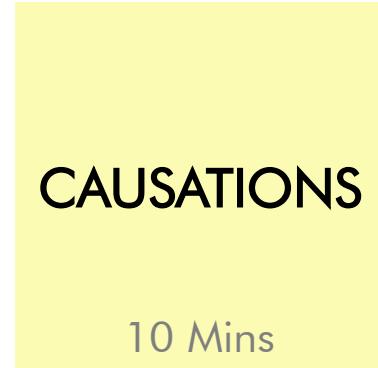
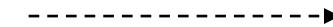
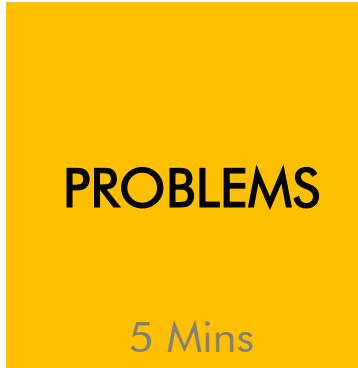
IDEAS GENERATION

Topic discussion/ selection	Research on selected topics	'Speculated Designs' proposals	Identify Problems & Causations	Create & Select Solutions
5 Mins	10 Mins	10 Mins	15 Mins	10 Mins

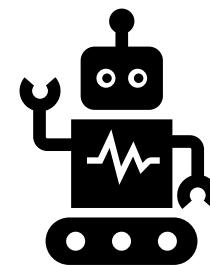
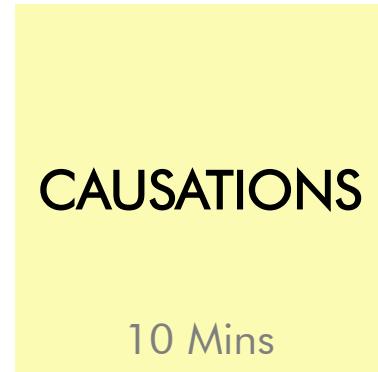
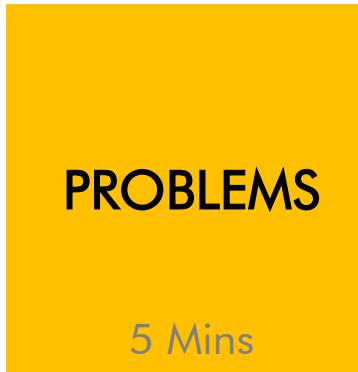
IDEA GENERATION



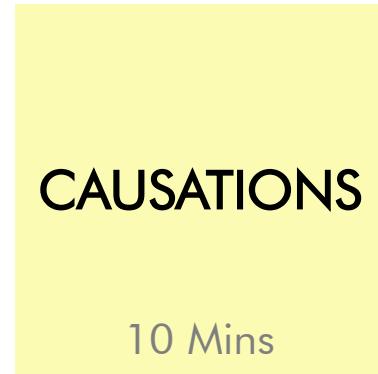
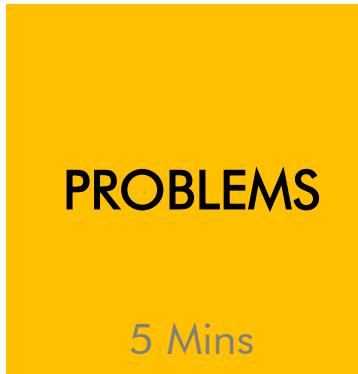
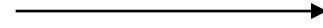
Speculated Design #1



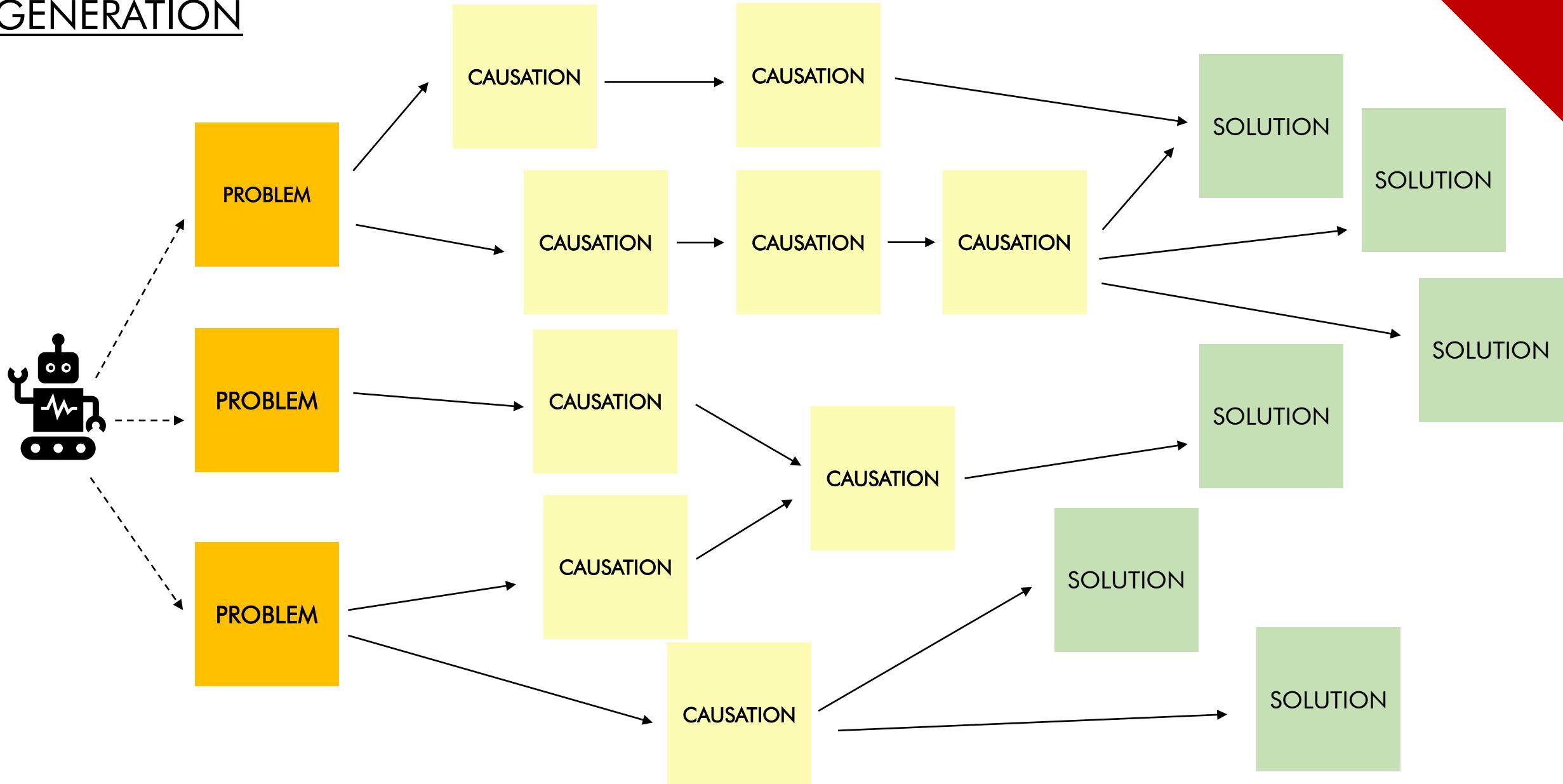
Speculated Design #2



Speculated Design #3



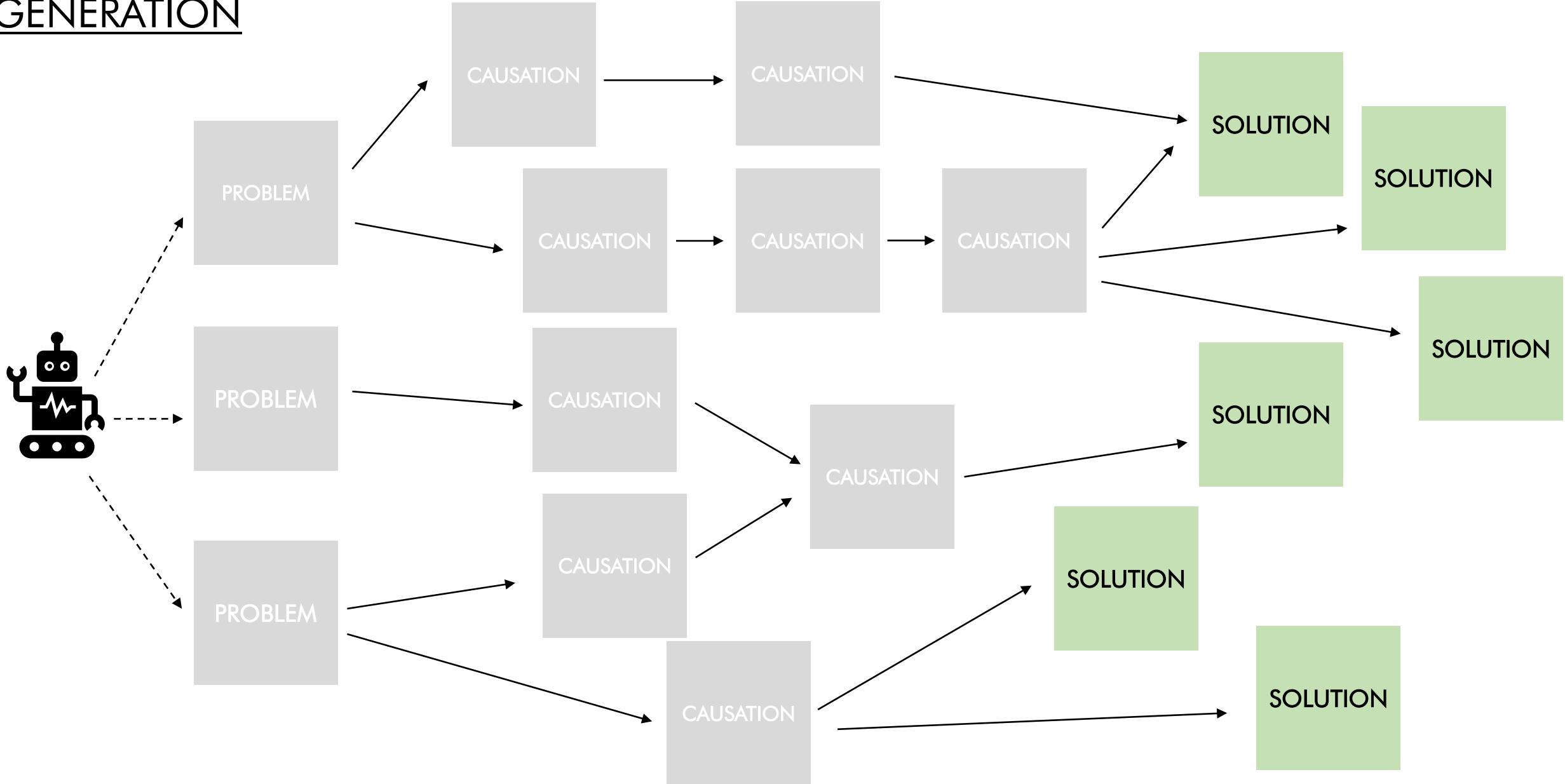
IDEA GENERATION



IDEAS GENERATION

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IDEA GENERATION



IDEA GENERATION

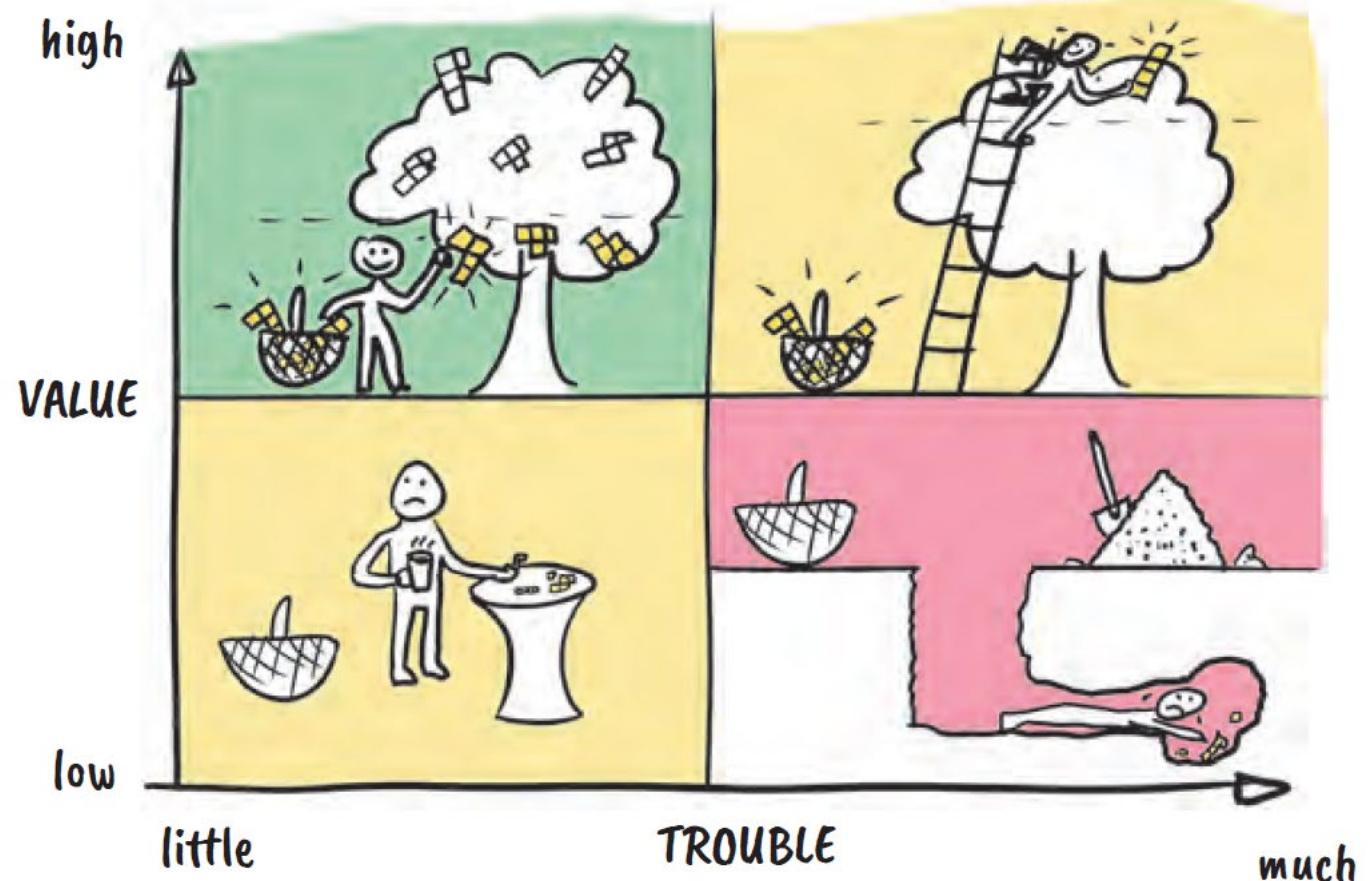
Group/classify the solutions into matrix

- Arrange the solutions (green post-its)

SOLUTION

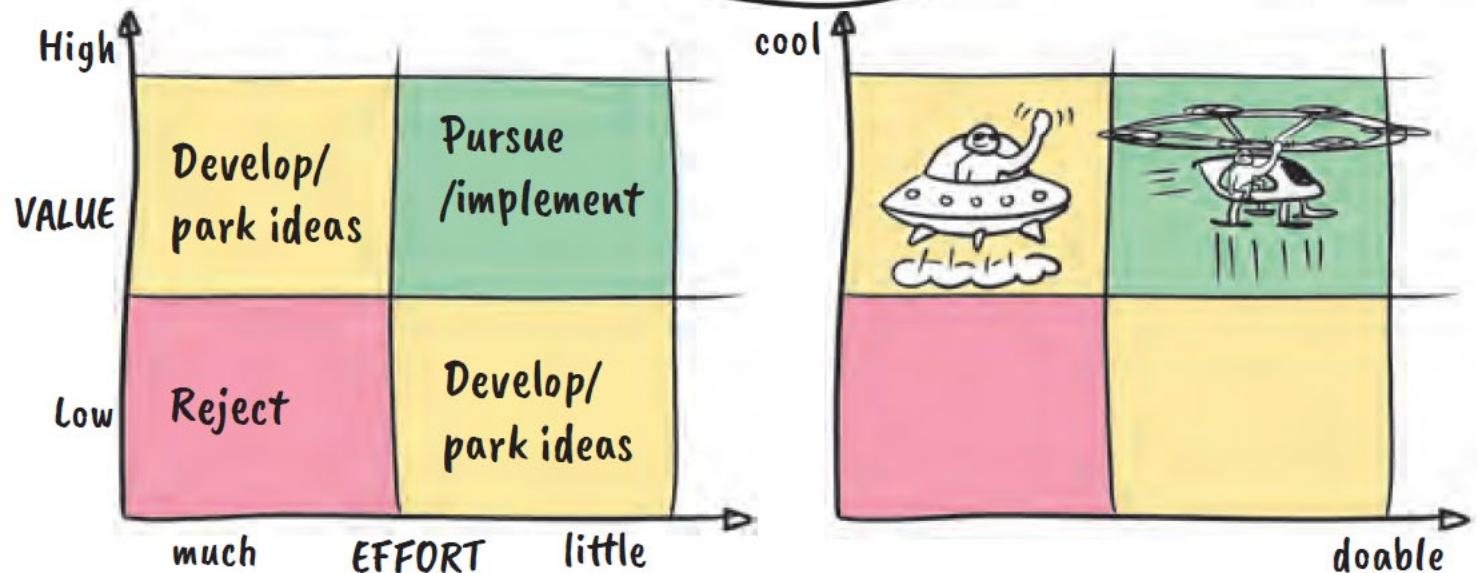
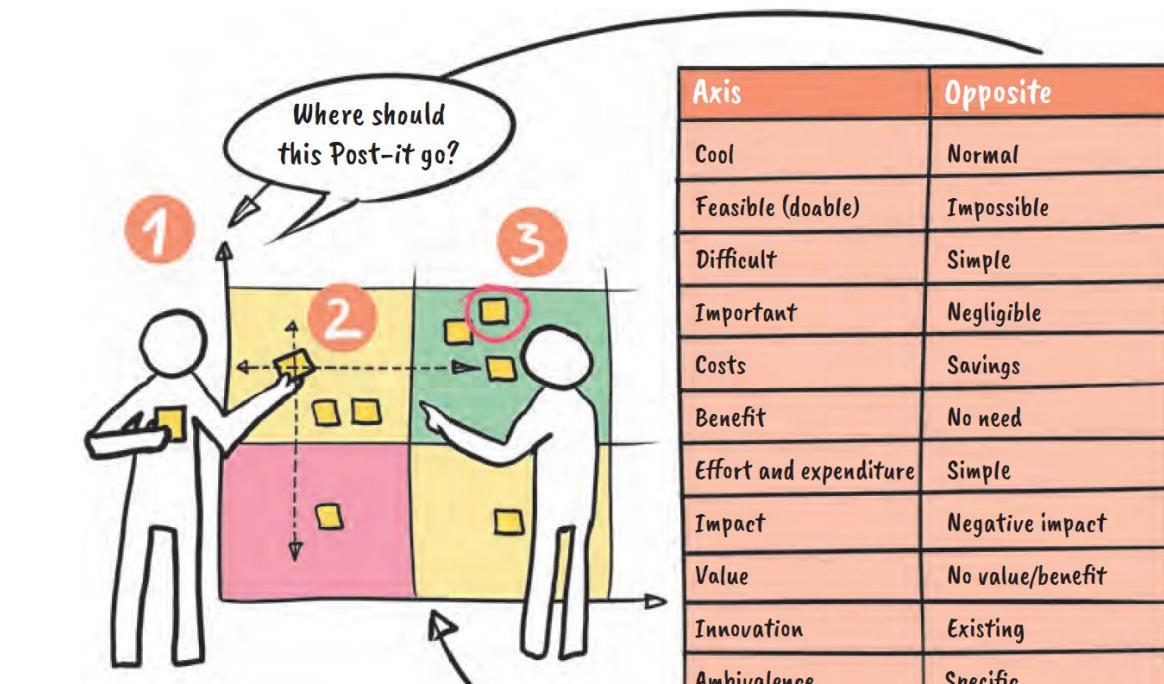
SOLUTION

SOLUTION

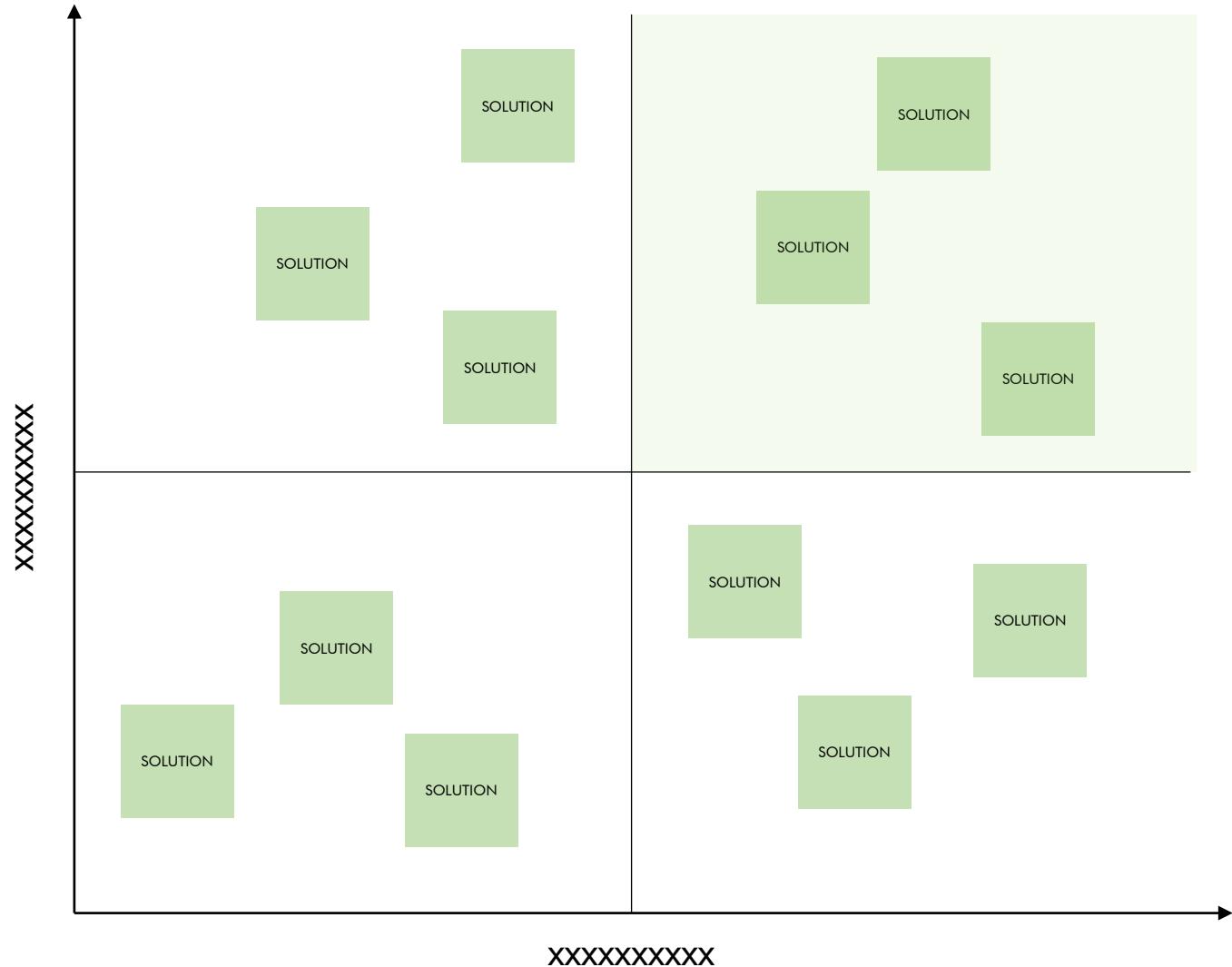


IDEA GENERATION

Define the
classification of the axes



IDEA GENERATION



PROTOTYPES DEVELOPMENT

CREATING PROTOTYPES

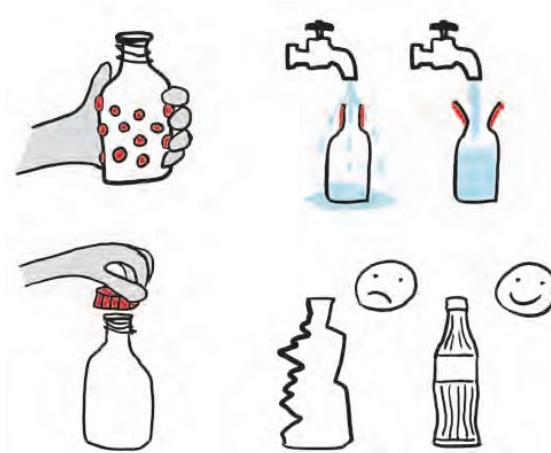
PROTOTYPES DEVELOPMENT

Identifying
'Prototypes'

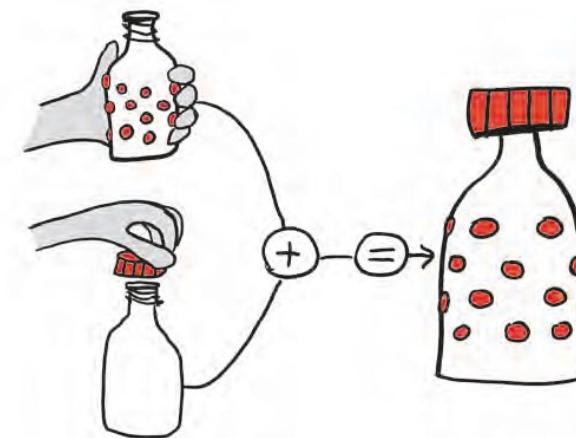
PROTOTYPES DEVELOPMENT

Focused Experiment CEP & CFP	Crazy Experiment Dark Horse	Combined Experiment 'Funky'	Imagining the Future 'Vision'
10 Mins	10 Mins	5 Mins	10 Mins

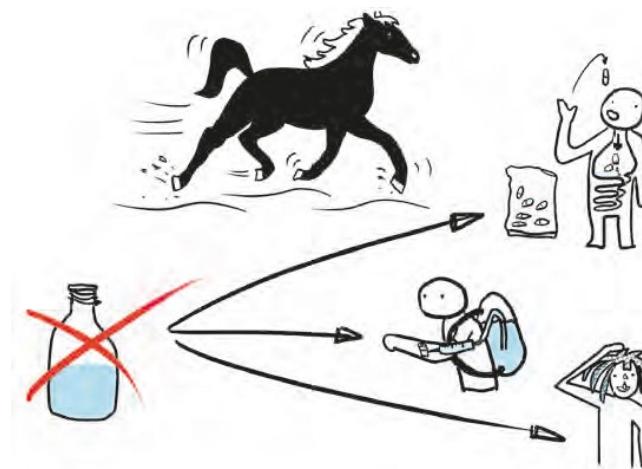
FOCUSED EXPERIMENT



COMBINED EXPERIMENT



CRAZY EXPERIMENT



IMAGINING THE FUTURE



PROTOTYPES DEVELOPMENT

Focused Experiment CEP & CFP	Crazy Experiment Dark Horse	Combined Experiment 'Funky'	Imagining the Future 'Vision'
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FOCUSED EXPERIMENT

COMBINED EXPERIMENT

CRAZY EXPERIMENT

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COMBINED EXPERIMENT

CRAZY EXPERIMENT

IMAGINING THE FUTURE

Don't forget to submit the workshop!

(Everybody needs to submit)

Happy Holidays!