EXPLORE AI ACADEMY

The art of asking the right question - Workshop 2

Defining a Problem Statement

Overview

01. Context

02. Example use case

03. Principles for problem solving

04. Conclusion

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Why is this important

"The biggest mistake I see new programmers make is focusing on learning syntax instead of learning how to solve problems."

— V. Anton Spraul

Effective problem solving requires a **structured**, **transferable**, **logical** approach.

It can be done through critical evaluation of a problem – known as **critical thinking**.

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So what is critical thinking anyway?

"**Thinking about**, monitoring, and regulating our own **thinking**."

Logical & reflective thinking

Looking at your results along the way

Awareness

Appropriate action

Range of flexible strategies

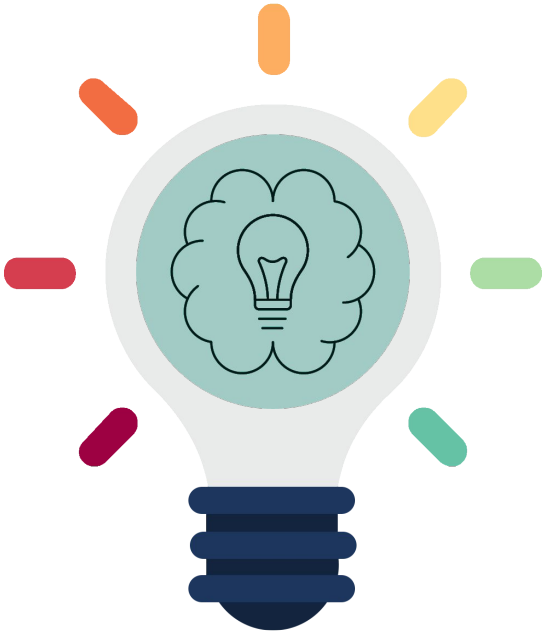
Metacognition involves being aware of how efficient we are in applying certain strategies to complete a task.

How does it help me to solve a problem?

CRITICAL THINKING

Gives you an **intellectual toolset** that can be applied to any problem.

Ensures you **consider all parts** of the problem.



Ensures that you **correctly define** the problem.

Ensures you produce the **best solution** for a problem.

METACOGNITION

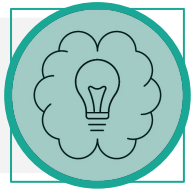
But first, try on your own

Scenario: A few of your colleagues really need coffee to get those neurons firing for a big project you're working on. They've asked you to take control of the situation.

Information: The office has a kitchen with a coffee machine and all the necessary ingredients to make coffee. You also know of a great takeaway coffee shop around the corner from the office. Make as many assumptions as you think are necessary.

Write down the steps you need to take to solve this "problem". 5 min

Try to recognise the implicit processes you follow while writing down these steps.



Let’s reflect...

01. Am I looking at this project from the correct perspective?

02. Is this the best way to carry out this project?

03. Did I miss any critical information, should I re-evaluate the scope?

04. Did I follow an appropriate cognitive and logical process?

05. What are we trying to solve?

When you DON’T understand the problem

airbnb

Lenny Rachitsky (former developer at Airbnb)

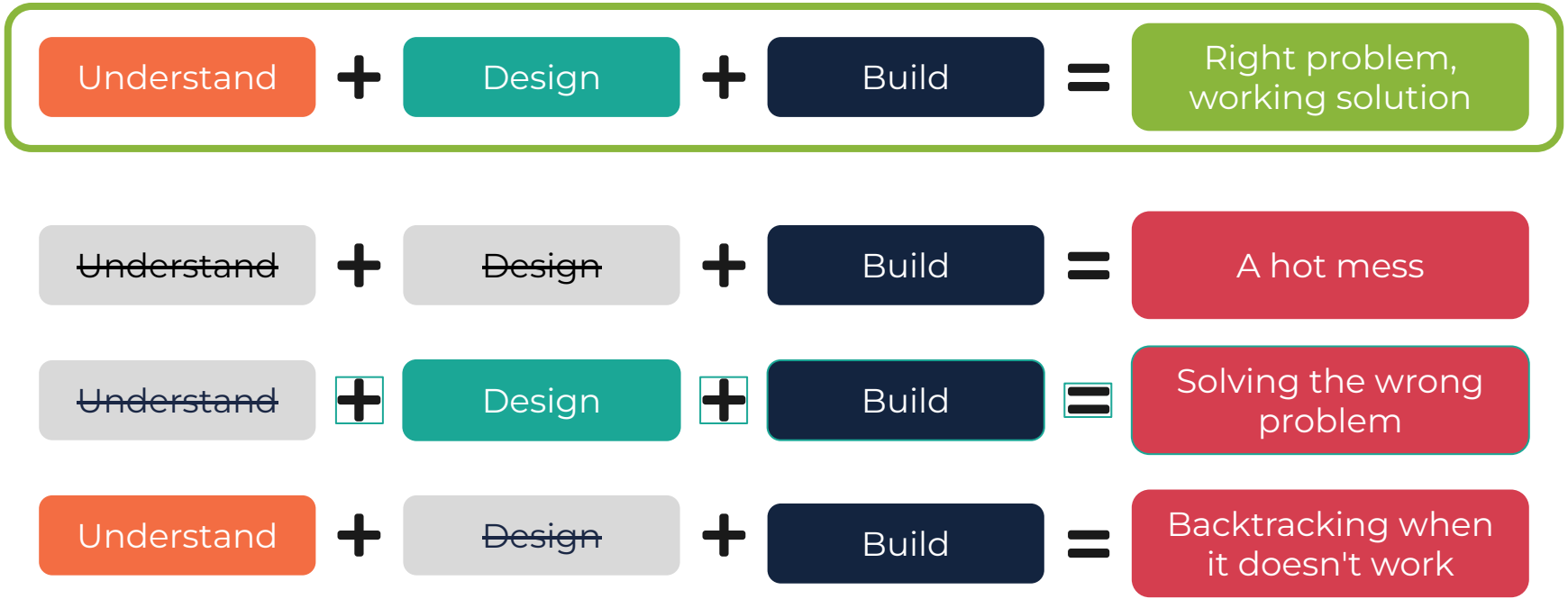
Build out a “social travel” experience for Airbnb travellers.

The problem:	“travellers want to hang out with other travellers.”
The **REAL** problem:	“travellers want to find high-quality, non-touristy things to do.”

“...nothing is more certain to cause a project to fail than a misunderstanding of the problem you are solving.”

A three-step approach to problem solving

Lenny's three-step process:



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Problem-solving steps to follow

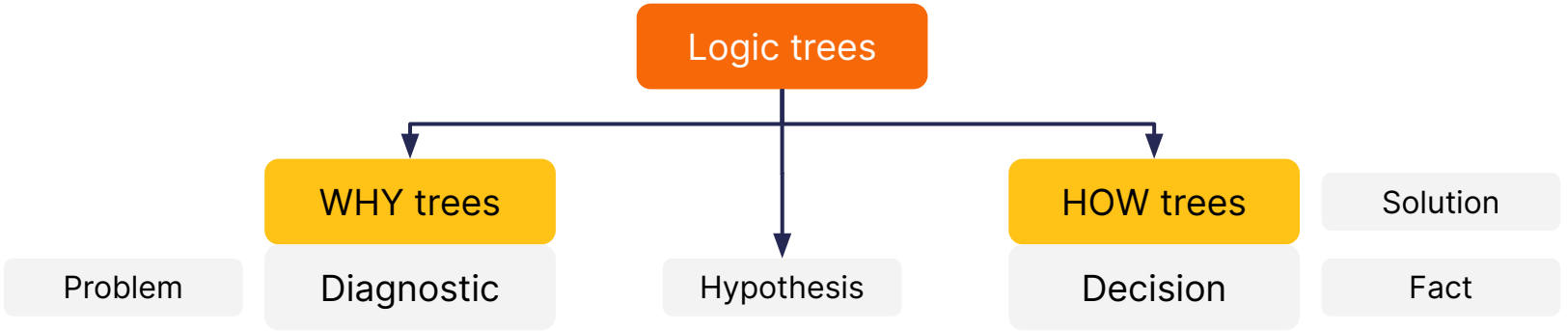
UNDERSTAND THE PROBLEM	1	**Understand** the problem in detail. What is the desired outcome?
	2	Write down a **problem statement**, making sure there is no ambiguity.
FIND THE FACTS	3	List the potential options/solutions using a **logic tree**.
	4	Consider the pros and cons of each potential solution.
IMPLEMENT & REVIEW	5	Select the best option and build that solution.

Methodologies

Logic trees	A fundamental problem-structuring framework for solving complicated problems.
EGAD	A framework to guide problem solving in larger projects.
Agile	A framework to effectively manage a project. Mostly used by developers, but can be applied to almost anything.
Design Thinking	A solution-based approach to solve complex, ill-defined problems.
Scientific Method	A logical problem-solving approach that is rigorous and replicable – used by scientists.
Root cause analysis	A problem-solving method used to identify the root causes of problems.

Logic Tree

> A tool used to **systematically visualise** all the possible **problems**, **solutions**, or **hypotheses** in order to understand a problem.



Goal: Search for all the possible **causes** of the problem.

Goal: Search for all the possible **solutions** to the problem.

Logic Trees

How to solve the traffic congestion problem in Los Angeles

Elon's logic:

How to solve traffic congestion?

- Reducing demand for cars → *Hard to do so, and impossible from an engineering perspective – must change the culture.*
- Increasing road capacity for cars
  - On-ground capacity (building more roads) → *There's a limit to how many roads you can build.*
  - On-air capacity (creating flying cars) → *Physics implies flying cars will be noisy and potentially dangerous.*
  - Underground capacity (creating tunnels) → *Possible and solves the problem, but currently too expensive.*

Agile

> An **iterative** approach to project management and software development that assists with delivering value.

Agiles Rituals

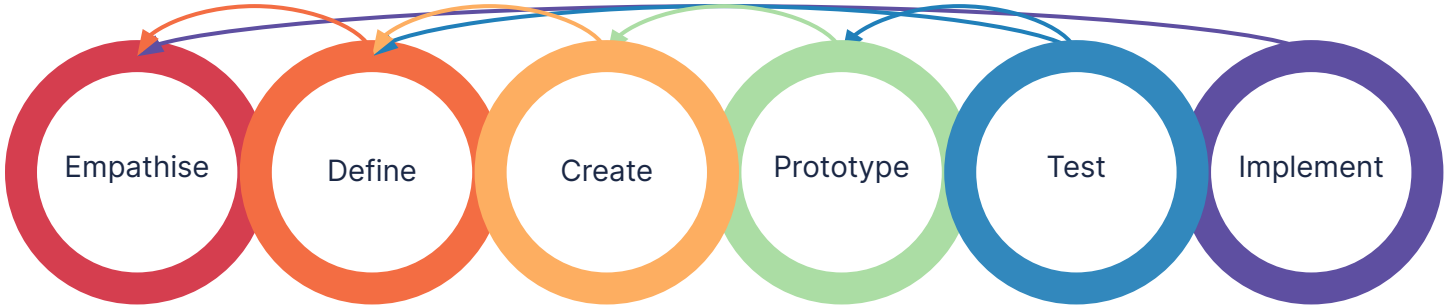
Kanban Board

User Stories

Design Thinking

> An **iterative** process to **redefine** problems, **challenge** assumptions (about the problem), and create innovative solutions.

- Iterate
- Change your mind
- Go back
- Repeat
- Innovate
- Show the world!



UNDERSTAND	EXPLORE	MATERIALISE
UNDERSTAND THE PROBLEM	**FIND THE INSIGHTS**	**IMPLEMENT & REVIEW**

Scientific Method

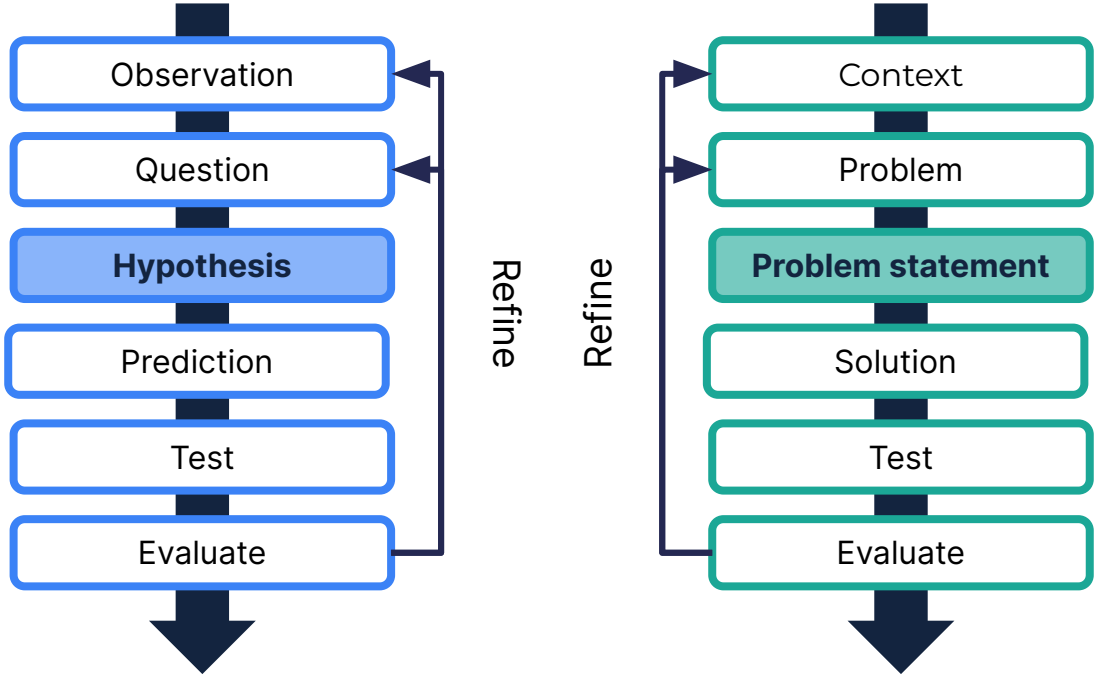
Used to construct and test **hypotheses** in a **rigorous** and **replicable** manner.

Hypothesis

A **proposed explanation** made based on limited evidence as a starting point.

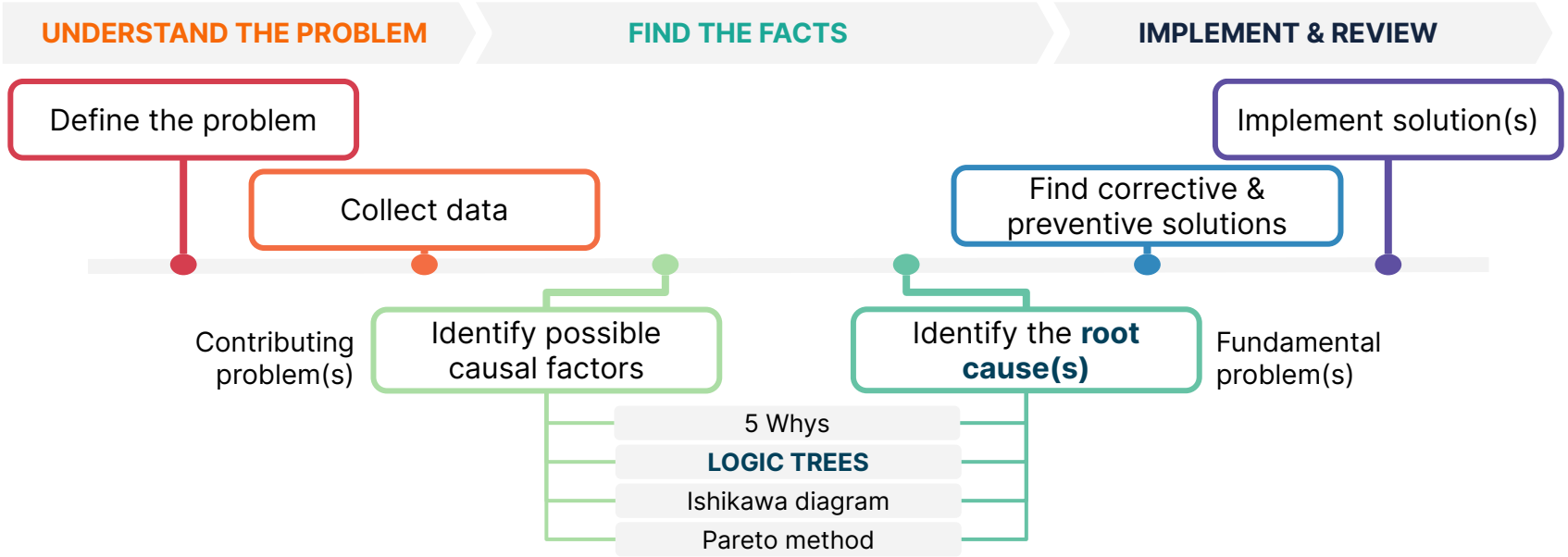
Empirical

The framework is based on **observation** rather than theory.



Root cause analysis

> A framework used to **systematically** identify and analyse the **root cause** of a problem and identify ways to resolve the problems (that lead to process failures).



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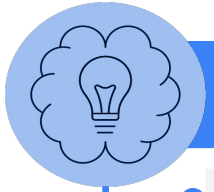
Conclusion

UNDERSTAND THE PROBLEM	The problem really does matter.
FIND THE FACTS	Be thorough, precise, and critical.
IMPLEMENT & REVIEW	Iterate, change your mind, go back, repeat, innovate!



CRITICAL THINKING → **METACOGNITION**

- Be aware
- Self-reflect
- **PRACTISE**