

+ 25

Engineers Are Users Too

A Case Study in Design Thinking for Infrastructure

GRACE ALWAN

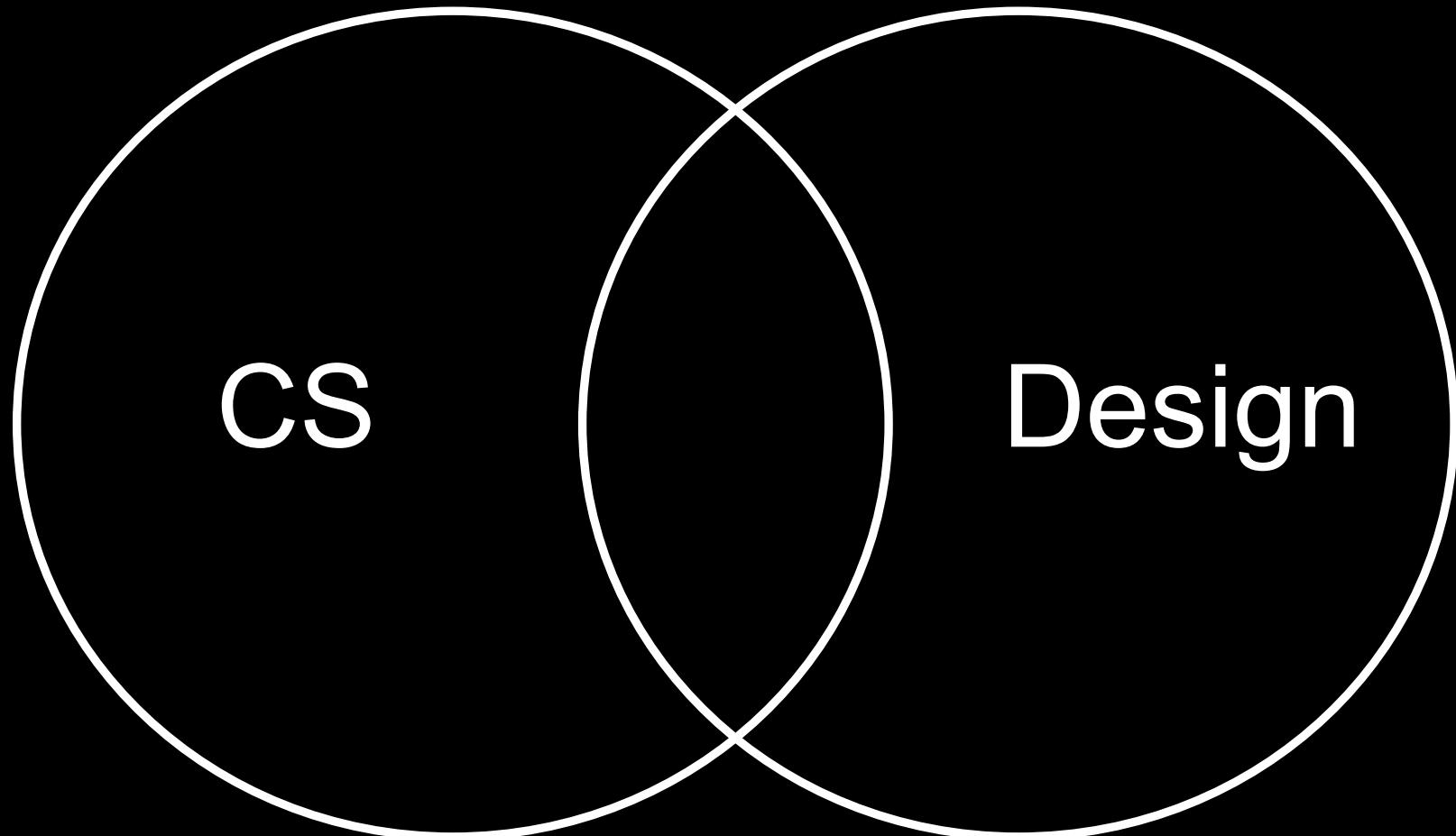


Cppcon
The C++ Conference

20
25



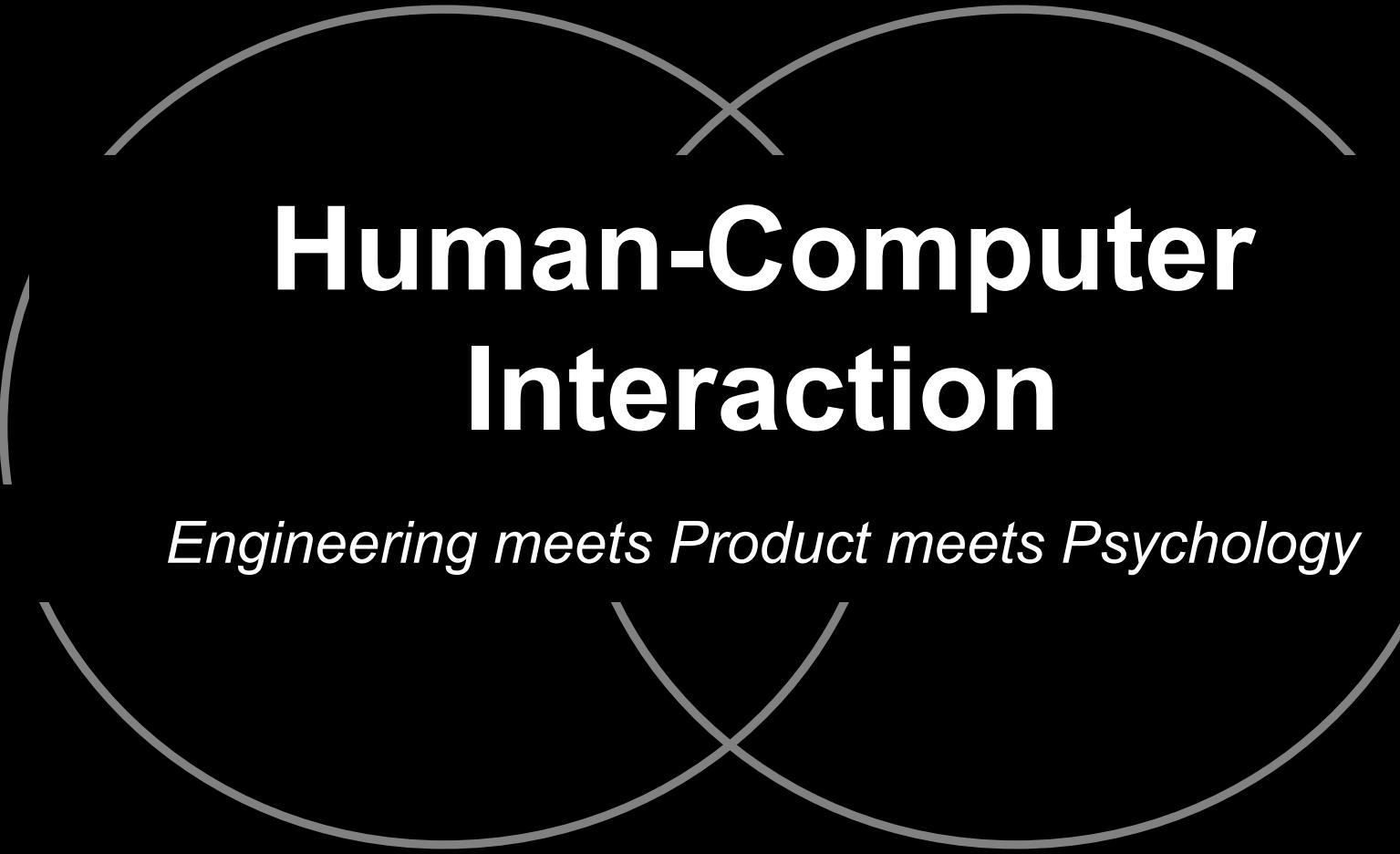
September 13 - 19



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Human-Computer Interaction

Engineering meets Product meets Psychology

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Engineer vs. UX Designer



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The Job Fair Speed Date



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Why Infrastructure Needs UX

Complex infrastructure → High Cognitive Load



Poor Developer Experience is a Design Problem

Treat it systematically with UX methods

Agenda

- The Problem
- Applying the UX Framework
 - User Interviews
 - Prototyping
 - Data Synthesis
- The Impact + How to Start

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The Problem

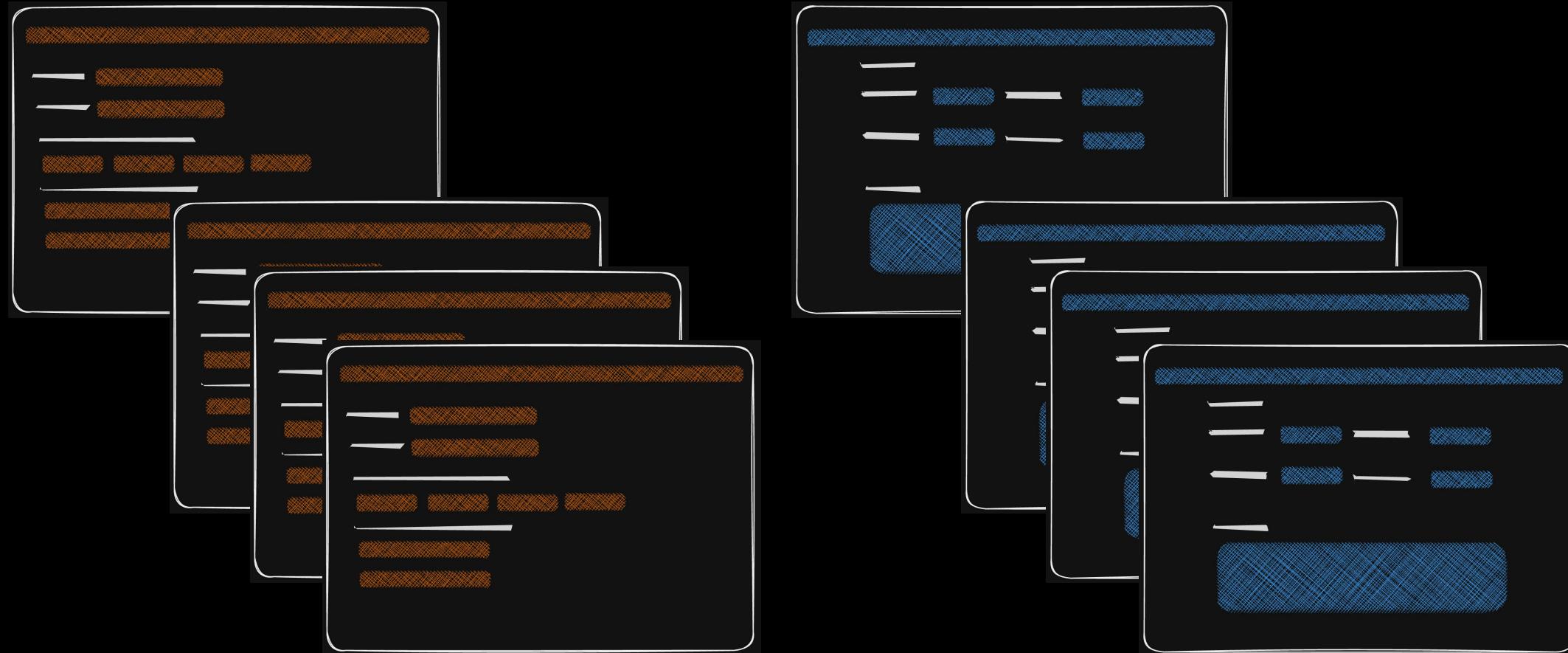
How do we set up infrastructure today?

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The ~~Tool~~ Tools Required



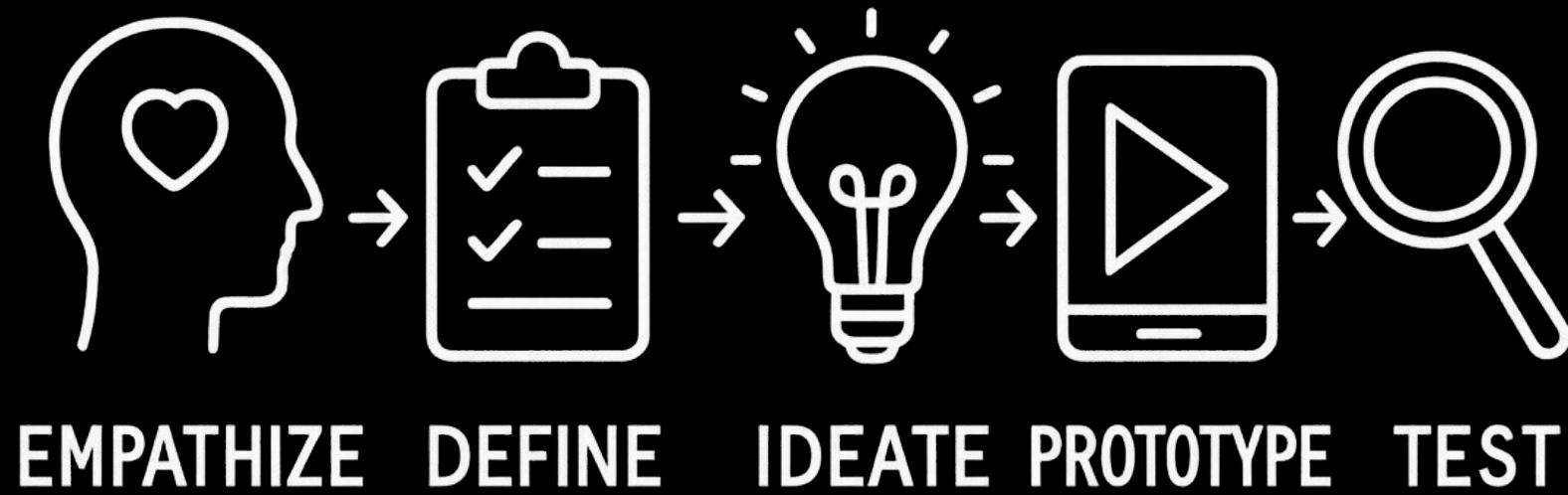
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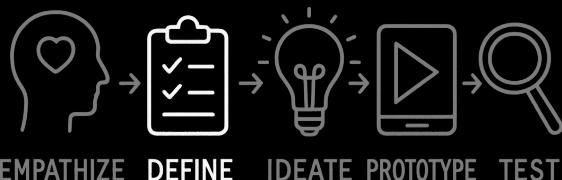
The UX Framework



Objectives

 Streamline cluster management

Prevent confusion, errors, and frustration



Hypotheses

 Centralized location

Inherit configurations from parent clusters

Autofill defaults

Questions

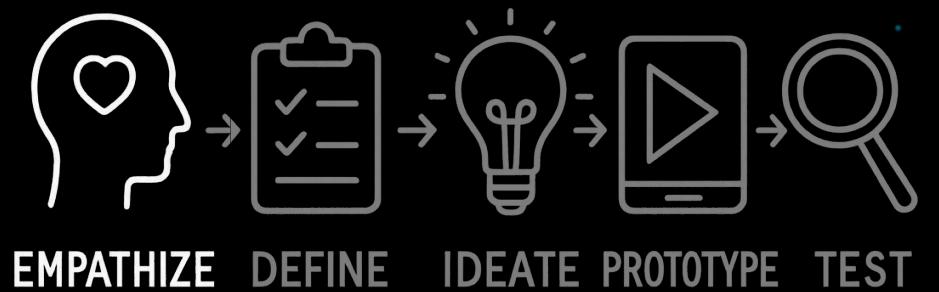
What is confusing about the current process?

What questions are we asking users that they don't understand?

Prototype testing

Interviewing

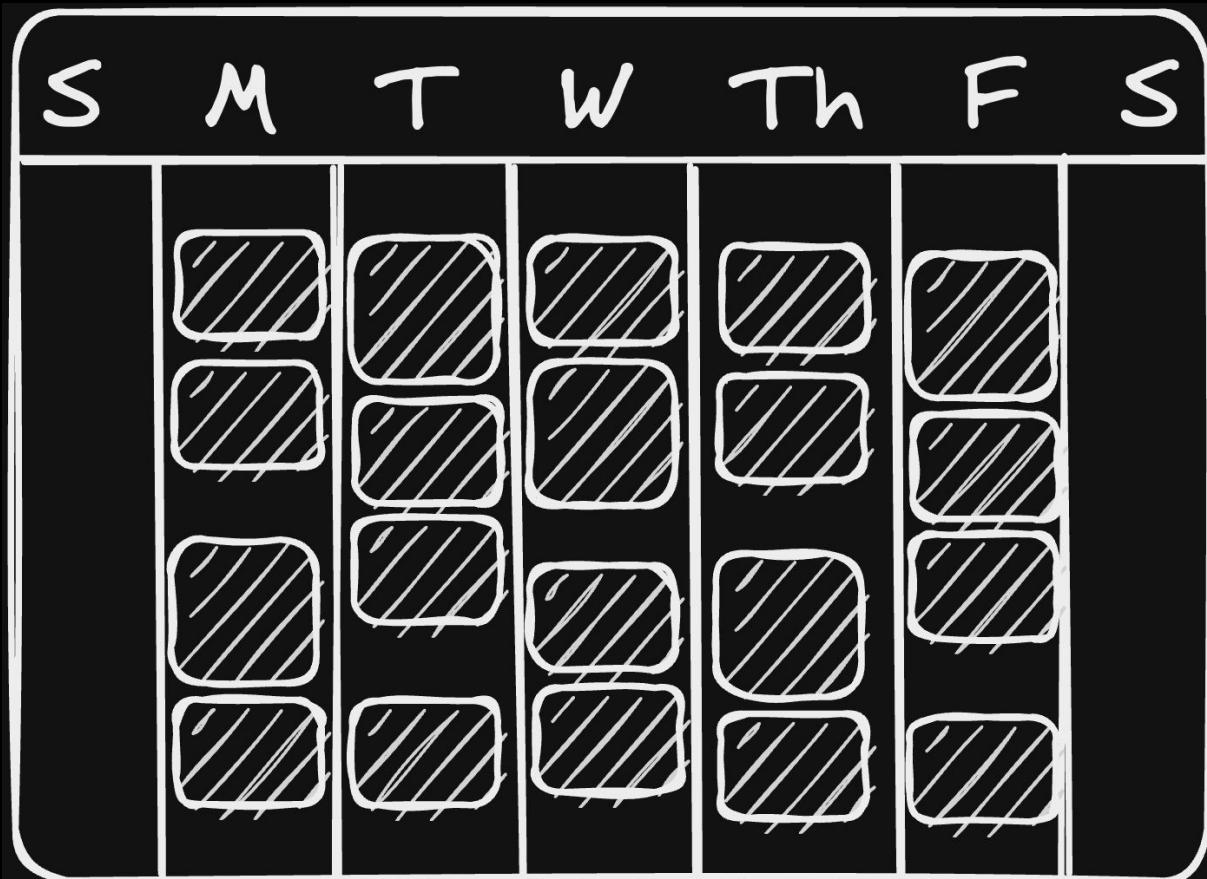
Assume nothing - Talk to people!



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Crafting the Right Questions

✗ Don't Ask ✗

What's wrong with cluster creation today?

Do you like this new design?

Isn't this method of creating clusters better?

Is this error message clear?

Press this button to do x. What do you think of that?

✓ Do Ask ✓

Can you show me how you set up a cluster today?

Tell me about the last time you ran that command.

What made you hesitate there?

What do you think this button does?

How did you feel when you saw that error?

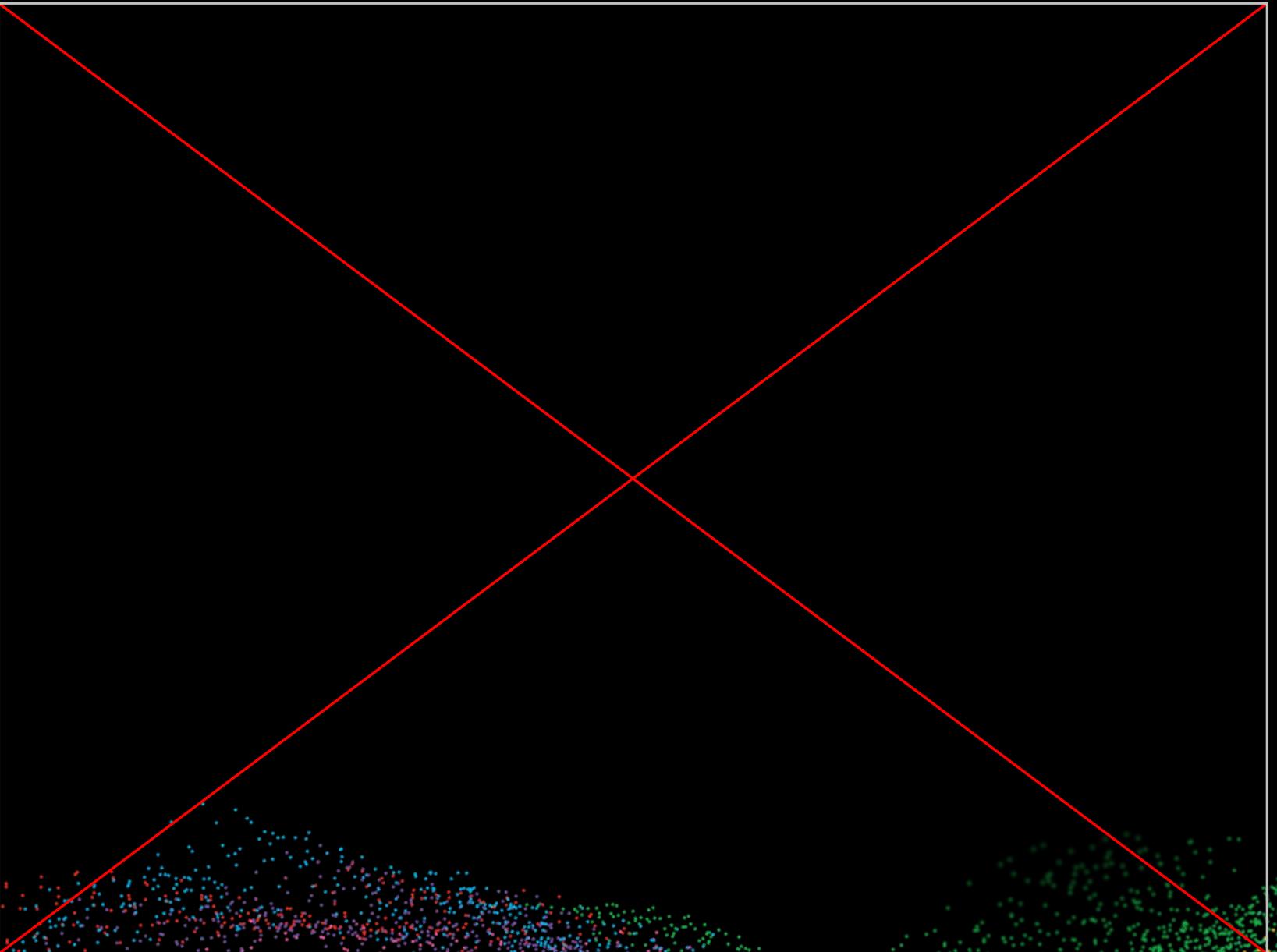
The Think-Aloud Protocol

The screenshot shows a mobile application interface for managing a conference schedule. At the top, there's a dark header bar with the word "SCHED" and the text "CppCon 2025". Below this is a navigation bar with two tabs: "Event Schedule" and "My Schedule", with "My Schedule" being the active tab and showing a count of 12 events. The main area displays a list of sessions scheduled for different times. On the left, a vertical timeline shows the start times: "14:35 MDT" and "15:15 MDT". Each session is represented by a colored box containing the session title, stage number, and speaker(s). The sessions listed are:

- 14:35 MDT: "Using Floating-point: What Works, What Breaks, and Why" (Stage 4, Egor Suvorov)
- 14:35 MDT: "Refactoring at Scale: LLM-Powered Pipelines for Detecting Code Smells, Hardening Tests, and Modernizing Legacy C++" (Stage 3, Jubin Chheda)
- 15:15 MDT: "Engineers Are Users Too: A Case Study in Design Thinking for Infrastructure" (Stage 3, Grace Alwan)
- 15:15 MDT: "Building a High-Performance Binary Serialization Format with In-Place Modification" (Stage 2, Hamish Morrison)
- 15:15 MDT: "Performance of std::expected With Monadic Operations" (Stage 1, Augustin Popa • David Li)

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The Think-Aloud Protocol



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What we heard

“New users cannot make clusters without help.”

“I created a cluster 6 months ago and thought I could do it again, but I couldn’t.”

“What does this do?”

“Ugh!”

Engagement

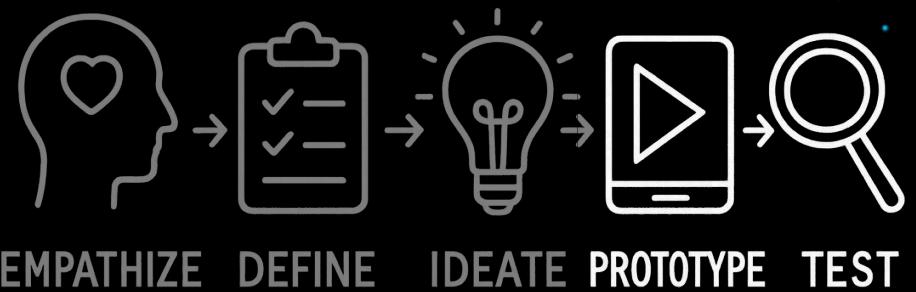


Curiosity

Opt-in
Updates

Shared
Ownership

Prototyping



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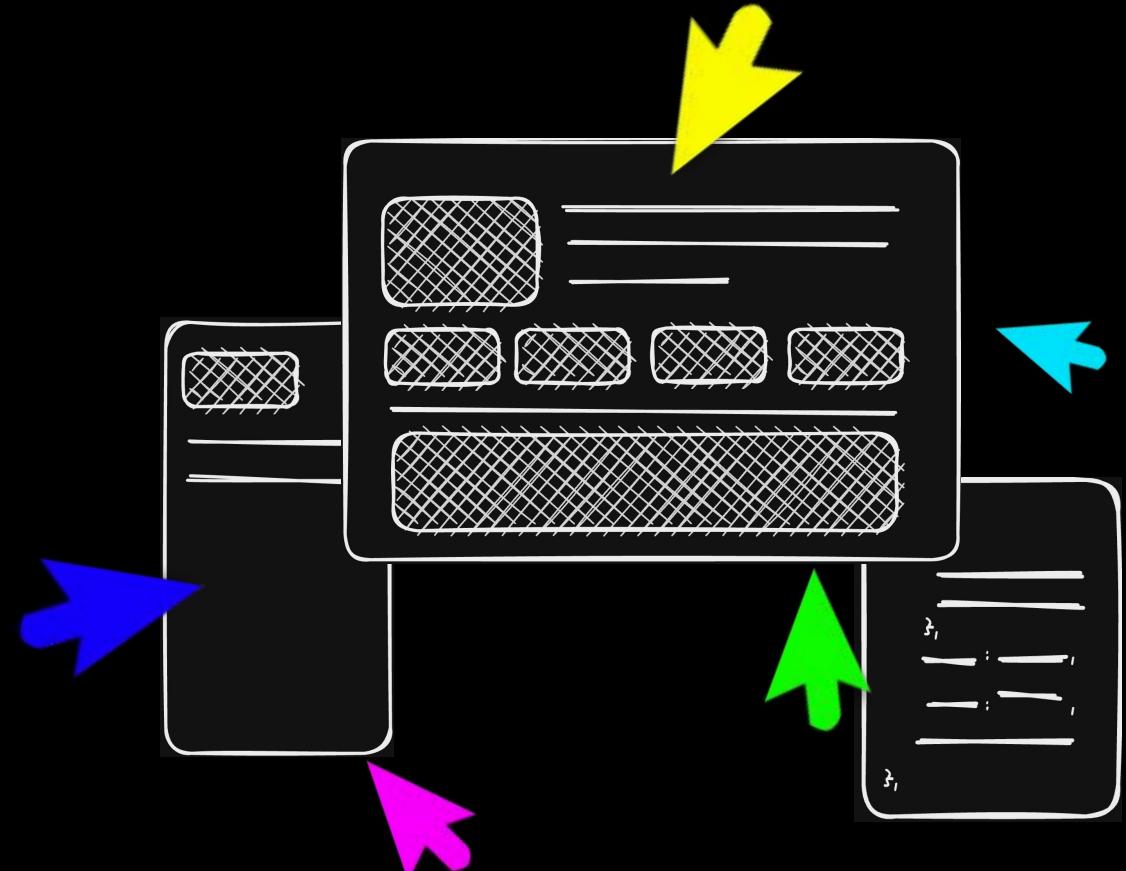
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Design Documents

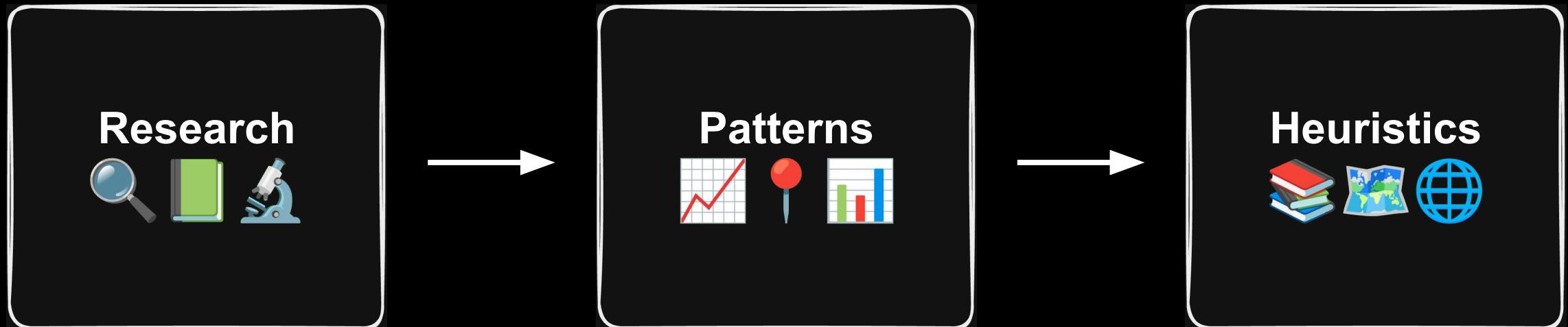
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Mocks



Learning Design Instincts



10 Usability Heuristics

Status
Visibility

Match
System <>
Real World

Control +
Freedom



Consistency

Error
Prevention

Recognize
> Recall

Flexibility

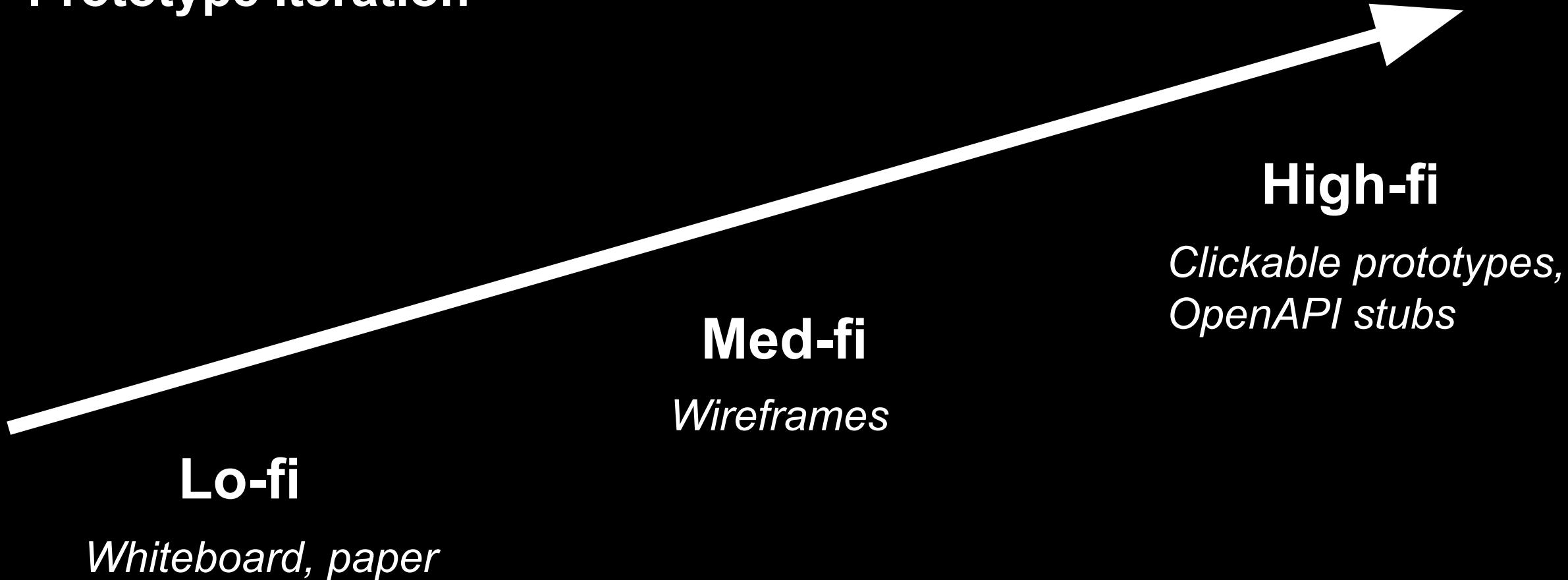


Minimalist

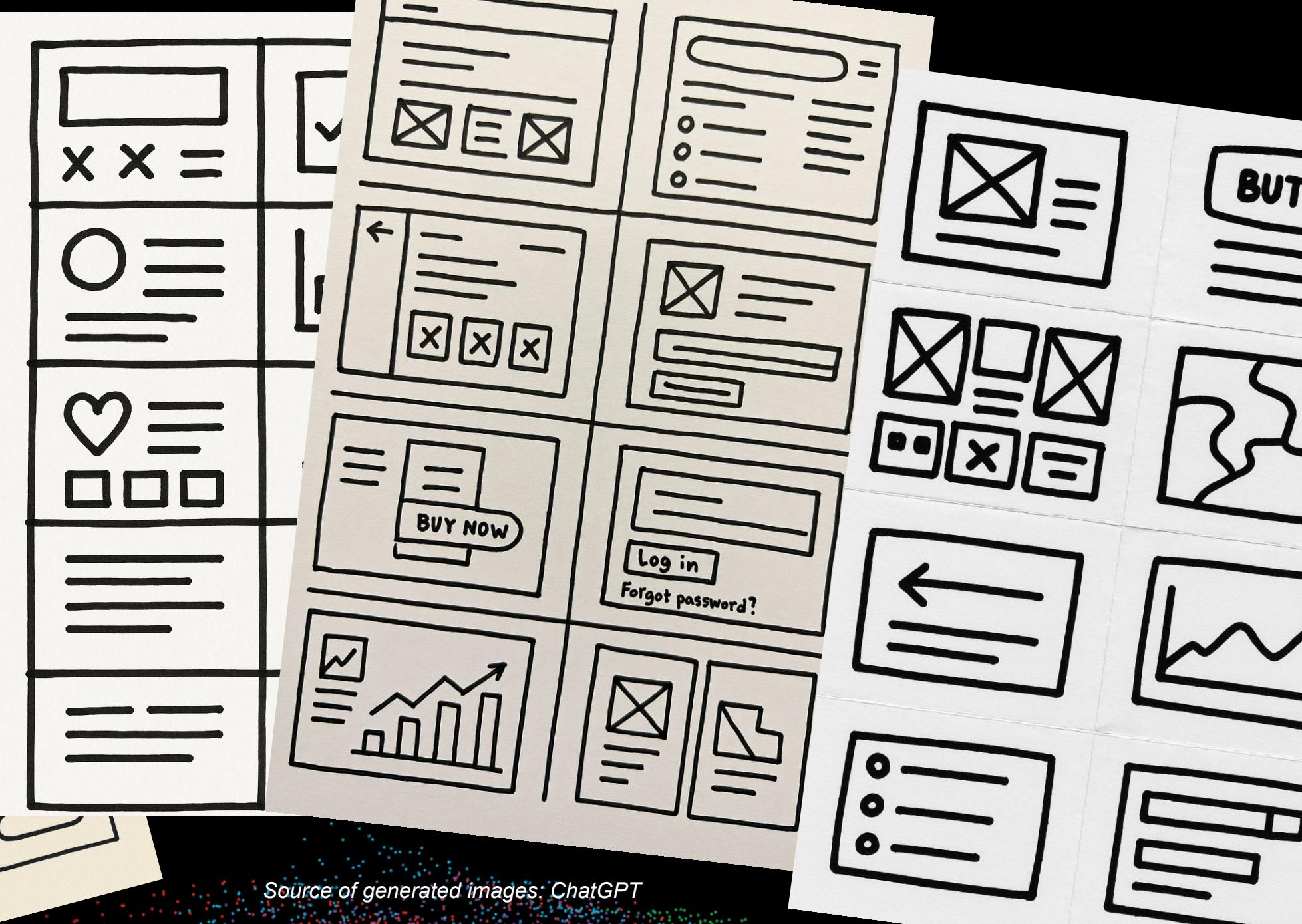
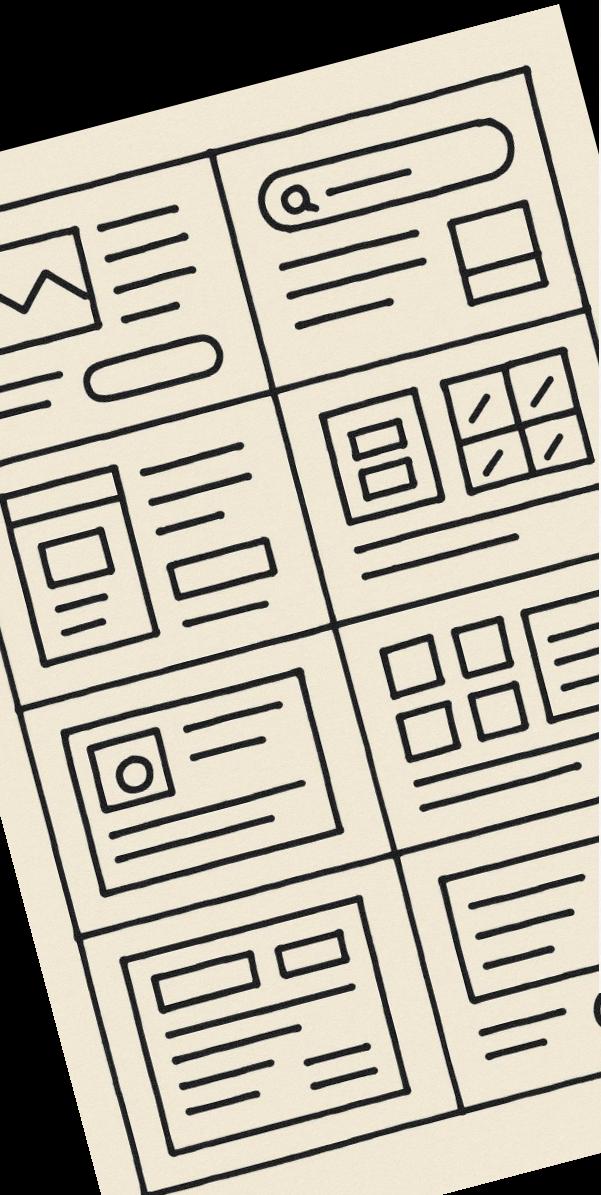
Help
Recover

Document

Prototype Iteration

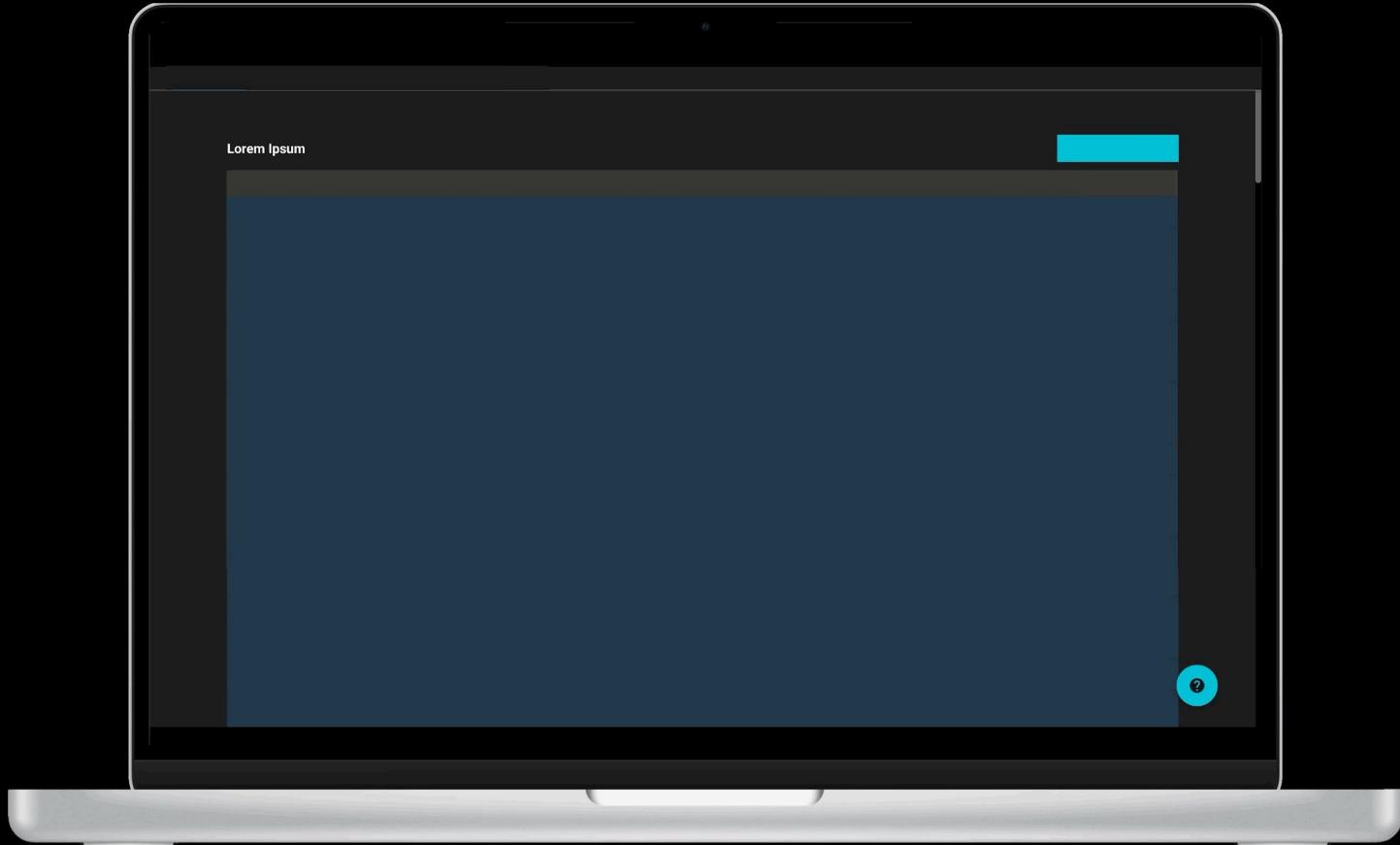


Crazy 8s!



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High-Fidelity Prototypes



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What we heard

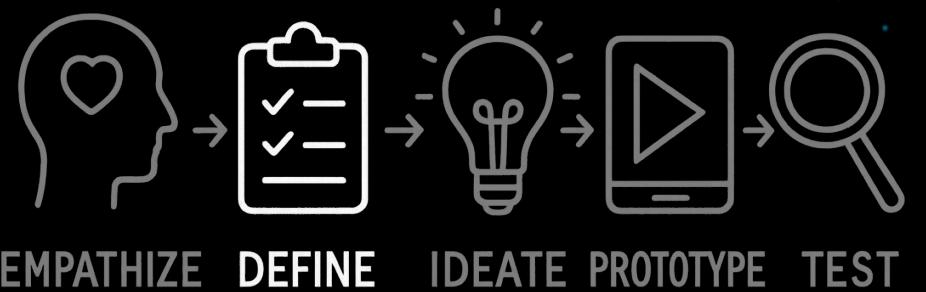
“This is seamless!”

**“This is
straightforward, I
wouldn’t have had to
think about this at all.”**

**“I flew threw this
because it was very
familiar.”**



Synthesis



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30 hrs

Affinity Mapping

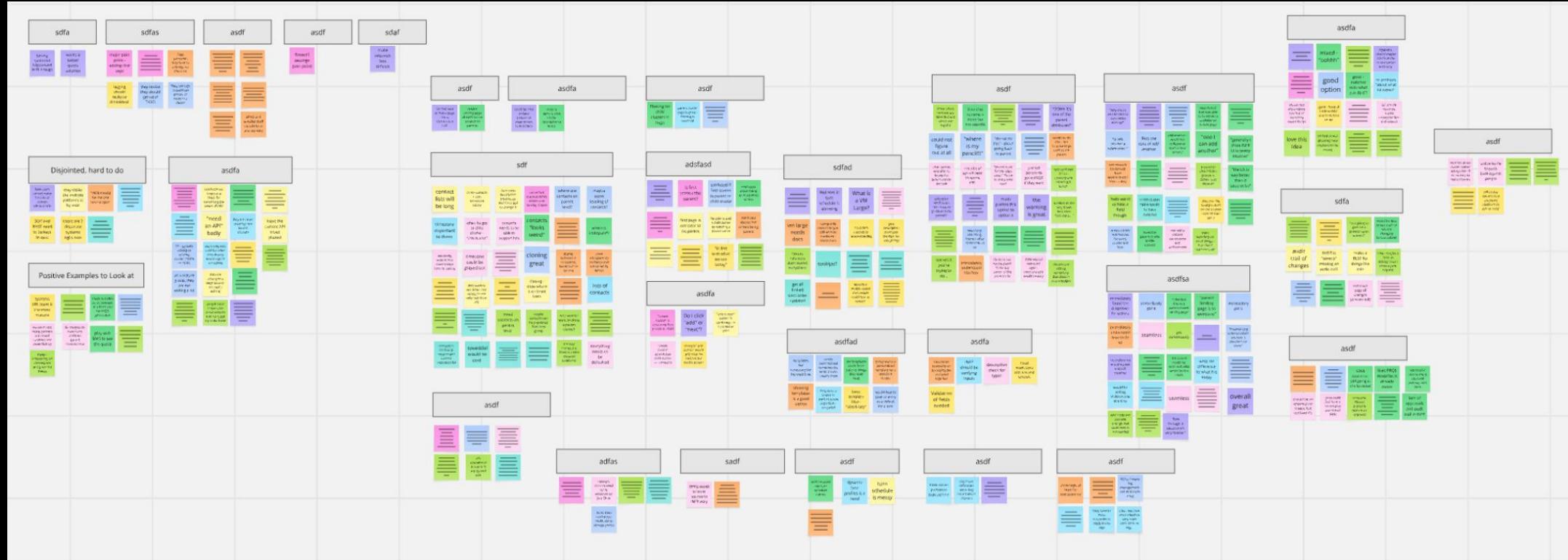


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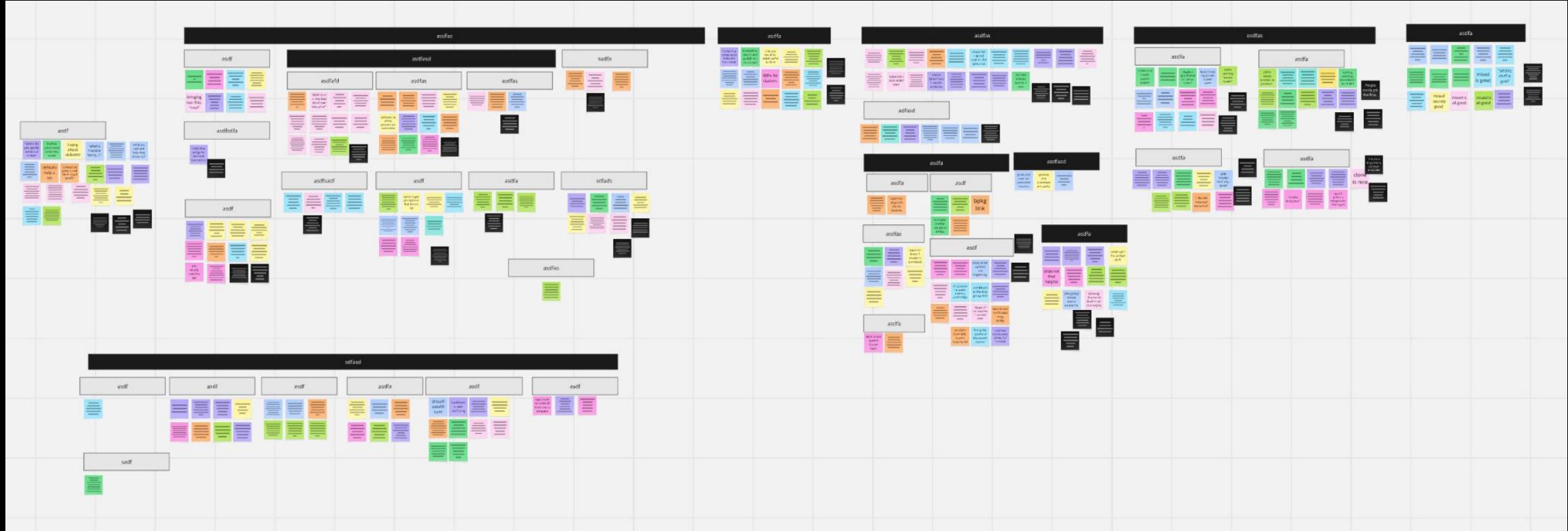
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Affinity Mapping



Affinity Mapping



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Results

Wayfinding &
Confidence

Document

Simplify
& Standardize

Desired
Workflows

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The Results Document



Problem + Context

Methods

- *participants, interview + prototype protocol*



Findings

- *themes + quotes*

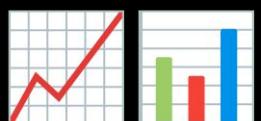


Design iterations

- *before/after rationale*



Recommendations



Appendix

- *affinity mapping screenshots, raw interview data*

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Takeaways

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Takeaways

Design
Thinking

Interviews

Prototypes

Synthesis

Results

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Engineer the Experience



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Questions?

Chat with me!

Grace Alwan

galwan@bloomberg.net

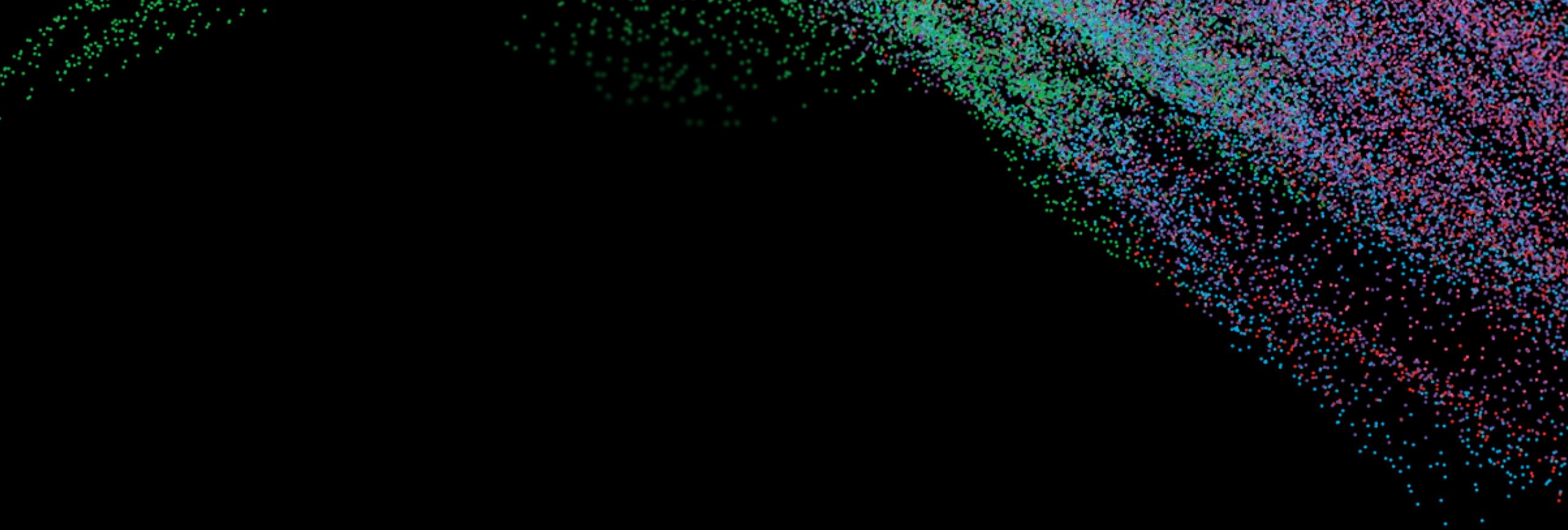
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