

# CSE 440: Introduction to HCI

## User Interface Design, Prototyping, and Evaluation!

### Lecture 02: Design Process

Instructor: Amy Zhang, 10/5/2021

# Today's Topics

- UI Hall of Fame and Shame
- Design Process
  - Why do we need to consider users in design?
  - Iterative Design
  - Design Diamond
  - Ideation
    - Ideation exercise
- Group Project Overview
- Start brainstorming with your team!

**UI Hall of Fame** 😁 **and Shame** 😞

M # # P # 17 k S R 17 S W L Amy

Twitter, Inc. [US] | https://twitter.com/lulu\_cheng/status/964947708275343361

Home

Lulu Cheng  
@lulu\_cheng

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I got 99 tabs but I generally know where things are

middle abyss of 'things I will definitely get back to':

- that long read new yorker article
- michelle's valentine playlist for barack
- youtube video of michelle kwan's '98 nationals free skate
- yelp page of brunch spot in oakland
- classPass renew membership page
- 20+ google docs
- bitcoin explainer

Personal inbox → calendar → work inbox → gdrive →

← → C 91

Twitter → Google Maps → Probs Amazon

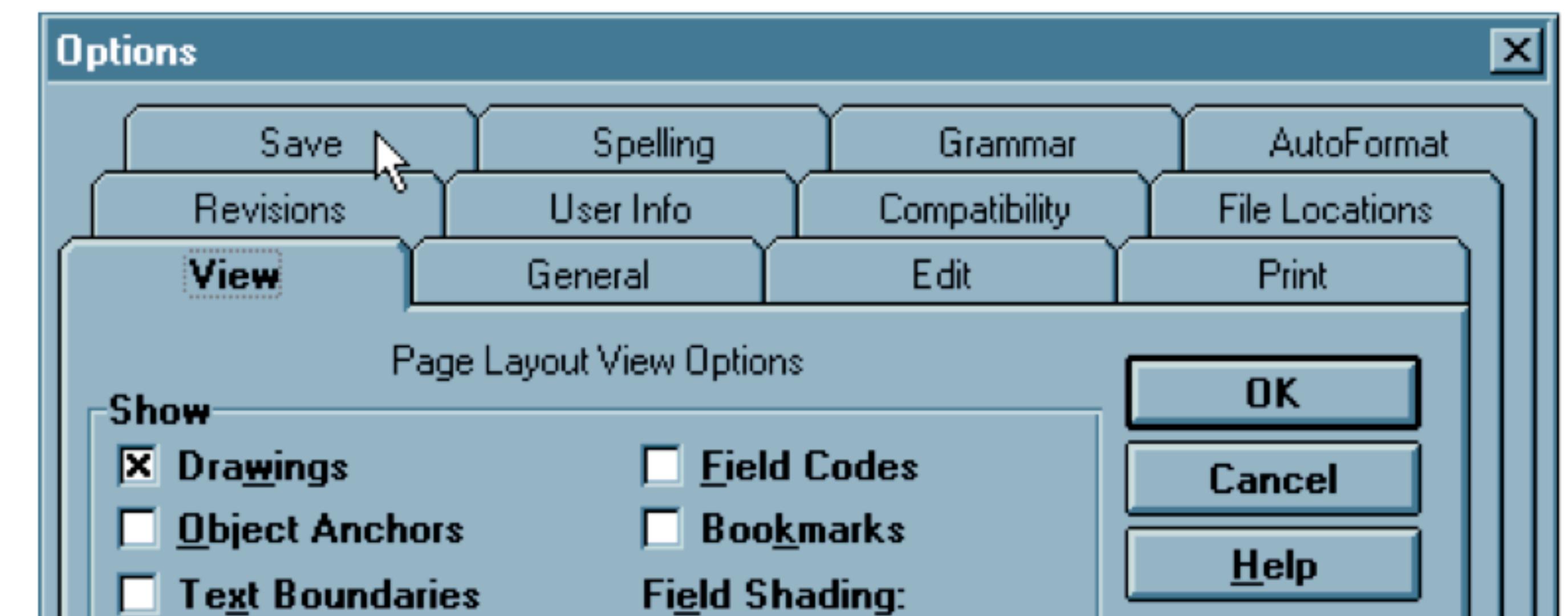
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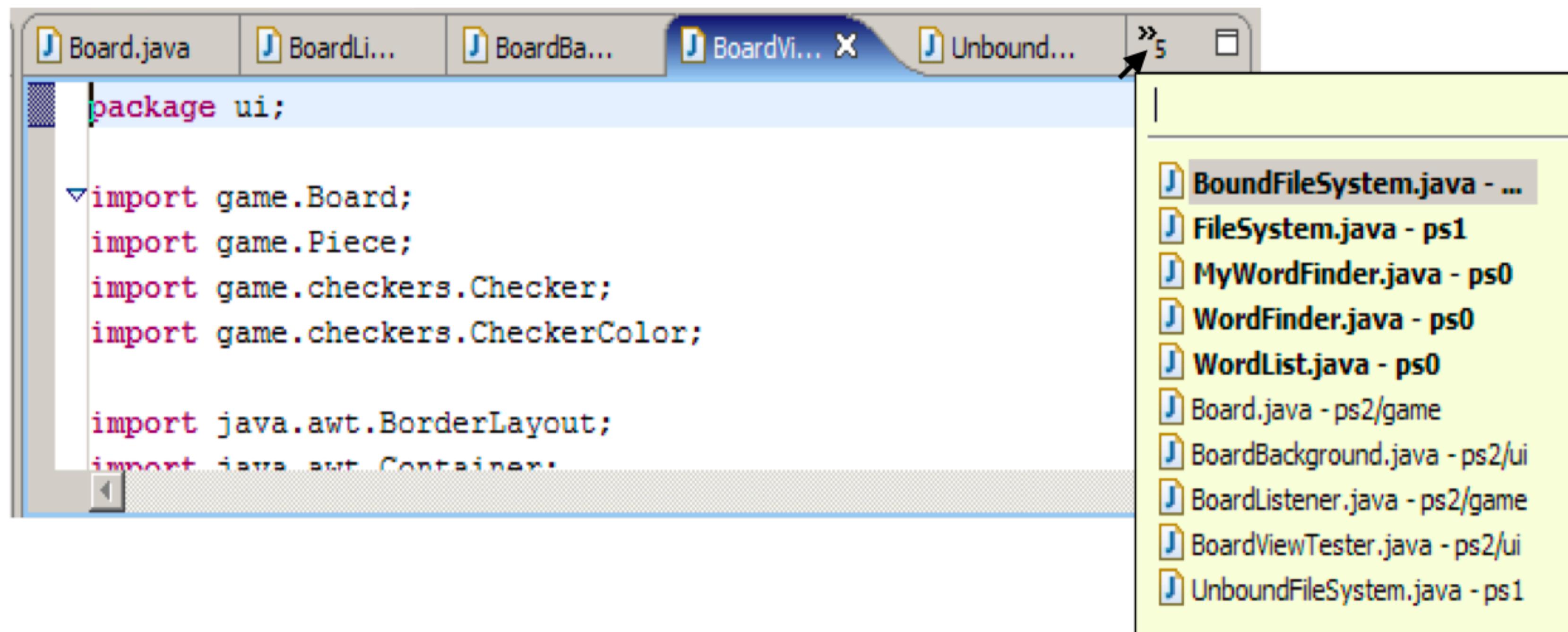
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# Hall of Fame or Shame?



# Hall of Fame or Shame?



A screenshot of a Java IDE interface. The top bar shows several tabs: Board.java, BoardLi..., BoardBa..., BoardVi..., and Unbound... The 'BoardVi...' tab is active. To the right of the tabs is a small window with a double arrow icon and the number '5'. Below the tabs is a code editor window containing the following Java code:

```
package ui;

import game.Board;
import game.Piece;
import game.checkers.Checker;
import game.checkers.CheckerColor;

import java.awt.BorderLayout;
import javax.swing.Container...
```

To the right of the code editor is a file browser window titled 'Unbound...' which lists the following files:

- BoundFileSystem.java - ...
- FileSystem.java - ps1
- MyWordFinder.java - ps0
- WordFinder.java - ps0
- WordList.java - ps0
- Board.java - ps2/game
- BoardBackground.java - ps2/ui
- BoardListener.java - ps2/game
- BoardViewTester.java - ps2/ui
- UnboundFileSystem.java - ps1

CHROME

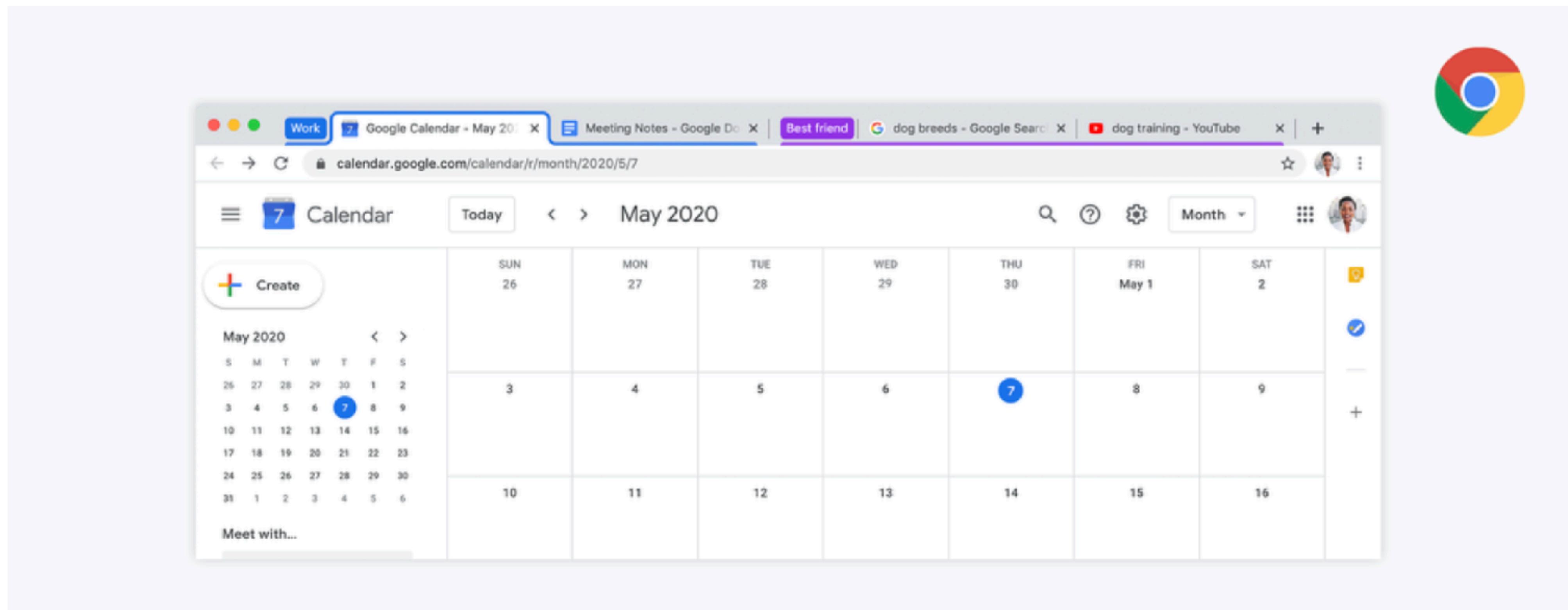
# Keep tabs on your tabs in Google Chrome

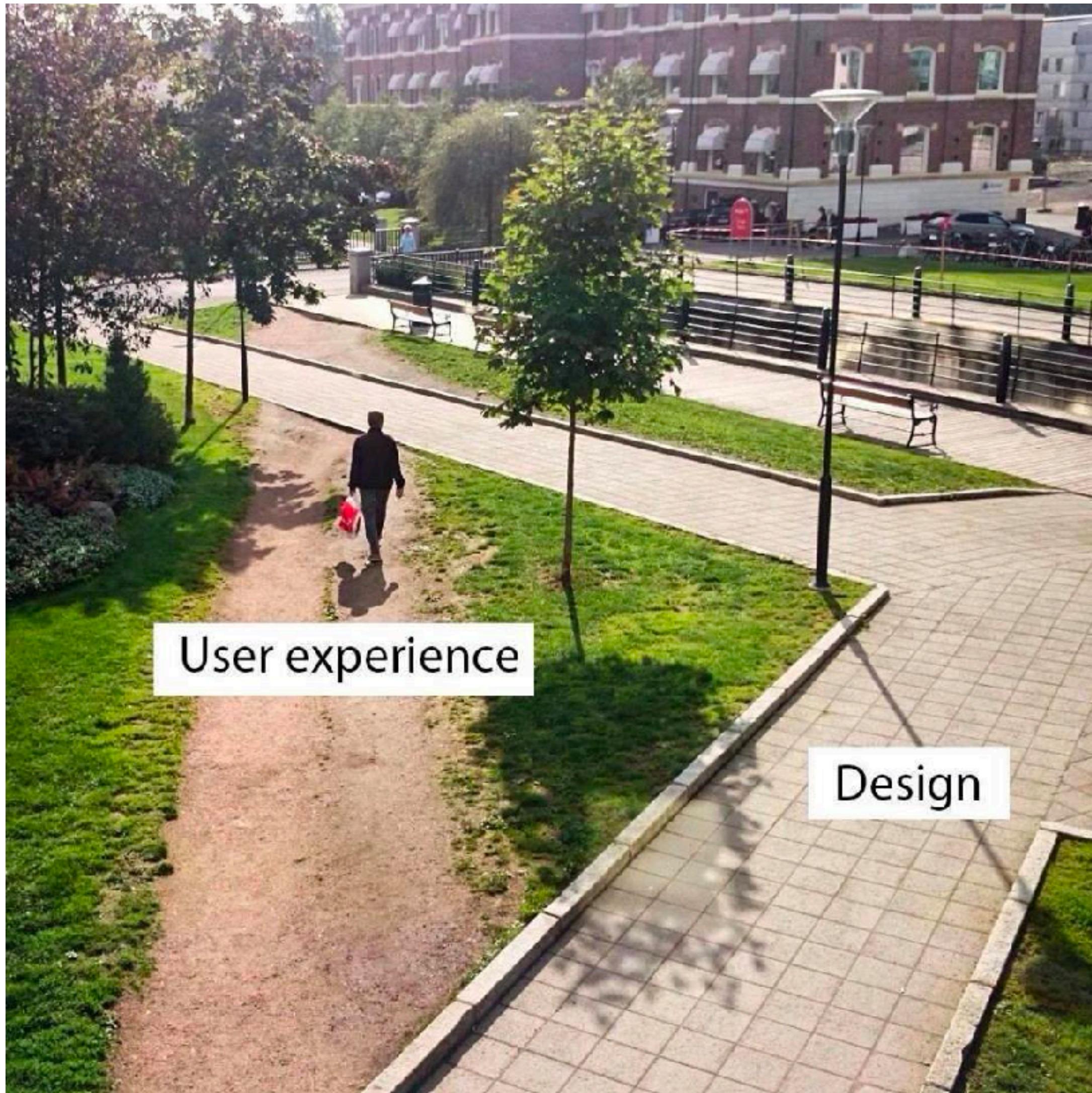
May 13, 2020 · 2 min read



Edward Jung  
UX Engineer, Chrome

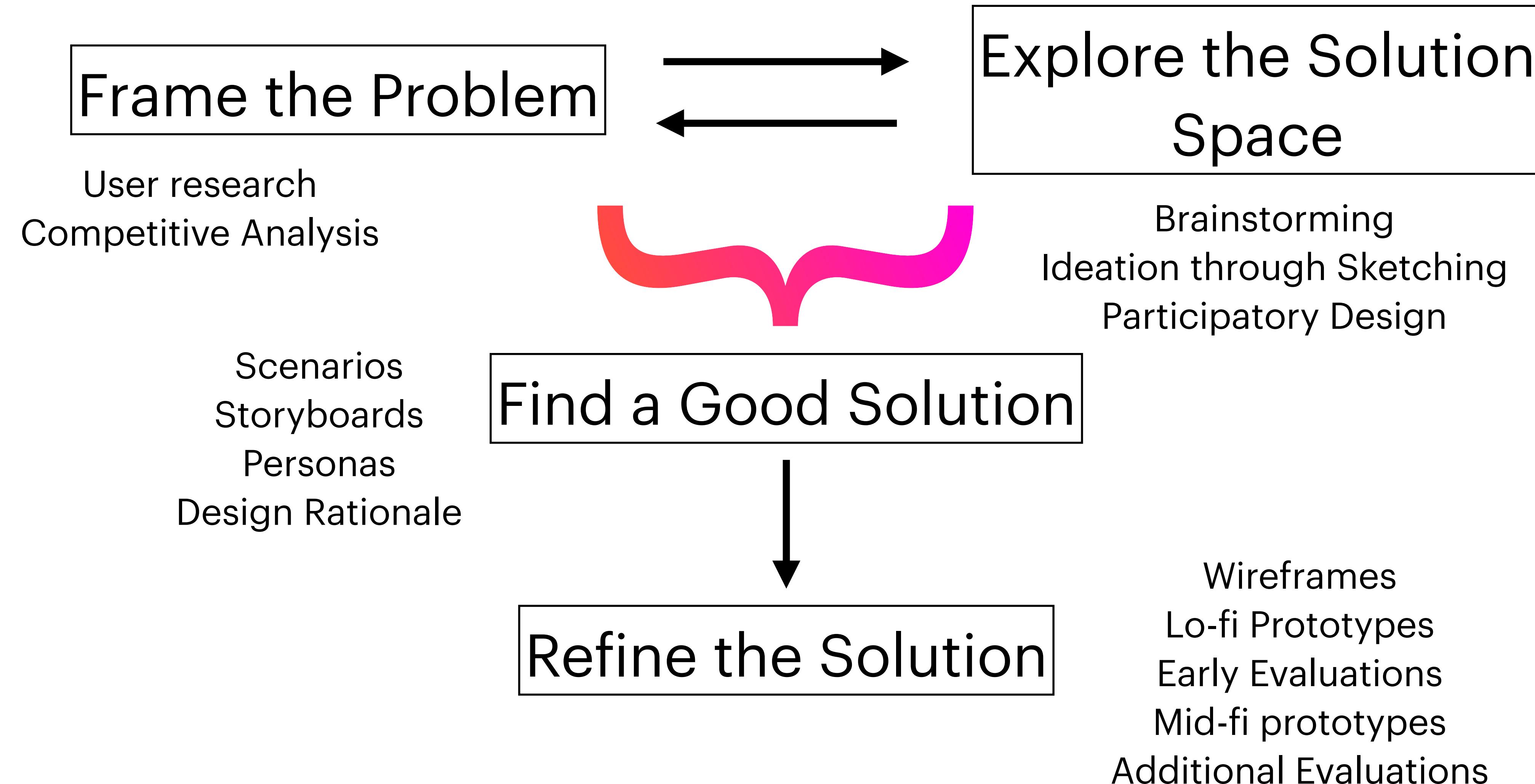
Share



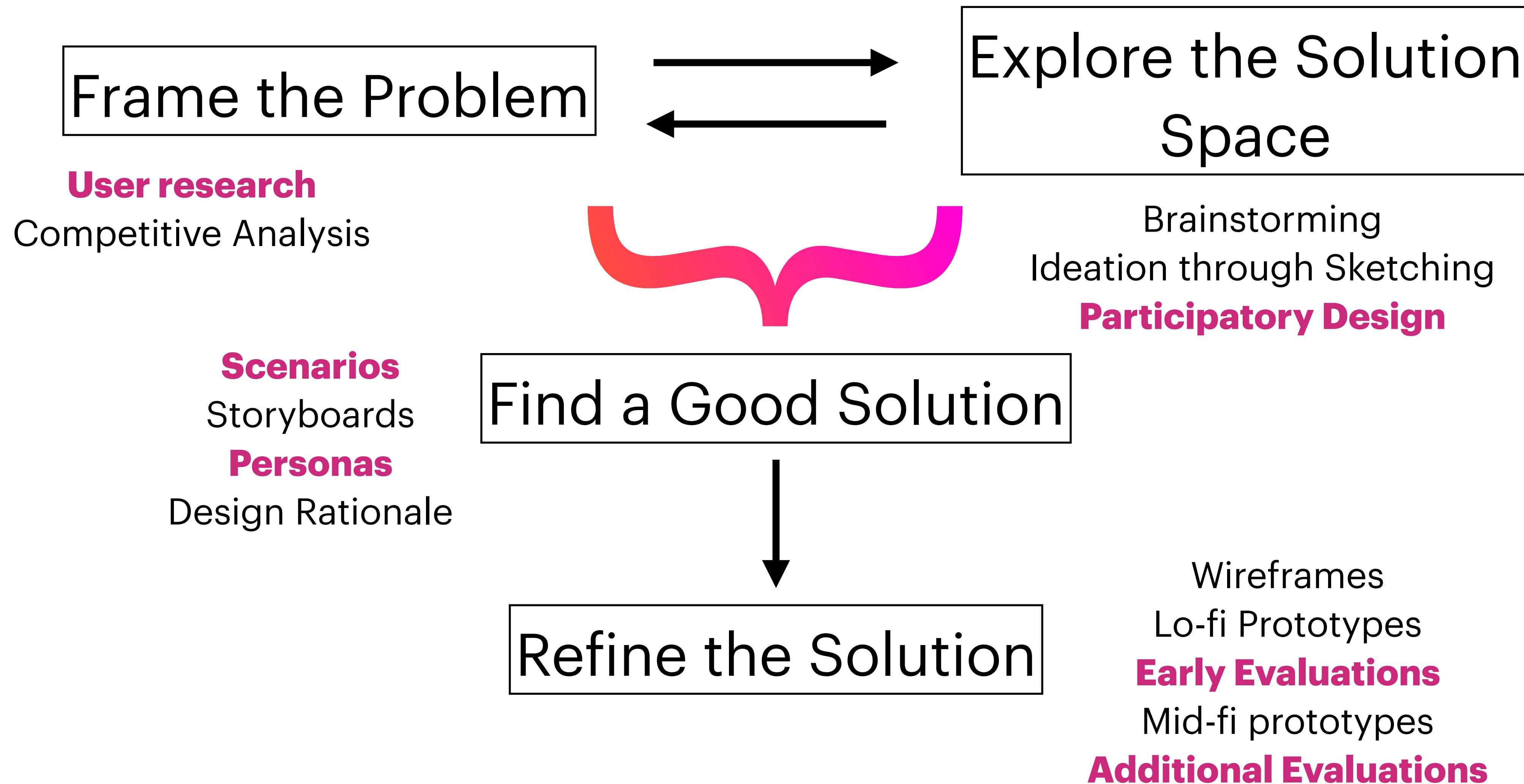


# Design Process

# Design Process in a Nutshell



# User-Centered Design



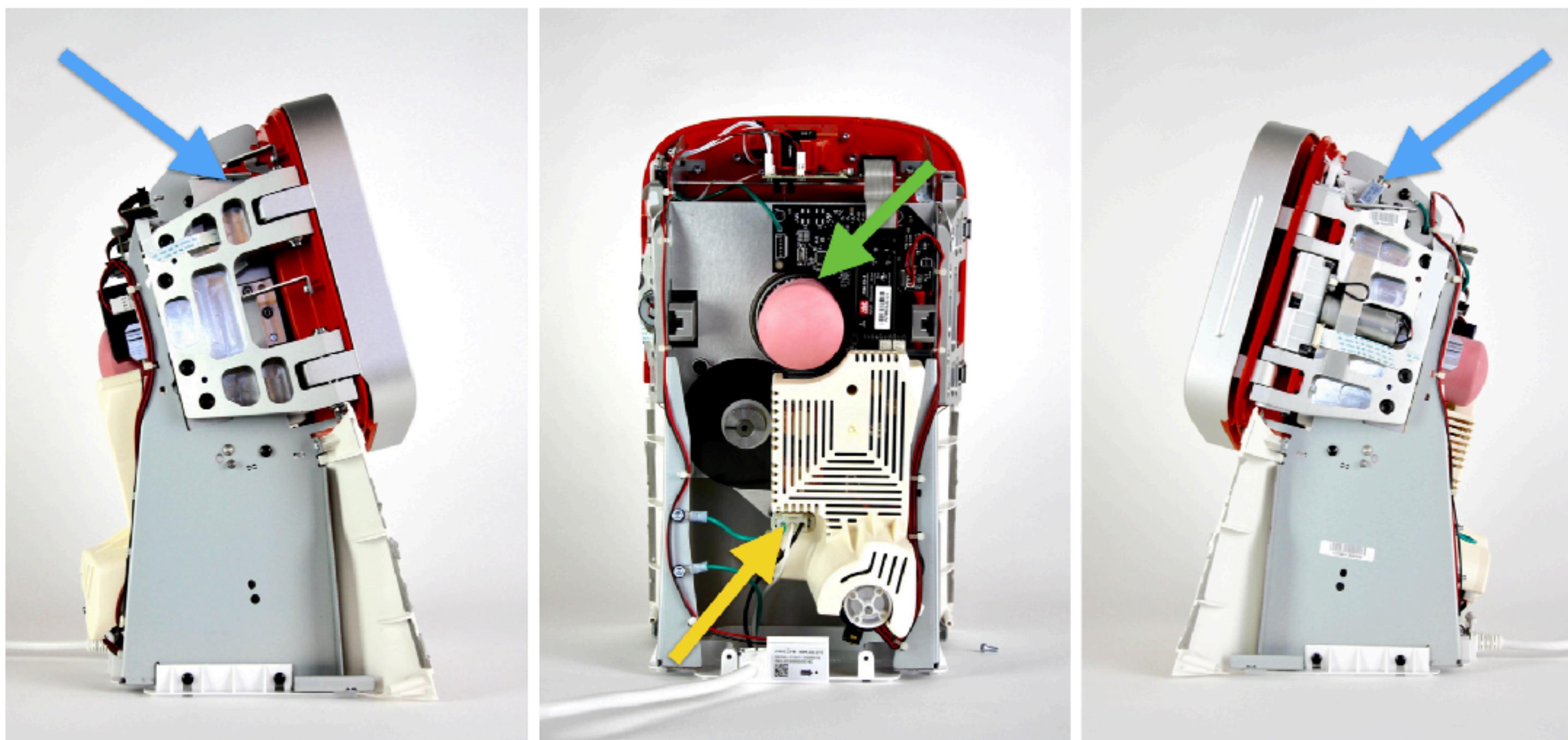
**Why do we need to center users  
in design?**

# Silicon Valley's \$400 Juicer May Be Feeling the Squeeze

**Two investors in Juicero were surprised to learn the startup's juice packs could be squeezed by hand without using its high-tech machine.**

By **Ellen Huet and Olivia Zaleski**

April 19, 2017, 2:00 AM MST

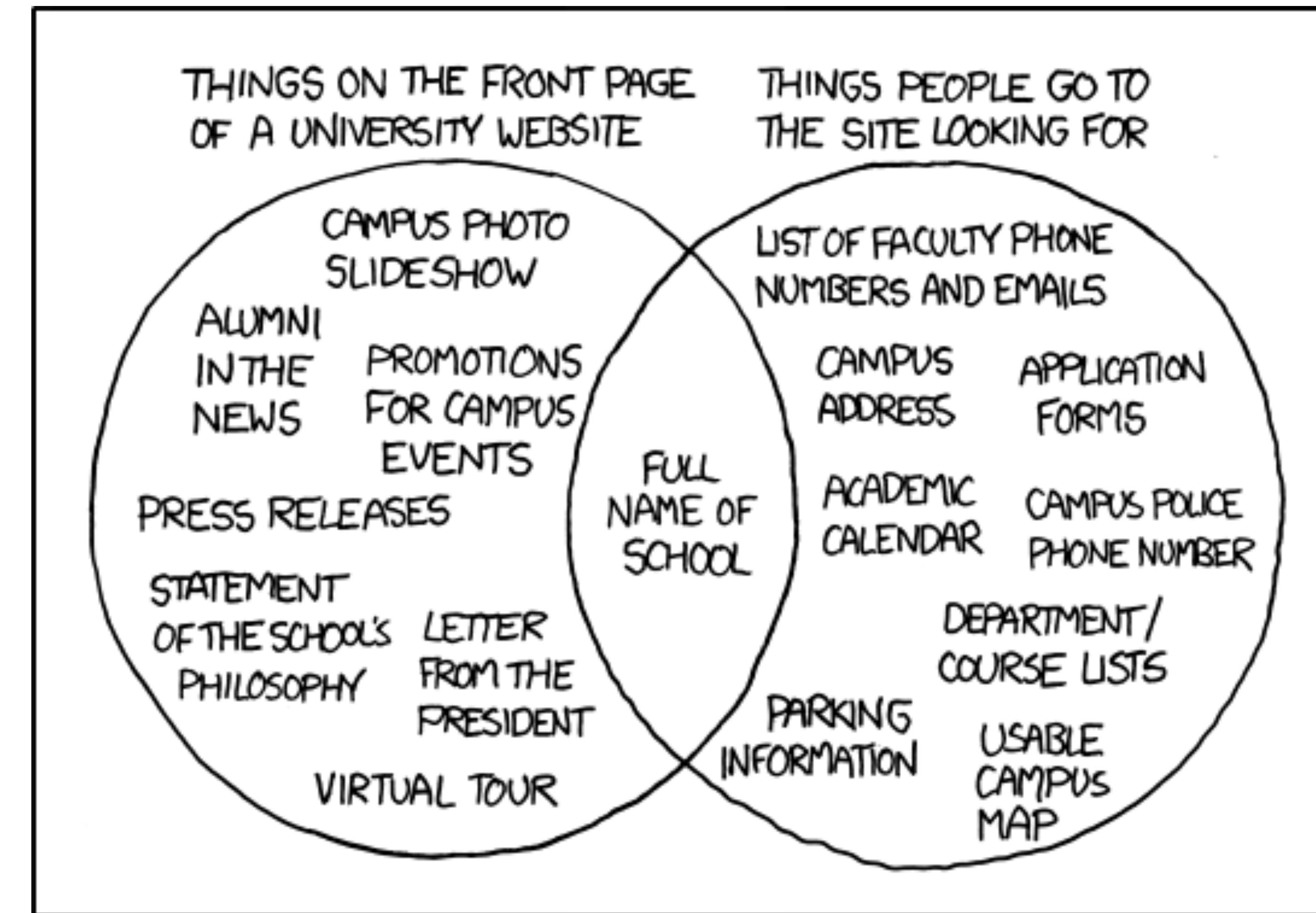


**One of the most lavishly funded gadget startups in Silicon Valley** last year was Juicero Inc. It makes a juice machine. The product was an unlikely pick for top technology investors, but they were drawn to the idea of an internet-connected device that transforms single-serving packets of chopped fruits and vegetables into a refreshing and healthy beverage.

Doug Evans, the company's founder, would compare himself with Steve Jobs in his pursuit of juicing perfection. He declared that his juice press yields four tons of force—"enough to lift two Teslas," he said. Google's venture capital arm and other backers poured about \$120 million into the startup. Juicero sells the machine for \$400, plus the cost of individual juice packs delivered weekly. Tech blogs have dubbed it a "Keurig for juice."

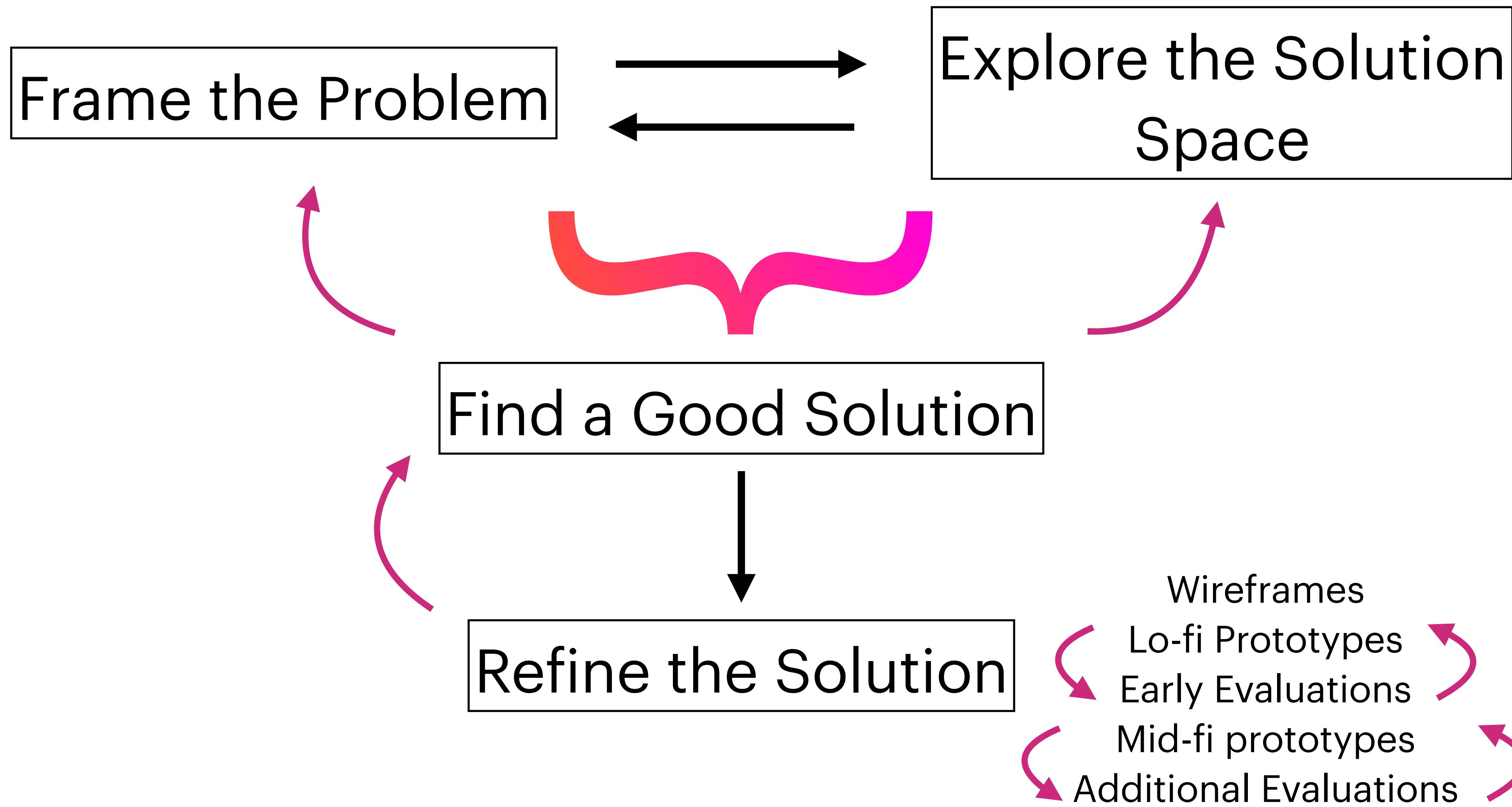


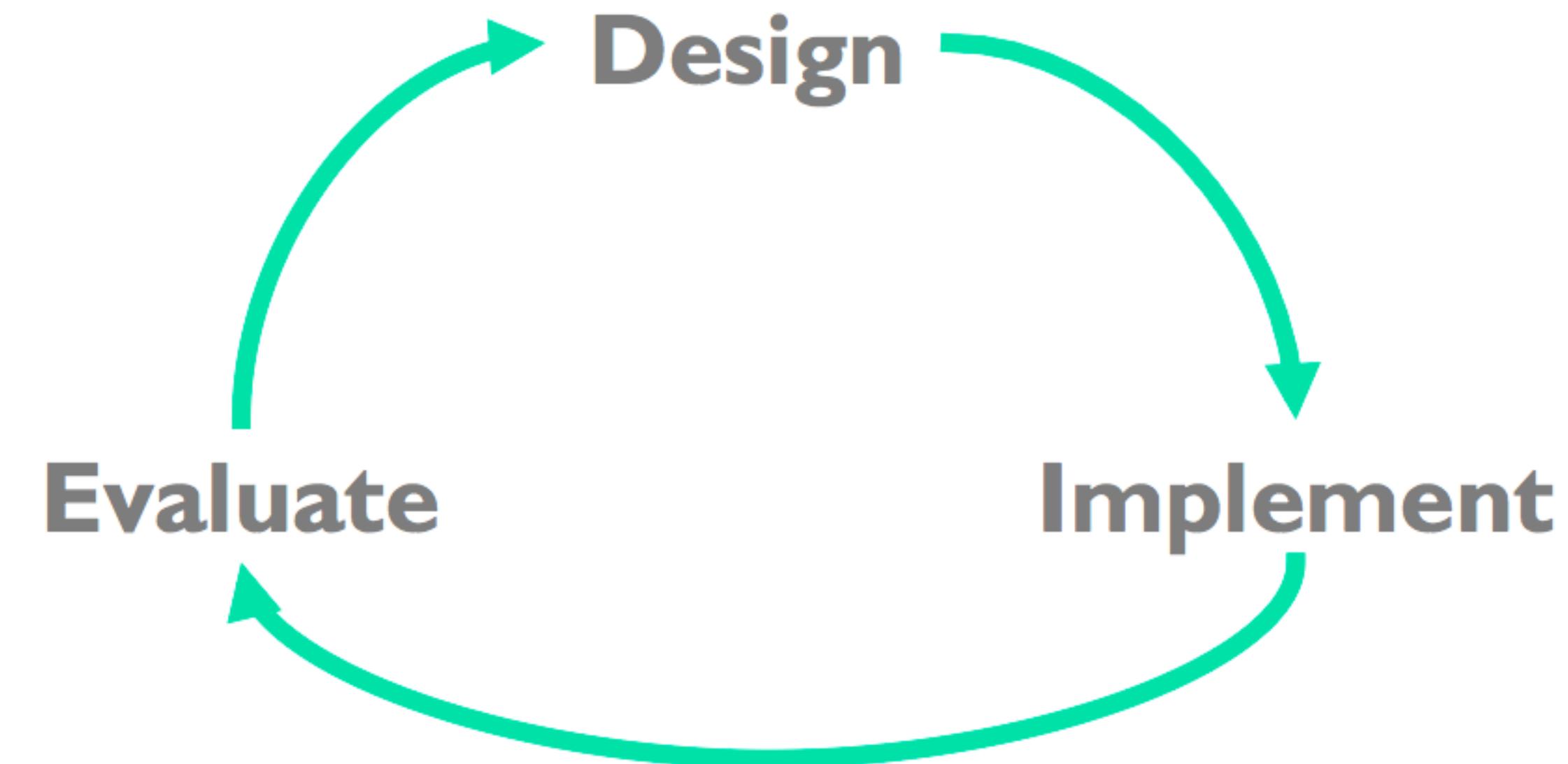
But after the product hit the market, some investors were surprised to discover a much cheaper alternative: You can squeeze the Juicero bags with your bare hands. Two backers said the final device was bulkier than what was originally pitched and that they were puzzled to find that customers could achieve similar results without it. Bloomberg performed its own press test, pitting a Juicero machine against a reporter's grip. The experiment found that squeezing the bag yields nearly the same amount of juice just as quickly—and in some cases, faster—than using the device.



**But how do we add users' feedback  
to our process?**

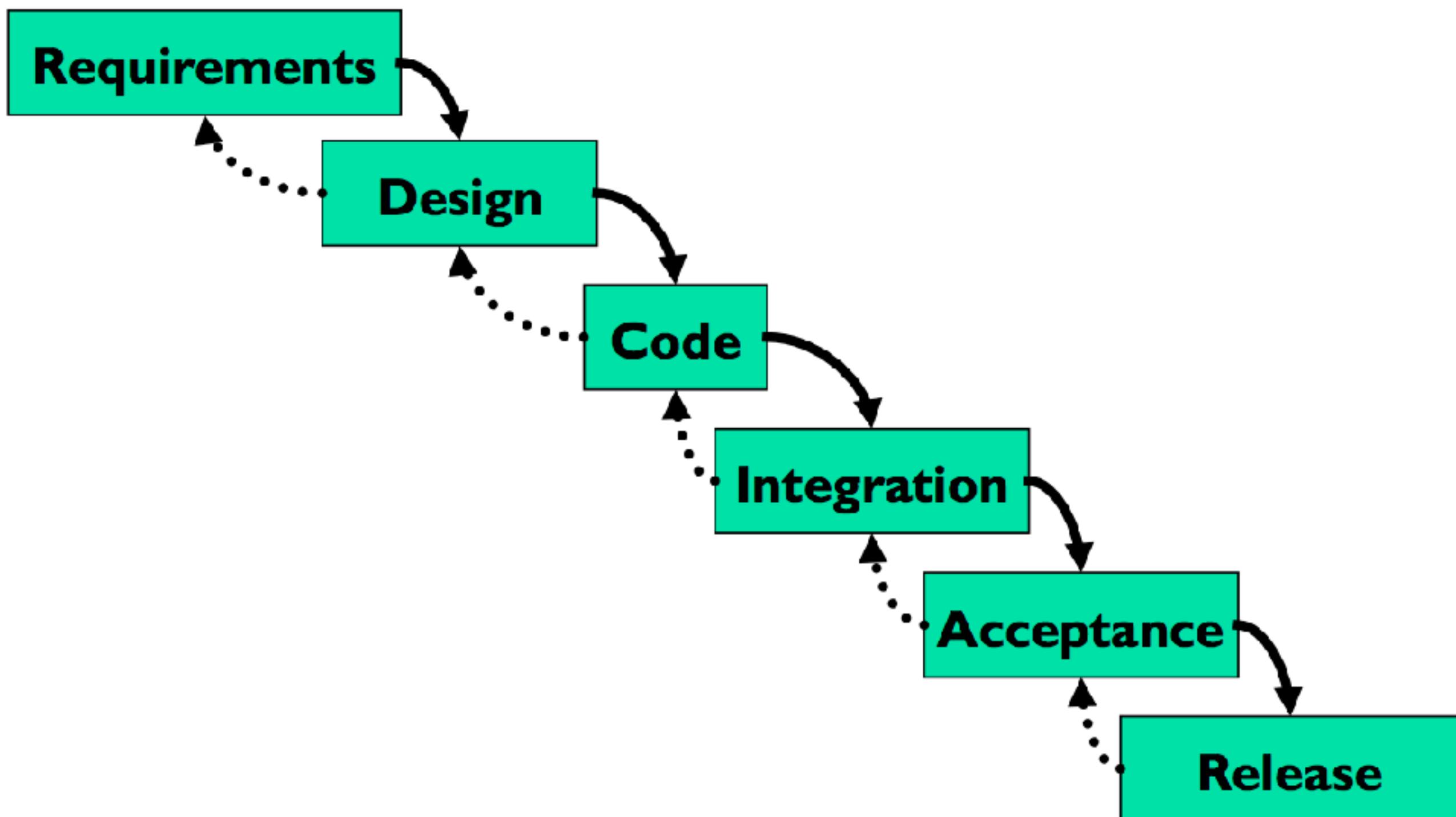
# Iterative Design





# Iterative Design

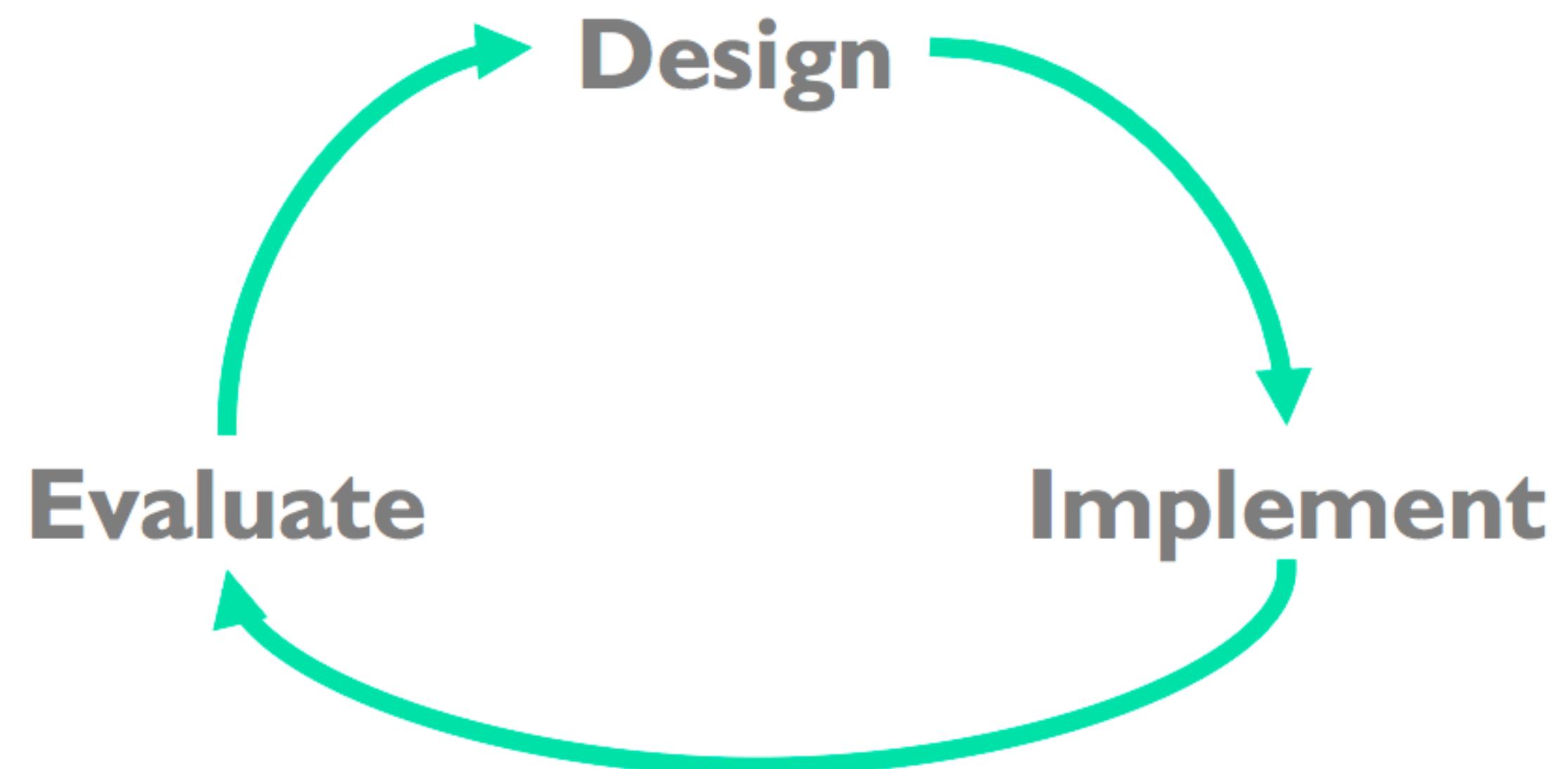
# Traditional Waterfall Model



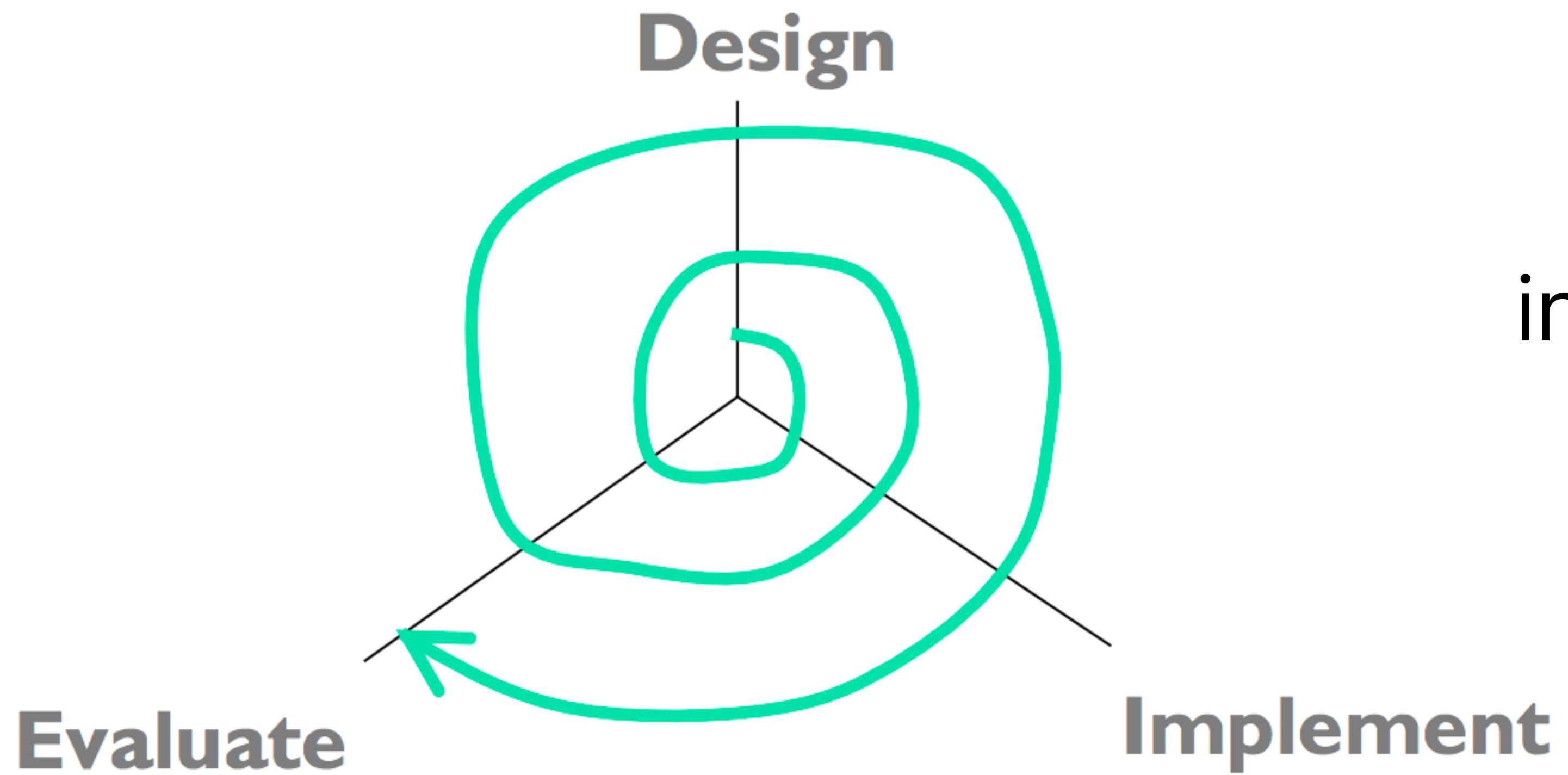
# Why is the waterfall method bad for designing UIs?

- User interface design is risky
- Users are not involved in validation until the acceptance test at the end
- UI flaws often cause changes in requirements and design

# Iterative Design



- You won't get it right the first time!



## Spiral Model

increases in fidelity with each iteration

# Examples of Early Prototyping

## Sketches

Voice

Your Classes:

Grades Thusfar

6.831	95
Exam Subtotal	NA
Project Subtotal	NA
Assignment Subtotal	95
Misc Subtotal	NA
6.UAT	75
6.III	80
6.001	62

Home

Calendar

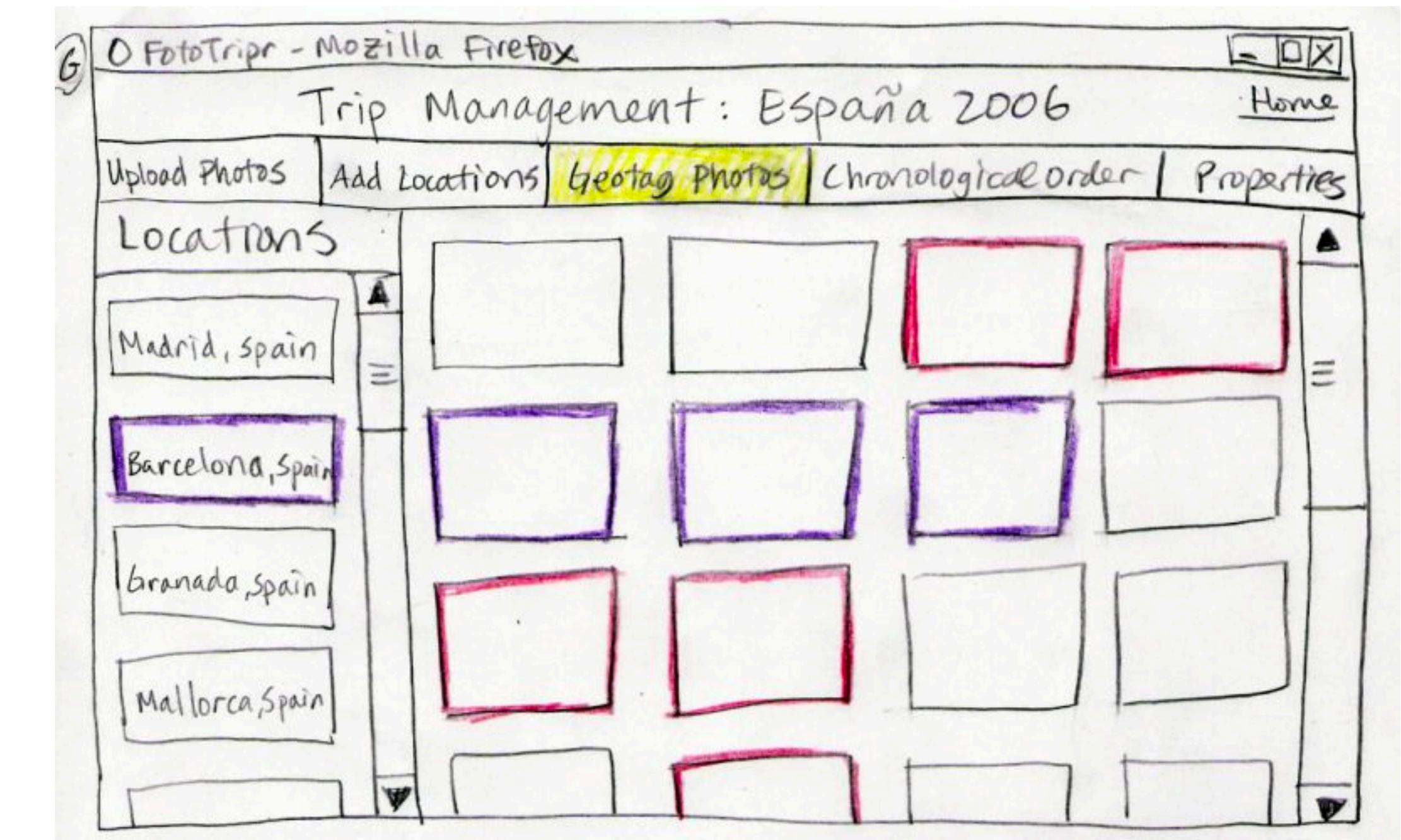
Classes

- 6.831
- 6.UAT
- 6.III
- 6.001

This week:

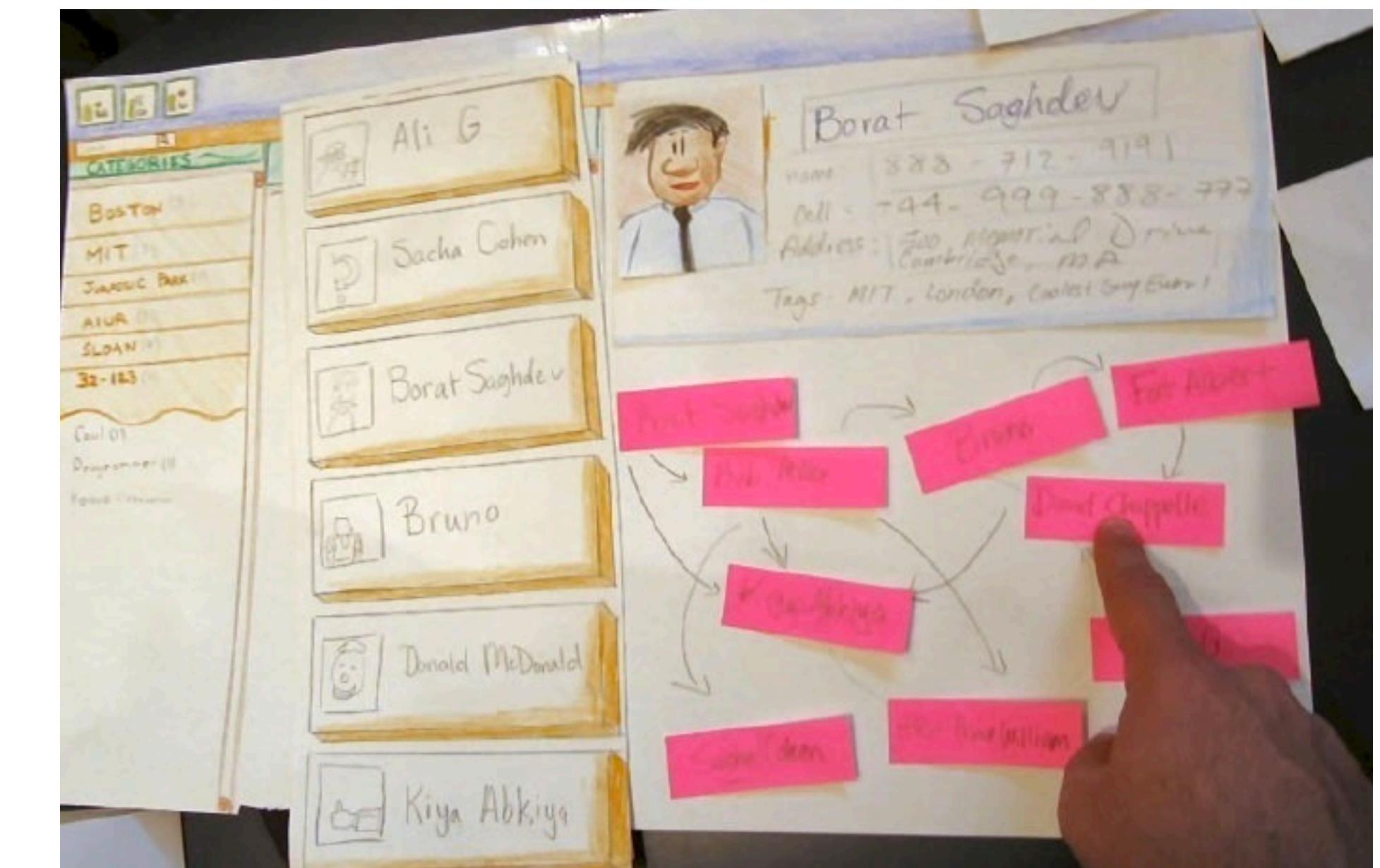
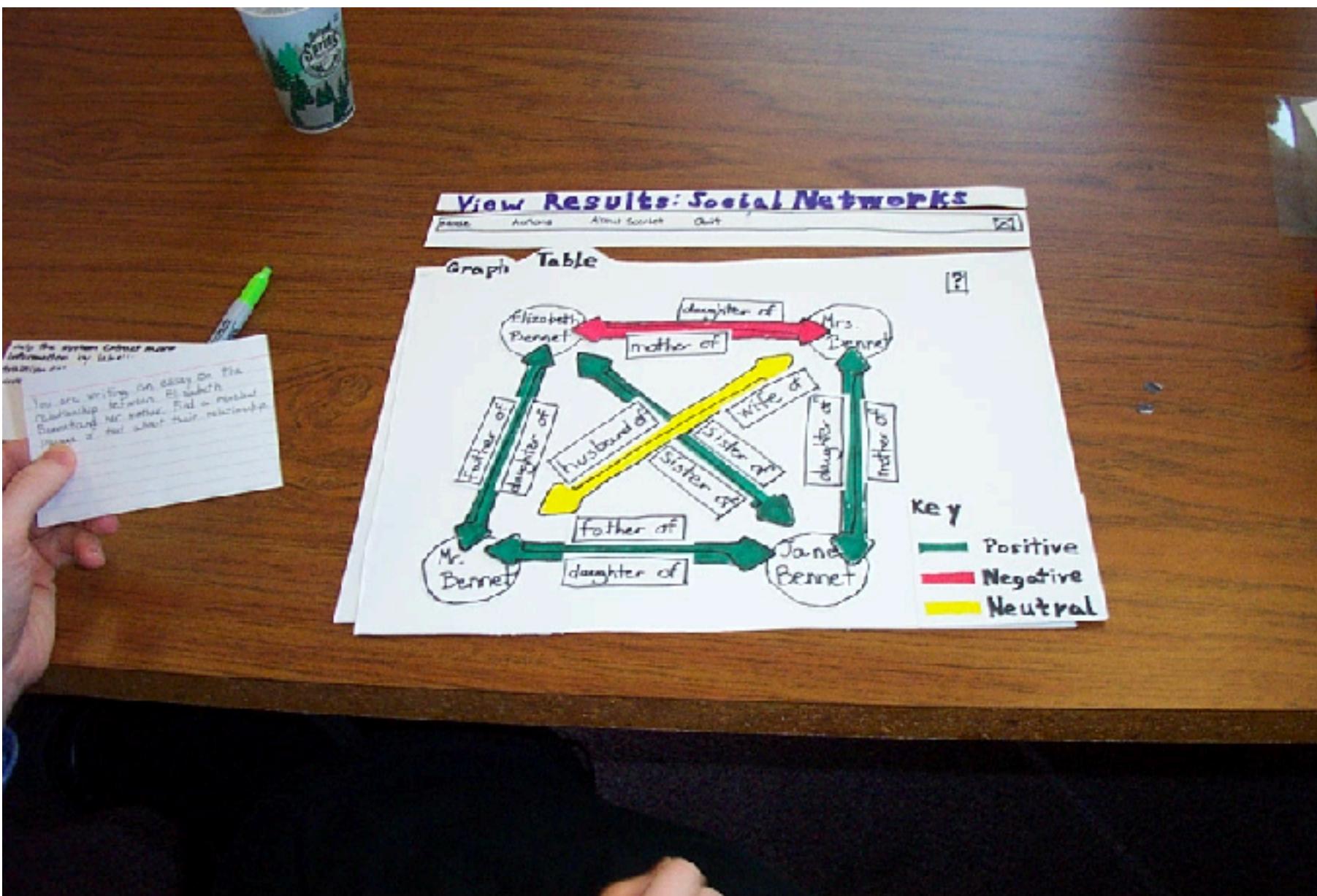
You have 6 assignments due.

Monday	2
6.001 Pset 3	@ 12 AM
6.III Lab 1 report	@ 6PM
Tuesday	3
Wednesday	0
Thursday ...	1



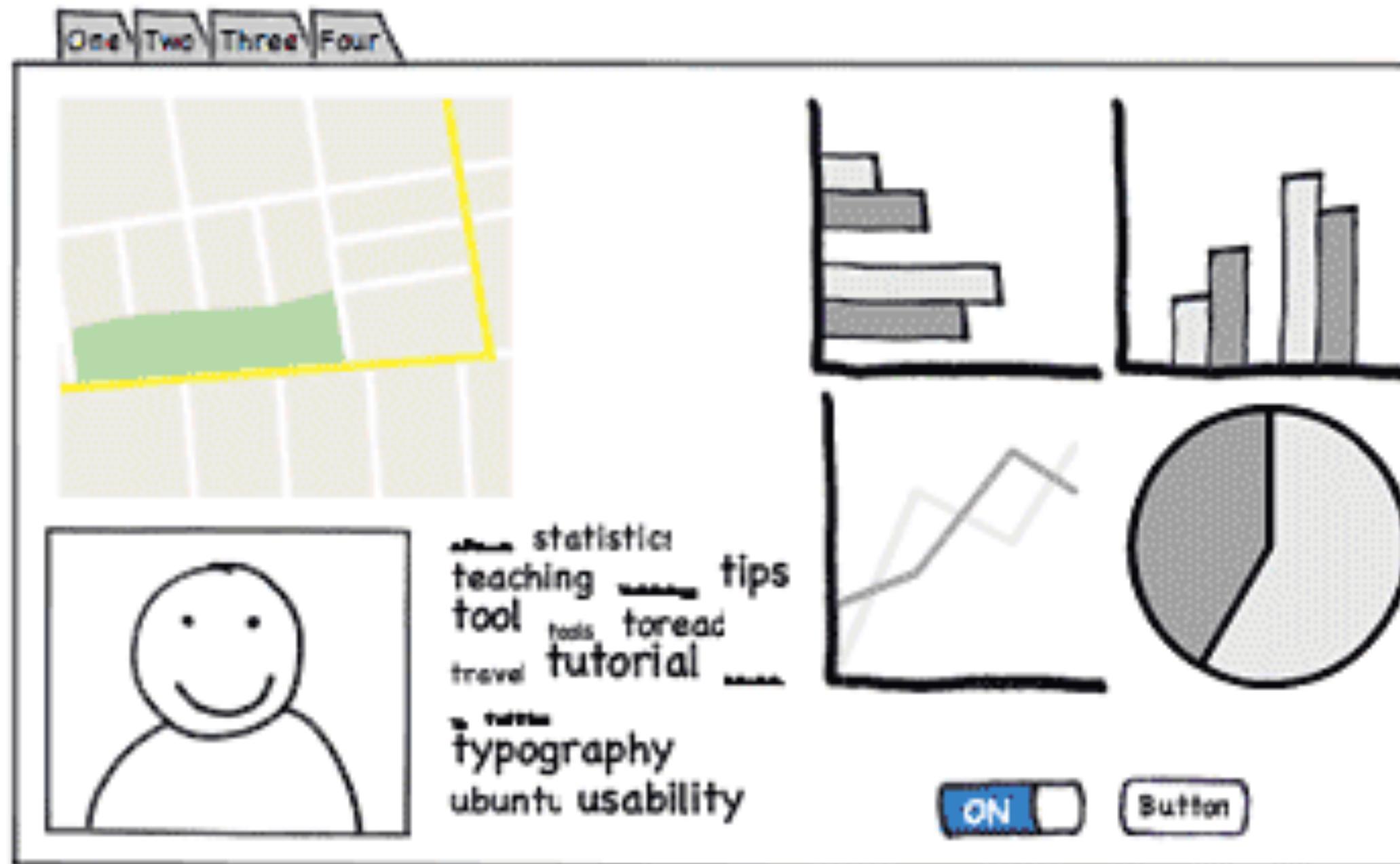
# Examples of Early Prototyping

## Paper Prototypes



# Examples of Early Prototyping

## Wireframes and Digital Mockups



GradeTrak™ [logout](#)  
Today is Tuesday, December 12, 2006.

Welcome, Ben Bitdiddle!

[Home](#)  
[My Classes](#)  
4.001J  
6.046J  
6.831  
[Settings](#)  
[Logout](#)

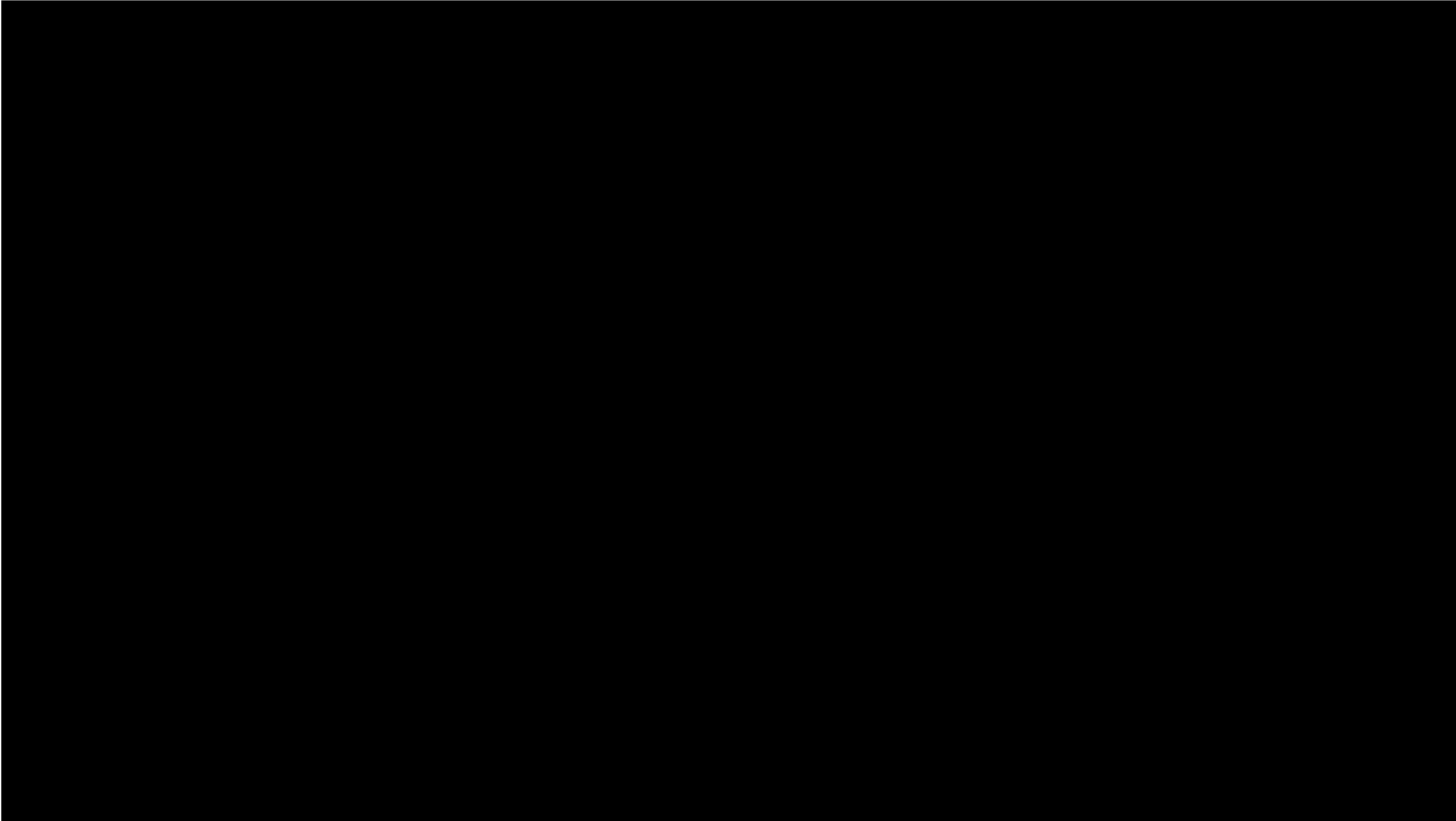
**My Classes**

Class	Estimated Grade	Remaining Assignments	Remaining Exams
4.001J	62% D-	1	0
6.046J	83% B	0	0
6.831	90% A-	1	0

**Seven Day Planner**

Date	Assignment	Time
Wednesday 12/13	6.831 GR6	5:00 PM
Friday 12/15	4.001J Final Project Due	

GradeTrak - A Bobby Lo and Jon Chu production.



**The Rapid Ideation Lab asked users how they would create the cars of the future.**

<https://www.lassor.com/student-project/rapid>

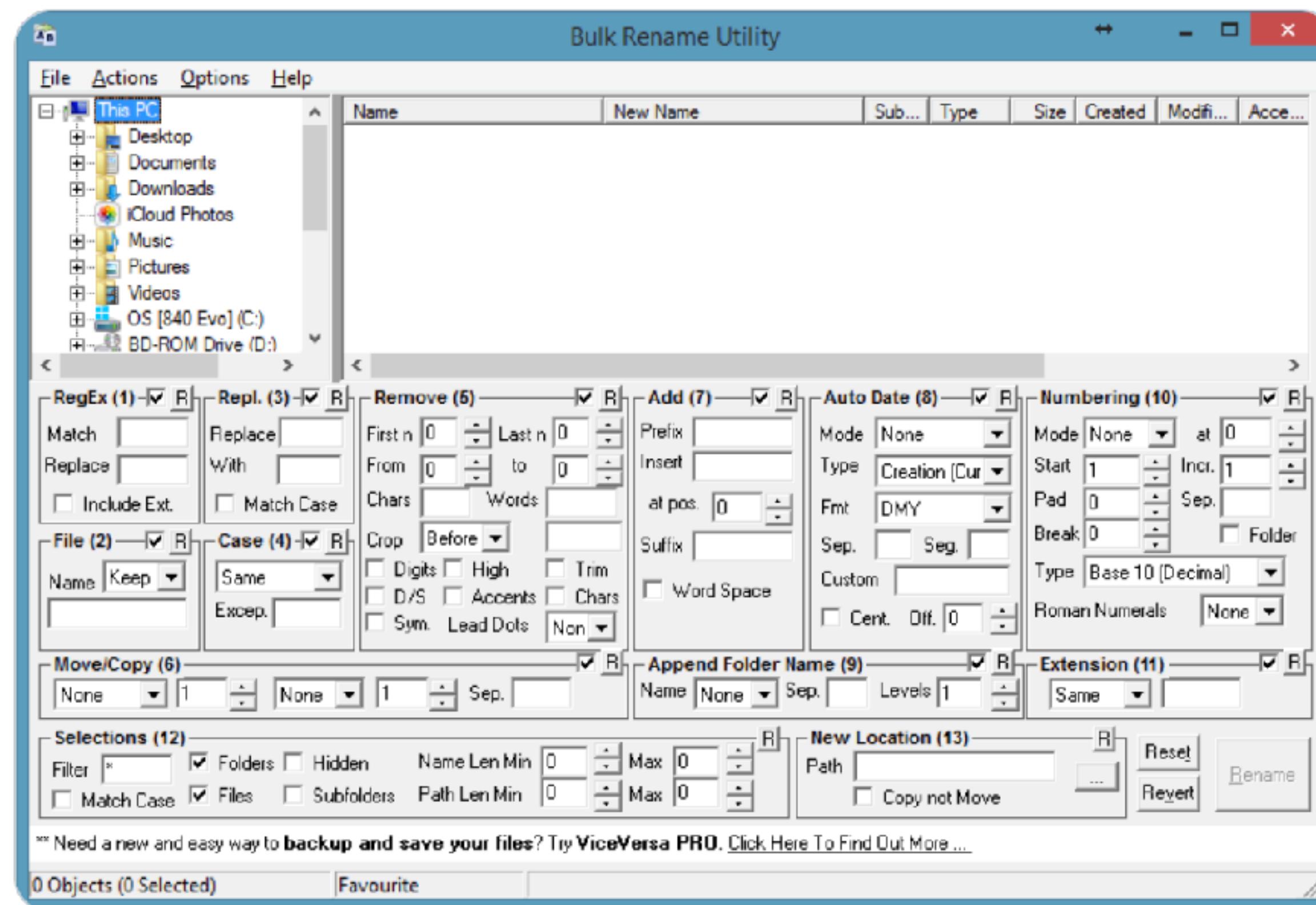
# Early Prototyping can detect problems



John Bellomy  
@cowbs

...

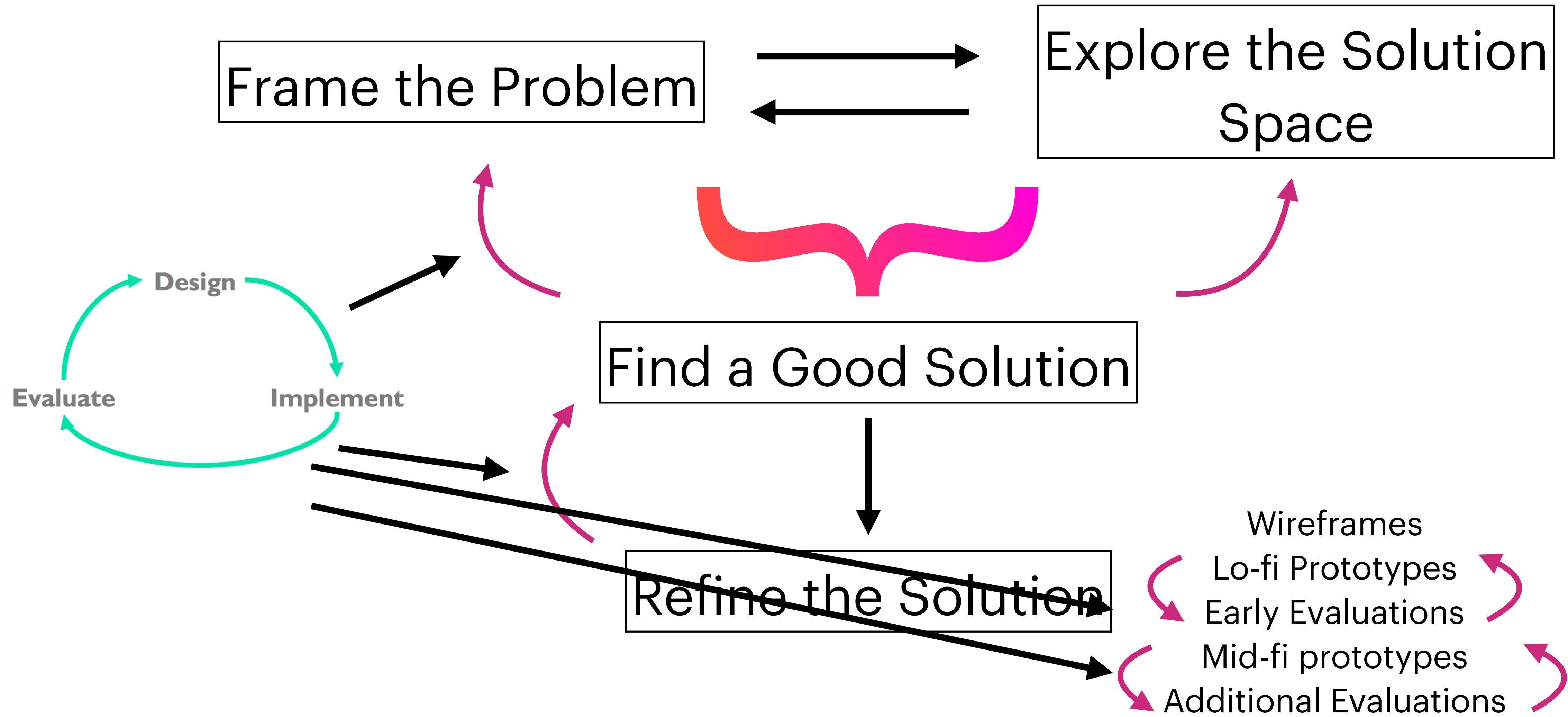
Engineers don't let engineers design user interfaces.



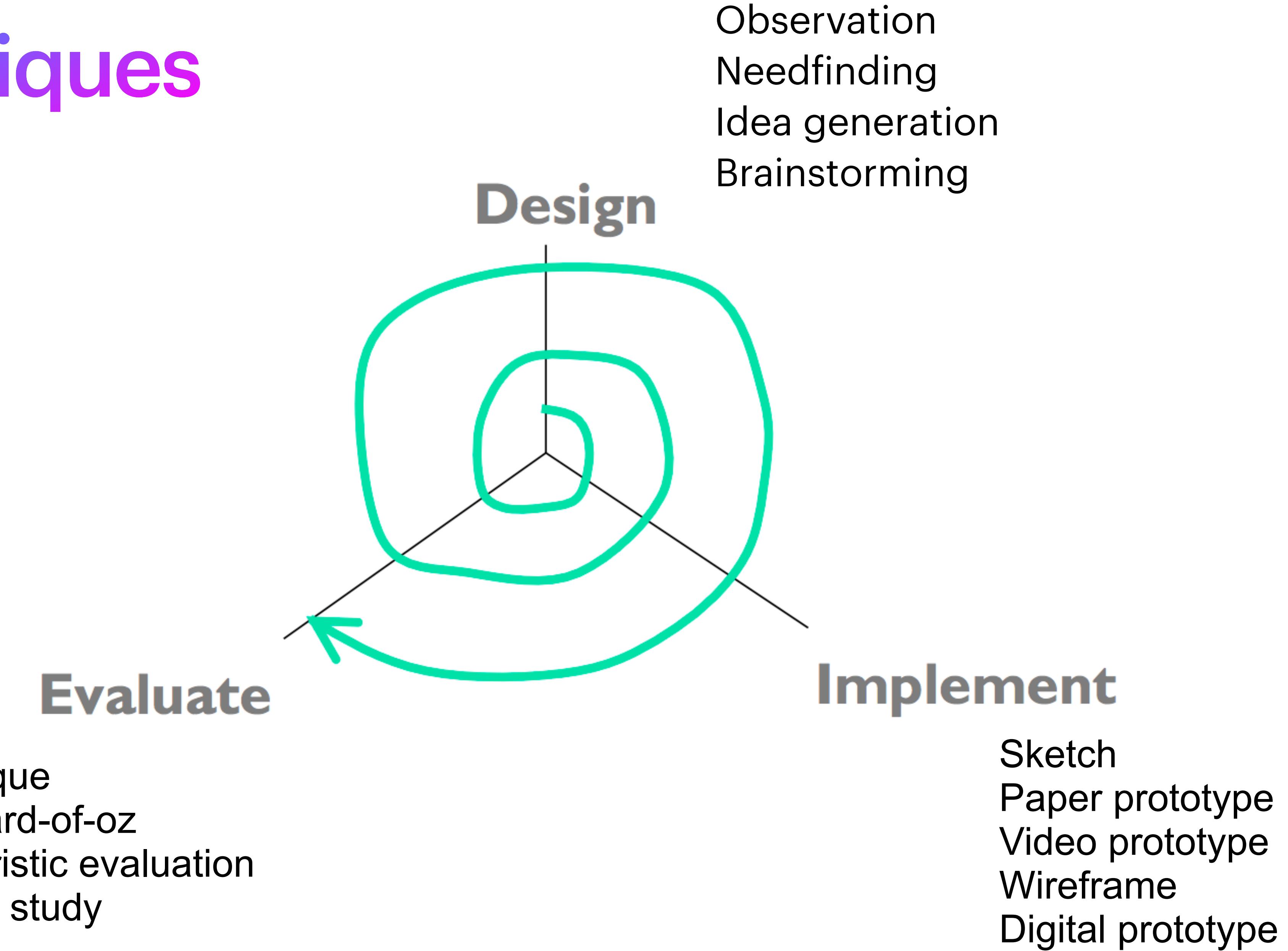
# Pros of Iterative Design

- Early iterations use cheap prototypes
- Later iterations use richer implementations, after UI risk has been mitigated
- More iterations generally means better UI
- Only mature iterations are seen by the world

# Iterative Design



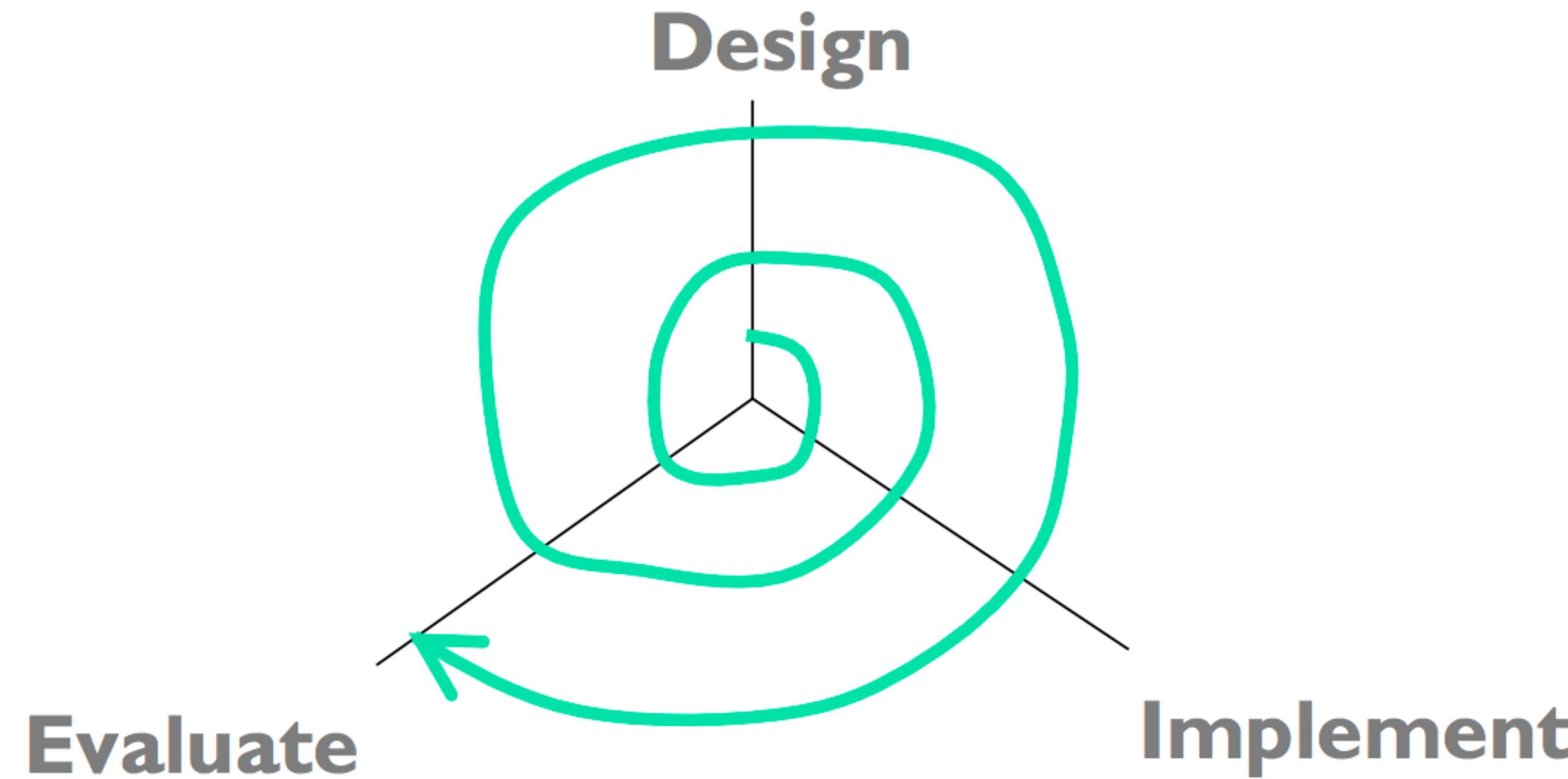
# Techniques



# Lecture Topics

03 - Ideation

06 - User Research



03 - Critique

11 - Interface Evaluation

13 - Heuristic Evaluation

09 - Sketching

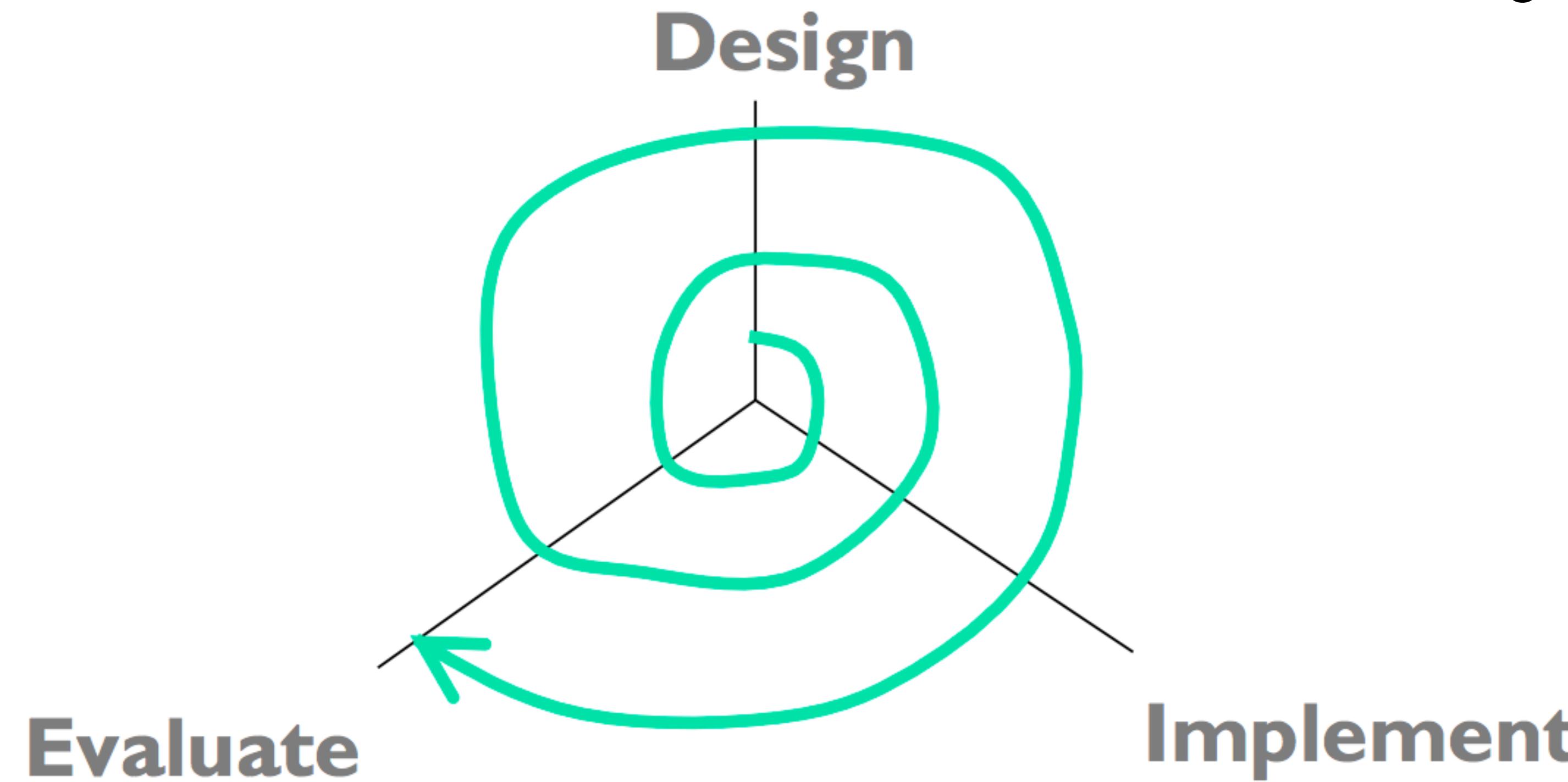
12 - Paper Prototyping

14 - Interface Implementation

# Group Assignments

1a, 1b: Project Brainstorm

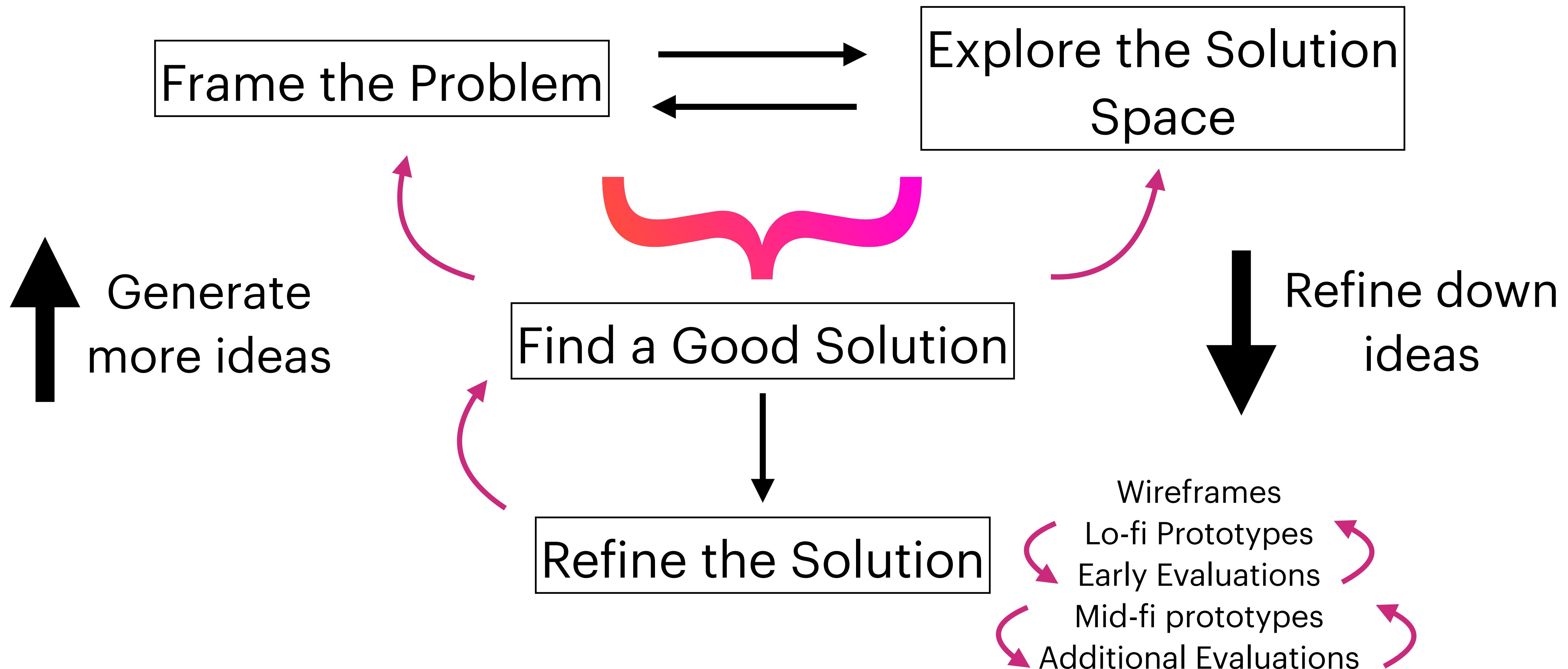
2a, 2b, 2c, 2d: Getting the Right Design



3b: Heuristic Evaluation  
3c: Usability Testing

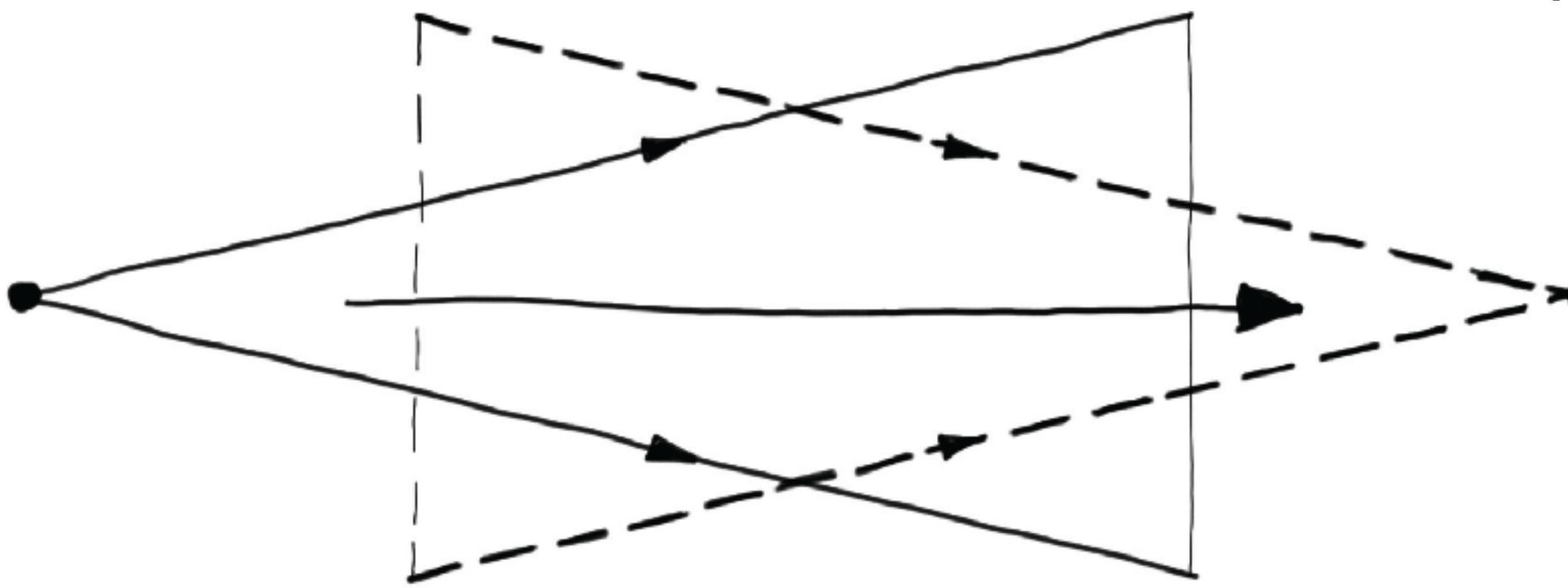
2e, 2f: Design sketches  
3a: Paper Prototype  
3d: Preliminary Mockup  
3e: Design Blogpost + finished mockup

# Design Diamond

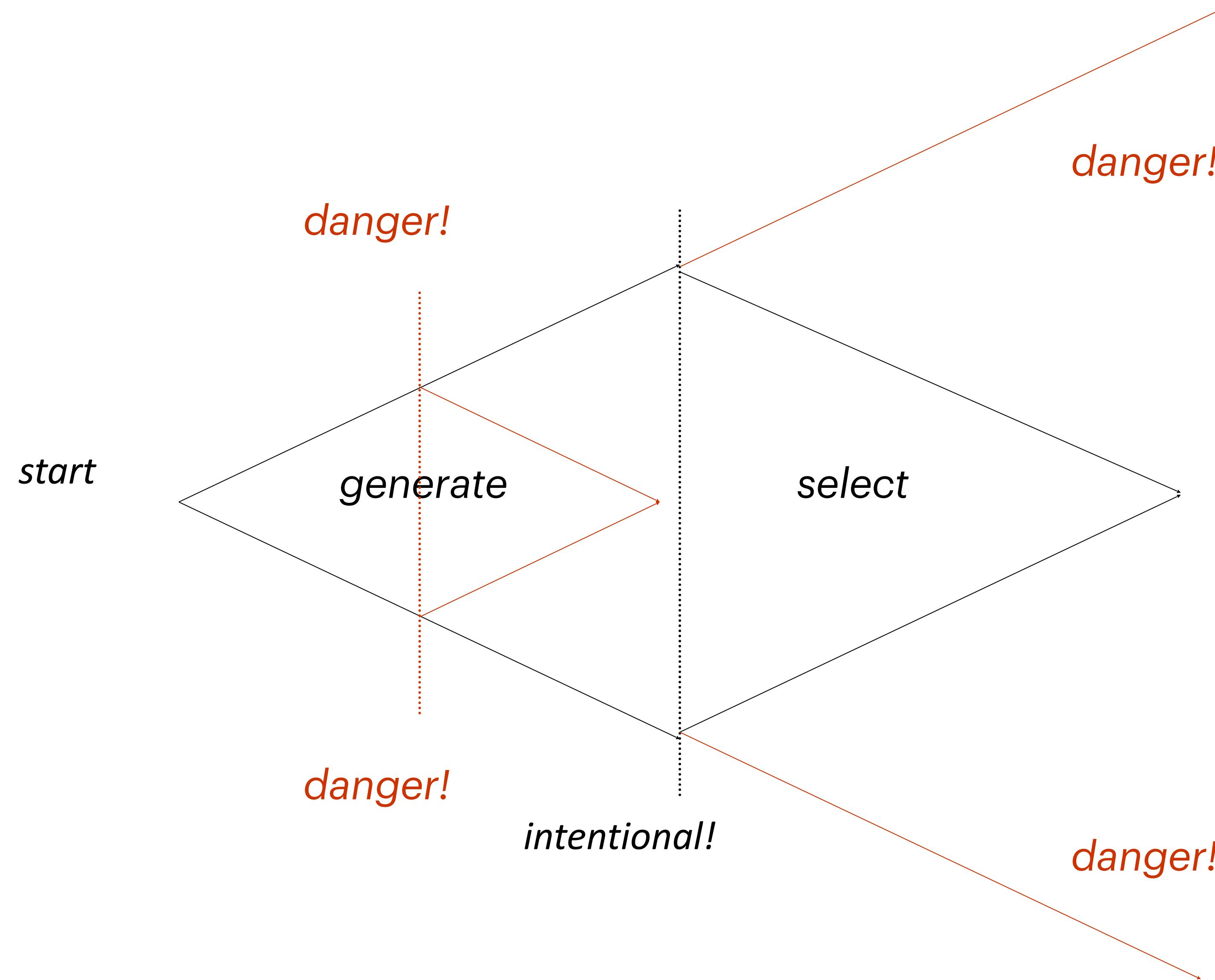


Elaboration

Reduction

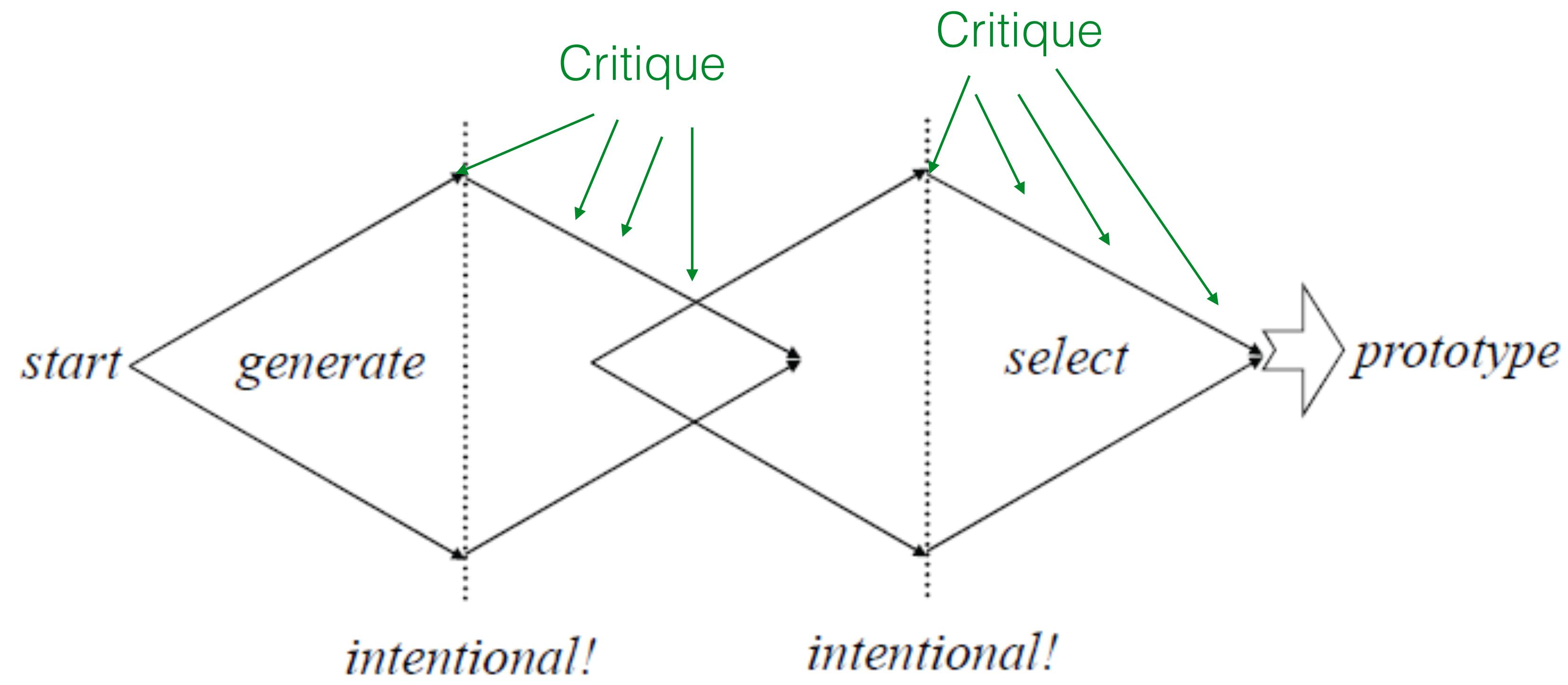


# Design Diamond



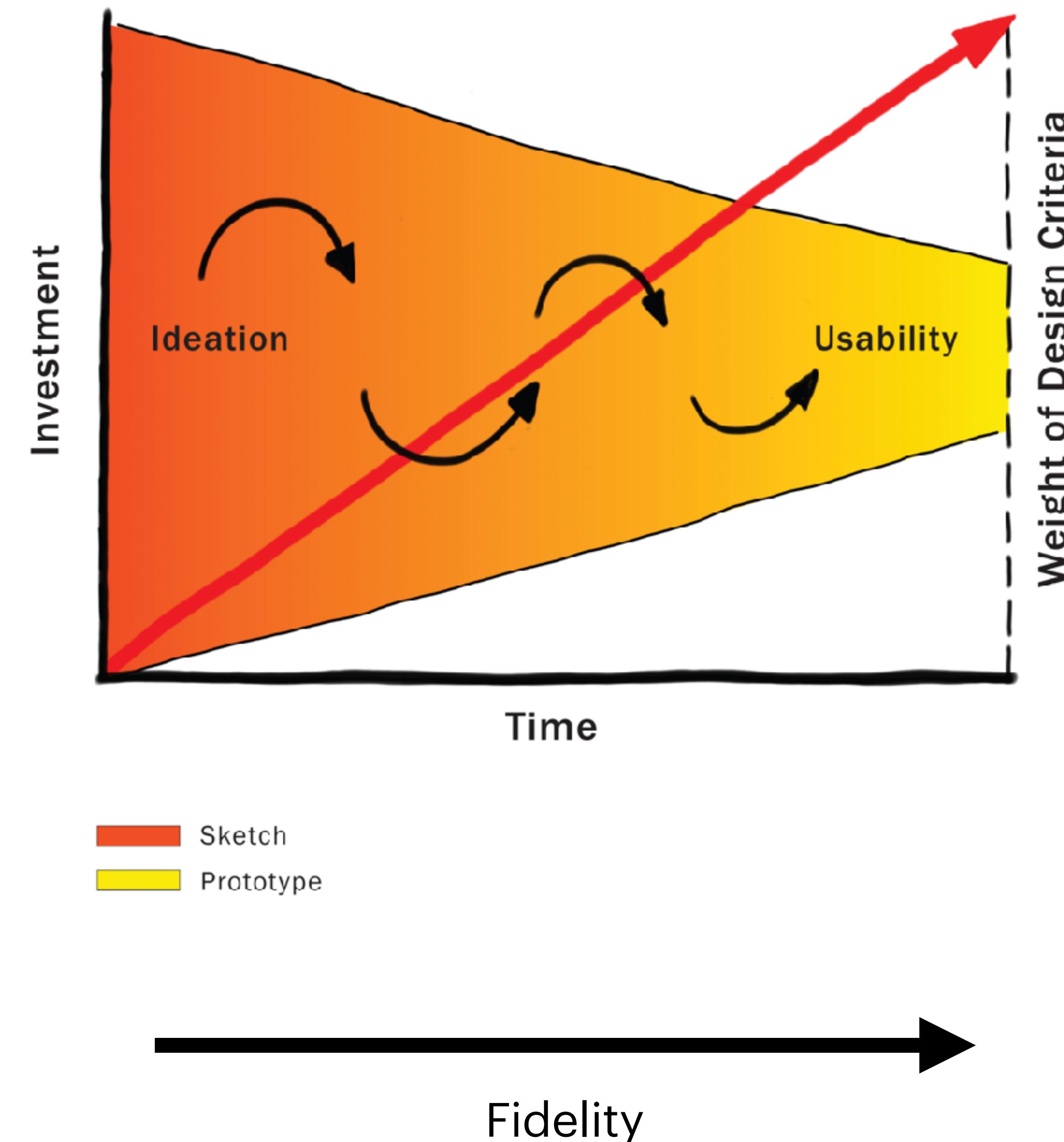
# The Role of Critique

- Ideas can be both good and bad
  - BOTH are useful in design
  - By making clear what is a bad design, we can avoid implementing it
  - Bad ideas help justify your good ideas and clarify what makes them good
- Feedback can turn a good idea into a great idea



# Combining design diamond with iterative design and spiral model

- By starting with low fidelity and moving to higher, we can more easily achieve a design diamond process earlier in the timeline (the “diamond” gets smaller over time)

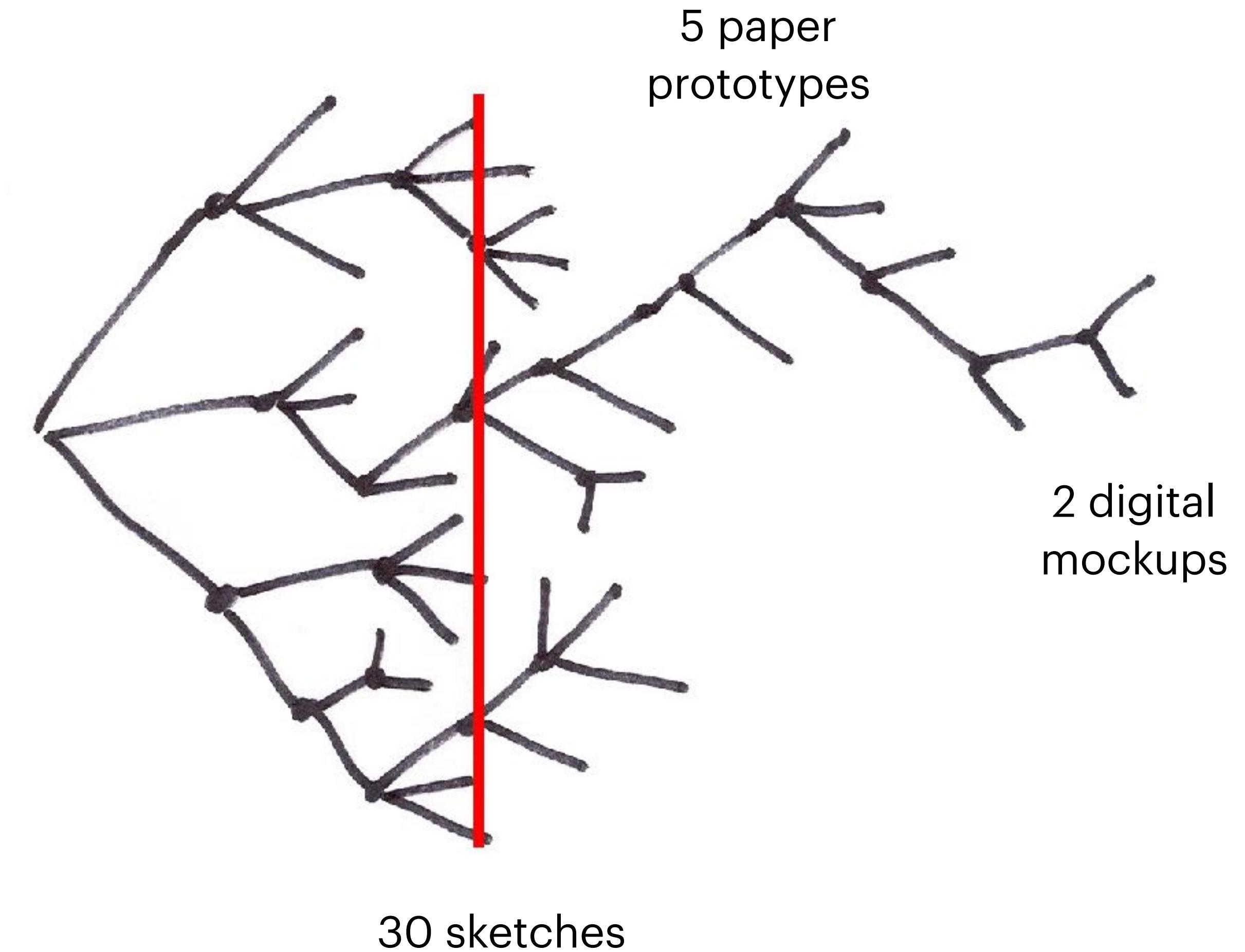


- **Parallel design:**

- Build and test multiple prototypes at the same time to explore design alternatives
- Easy to do when sketching or making lo-fi prototypes!

- In contrast, **serial design:**

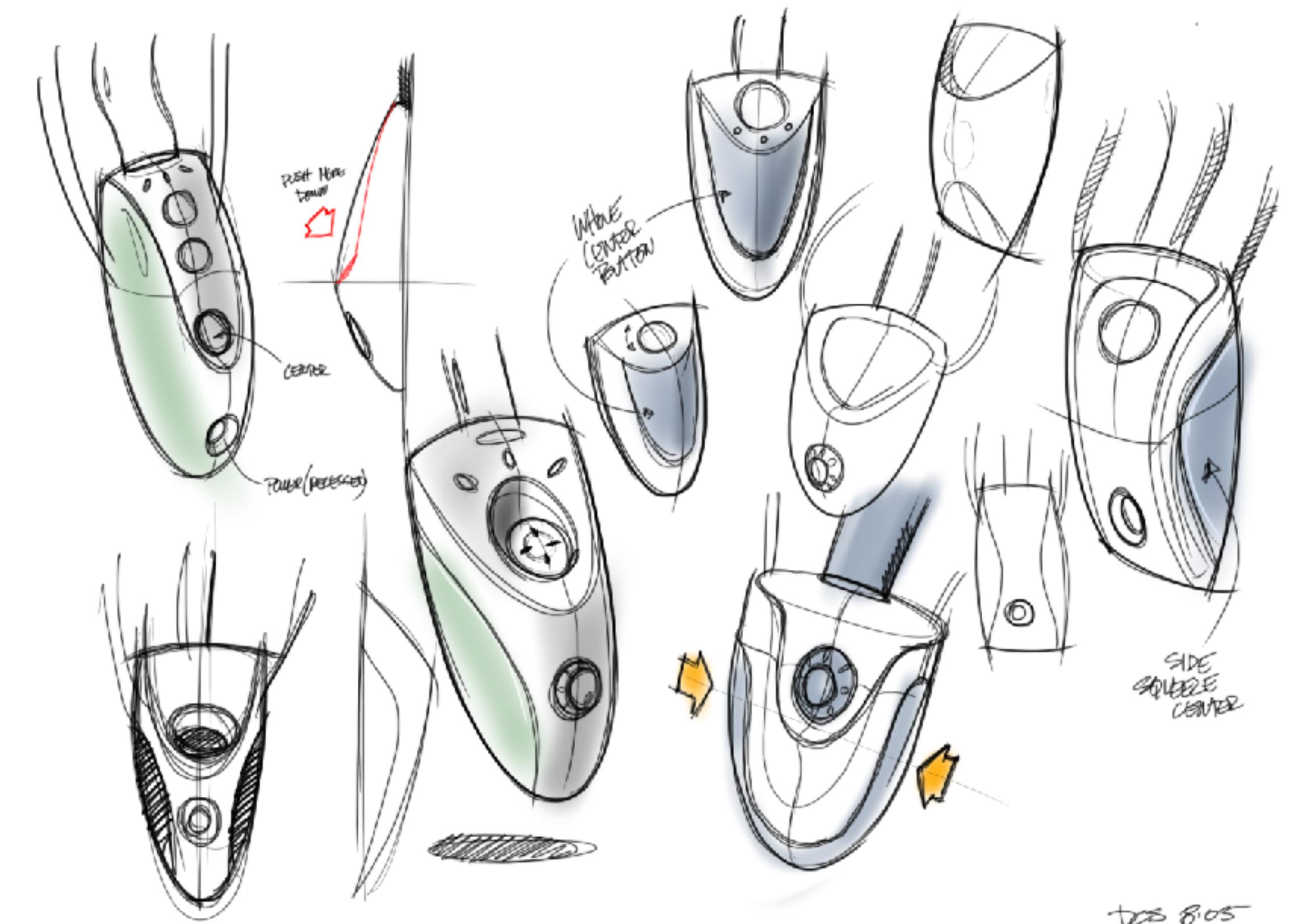
- One design at a time
- More useful during later stages of prototyping



# Ideation

# Sketching

- A way to think through ideas, explore alternatives, and convey them to others very early in the design
- Easy to make, easy to throw away, so you don't get too attached
- Quantity over quality - bad ideas are also useful!



By Reid Schlegel: <https://www.youtube.com/watch?v=FVx9RLCnJH8>

# Ideation Exercise

# The Tea Alignment Chart

	INGREDIENT PURIST	INGREDIENT NEUTRAL	INGREDIENT REBEL
FORM PURIST	(Must at least partly be produced by heat processing plant leaves)	(Can be any form of plant-based product)	(Can contain literally anything, be it drinkable or not)
FORM NEUTRAL	"Black tea is a tea"	"Lemon water is a tea"	"Chocolate latte is a tea"
FORM REBEL	"Bubble tea is a tea"	"Minestrone is a tea"	"Gamer girl bath water is a tea"
	"Tea tree oil is a tea"	"Natural resin is a tea"	"Battery acid is a tea"

# Sketching Part 1 (3 min)



- By yourself, sketch 5 new designs for a cup
- Try to push yourself to think of 5 vastly different designs by considering very different contexts and use cases for a cup
- What assumptions are you making about how cups are used? What happens when you get rid of one of those assumptions?

Lawful

Neutral

Chaotic

Good



Neutral



Evil



# Sketching Part 2 (6 min)



- Consider how your 5 designs explore different **dimensions** of the **design space** of cups (color, size, shape, material, etc.)
- Throw out those old ideas and now come up with 10 **new** cup designs that stretch those dimensions out or combine them in new ways.
- Purposefully come up with bad/ridiculous designs!
- From these 15 cup designs, pick 2-3 that are your favorite (you'll also be sharing these later in groups).
- Answer questions at: [www.yellkey.com/town](http://www.yellkey.com/town) (permalink or if YK is down: <https://tinyurl.com/5ajt2ytj>)

# Reflection

- What was hard about this exercise?
  - Did you have any trouble coming up with that many sketches?
  - Did you have trouble trying to think of very different sketches?
- What helped you break out of a rut?
- Anything else interesting you noticed while going through this process?



# Group Project Overview

# Adulting!

- This can be broadly construed to relate to helping people gain any form of **self-actualization**--whether that be as a worker, a citizen, a community member, a student, a parent, or just an independent and thriving person!
- We encourage your team to try and pick a group **you all do not consider yourself a member of**; this is so that you will not rely too much on your own experiences during user research. We know many of you may have first-hand knowledge about struggles with adulting (don't we all!) but try to find an aspect of it that you haven't directly encountered or that you don't care that much about but that others have and do.
- Define the specific adulting skill/goal that you wish to help in which population. Then start to consider ways technology can be designed to help address this. Some examples of relevant projects are in the syllabus!



# Fridgigotchi

A friend to save your food

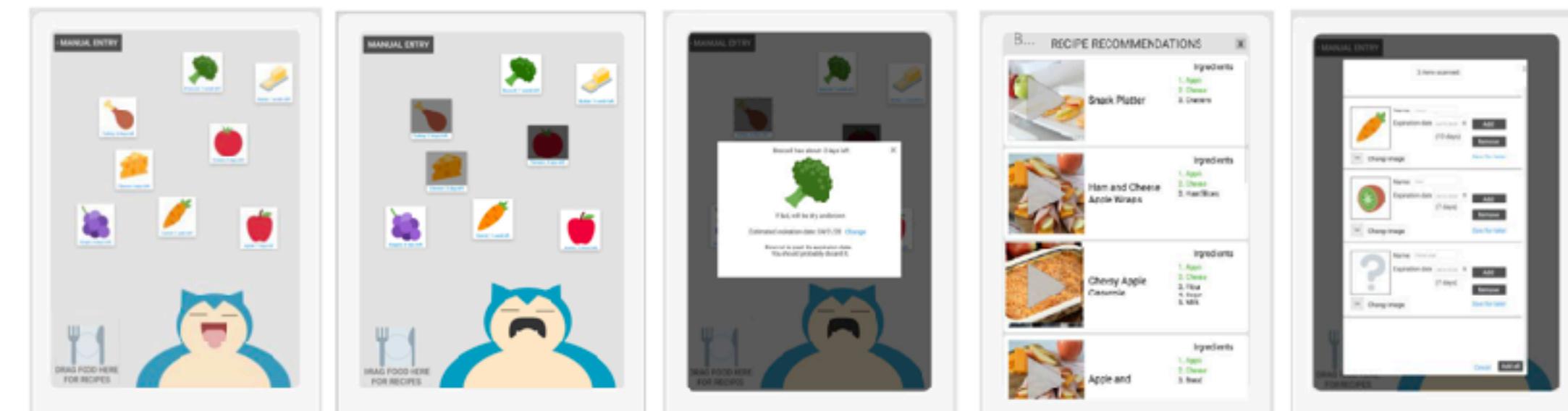
## Our Problem

The USDA estimates that we waste up to 40% of the food that is produced in America. That translates to \$161 billion wasted annually, with wasted food contributing 6.7% of all greenhouse gas emissions.

## Our Value

We introduce Fridgigotchi as a way to help people reduce their food waste. Fridgigotchi provides updates on how close food is to spoiling and recipe suggestions so that food gets used, all with a fun and cute design.

## Features



Fun Design

Spoil Indicator

Spoil Warning

Recipe Ideas

Receipt Upload

## Design Process



Research

Discover tasks to help reduce waste



Sketches

Explore designs quickly and cheaply



Storyboard

Convey the context for how tasks get done



Paper Prototype

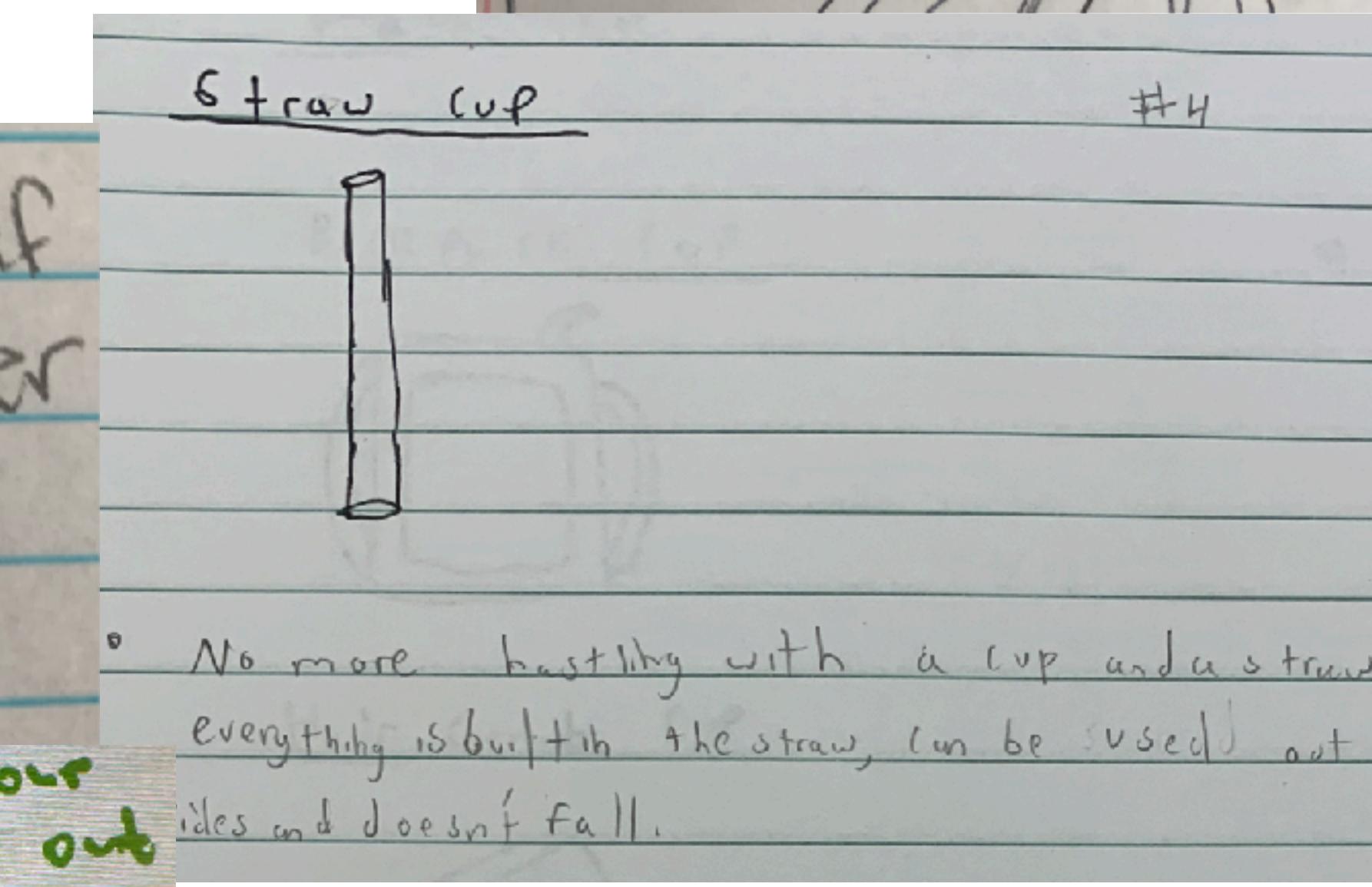
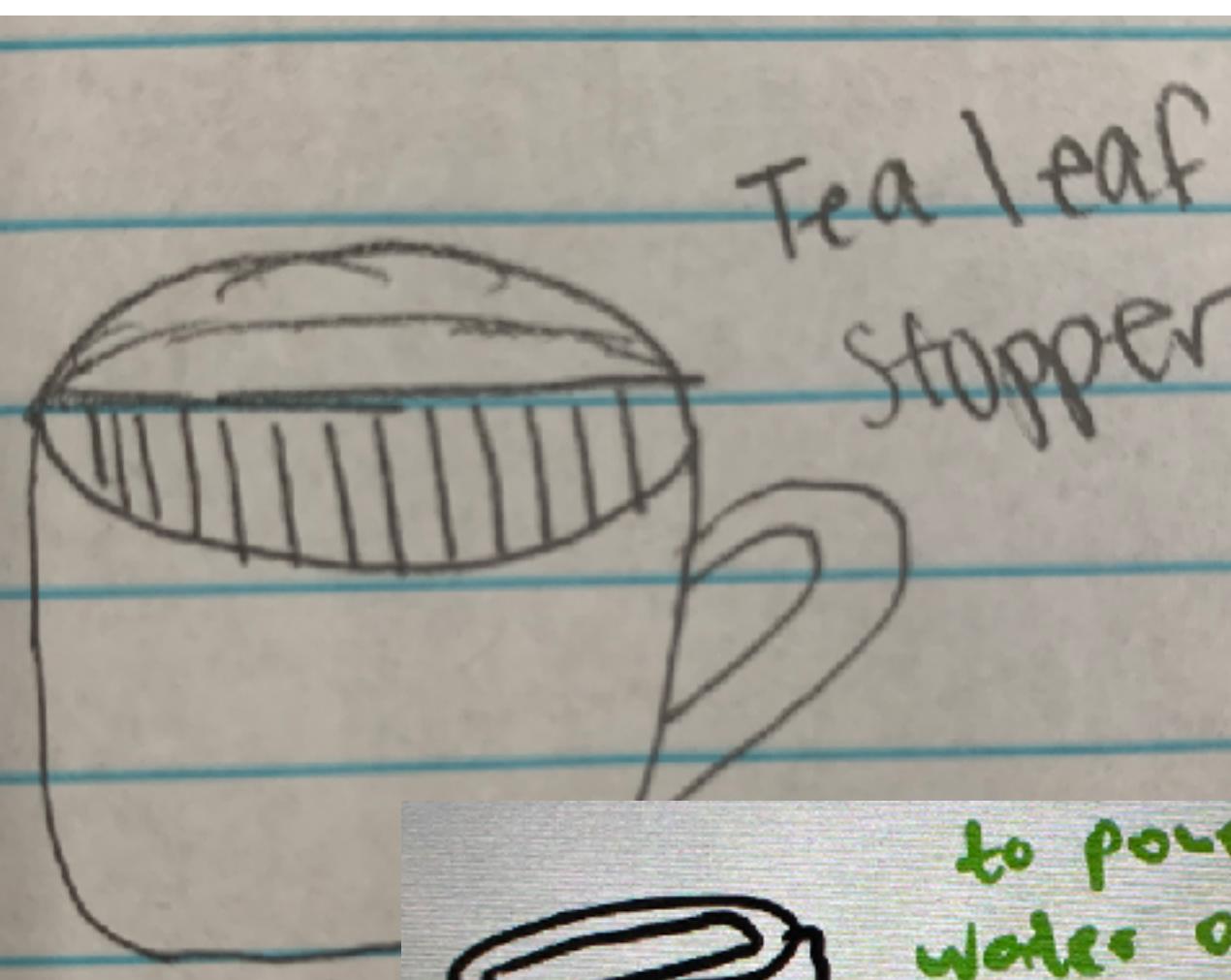
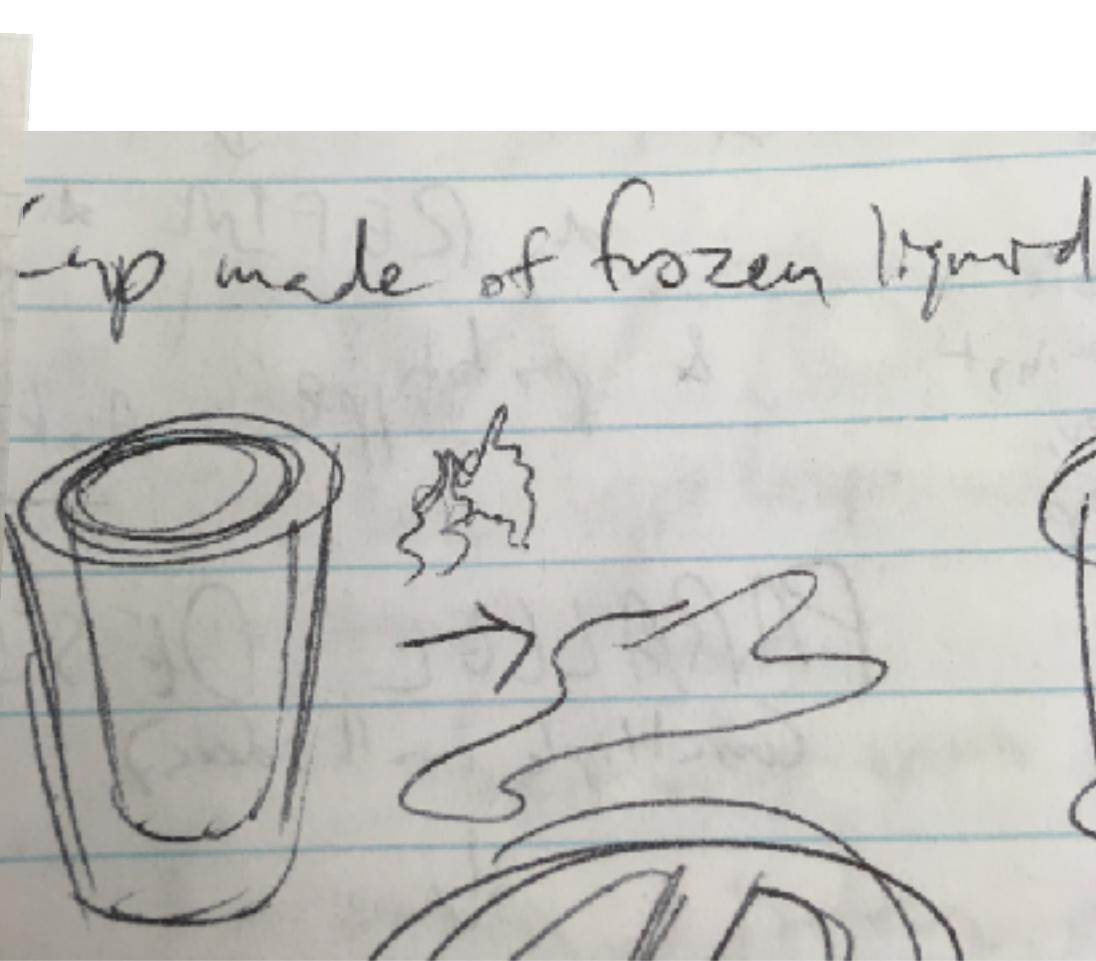
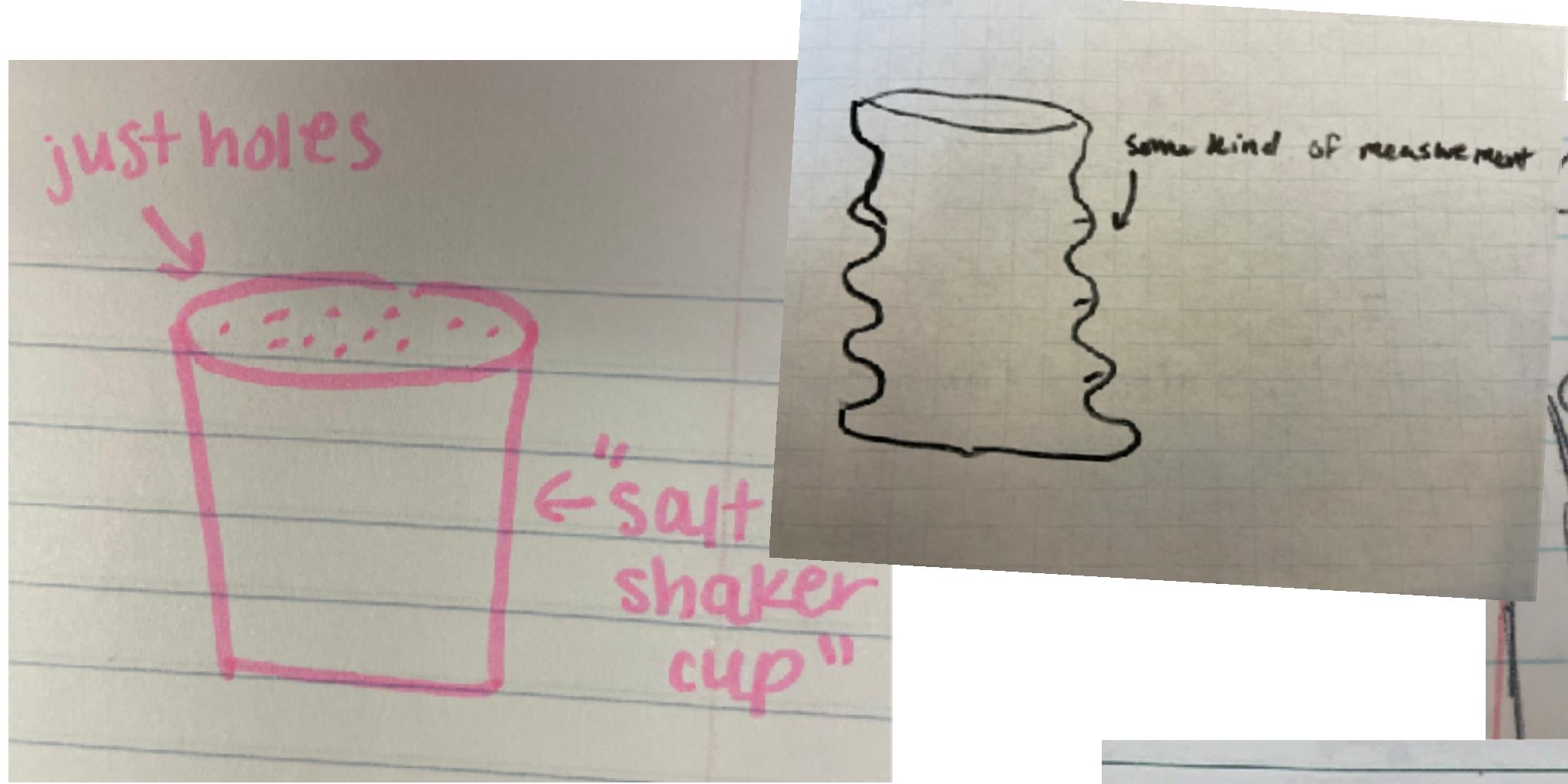
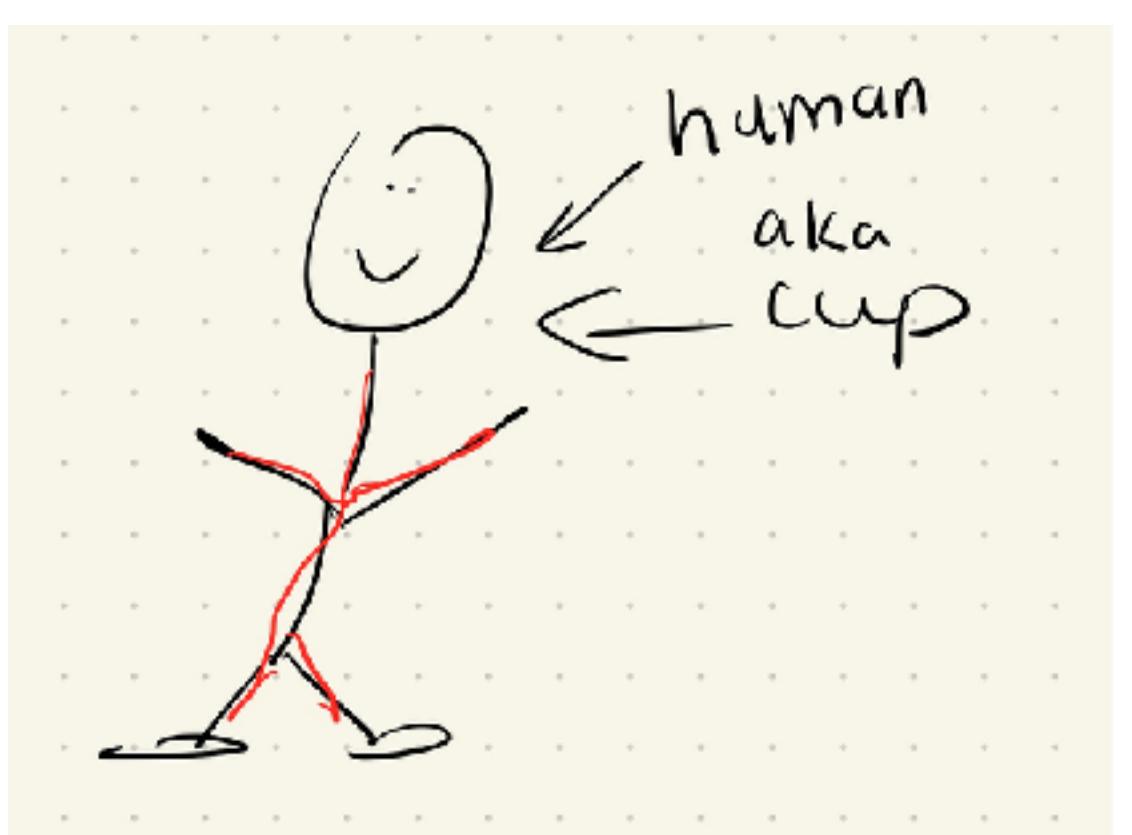
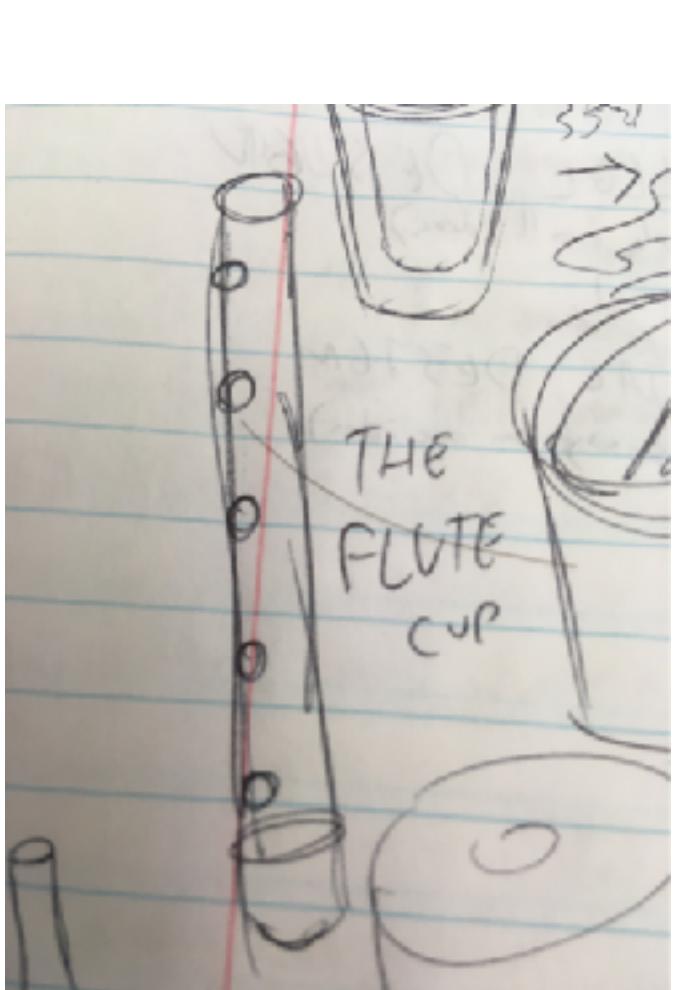
Conduct usability tests and heuristic evaluation

# Thinking about ideas for the project

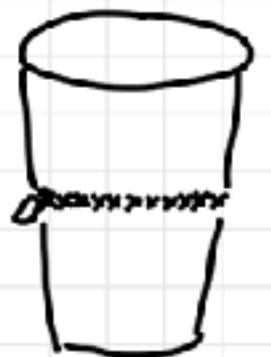
- Pick ideas that you are **passionate** about!
- The problem and the target user group should not be too vague (“people who exercise”). As mentioned, thinking of specific types of users and contexts will be helpful for customizing your design (for ex: novice vs expert exercisers).
- But also **don't scope it too narrowly just yet**. If you do, you may realize that you've narrowed it so much that you've already got a specific solution in mind. Try to keep an open mind at this point and look around for a weighty, complex problem with several avenues for potential exploration.

# In Your Groups:

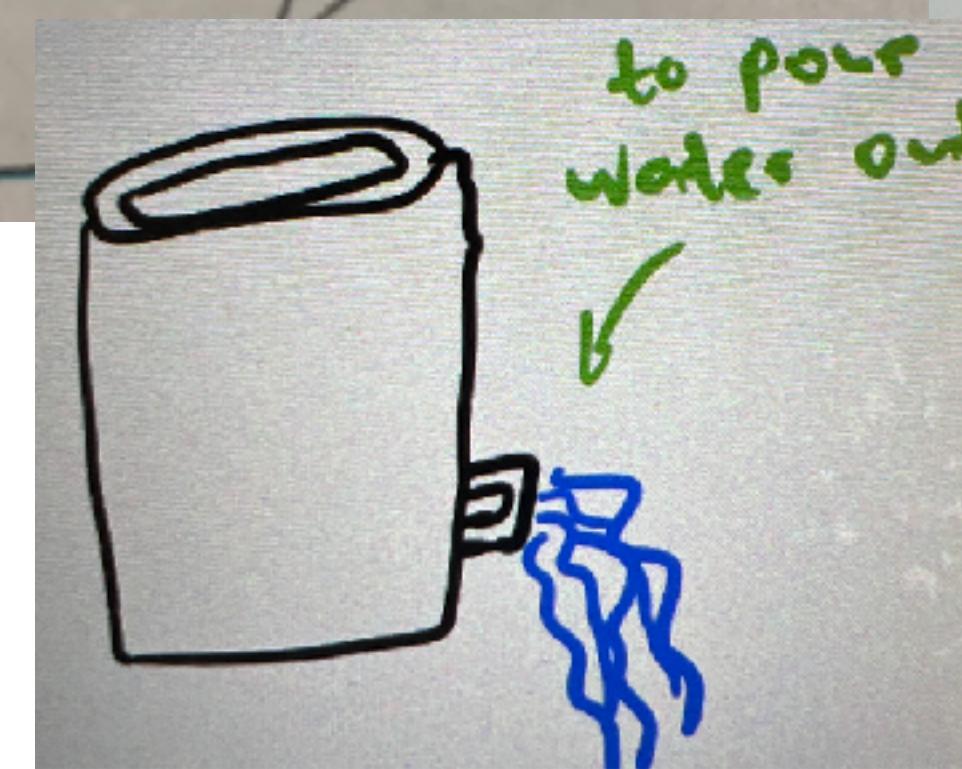
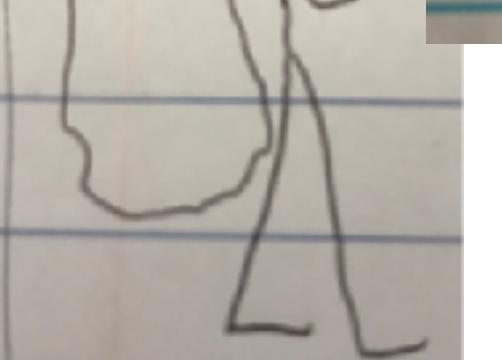
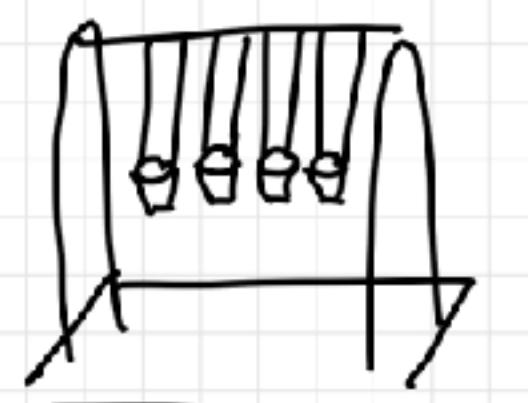
- Share your 2-3 favorite cup designs. Talk about your design process, what dimensions you explored. How did you landed on these 2-3, and why are they your favorite?
- In the remaining time, start working on 1a in your group.
- Remember to exchange contact details, discuss when to meet, how to communicate.
- The final 1a is due 11AM Thursday in Gradescope!
- While ideating for 1a, one useful technique is for teams to individually come up with a number of ideas before sharing them all with the rest of the team. Helps to reduce groupthink and improves the creativity of output (making a bigger diamond before narrowing!) We'll discuss why on Thursday!



zipper for easy cleaning



newtons cradle shots



Some interesting cup ideas people came up with!