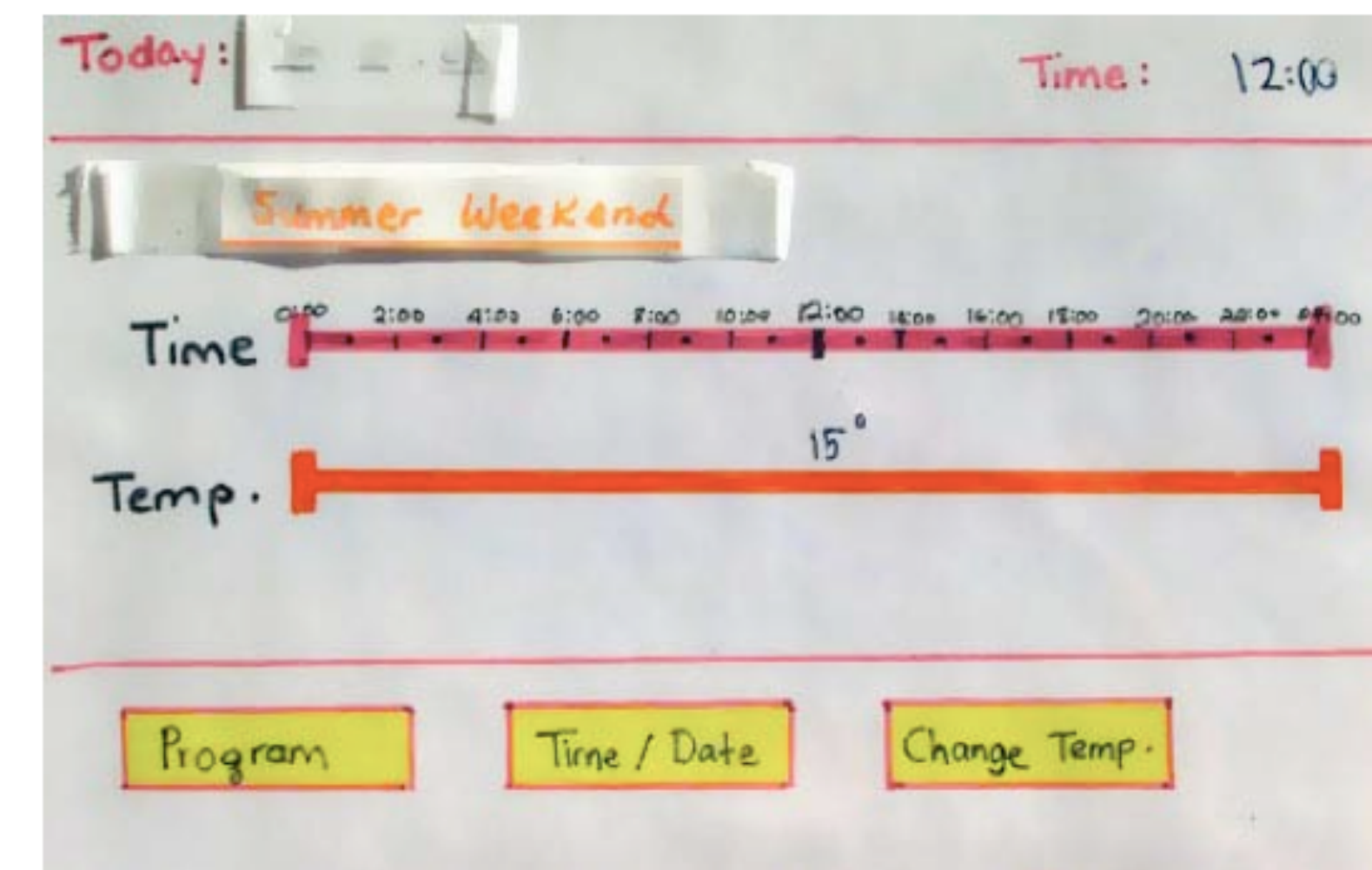
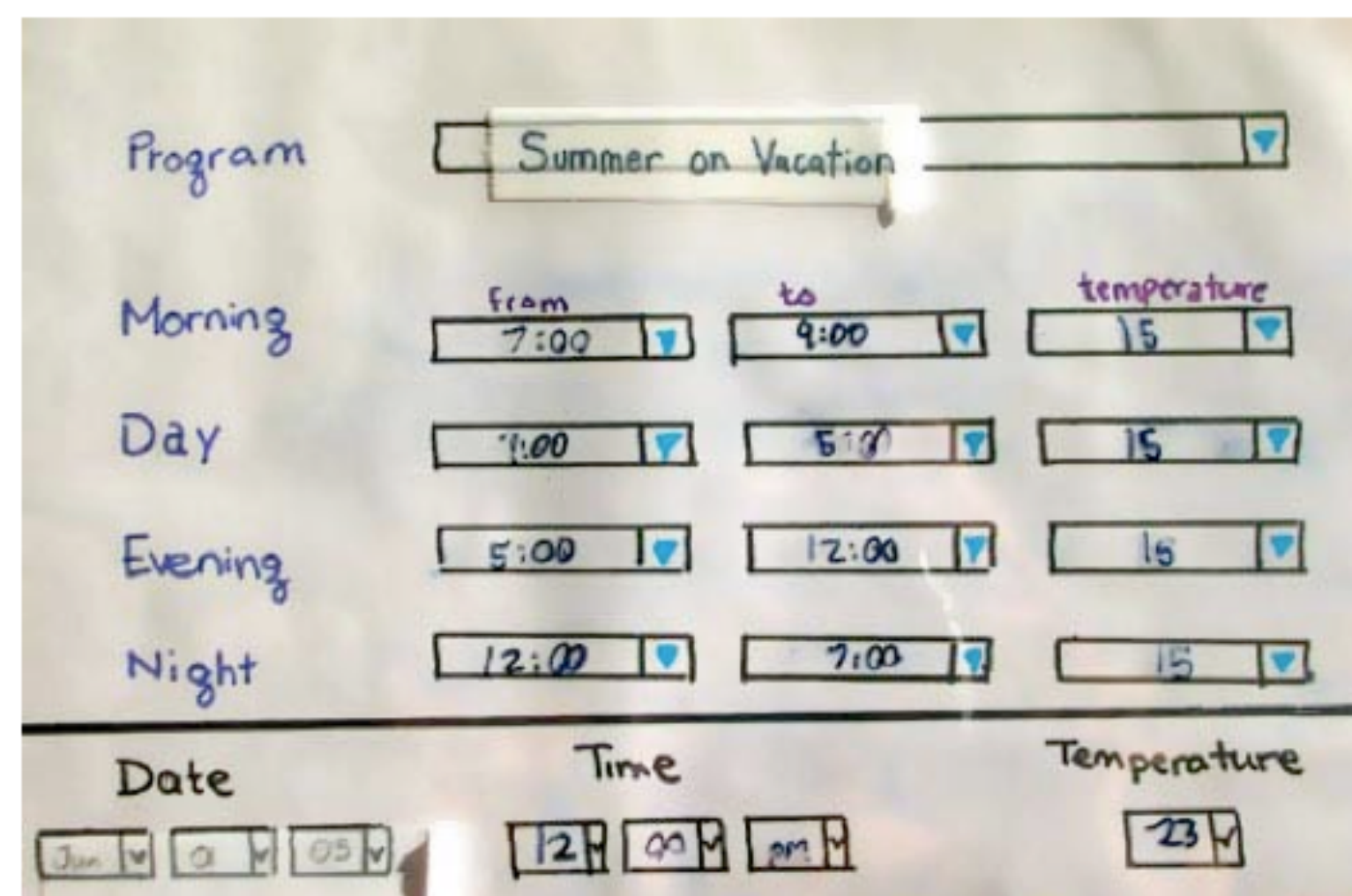
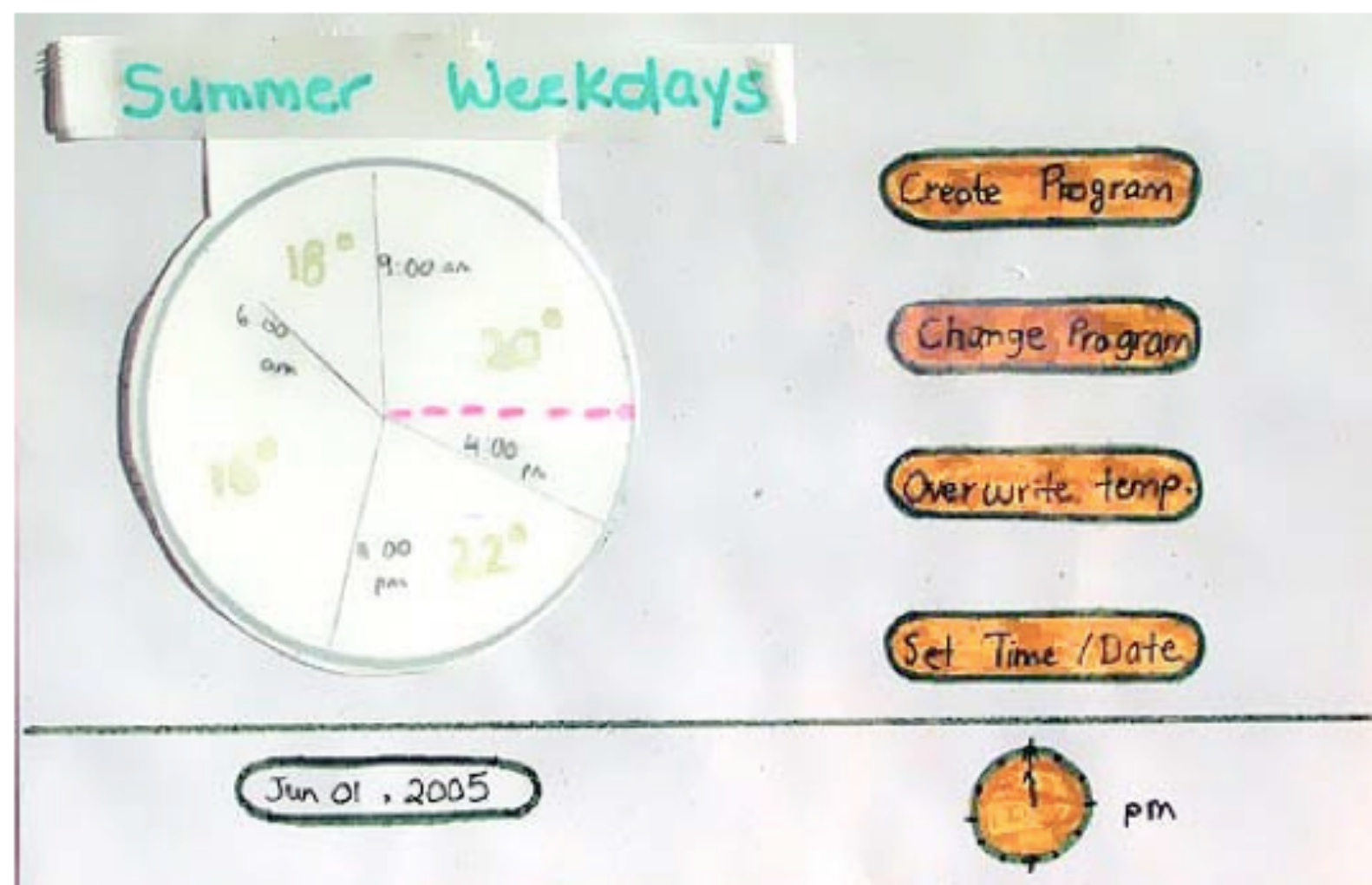


# CS181DT Class 15: Prototyping



Three different paper prototypes for the same idea

<http://courses.csail.mit.edu/6.831/2014/readings/L10-prototyping/#paper-prototypes>

# Class 15 agenda

- Lecture: From design goals to designs: prototyping!
- Break
- Studio: Paper prototypes (wireframes)

## Announcements

- Remember, all P2 checkpoints will *not* affect your final P2 grade. They're for feedback only

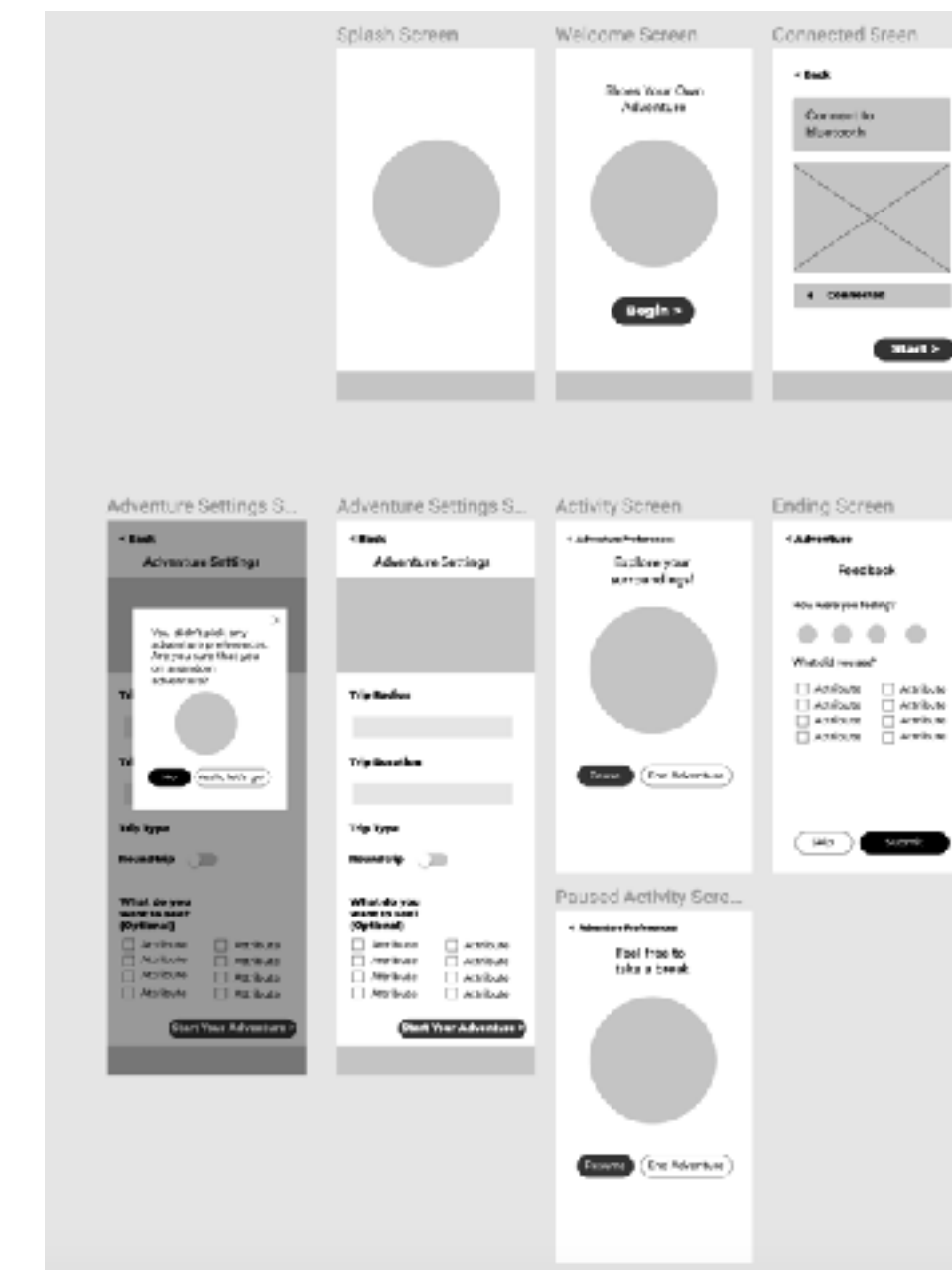
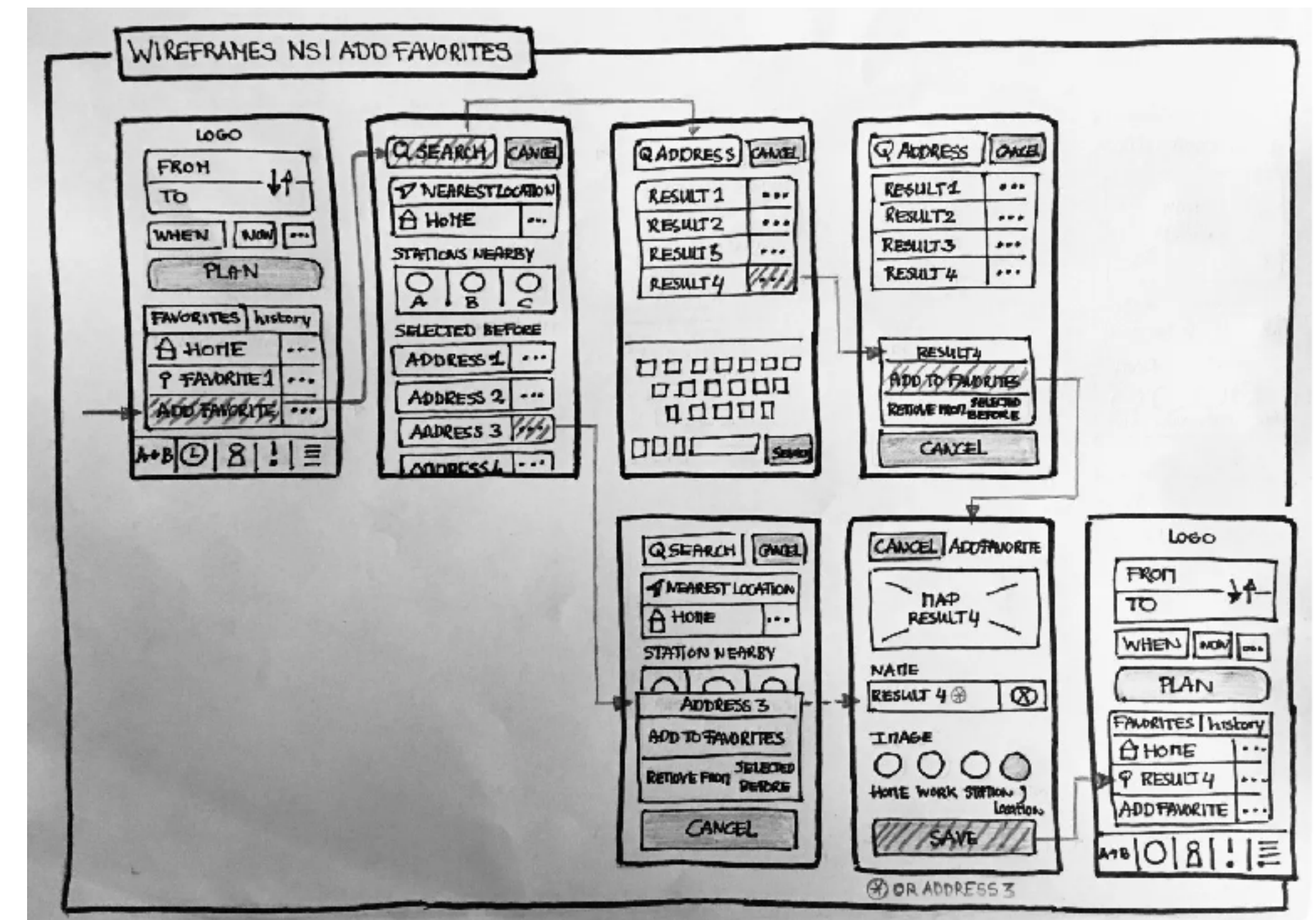
# Prototypes

# From design goals to design

- Prototypes are instantiations of ideas that can be informed by your user needs and design principles
- Prototypes force you to make design decisions
- This class we'll be making low fidelity *paper prototypes*. Benefits of paper:
  - Faster to build
  - Easier to change
  - Focuses attention on big picture rather than nitpicking UI details

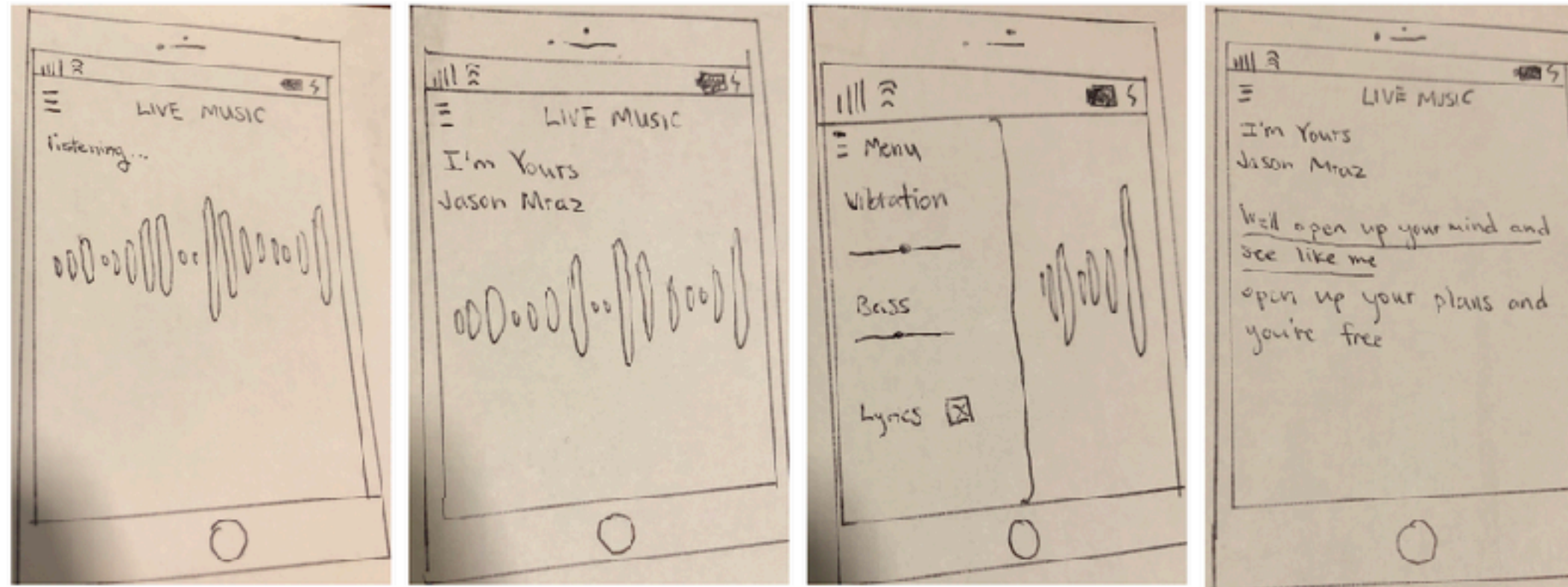
# Wireframe

- A wireframe is an **architectural representation** of a user interface like a screen, window, dialog box or web page.
- Wireframes visually depict the basic layout of an app or website. They typically lack style, color, and graphics as their purpose is to test **functionality** and determine **priority of content**.

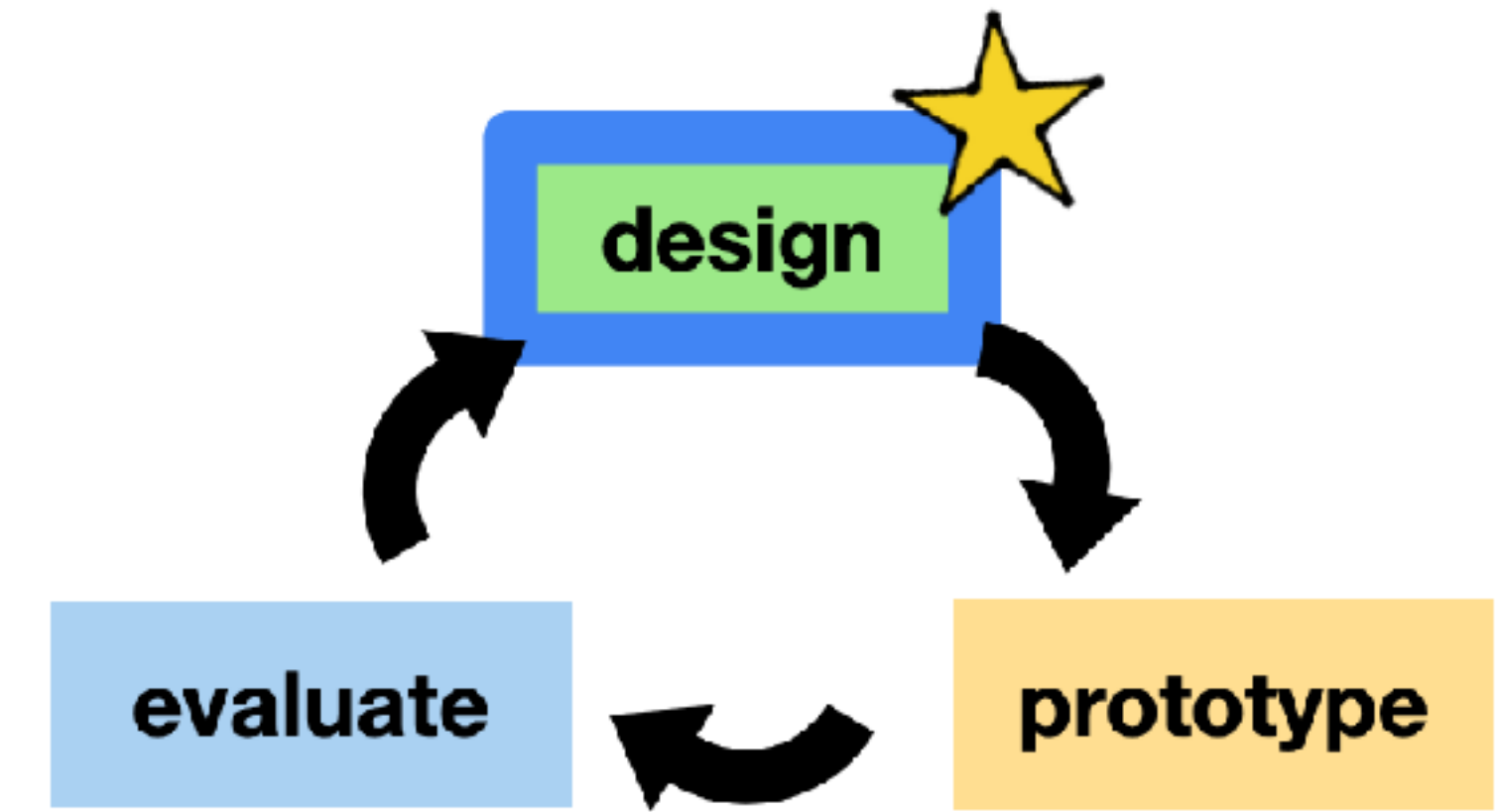
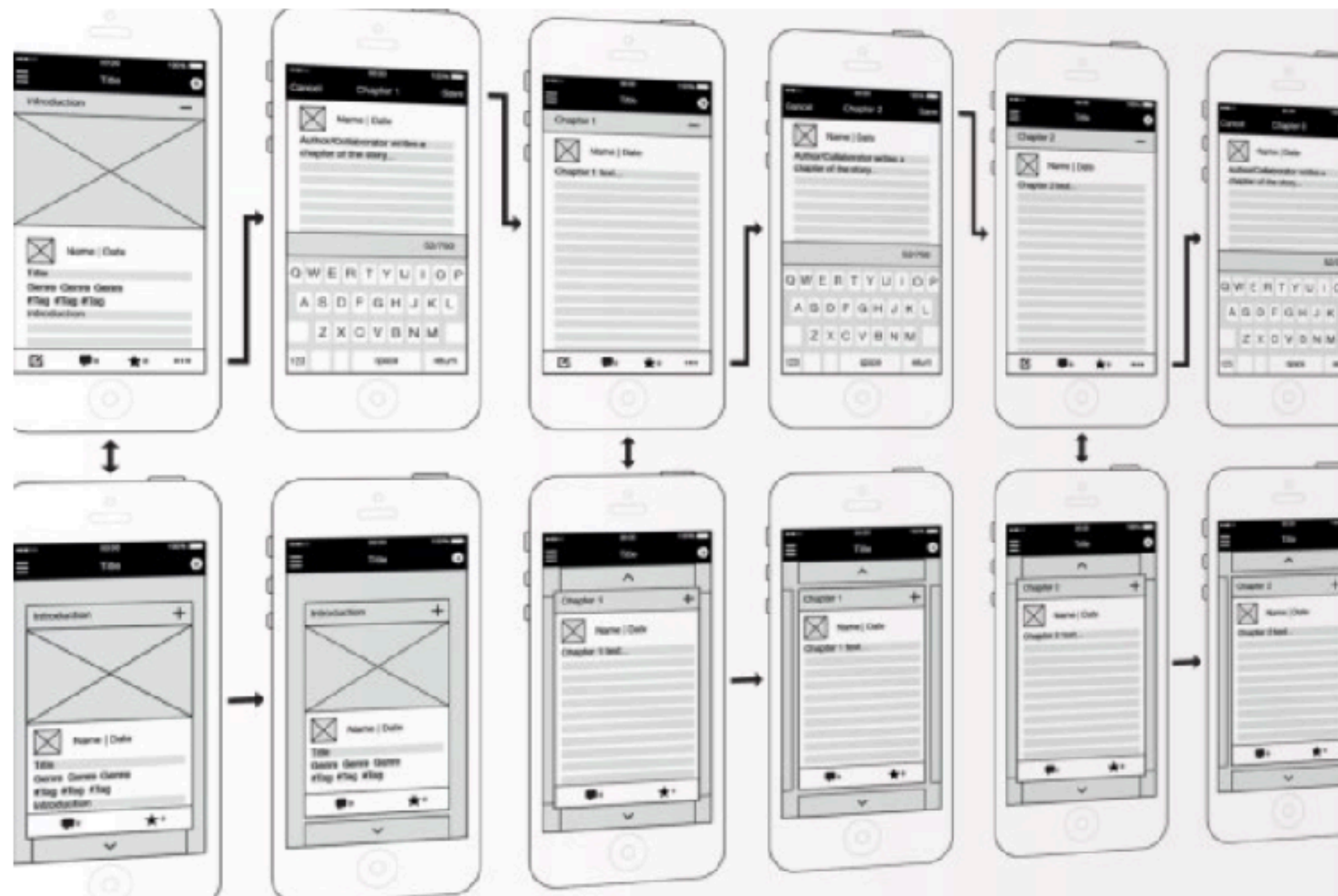


# Sketch vs wireframe

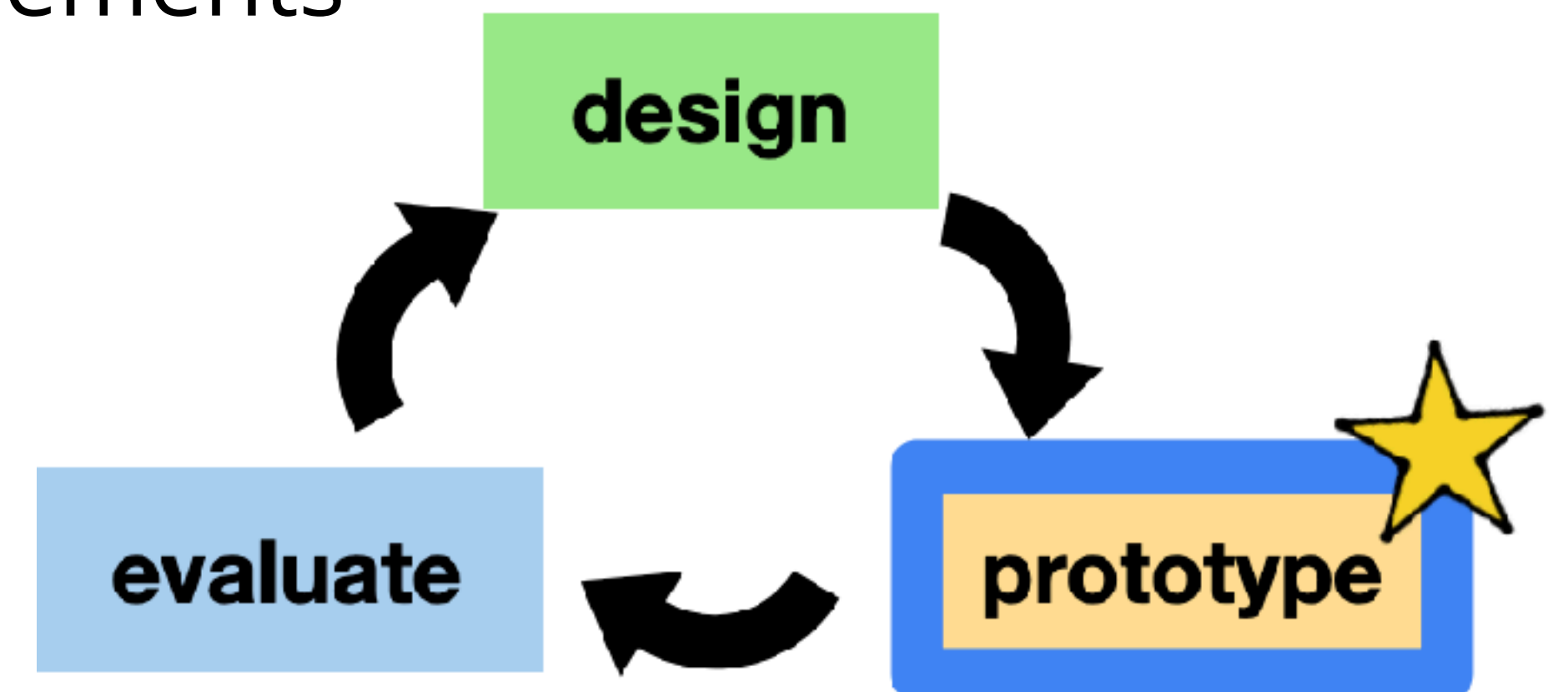
Sketch



Wireframe

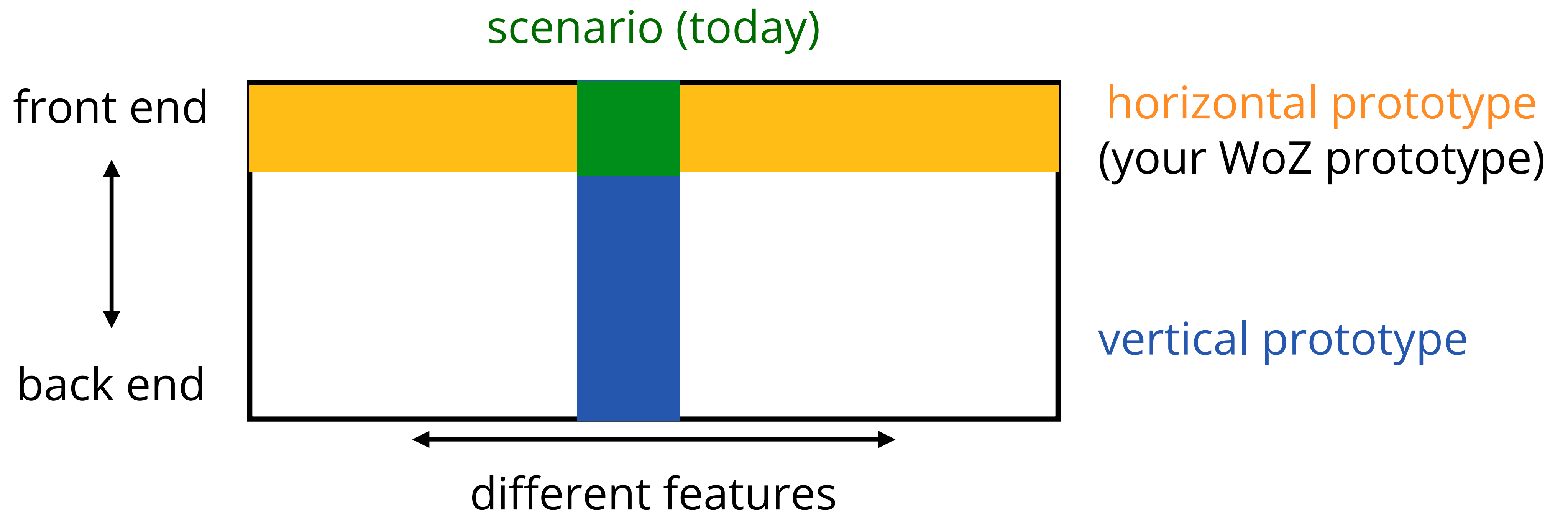


A wireframe fleshes out more details than a sketch, such as specific UI elements



# Prototype fidelity is multidimensional

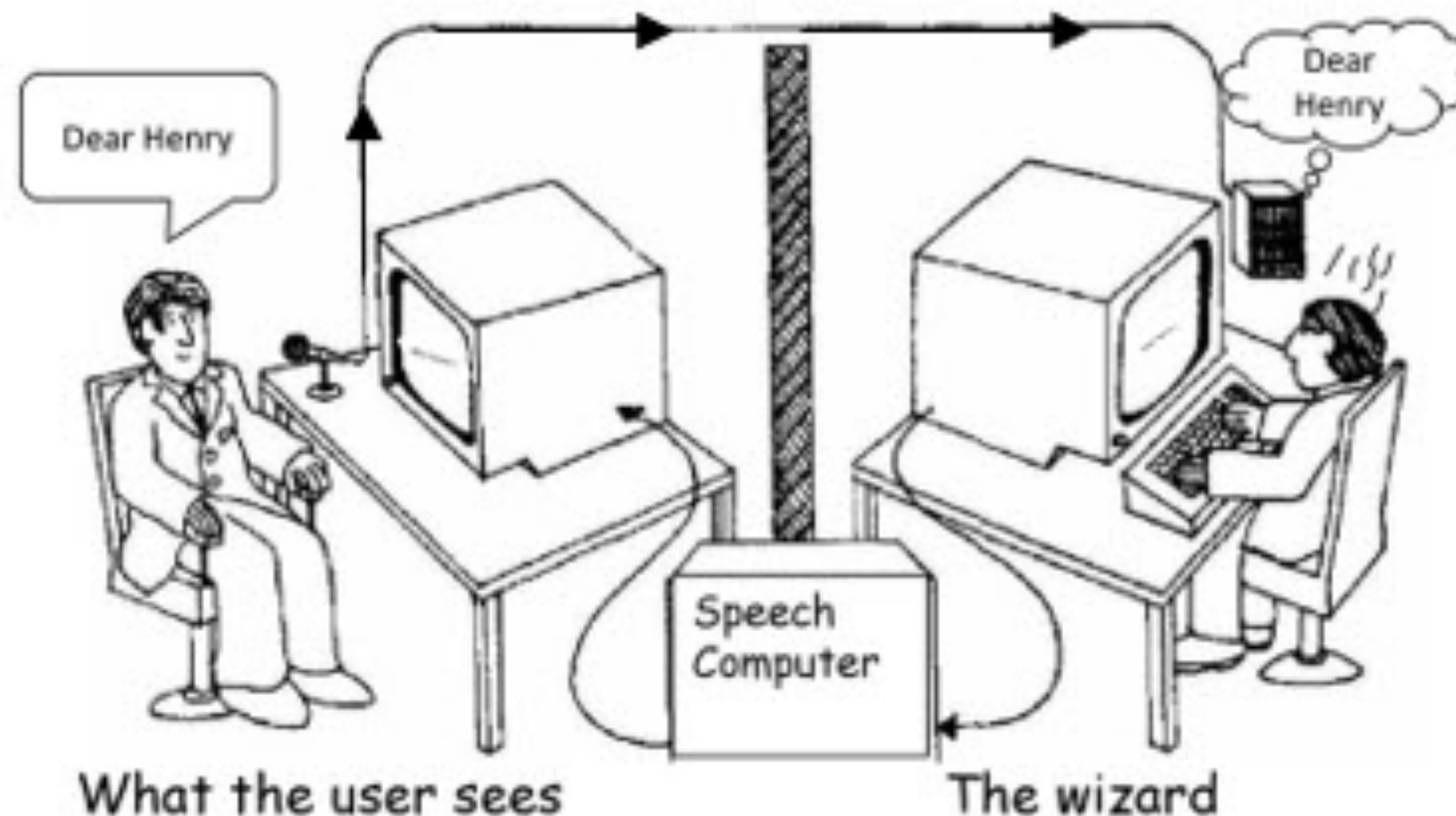
- Breadth (horizontal) - how many features does your prototype cover?
- Depth (vertical) - degree of functionality (how responsive to user inputs is your prototype? Or does it just have "canned" options)



# The Wizard of Oz technique

- A setup where subjects interact with a computer system they believe to be autonomous, but the system is actually operated by an (unseen) human being

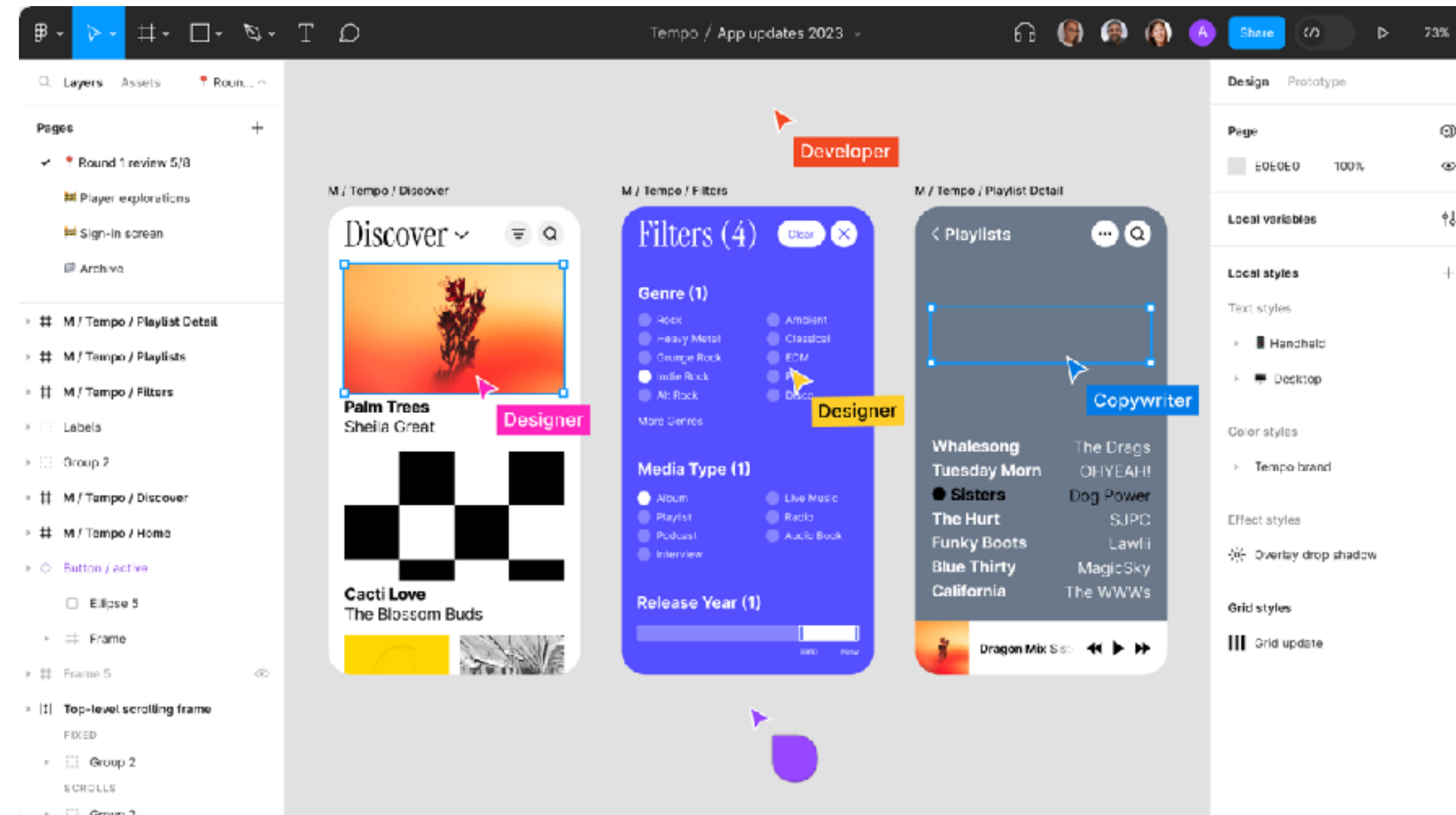
*Wizard of Oz testing – The listening type writer IBM 1984*





# Your project timeline

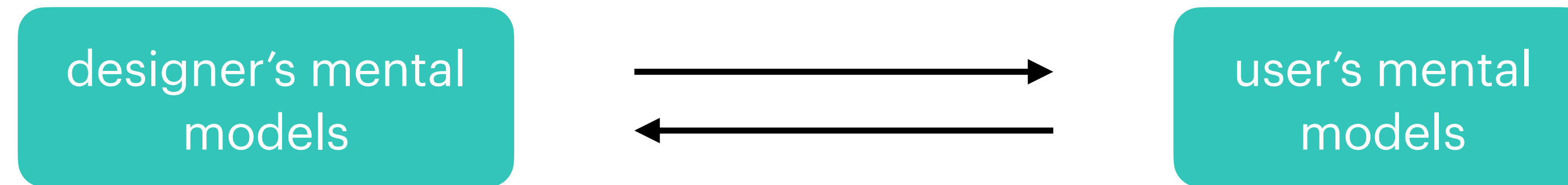
- Today: get started on paper prototyping your main **scenario**
- First class after spring break: make & evaluate more scenario paper prototypes
- Week after spring break: use **Figma** to make a Wizard of Oz breadth prototype



# Guidelines for “good” design

AKA you'll never look at common household appliances the same way

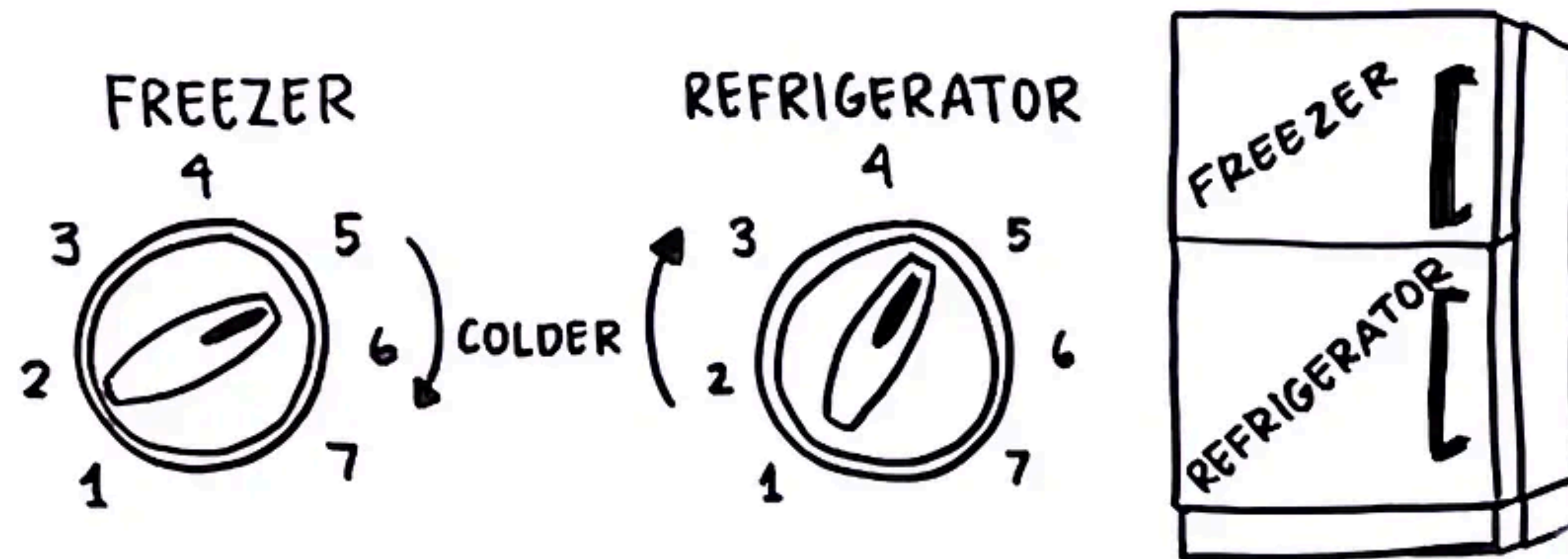
# Conceptual model



- As designers, we want to minimize the gap between a designer's mental model and the user's mental model
- That's the purpose of an *interface*: to communicate our design intent without the need for written instructions/documentation
- "Walk up and use" cases

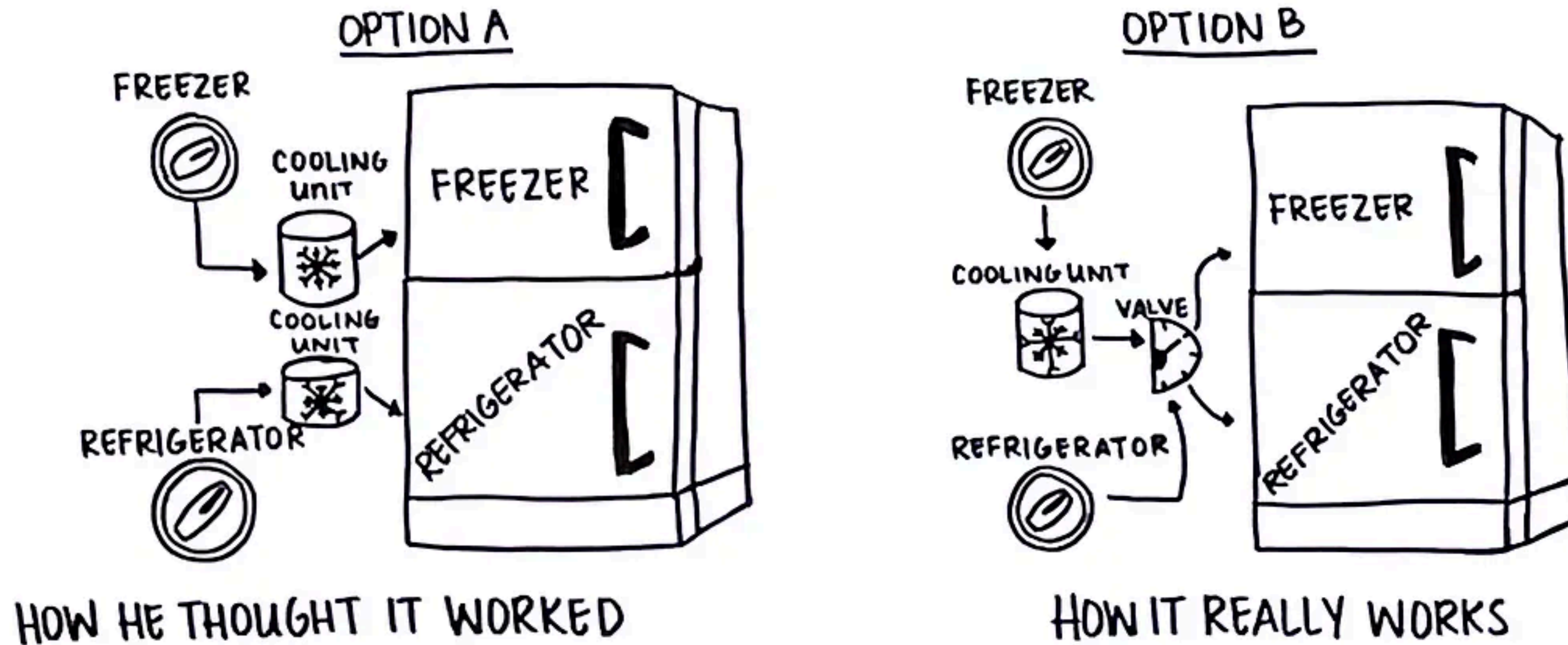
# Conceptual model example

- In *The Design of Everyday Things*, Don Norman gives a fridge example. He wanted to make his freezer colder, so he turned the freezer dial. But it made his refrigerator colder too.



# Conceptual model example

- In reality, the controls were shared: a difference in the designer's versus user's mental models.



# Affordance

- “the term affordance refers to the **perceived and actual properties** of the thing, primarily those fundamental properties that determine just how the thing could possibly be used.”



## Scissors afford cutting

What are some clues?

- Holes for fingers to hold
- Sharp blades to cut things
- Screw to allow axial rotation

We call these **signifiers**.

# “Natural” vs learned affordance

- Affordances can be cultural
- Obvious: glass is see through (inherent property)
- Learned
  - Knobs afford turning
  - Glass affords breaking
  - Buttons afford pushing



*Turnability*



*See through*



*Breakability*



*Pushability*

# Infamous door handles





# Better: push bars vs pull handles



# Your turn

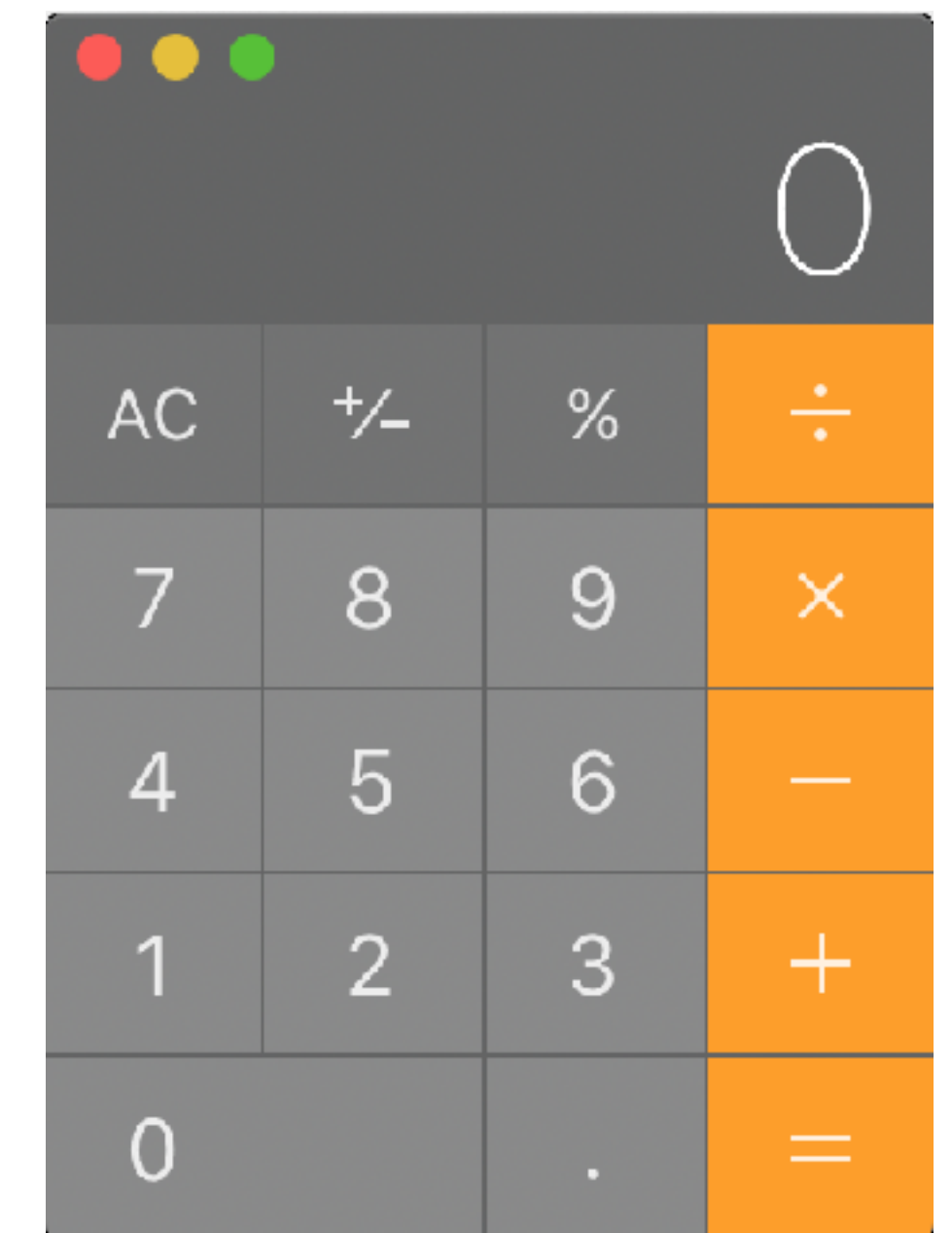
- Affordance contest!
- Turn to the person next to you and pick an object one of you has on hand. In 90 seconds, brainstorm as many affordances (and the corresponding signifiers) as you can. Keep track!



- Sharp blades signify that scissors afford cutting
- Finger holes signify that scissors afford holding
- Screw signifies that scissors afford rotational movement
- Weight of the steel signifies that scissors afford being used as a blunt weapon

# Skeumorphism

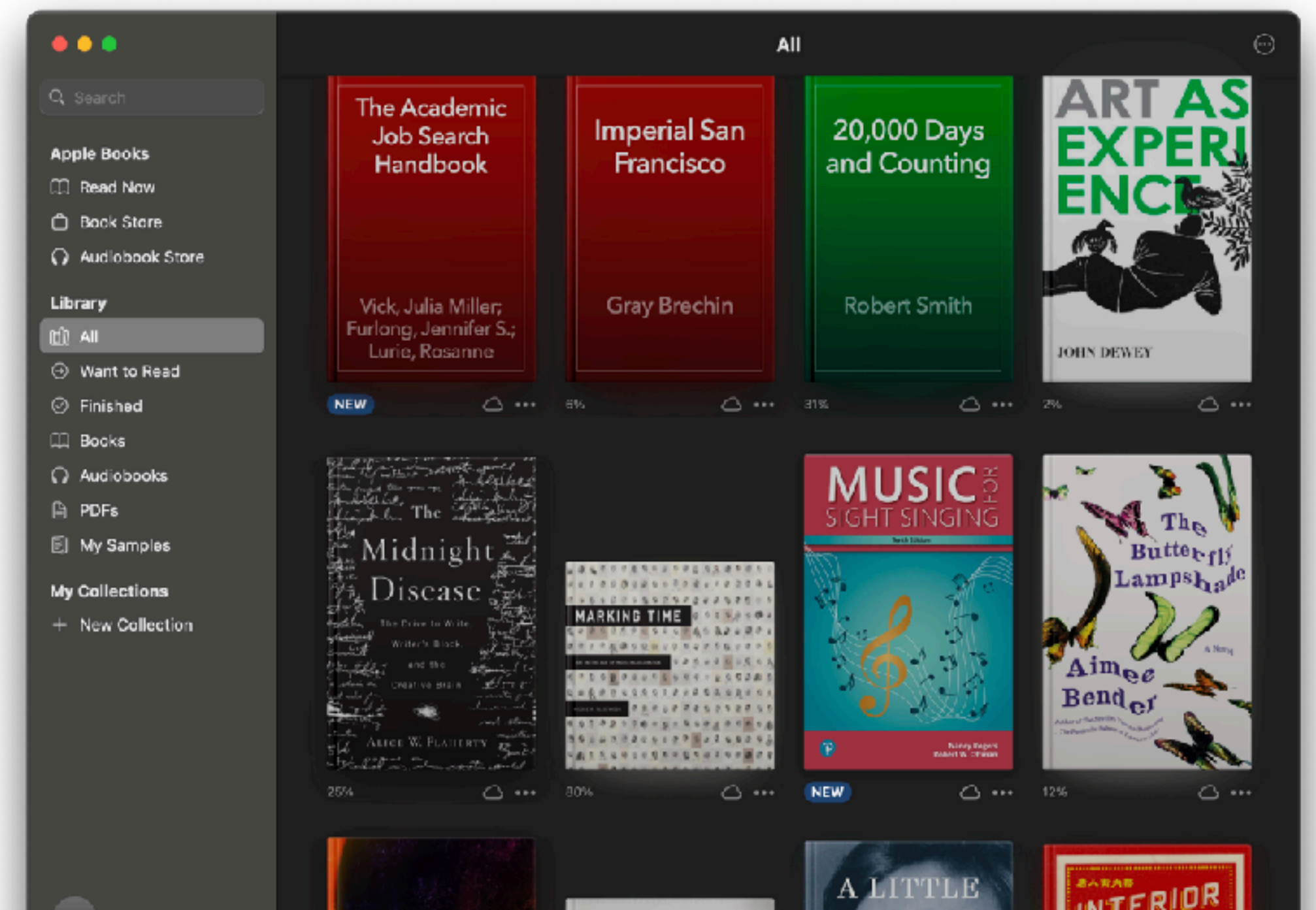
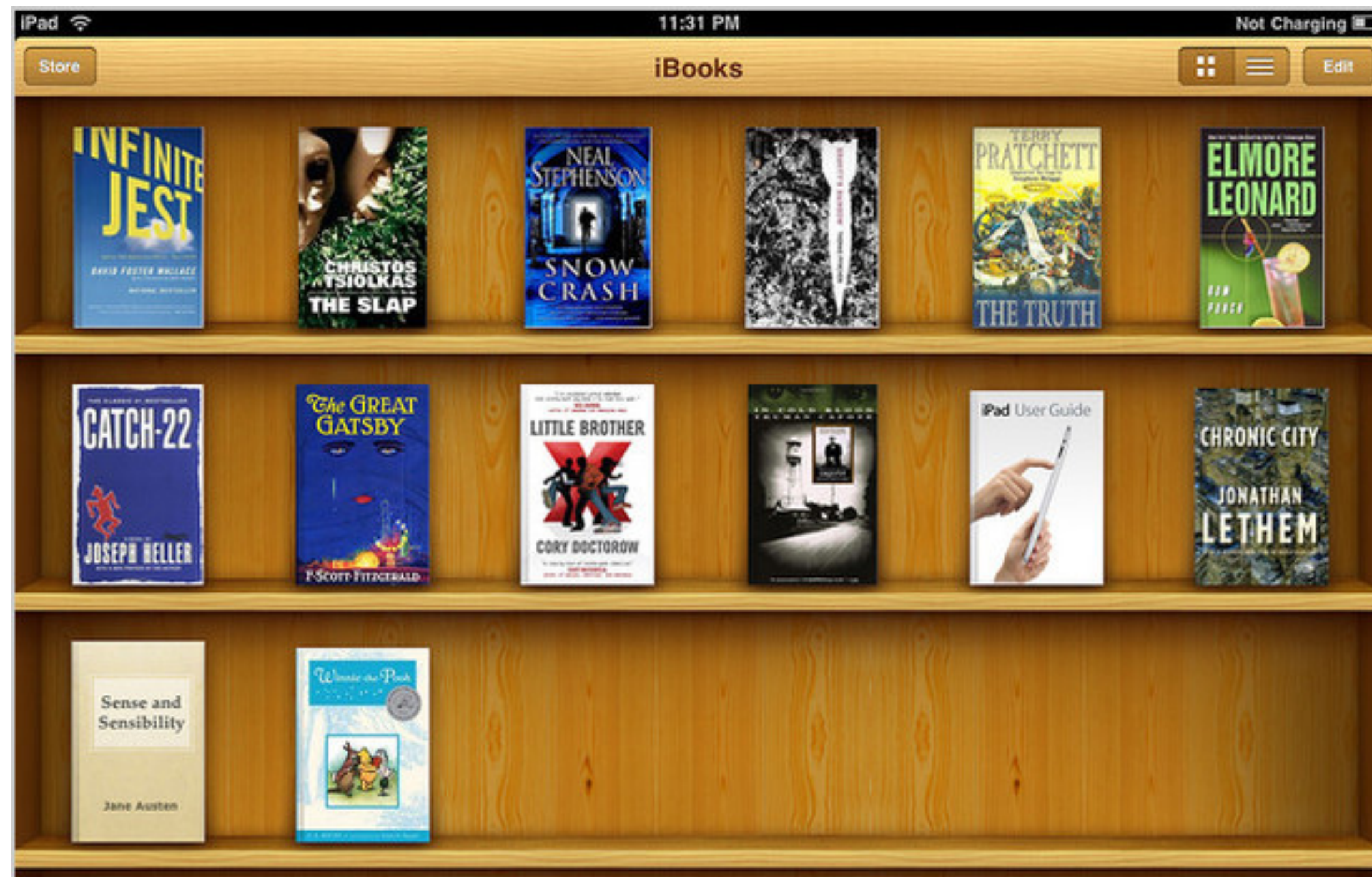
- Using metaphors is a design strategy to help leverage the familiar, but risks in resulting in naive conceptual models
- Skeumorphism is a kind of metaphor where digital GUIs (graphical user interfaces) were made to resemble analog equivalents



# Skeuomorphism

- **Pros**
- Reuse learned knowledge
- Repurpose conceptual models
- Clearly shows affordances

- **Cons**
- Limits what users can do
- Implies capabilities that may not exist



# **3 Design Principles**

**1. Make controls visible**

**2. Make mappings clear**

**3. Provide feedback**

# Make controls visible



Poor visibility (how do you set an alarm?)

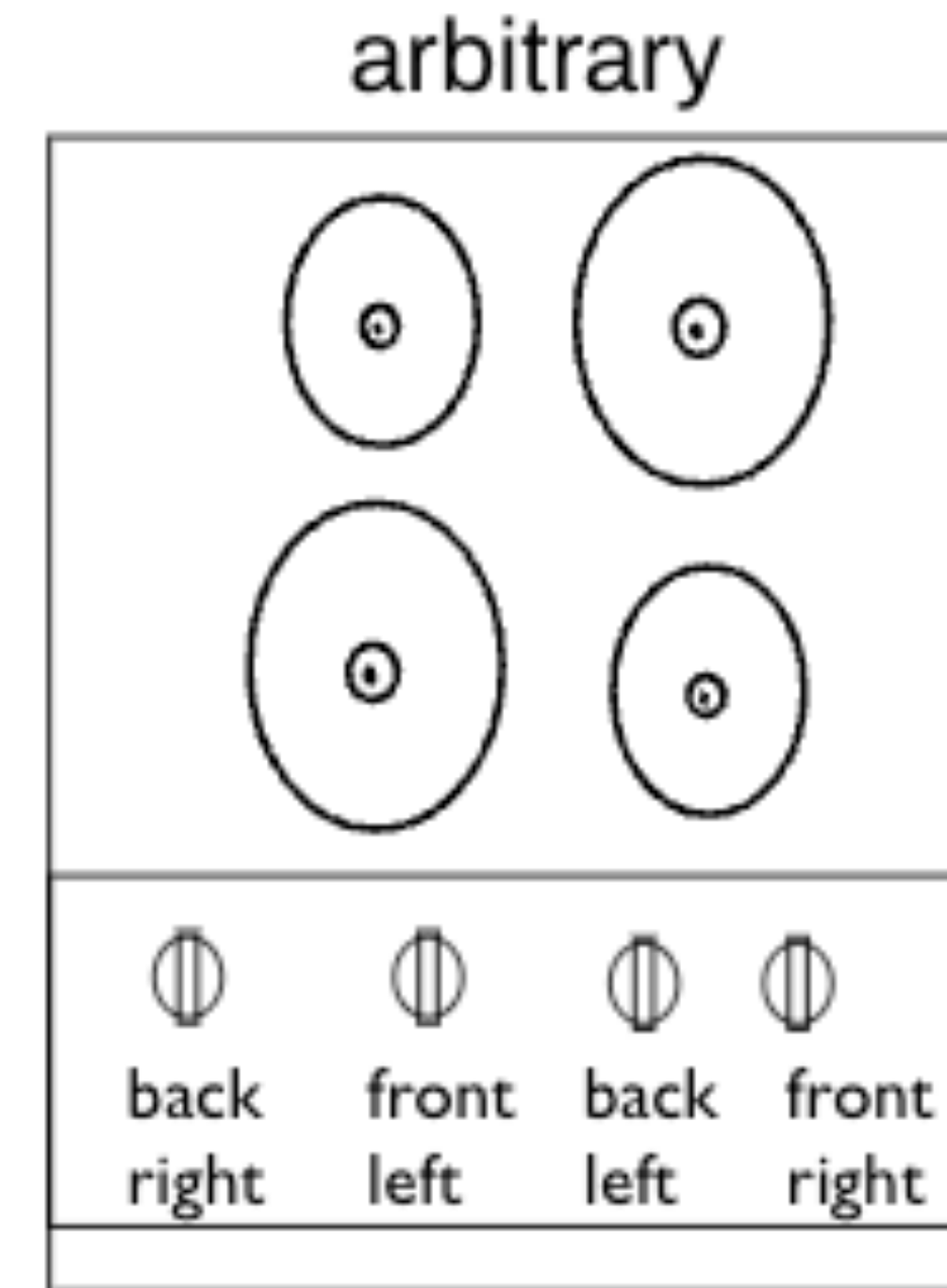


Too much visibility

# Make mappings clear



Good mapping for car seat controls



24 possibilities!

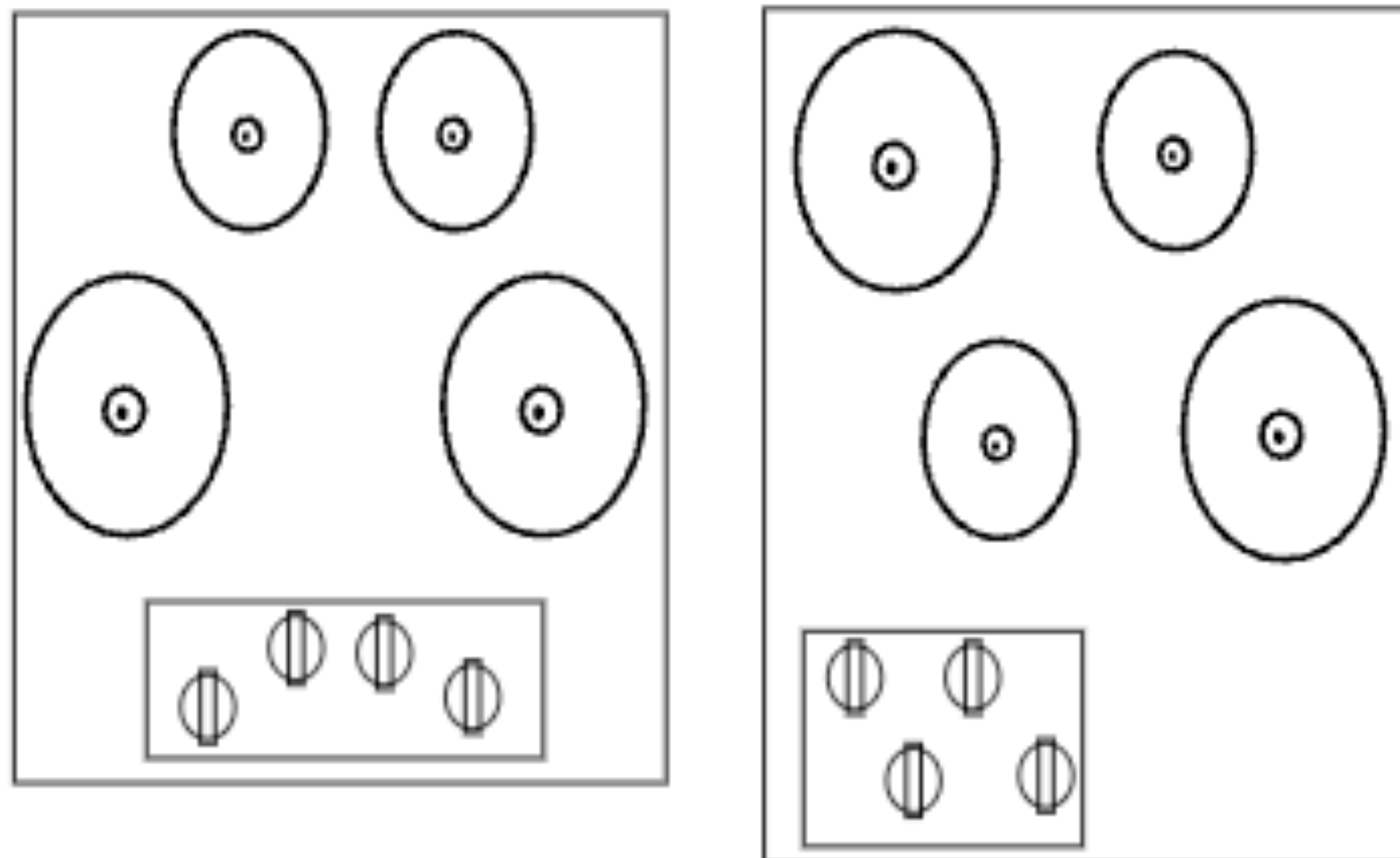
Requires:  
visible labels  
memory

Bad mapping for stove top



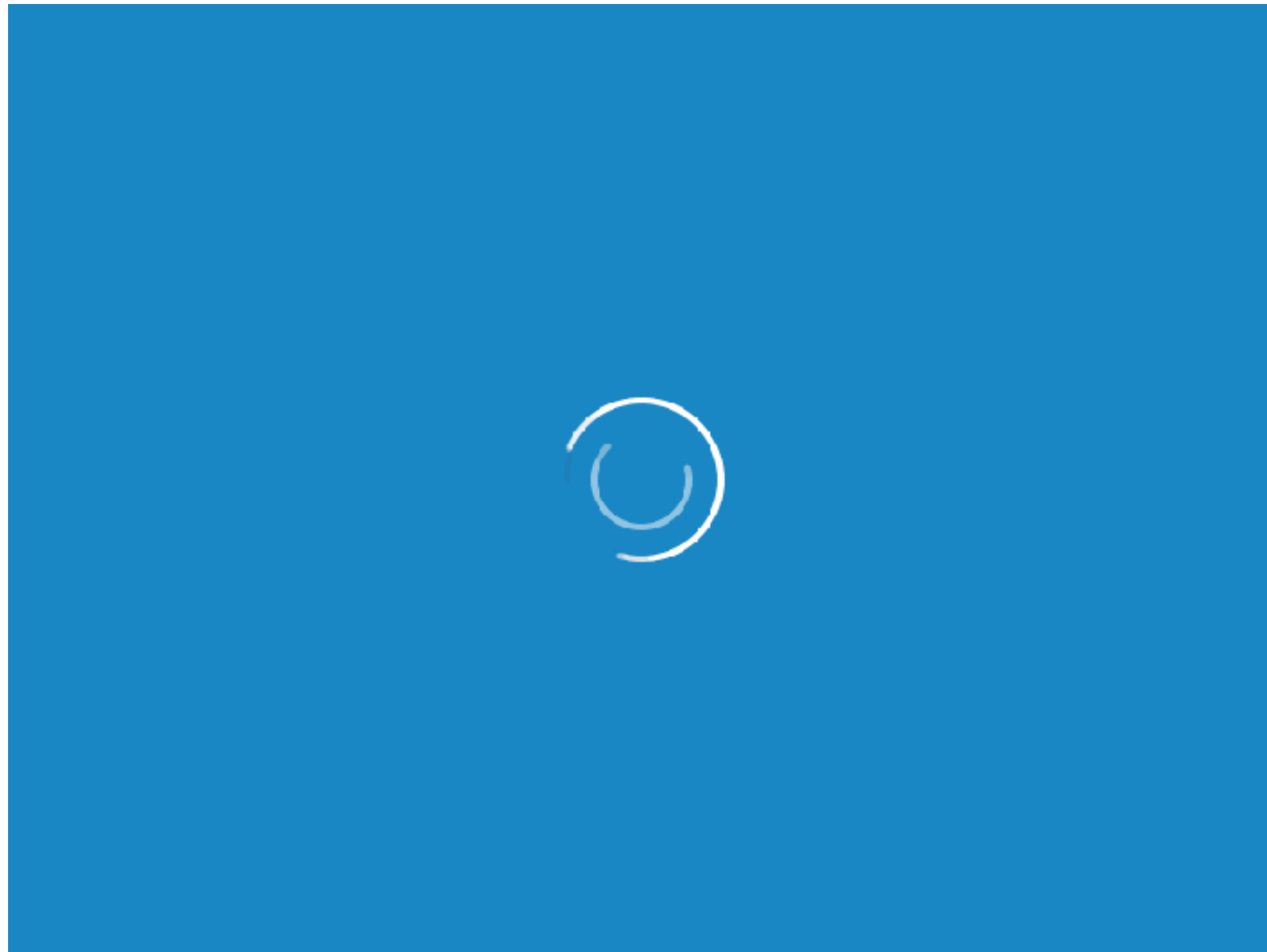
# Make mappings clear

full mapping

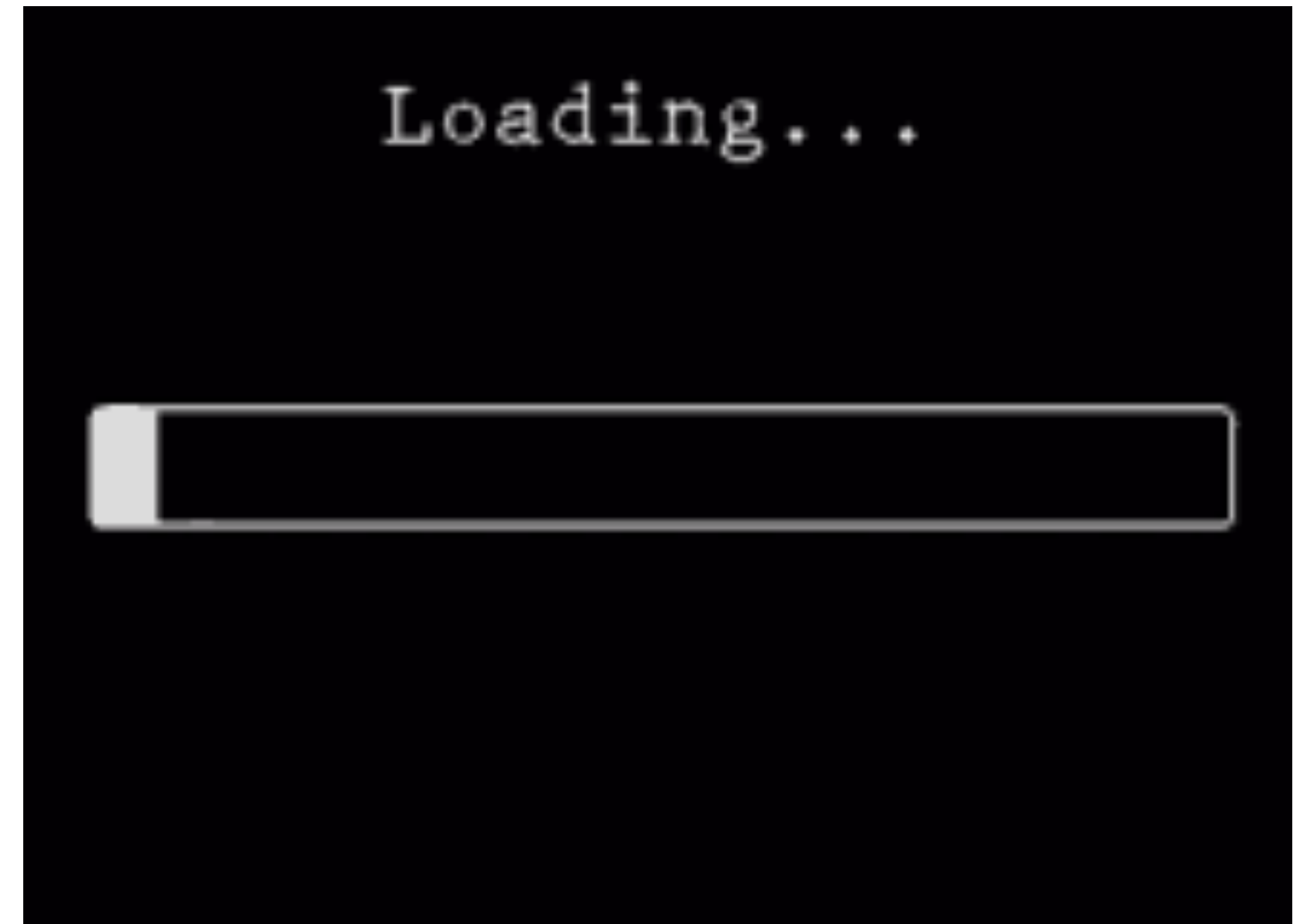


Better: controls placed in the same orientation as burners

# Provide feedback



Bad: when will it be done??



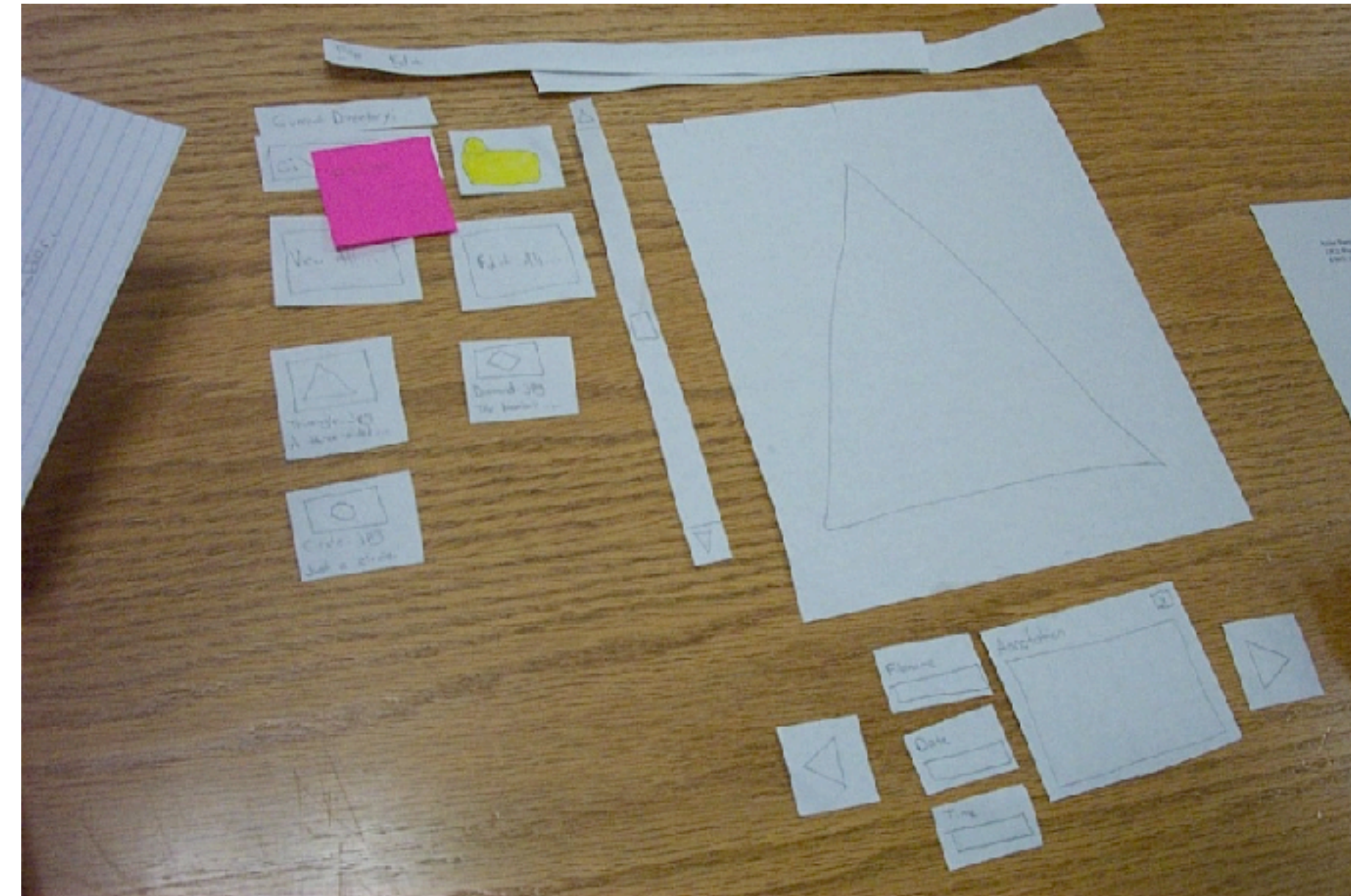
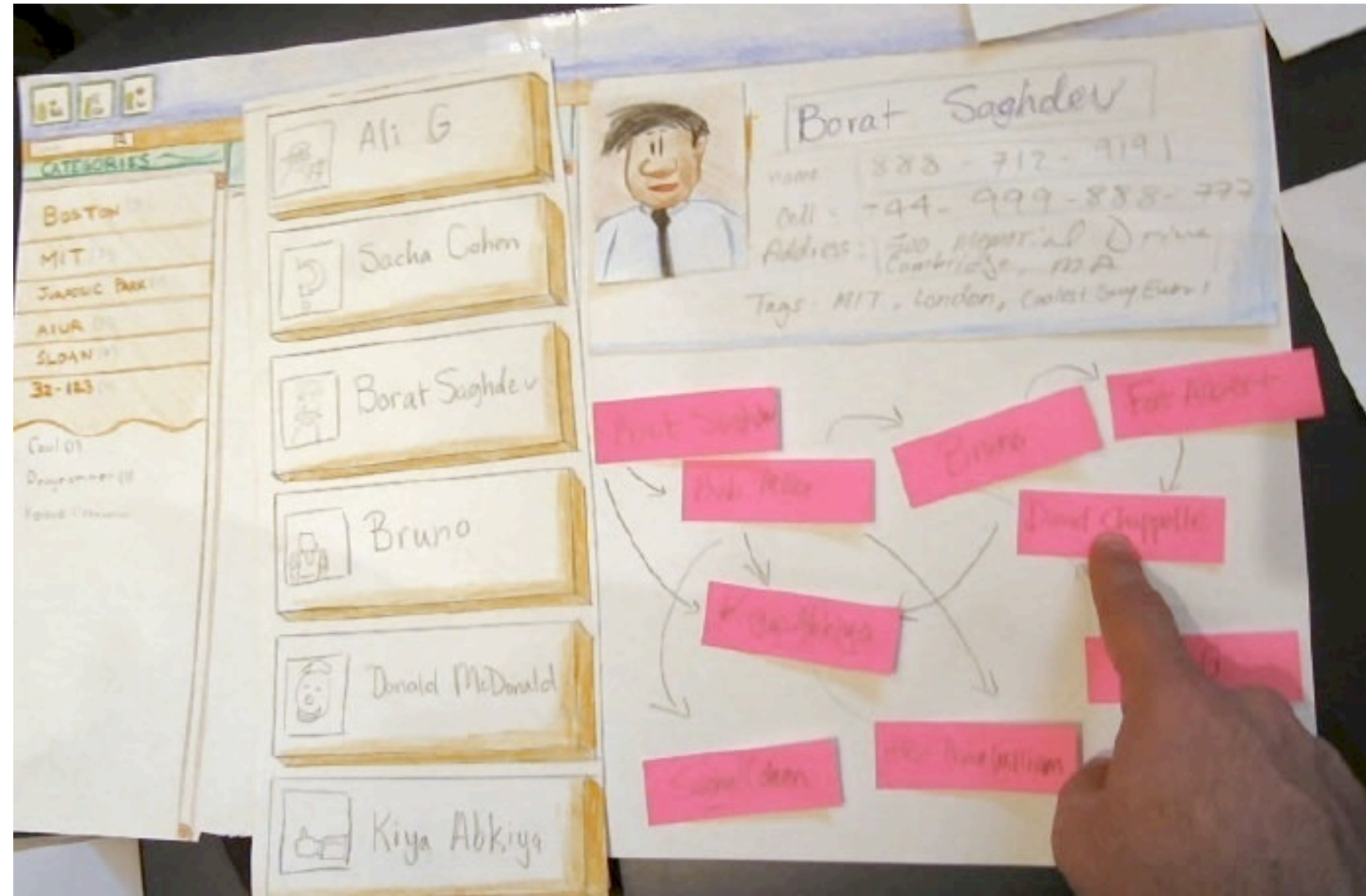
Better: some relative information

# Summary

- Prototypes force you to make design decisions quickly and cheaply. “Fail fast, fail often” before you sink in engineering time
- Much of “good” design stems from matching your and the user’s mental models. To do so,
  - **Make affordances** and controls **visible** but not over-exposed
  - Provide clear **mappings** between controls (inputs) and outputs
  - Provide clear and timely **feedback** in response to user input

**Your first paper prototype**

# Paper is easier than code



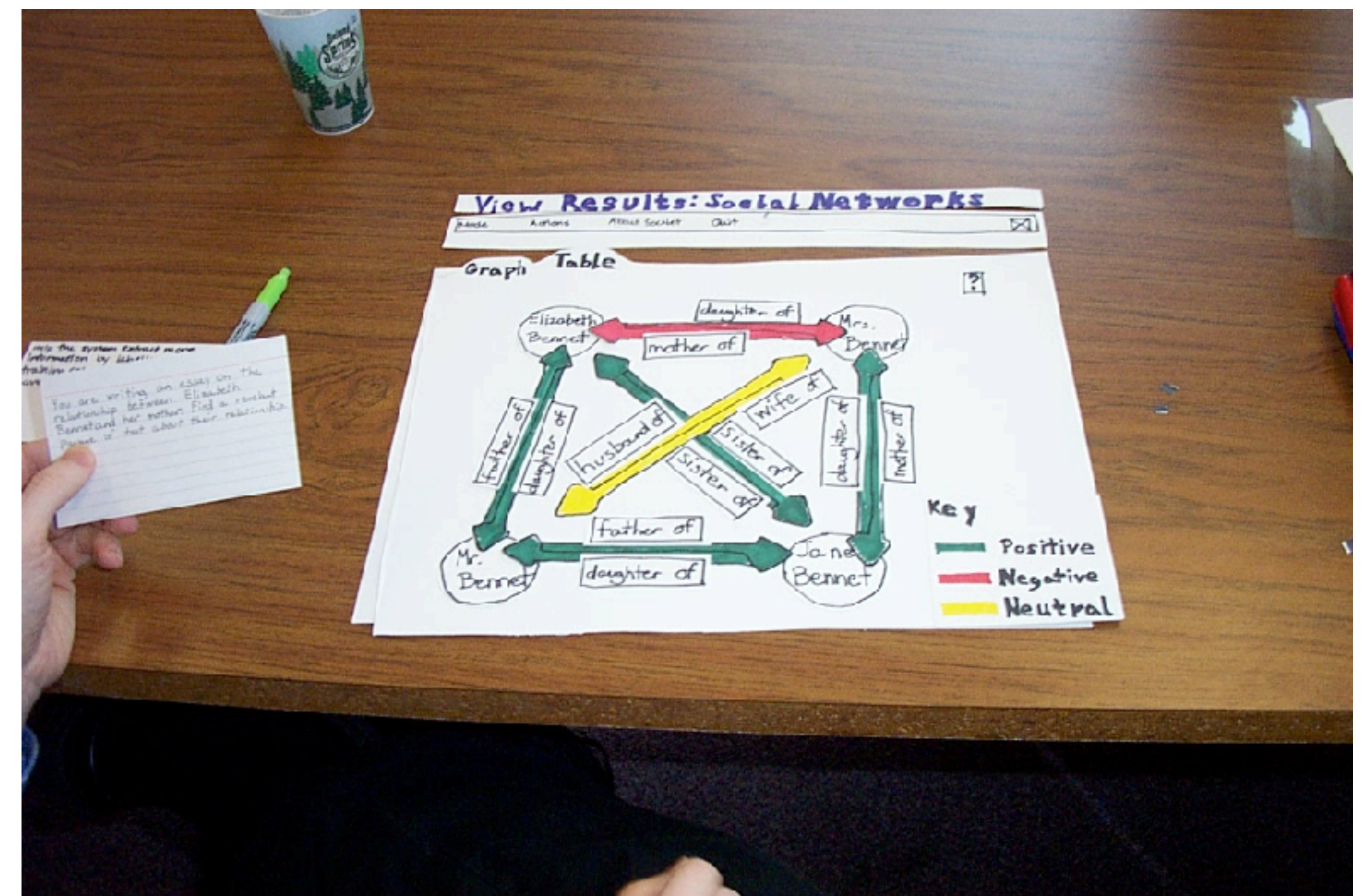
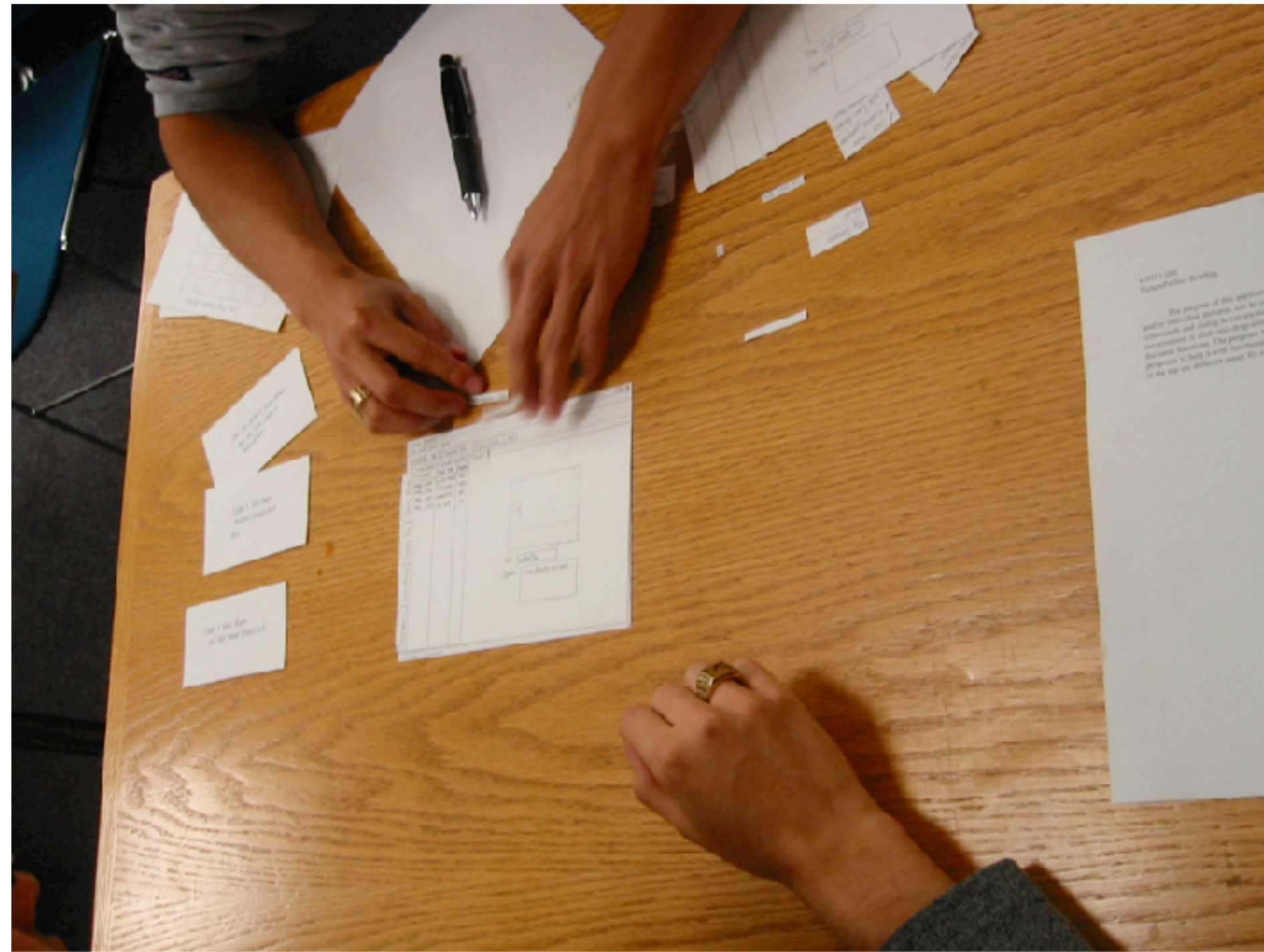
- Making with paper is faster and cheaper than implementing with code
- Use post-its or cut out smaller sheets of paper to replace UI elements

# Other ways of interactivity



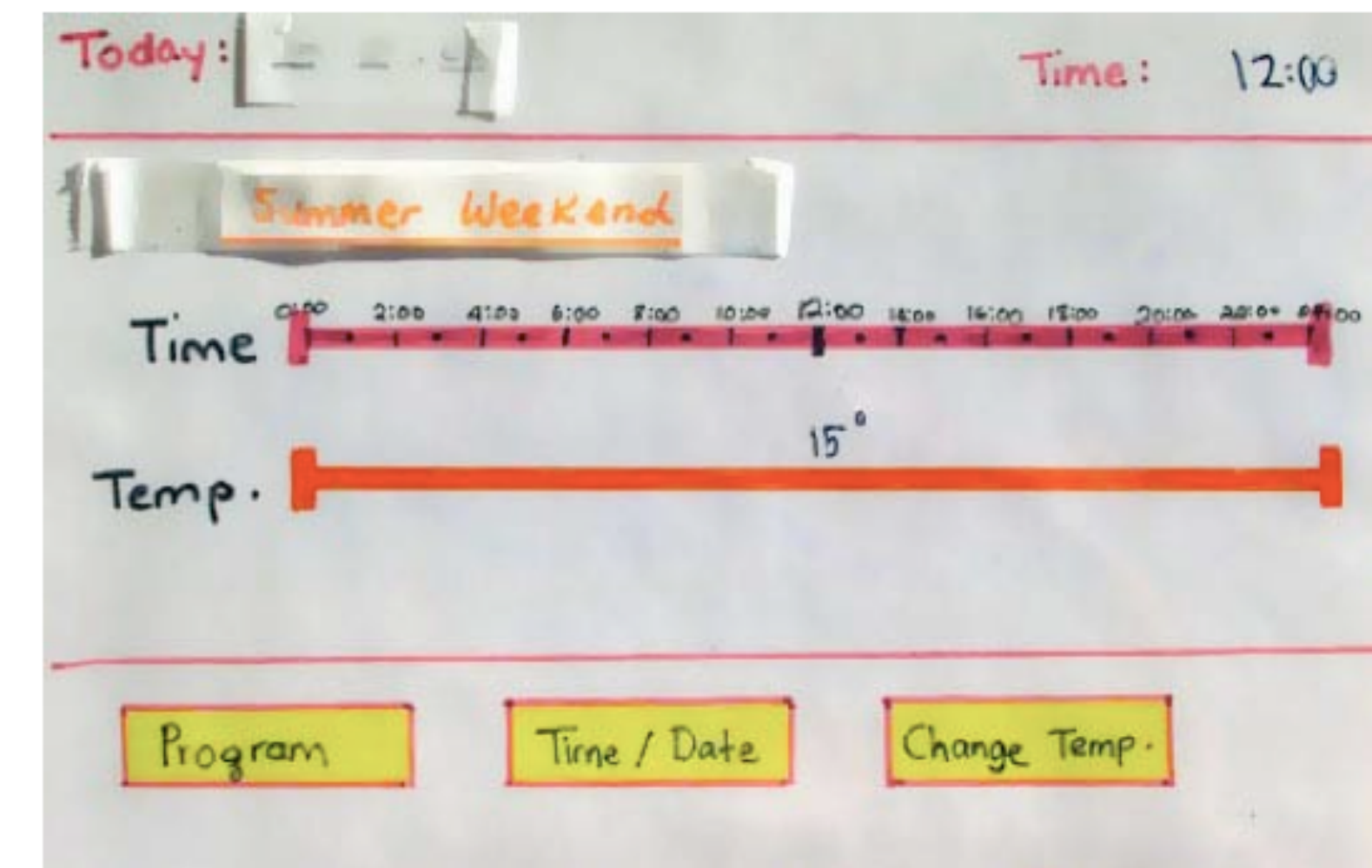
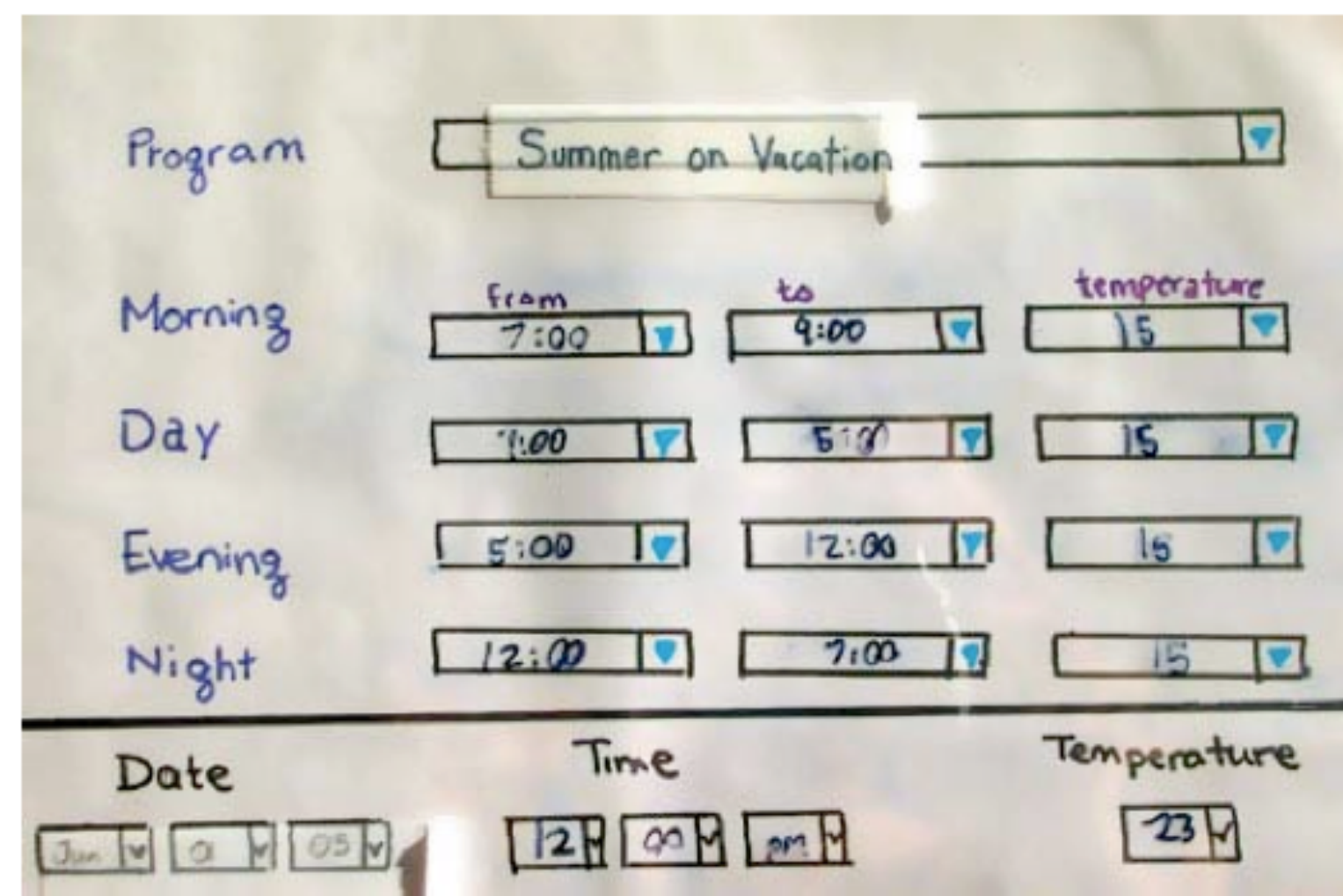
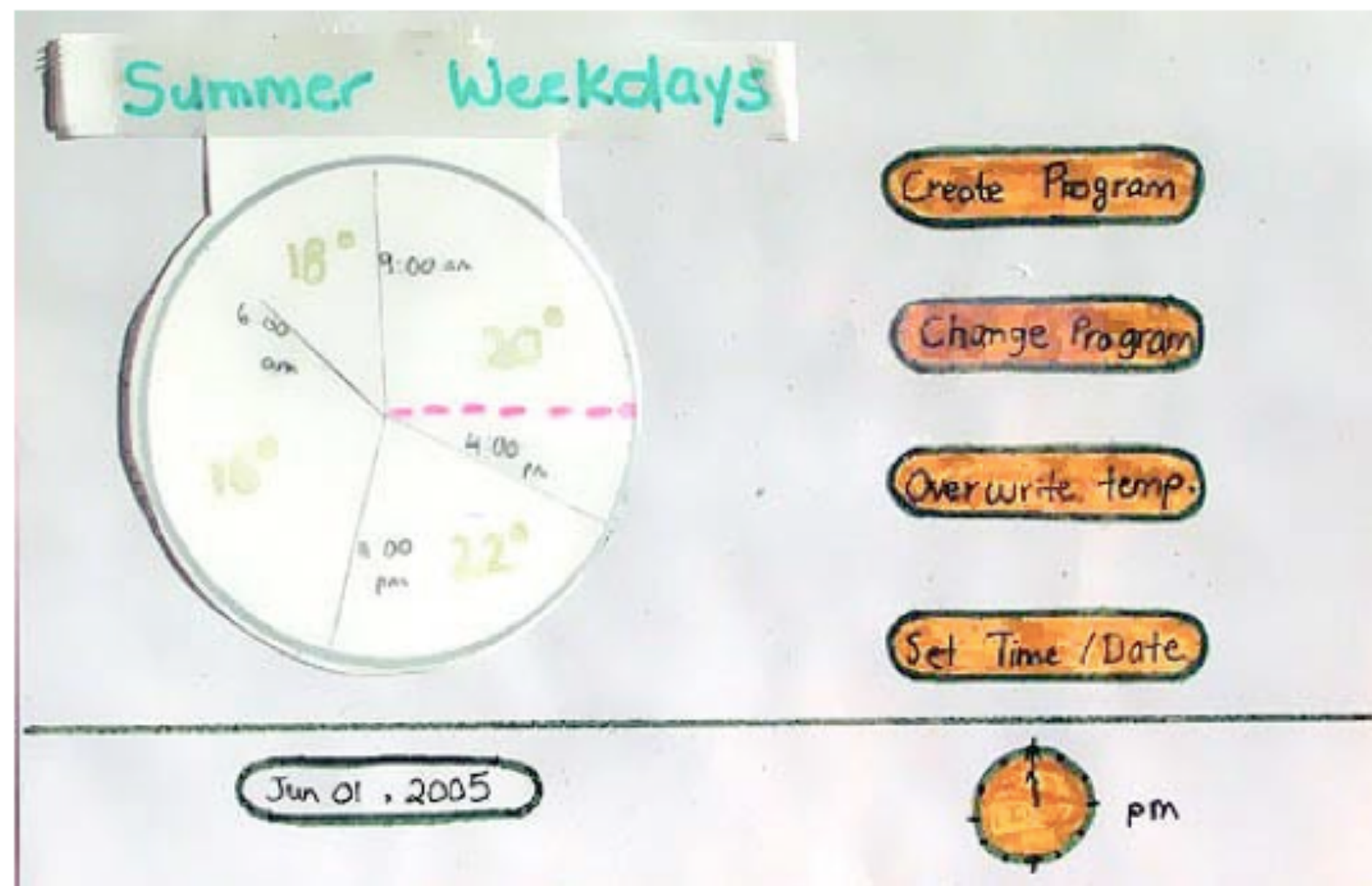
- Make a “frame” (like a phone or laptop screen) and replace screen content inside

# Size matters



- Bigger prototypes are easier to manipulate and switch out screens
- If you're making a web app, aim for a full 8.5x11 sheet of paper (a laptop screen size)
- Write big and dark: markers are better than pencil

# Multiple alternatives generate better feedback



- When a design is presented with others, people tend to be **more ready to criticize** and offer problems, which is exactly what you want in the early stages of design.

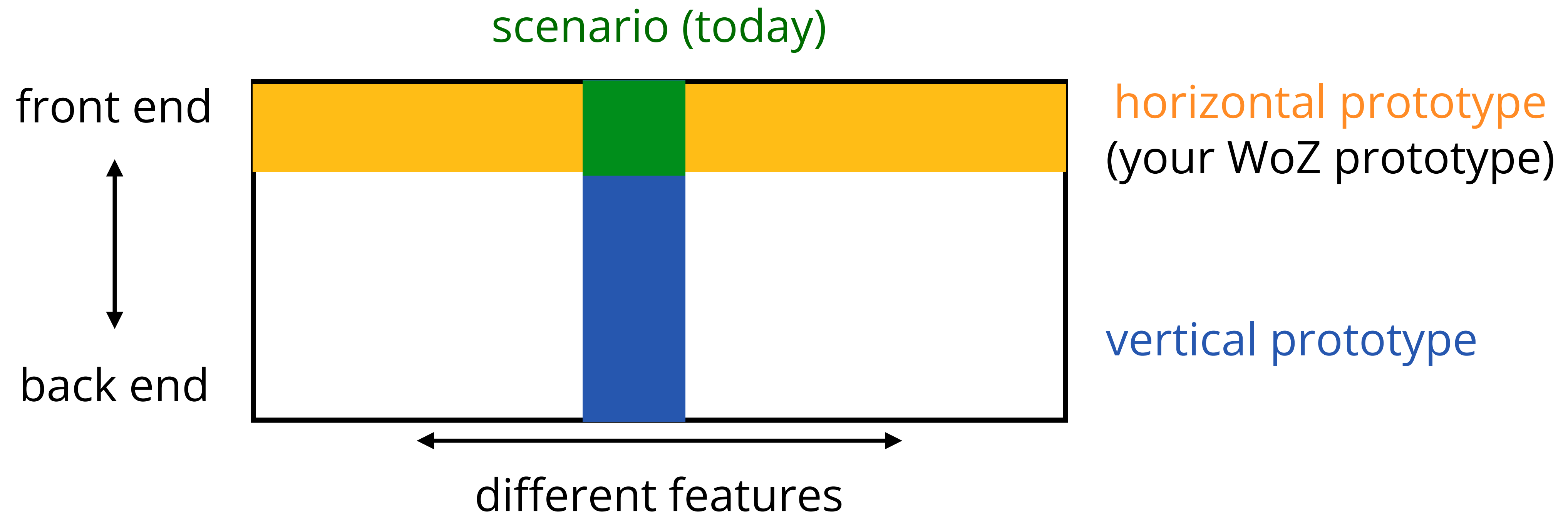


# What can and can't you learn?

- **Functionality:** Does your tool do what it needs to do? Is it missing features?
  - **Conceptual model:** Do users understand it?
  - **Navigation & task flow:** Can users find their way around?
  - **Terminology:** Do users understand symbols or how to interact with UI elements?
  - **Screen content:** Are you displaying the right information at the right time?
- Can't learn...
    - Look & feel
    - Response time
    - Exploration << deliberation: users don't explore as much with paper prototypes

# Step 1: Pick your scenario

- 2 min: As a group, decide what the most important scenario for your tool is (what do users want to do, and how will your tool accomplish it?)
- Go back to your design goals if you're struggling



# Step 2: Everyone make a paper prototype

- Everyone should make their own first stab at a wireframe to accomplish this task scenario (more ideas generates better feedback!)
  - What elements are on the screen? How does the user interact with them? (**visible affordances**)
  - What options are available to the user? What parameters are important? (**mappings**)
  - How does interacting with the elements change the UI? (**feedback/flow**)
  - How does the user know when the scenario is done? (**feedback**)
- Bring them to class on Thursday: we'll be testing them within your groups

# Class 15 recap

- No exit ticket this week: anonymous written mid-semester feedback instead!
- TODOs:
  - **Thurs**
    - Bring your (finished) paper prototype to class!
    - Zipcrit from Ariel
    - 1 sketchnote (see Canvas for details), seminar from Angie & David
  - Fri 11:59pm
    - P2M2 - Intro due (Extensions until Sunday OK, I just didn't want to assign any work over spring break)