Early Stage (lo-fi & med-fi) Prototyping

Prof. James A. Landay
Computer Science Department
Stanford University

Autumn 2023
October 16, 2023

Interface Hall of Fame or Shame?

Dyson AirBlade hand dryer
example courtesy of Maya I.

Interface Hall of Fame or Shame?

Good

- shape indicates function
- so simple that instructions fit in 1 image
- fun!

Bad

- dripping water?
- too much noise
- still takes too long

Dyson AirBlade hand dryer
example courtesy of Maya I.

Interface Hall of Fame!

Good

- shape indicates function
- so simple that instructions fit in 1 image
- fun!

Bad

- dripping water?
- too much noise
- still takes too long

Dyson AirBlade hand dryer
example courtesy of Maya I.

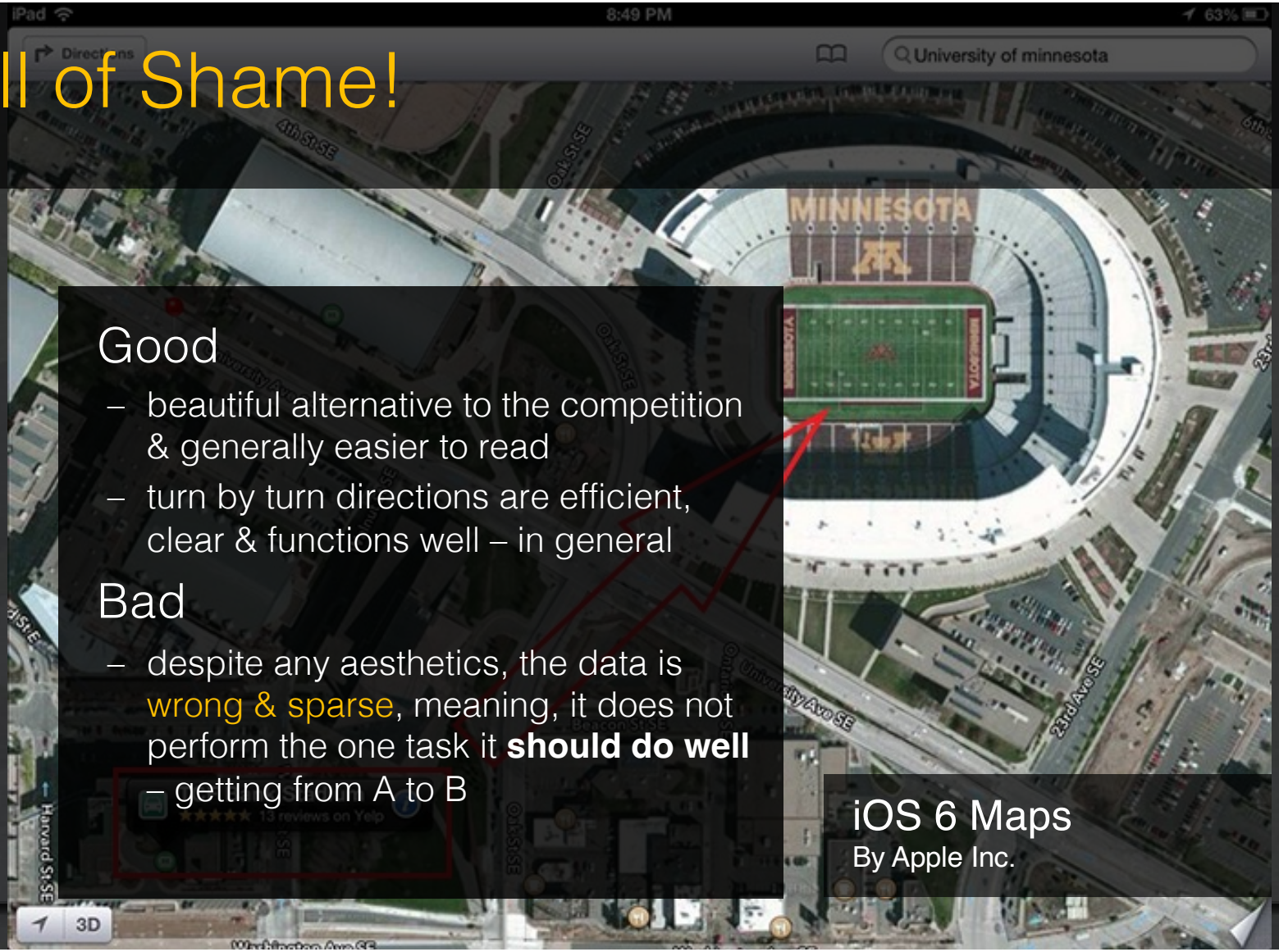
Can We Do Better?

Good

- Integrate hand dryer into sinks…


300 m
TURN RIGHT ONTO DRAAIWEG
TURN LEFT ONTO NOLENSLAAN
Verenigingstraat
Draaiweg
David van Mollembrug
Annerieks Knipperie
Schouwweteringstraat
David van Mollemstraat

Hall of Shame!



Good

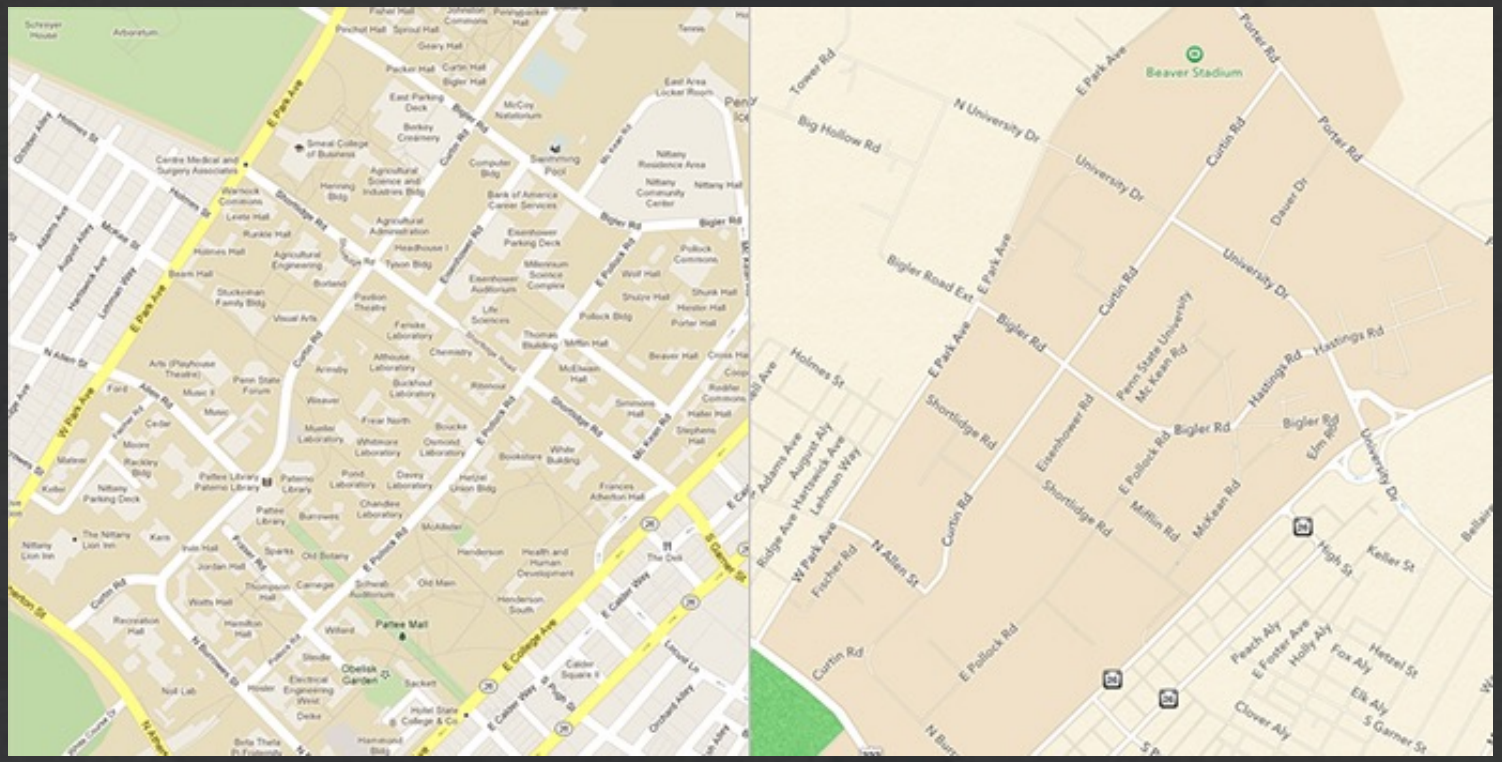
- beautiful alternative to the competition & generally easier to read
- turn by turn directions are efficient, clear & functions well – in general

Bad

- despite any aesthetics, the data is wrong & sparse, meaning, it does not perform the one task it **should do well** – getting from A to B

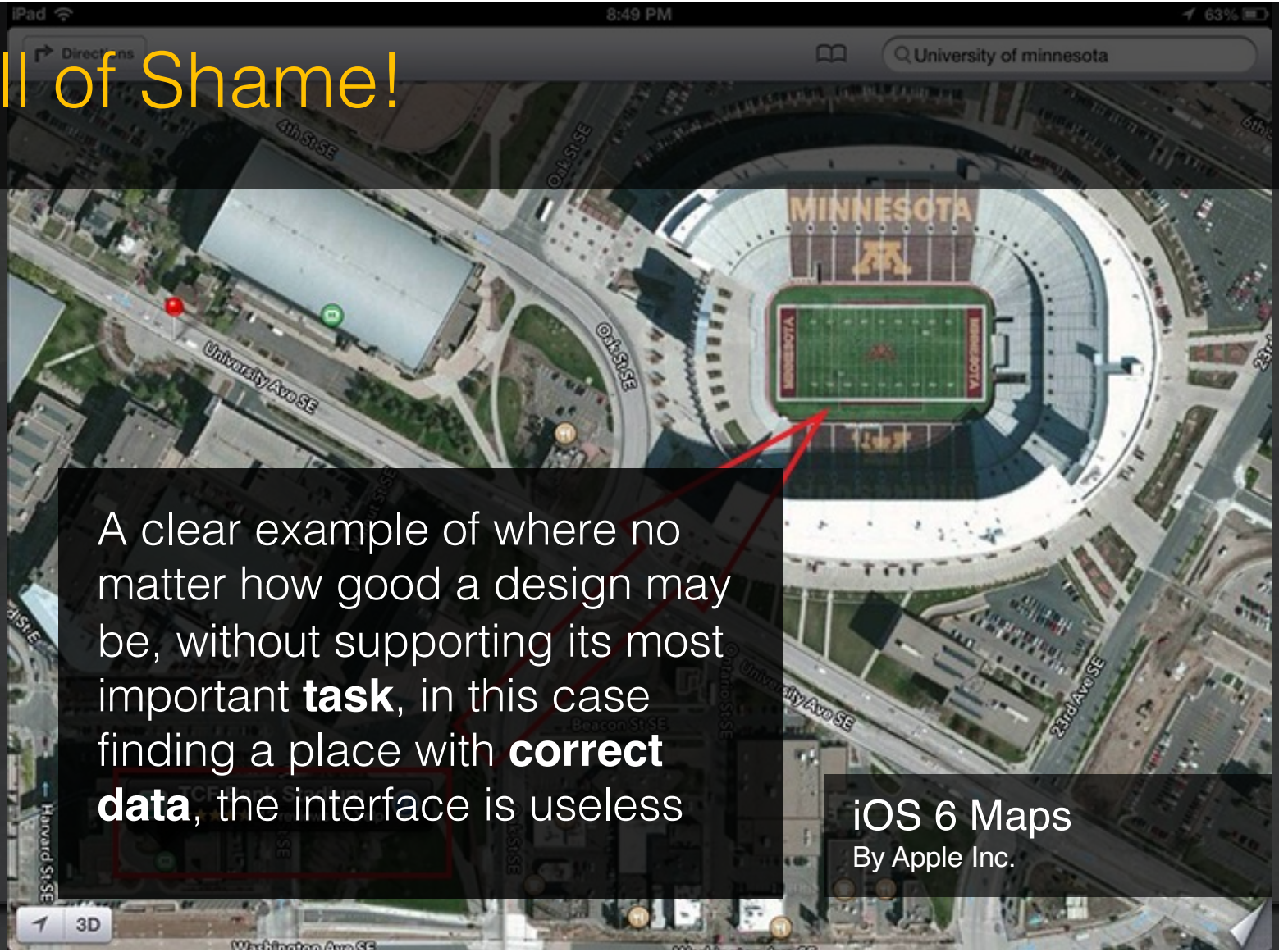
iOS 6 Maps
By Apple Inc.

Hall of Shame!



Google Maps Data vs iOS6 Maps Data

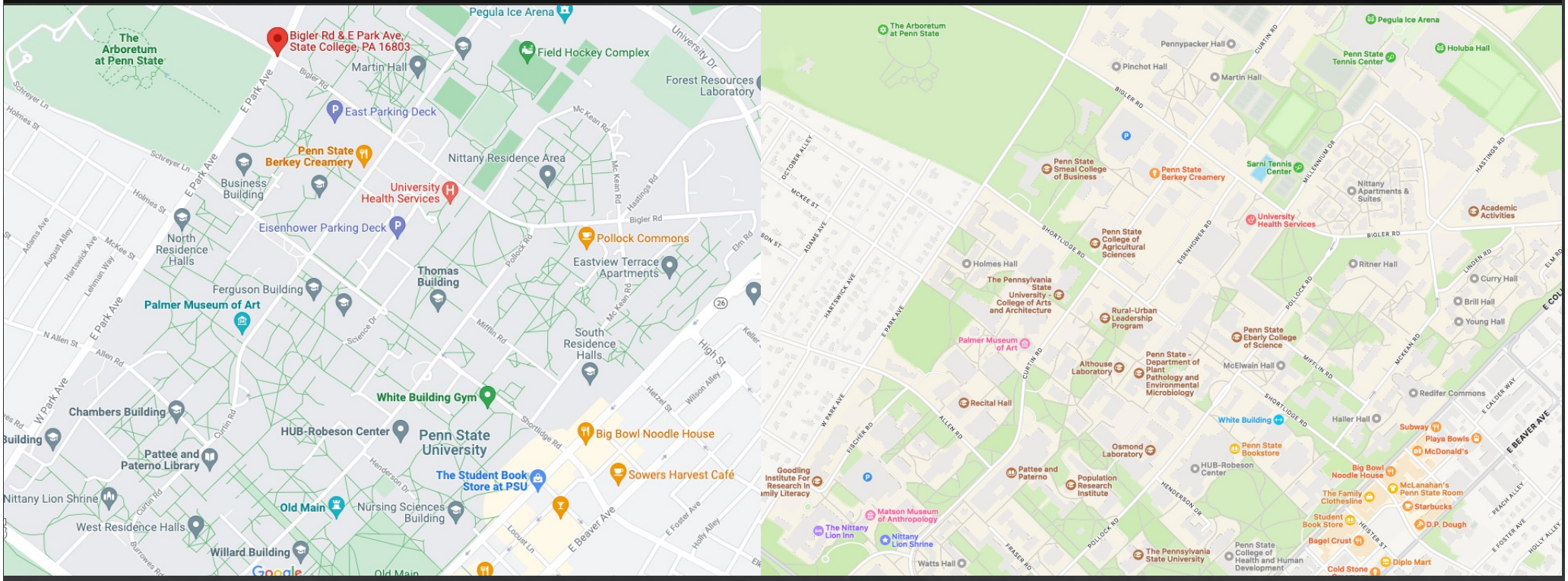
Hall of Shame!



A clear example of where no matter how good a design may be, without supporting its most important **task**, in this case finding a place with **correct data**, the interface is useless

iOS 6 Maps
By Apple Inc.

Hall of Shame!



Google Maps Data vs iOS14 Maps Data – much closer in quality

Early Stage (lo-fi & med-fi) Prototyping

Prof. James A. Landay
Computer Science Department
Stanford University

Autumn 2023
October 16, 2022

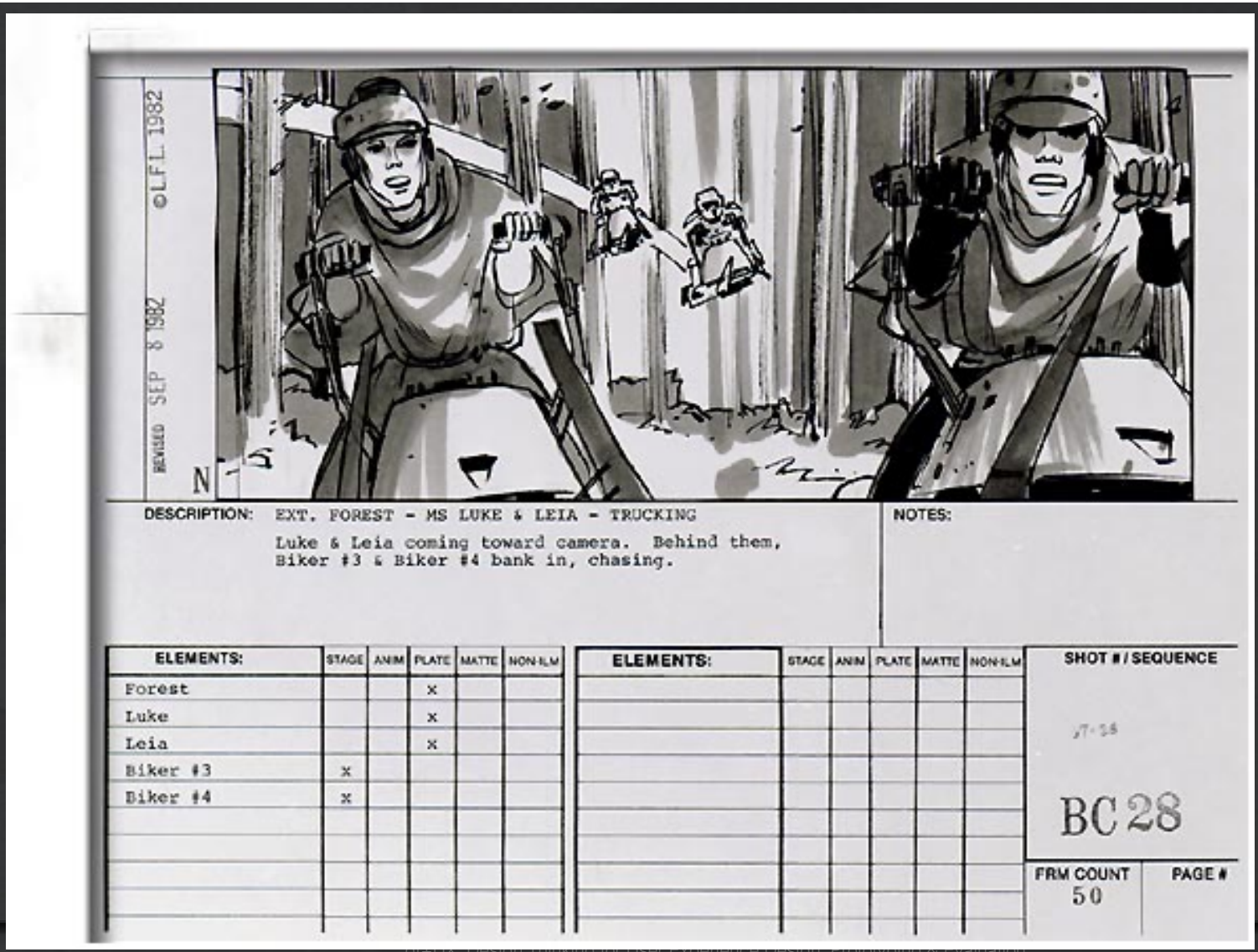
Outline

- Sketching vs. Storyboarding
- Prototyping
- Low-fi prototyping
- Conducting a low-fi test
- Medium-fi prototyping

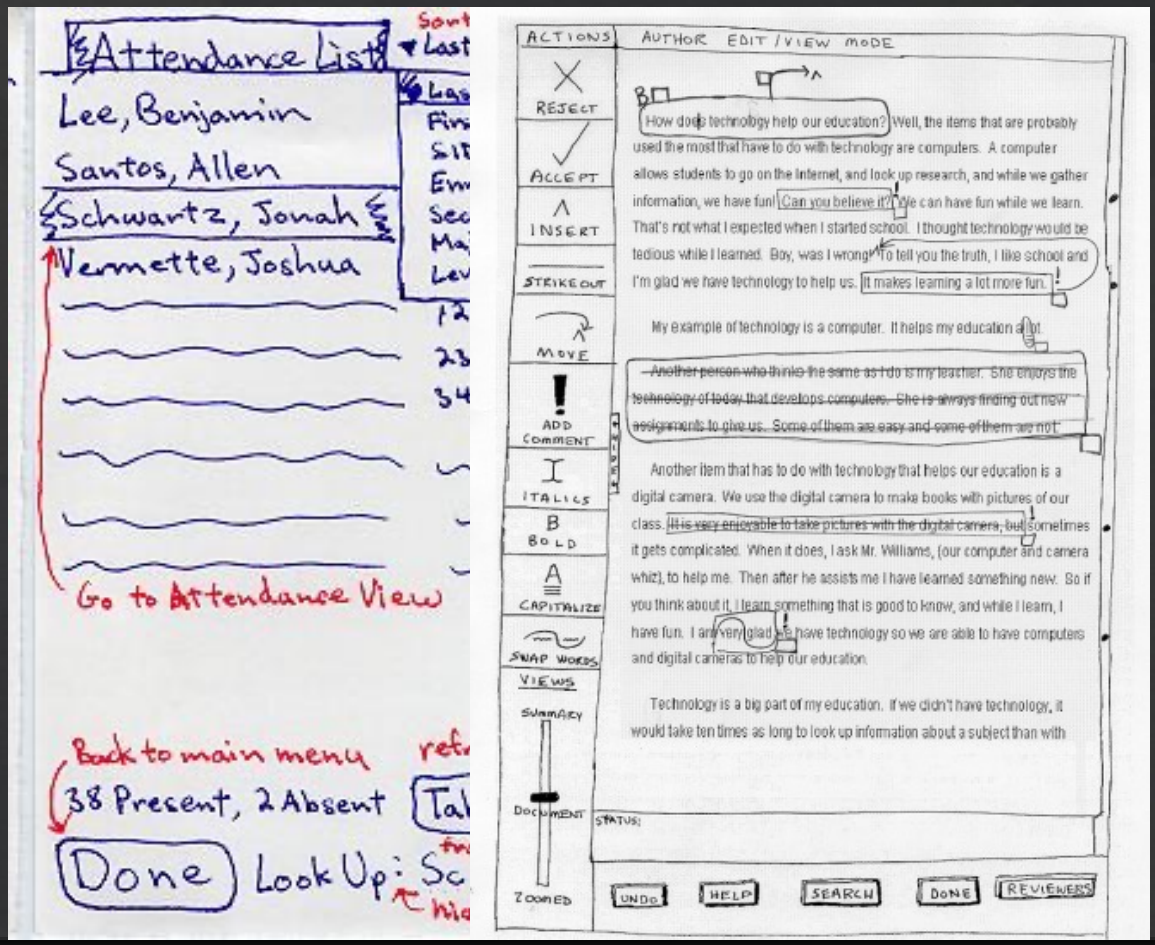
Sketches & Storyboards

- Where do storyboards come from?
  - film & animation
- Give you a “script” of important events
  - leave out the details
  - concentrate on the important interactions

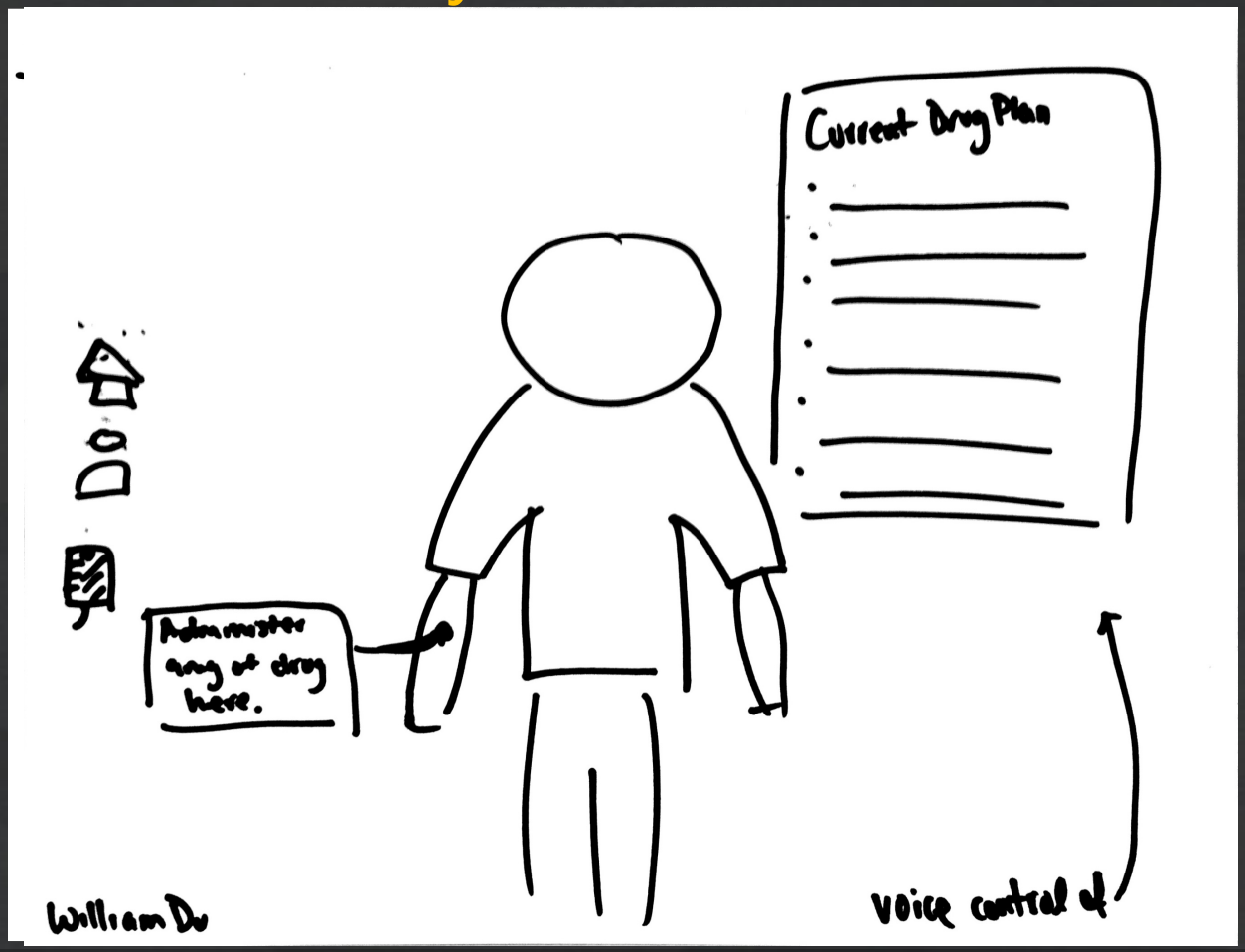

1
EXIT-SORTIE
OK
2
3
4
5
PULL
6
7
8
ZOOM BACK WITH BEN.
9- RIGHT TO CAMERA AND FAST PAN LEFT
79- AS BEN STARTS UP.

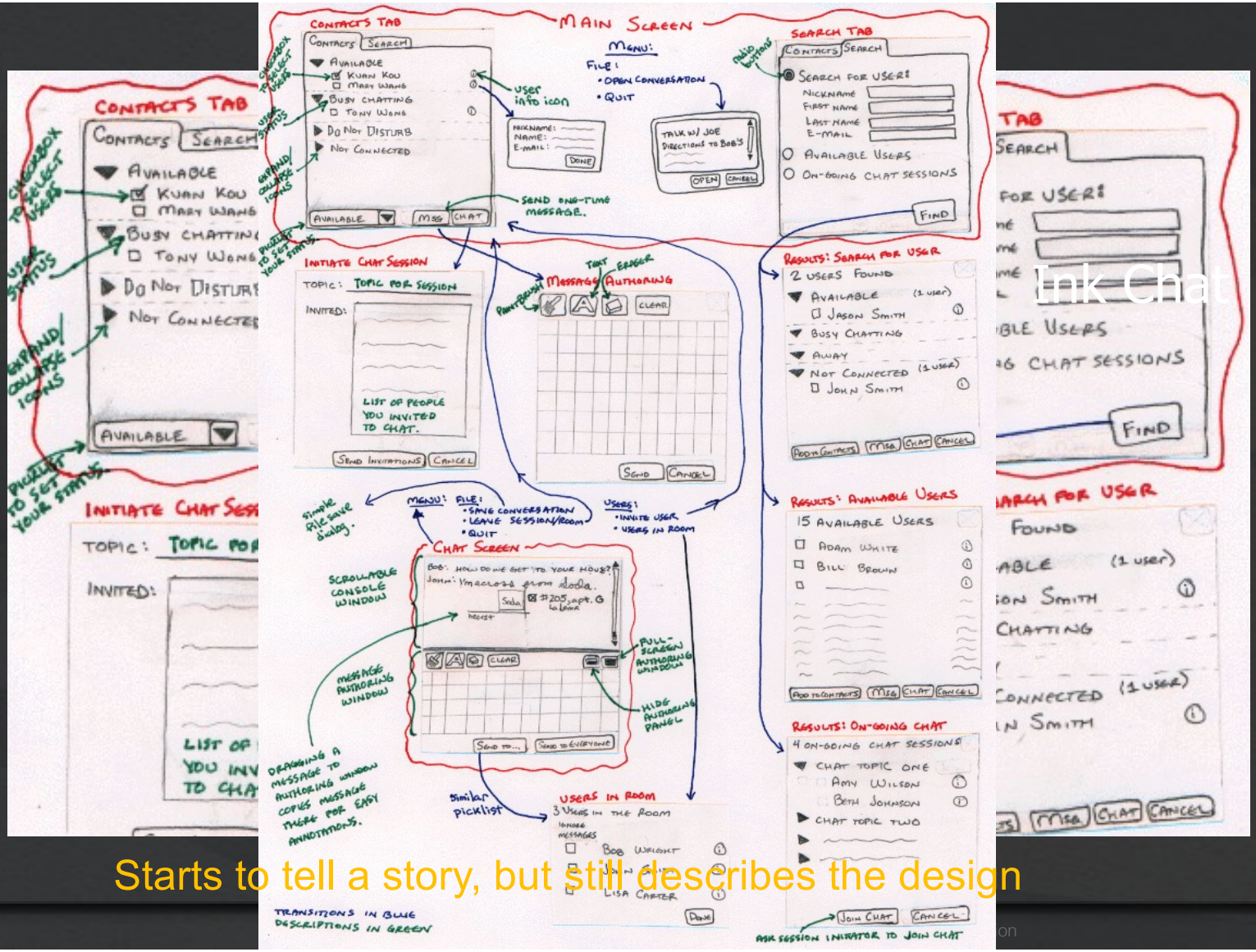

REVISED SEP 8 1982
©LFL 1982
N
DESCRIPTION: EXT. FOREST - MS LUKE & LEIA - TRUCKING
Luke & Leia coming toward camera. Behind them,
Biker #3 & Biker #4 bank in, chasing.
NOTES:
ELEMENTS: STAGE ANIM PLATE MATTE NON-ILM
Forest x
Luke x
Leia x
Biker #3 x
Biker #4 x
ELEMENTS: STAGE ANIM PLATE MATTE NON-ILM
SHOT # / SEQUENCE
BC 28
FRM COUNT 50
PAGE #

Sketches & Storyboards in UX Design



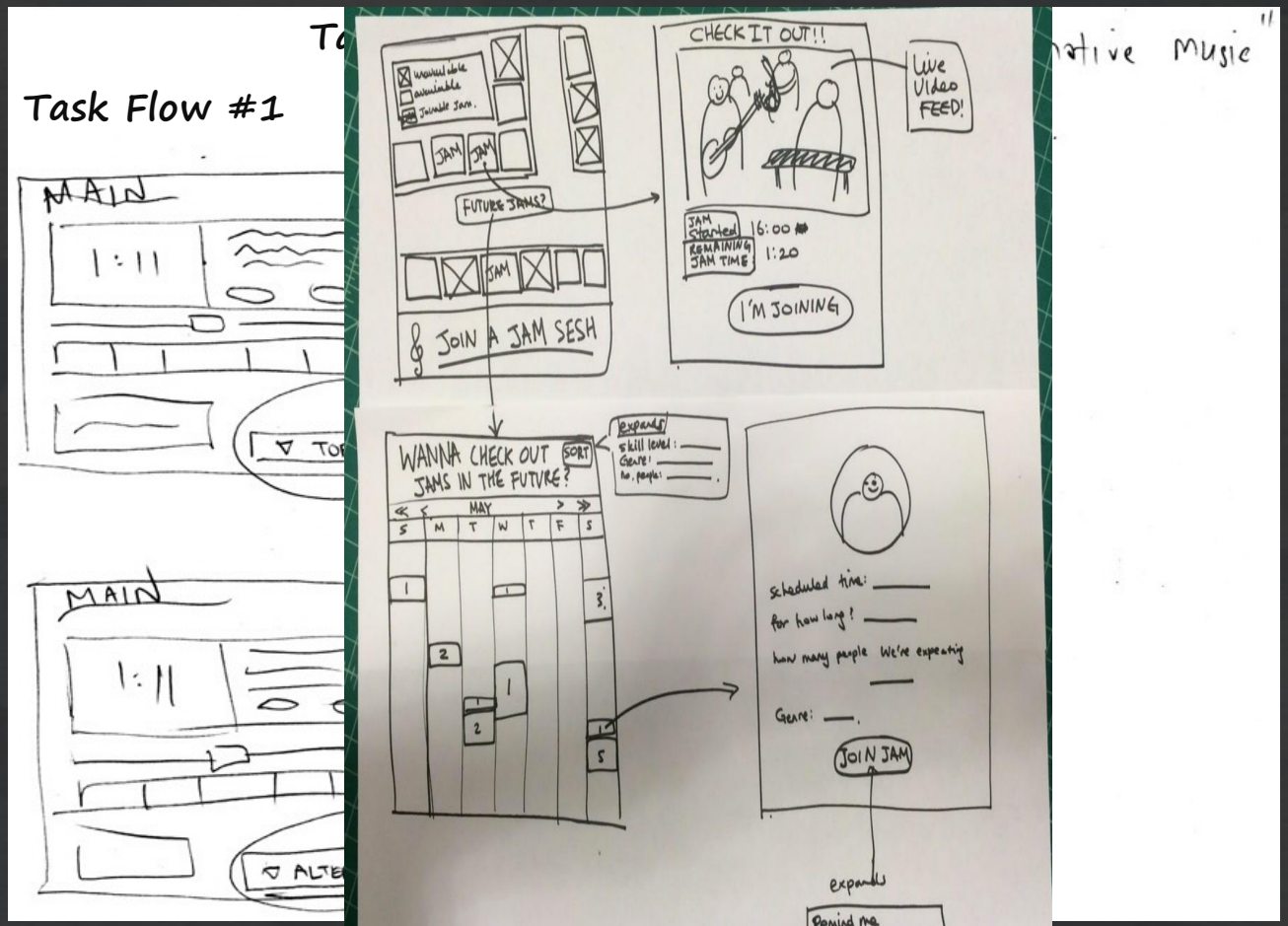
Sketches & Storyboards in UX Design




CONTACTS TAB
MAIN SCREEN
SEARCH TAB
INITIATE CHAT SESSION
MESSAGE AUTHORING
RESULTS: SEARCH FOR USER
RESULTS: AVAILABLE USERS
RESULTS: ON-GOING CHAT
CHAT SCREEN
USERS IN ROOM
Ink Chat
Starts to tell a story, but still describes the design

Sketches & **Storyboards in UX Design**

Task Flow
(Wireframe)

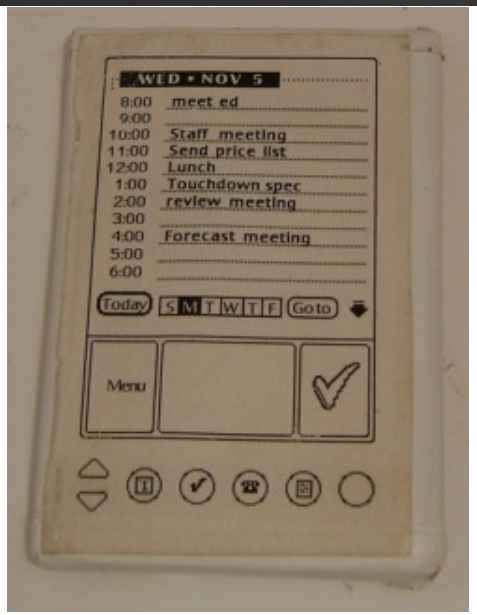


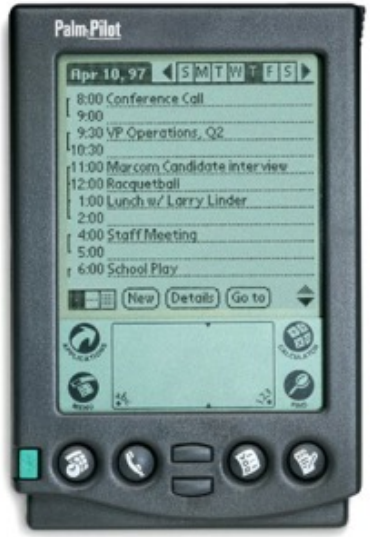
What is a Prototype?

"A prototype is an early sample or model built to test a concept or process or to act as a thing to be replicated or learned from."
– Wikipedia

CS147 definition: a working representation of a final artifact

http://www.computerhistory.org/collections/accession/102716262



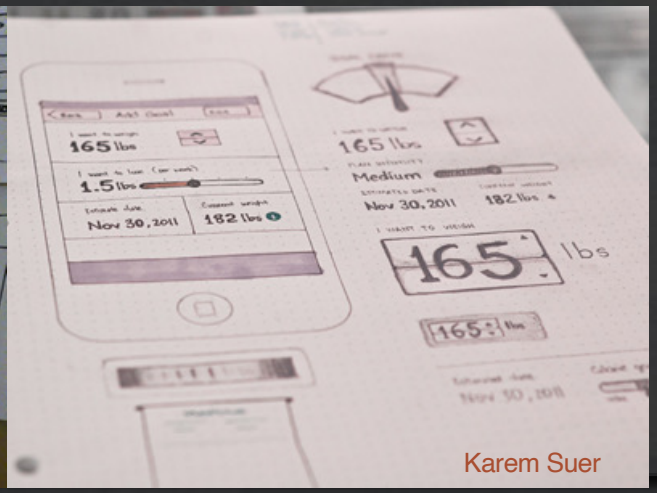


Types of Prototypes

Prototypes are concrete representations of a design

Prototype dimensions

- representation: form of the prototype
  - off-line (paper) or on-line (software)
- precision: level of detail (e.g., informal or polished)



Types of Prototypes

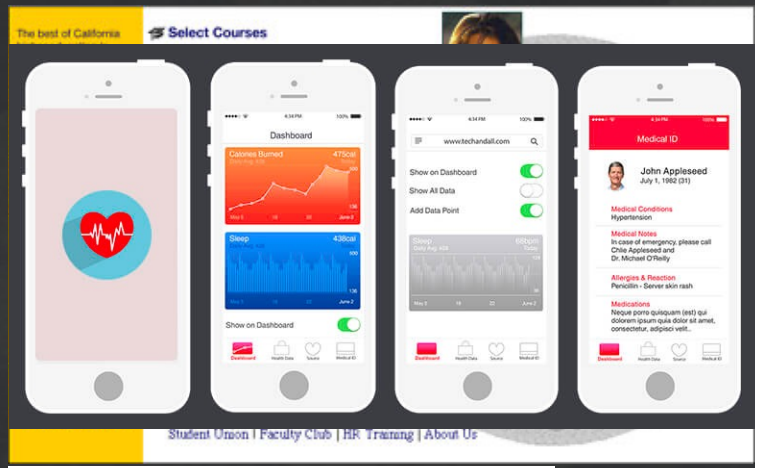
Prototypes are concrete representations of a design

Prototype dimensions

- representation: form of the prototype
  - off-line (paper) or on-line (software)
- precision: level of detail (e.g., informal or polished)
- interactivity: watch-only to fully interactive
  - fixed prototype (video clips)
  - fixed-path prototype (each step triggered by specified actions)
    - at extreme could be 1 path
  - open prototype (real, but limited error handling or performance)
- evolution: expected life cycle of prototype
  - e.g., throw away or iterative

Fidelity in Prototyping

- Fidelity refers to the level of detail
- High fidelity?
  - prototypes look like the final product

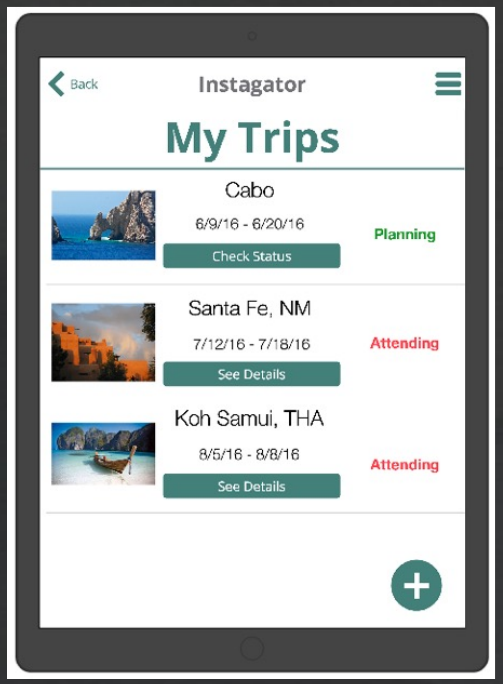


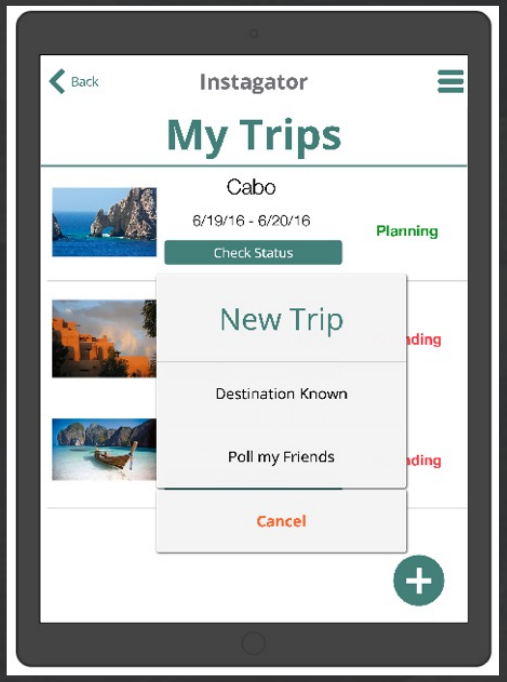
- Low fidelity?
  - (often) sketched renditions with many details missing

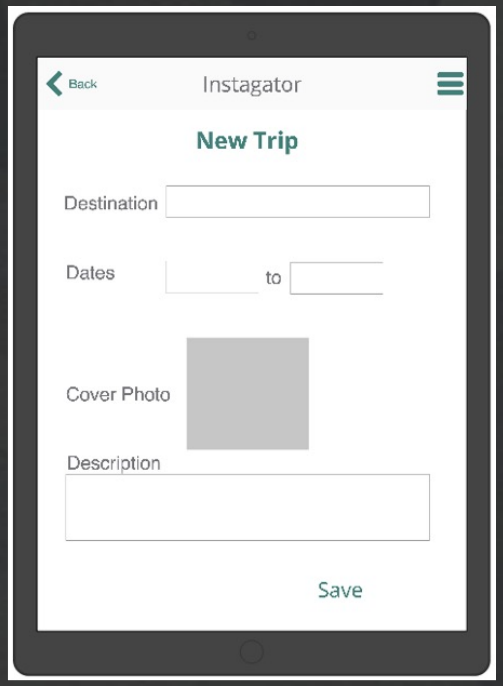
What do we like about this prototype?

What do wish could be improved?

What do we like about this prototype?



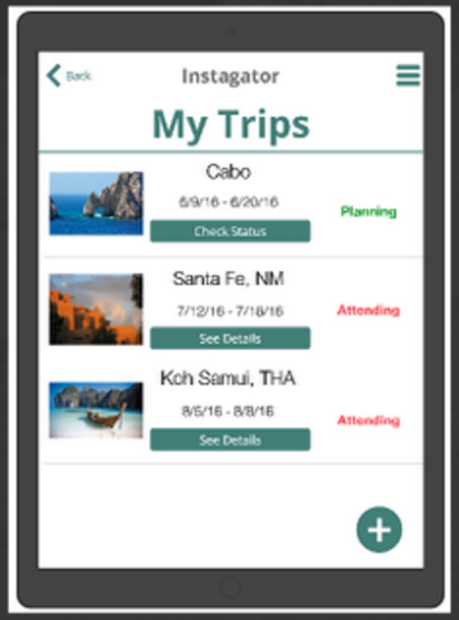




What do wish could be improved?

The feedback you get is different

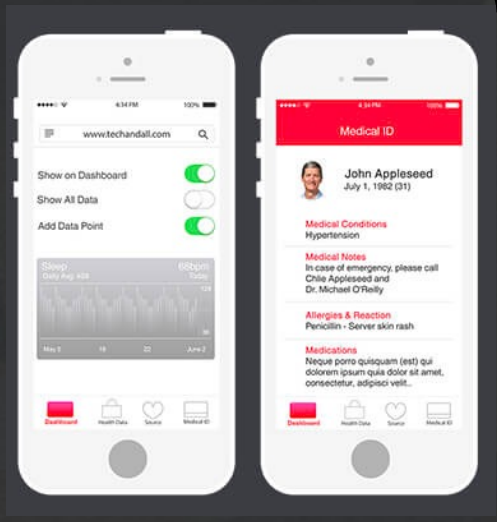
Low-fi



Medium-fi

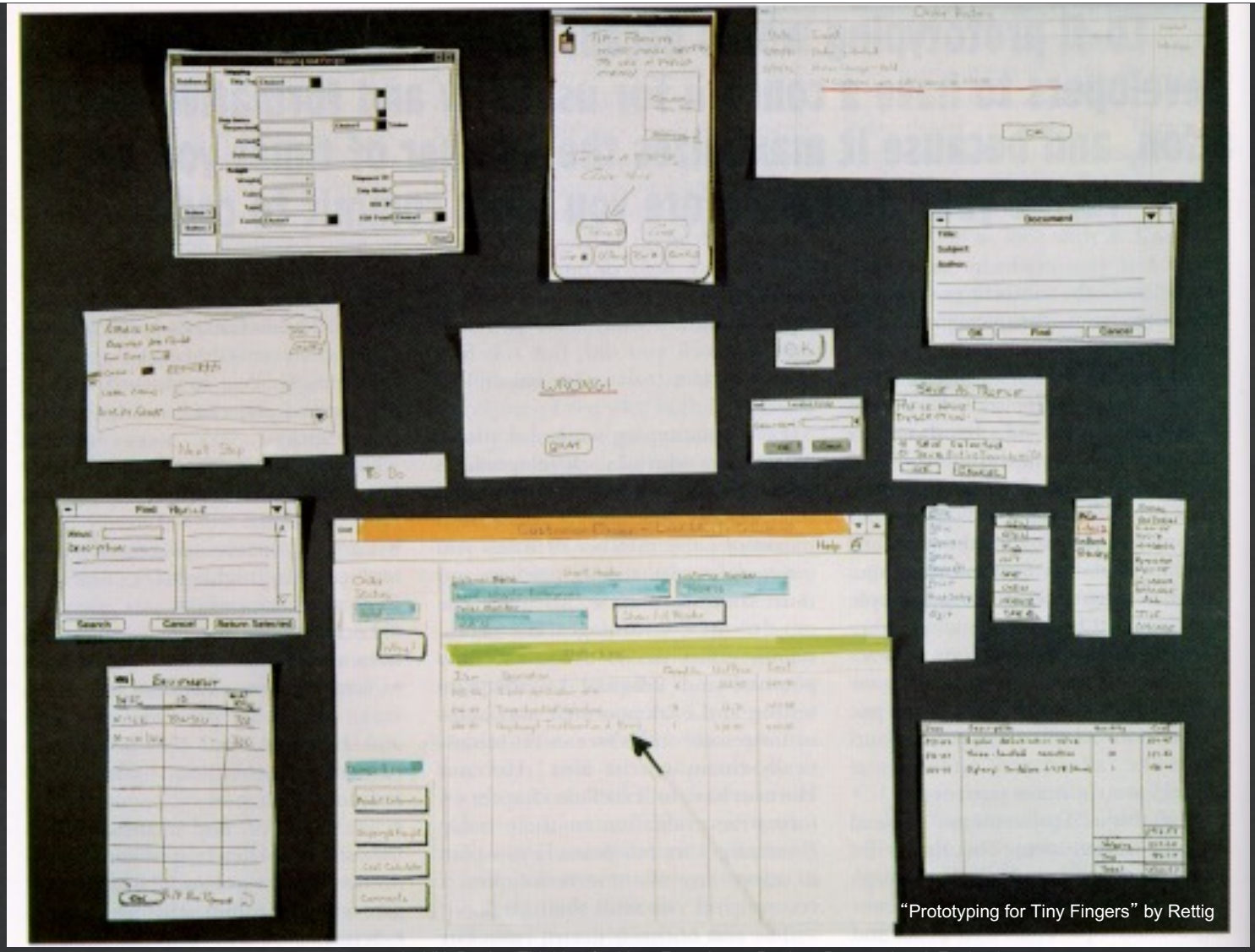
Hi-fi Prototypes Warp

- Perceptions of the tester/reviewer
  - representation communicates “finished”
    - comments focus on color, fonts & alignment
- Time of the designer
  - encourage precision
    - specifying details takes more time
- Creativity of the designer
  - lose track of the big picture

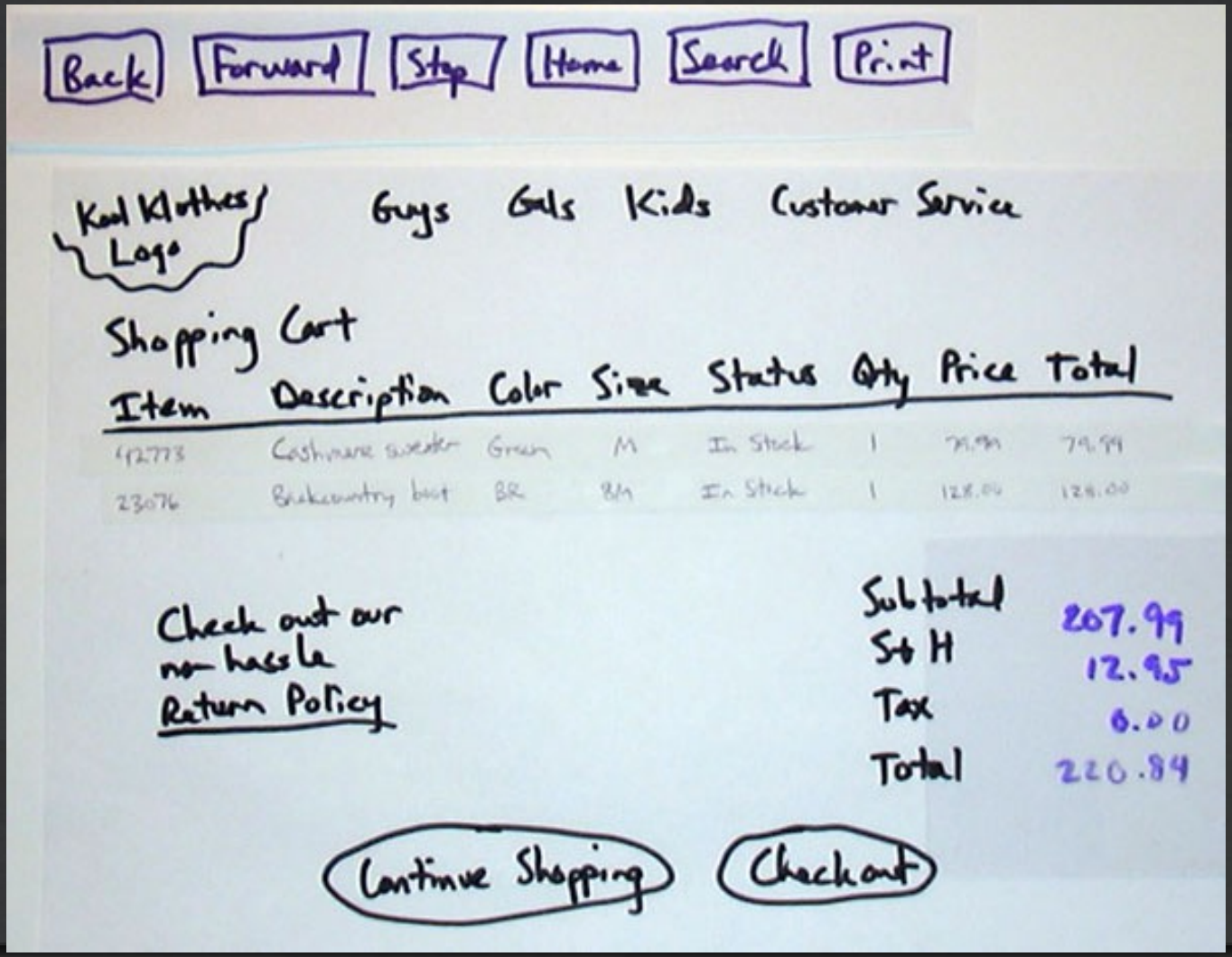


Why Use Low-fi Prototypes?

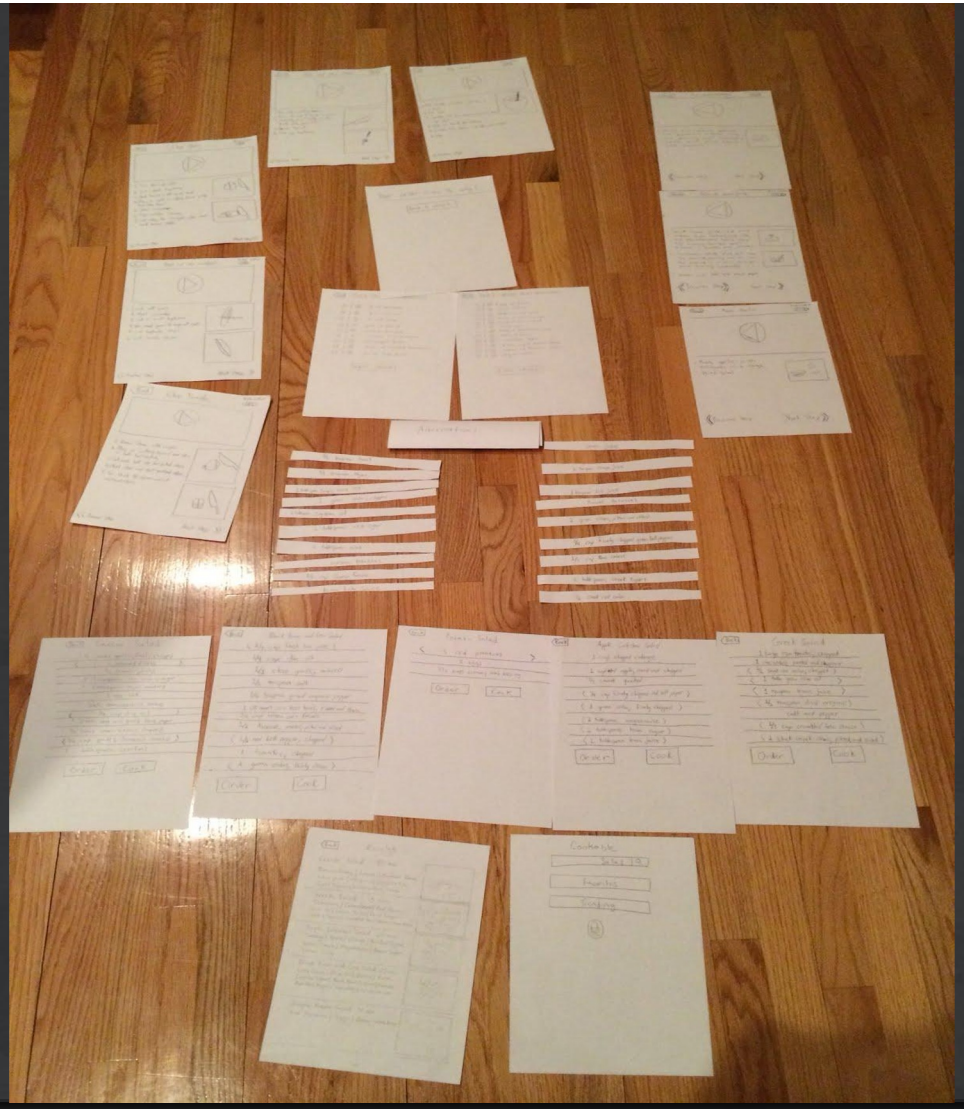
- Traditional methods take too long
  - sketches → prototype → evaluate → iterate
- Can instead simulate the prototype
  - sketches → evaluate → iterate
  - sketches act as prototypes
    - designer “plays computer”; others observe & record
- Kindergarten building skills
  - allows non-programmers to participate

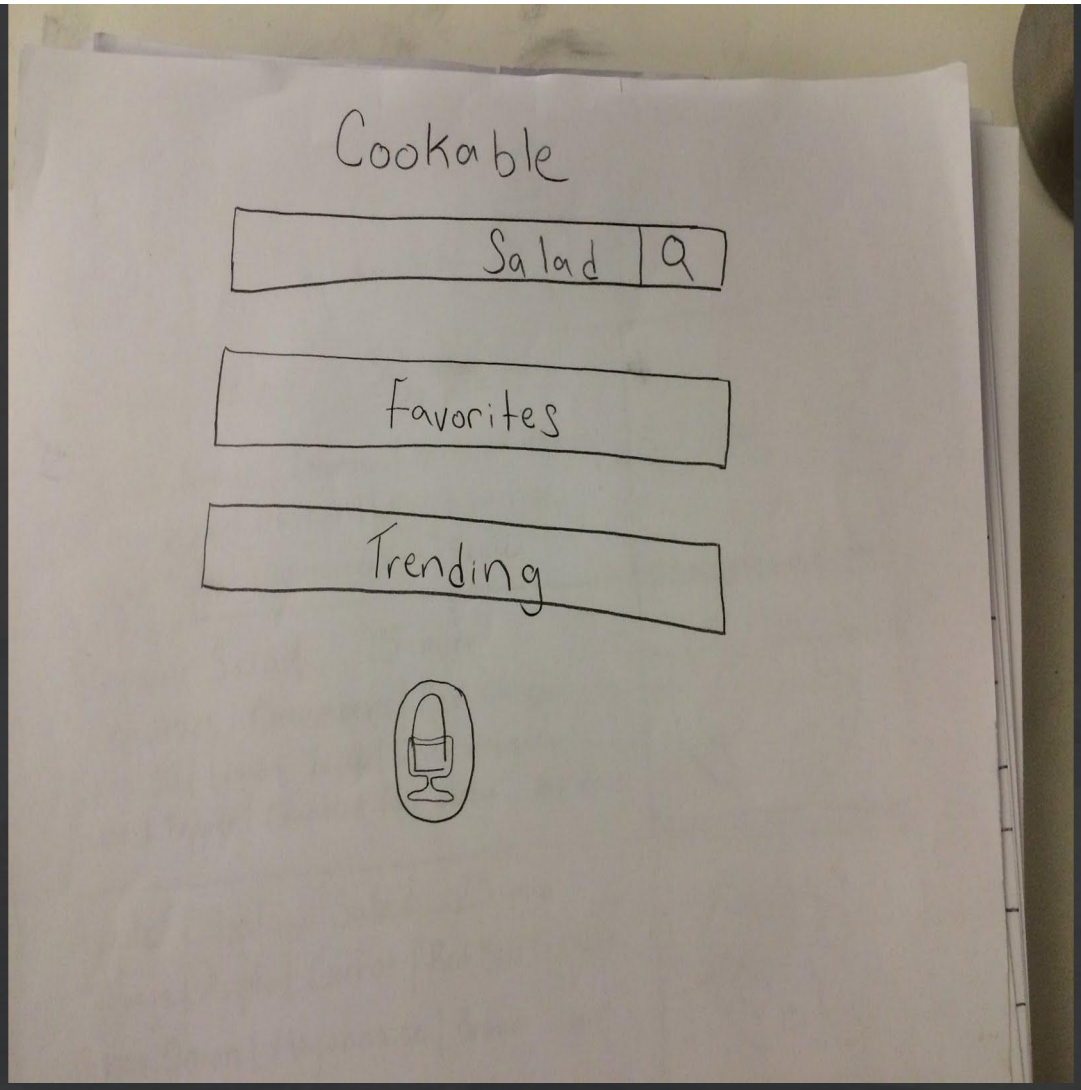


"Prototyping for Tiny Fingers" by Rettig


Back
Forward
Stop
Home
Search
Print
Kool Klothes Logo
Guys
Gals
Kids
Customer Service
Shopping Cart
Item
Description
Color
Size
Status
Qty
Price
Total
Check out our no hassle Return Policy
Subtotal
207.99
S&H
12.95
Tax
0.00
Total
220.84
Continue Shopping
Checkout

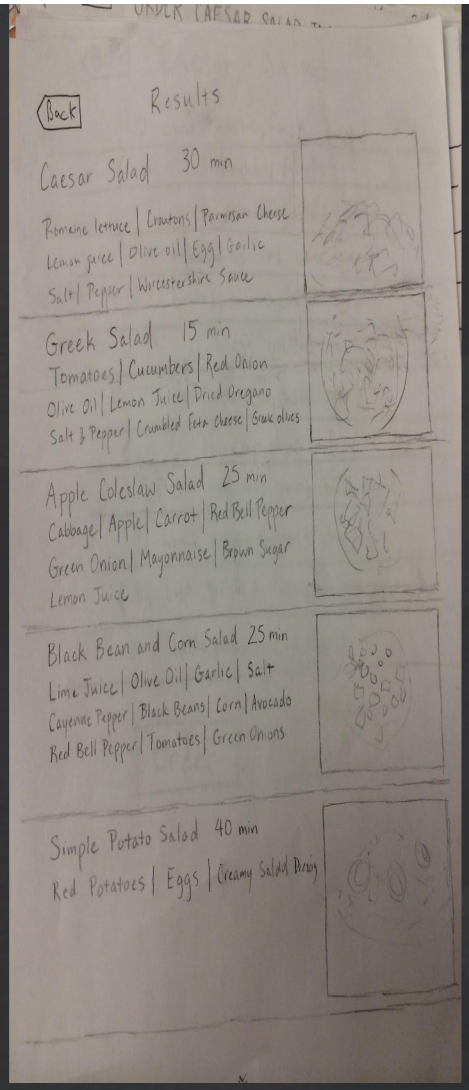
Cookable

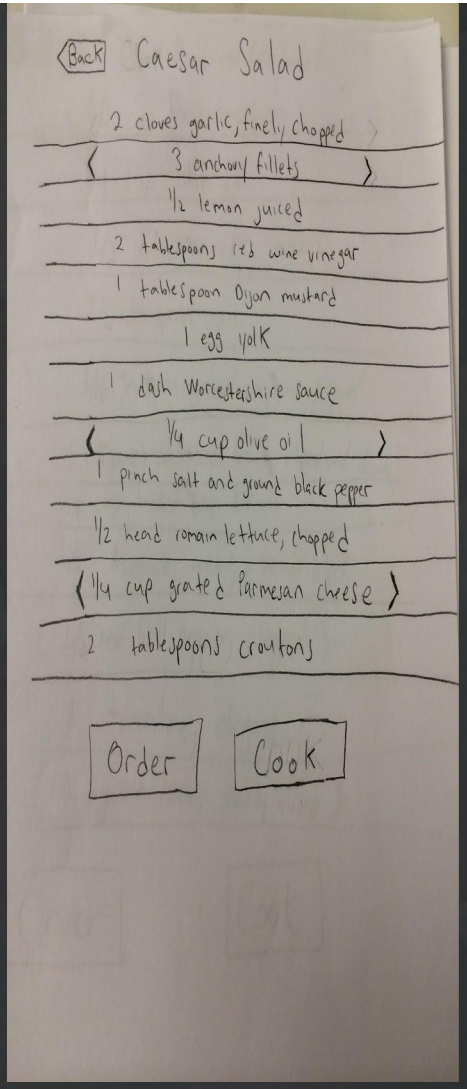




Cookable

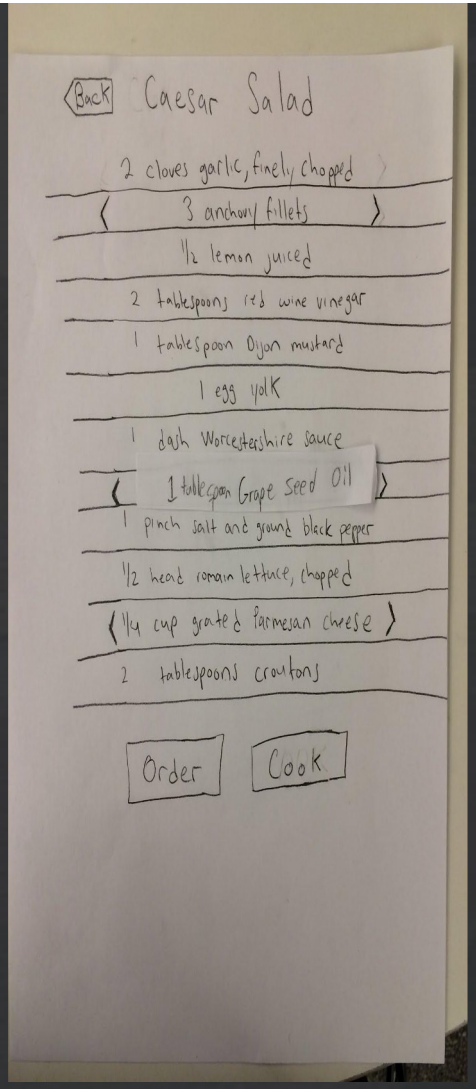
Cookable

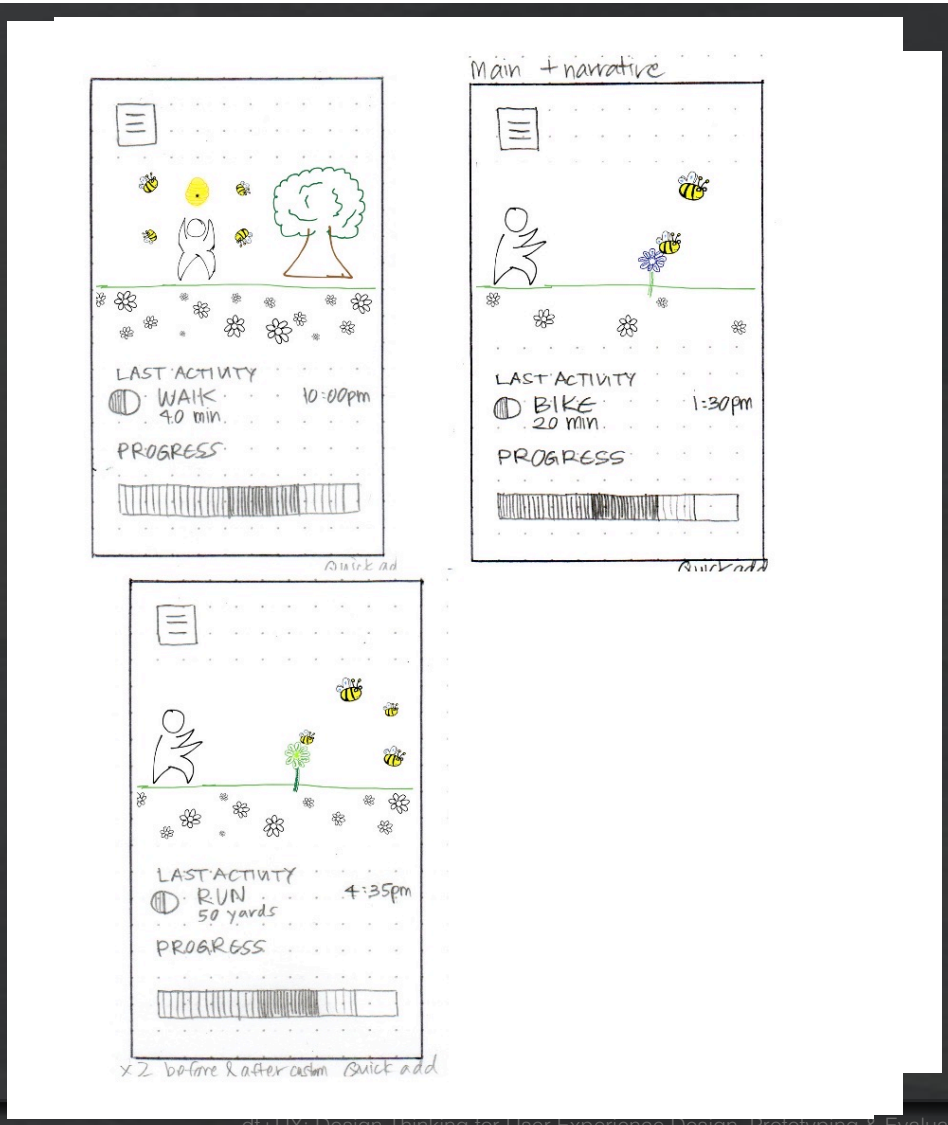

Back
Results
Caesar Salad 30 min
Romaine lettuce | Croutons | Parmesan Cheese
Lemon juice | Olive oil | Egg | Garlic
Salt | Pepper | Worcestershire Sauce
Greek Salad 15 min
Tomatoes | Cucumbers | Red Onion
Olive Oil | Lemon Juice | Dried Oregano
Salt & Pepper | Crumbled Feta cheese | Greek olives
Apple Coleslaw Salad 25 min
Cabbage | Apple | Carrot | Red Bell Pepper
Green Onion | Mayonnaise | Brown Sugar
Lemon Juice
Black Bean and Corn Salad 25 min
Lime Juice | Olive Oil | Garlic | Salt
Cayenne Pepper | Black Beans | Corn | Avocado
Red Bell Pepper | Tomatoes | Green Onions
Simple Potato Salad 40 min
Red Potatoes | Eggs | Creamy Salad Dressing


Back
Caesar Salad
2 cloves garlic, finely chopped
3 anchovy fillets
1/2 lemon juiced
2 tablespoons red wine vinegar
1 tablespoon Dijon mustard
1 egg yolk
1 dash Worcestershire sauce
1/4 cup olive oil
1 pinch salt and ground black pepper
1/2 head romain lettuce, chopped
1/4 cup grated Parmesan cheese
2 tablespoons croutons
Order
Cook

Cookable

Cookable


Back
Caesar Salad
2 cloves garlic, finely chopped
3 anchovy fillets
1/2 lemon juiced
2 tablespoons red wine vinegar
1 tablespoon Dijon mustard
1 egg yolk
1 dash Worcestershire sauce
1 tablespoon Grape seed Oil
1 pinch salt and ground black pepper
1/2 head romain lettuce, chopped
1/4 cup grated Parmesan cheese
2 tablespoons croutons
Order
Cook


main + narrative
LAST ACTIVITY
WALK
40 min.
10:00pm
PROGRESS
LAST ACTIVITY
BIKE
20 min.
1:30pm
PROGRESS
LAST ACTIVITY
RUN
50 yards
4:35pm
PROGRESS
x2 before & after custom quick add

Who is Zuki?

Administrivia

- Grading on Assignment #1: Needfinding

A1 Group Presentation:	-: 0%	✓- -: 0%	✓-: 0%	✓: 48%	✓+: 50%	✓ ++: 3%
A1 Individual Presentation:	-: 0%	✓- -: 0%	✓-: 0%	✓: 25%	✓+: 70%	✓ ++: 5%

- Add these slack channels
  - #ask-for-feedback (feedback from peers and CAs as they get time)
  - #slack-overflow (crowdsourcing tech support – web site and reactive native)
  - If you help your peers in a significant way, we can raise your class participation grade
- Figma Workshop: Wed, Oct 18th 7:30-8:30 PM (interactive hands-on activities & help)
- Web site directories will be created for each team by this week
  - each team needs 1 person to fill out this form by tonight (Monday, Oct 16th)
    - https://bit.ly/cs147au23-team-name
  - start to get sites up there this weekend
    - should have all your work–not graded until mid-point check-in & near end of quarter
  - CAs will send you your directory path/name on web.stanford.edu

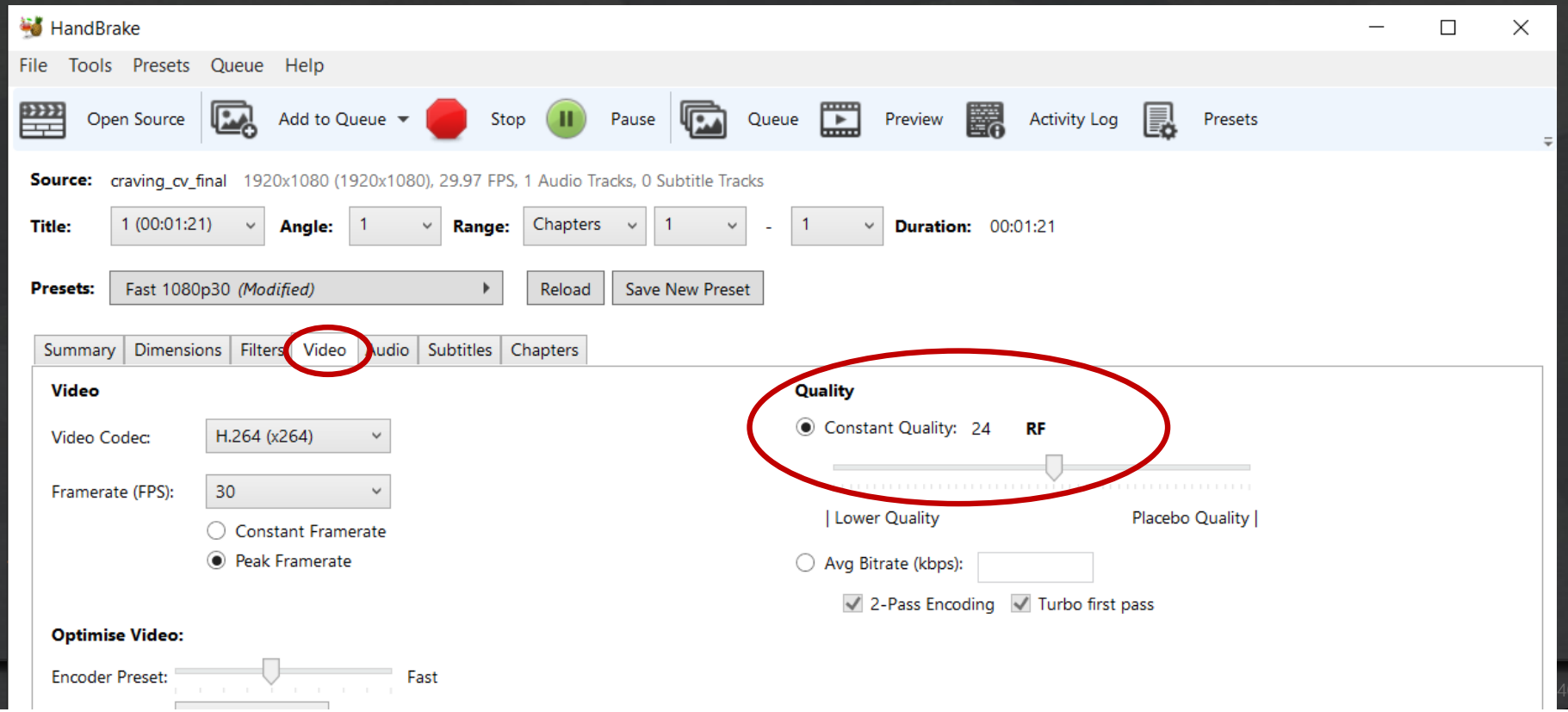
Administrivia: Video Hints

- Under 2 minutes (90 seconds or less even better)

- Add credits at end
  - Team/project name
  - Your names (first name & last initial)
  - “CS 147 – Autumn 2023”
  - Won’t count in your time limit

Administrivia

- Use *must* use handbrake to compress your video
  - It will take your video from 250MB-1GB down to ~50MB



Team Break

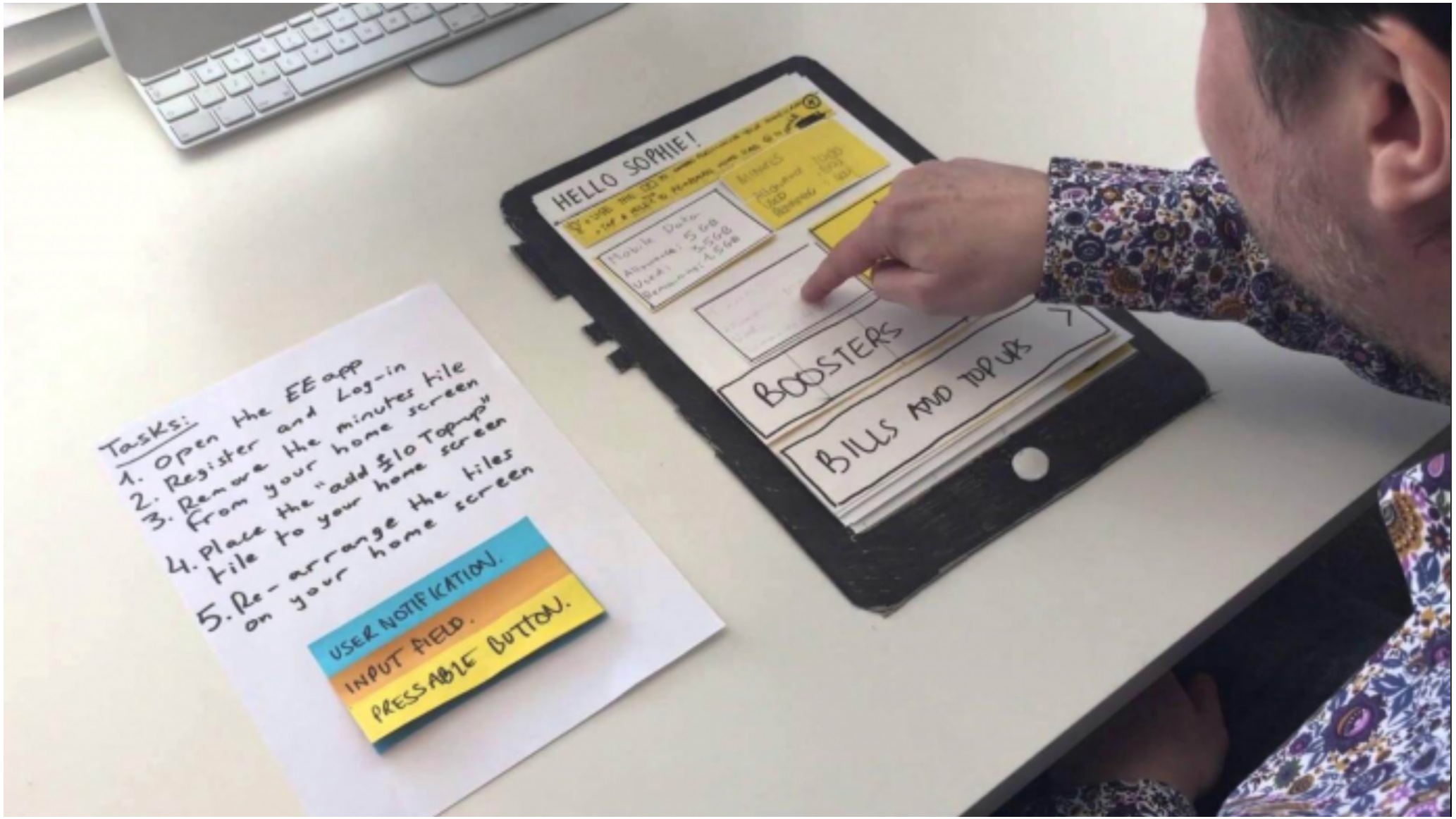
- Reflect on last week's assignment (~5-8 min)
  - what did you like about your teamwork?
  - what do you wish could be improved?
  - share out with each other

- This week's assignment (~15 min)
  - Get greenlight from CA on solution + tasks
  - work on your video storyboards/editing

TEAM MEETINGS

Constructing the Model

- Set a deadline
  - don't think too long - *build it!*
- Draw a window frame on large paper
- Put different screen regions on cards
  - anything that moves, changes, appears/disappears
- Ready response for any user action
  - e.g., have those pop-up dialogs, etc. already made
- Use printer/scanner to make many versions


HELLO SOPHIE!
BOOSTERS
BILLS AND TOPUPS
Tasks:
1. Open the EE app
2. Register and Log-in
3. Remove the minutes tile From your home screen
4. Place the "add £10 Topup" tile to your home screen
5. Re-arrange the tiles on your home screen
USER NOTIFICATION.
INPUT FIELD.
PRESSABLE BUTTON.

Preparing for a Test

- Select your “customers”
  - understand background of intended users
  - use a screening questionnaire to get the people you need
  - don’t use friends or family
  - start recruiting today
- Prepare scenarios that are
  - typical of the product during actual use
  - make prototype support these (small, yet broad)
- Practice to avoid “bugs”

Conducting a Test

Four Roles

- Greeter – puts users at ease & gets data
- Facilitator – only team member who speaks
  - gives instructions & encourages thoughts, opinions
- Computer – knows application logic & controls it
  - always simulates the response, w/o explanation
- Observers – take notes & recommendations


Incident Forms Book
Battalion 3412

Who is Zuki?

Practice: low-fi prototype testing

In a group of 3-4 people around you, you will test the low-fi prototype of Parbon app!

One will play *user*, one will play *facilitator*, and 1-2 will play *observers* taking notes.

Share the **critical incidents** (both **positive** and **negative** events) from your test in Slack.

Note: If you are the user, remember to talk-aloud about what you are thinking as you navigate the prototype!

Practice: low-fi prototype testing

Parbon allows users to log and track their carbon usage from commutes, understand what their carbon footprint means relative to the world around them, and buy carbon offsets.

- Simple task: Log your personal carbon emissions data
- Moderate task: Purchase carbon offsets to counteract your emissions
- Complex task: Post your carbon metrics to share with friends and family

https://bit.ly/parbon-figma-test

Evaluating Results

- High level questions about your design
  - does it address the problem you want to solve?
  - is this the right realization of your solution?

- Sort & prioritize observations
  - what was important?
  - lots of problems in the same area?

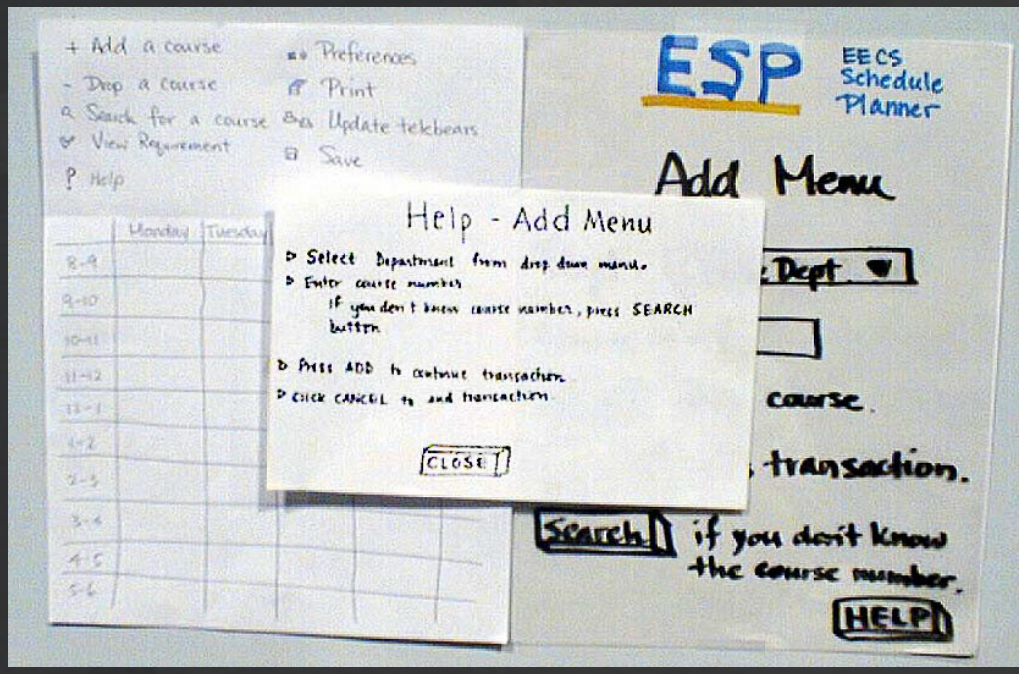
- Make changes & iterate
  - even *iterate between tests*

Advantages of Low-fi Prototyping

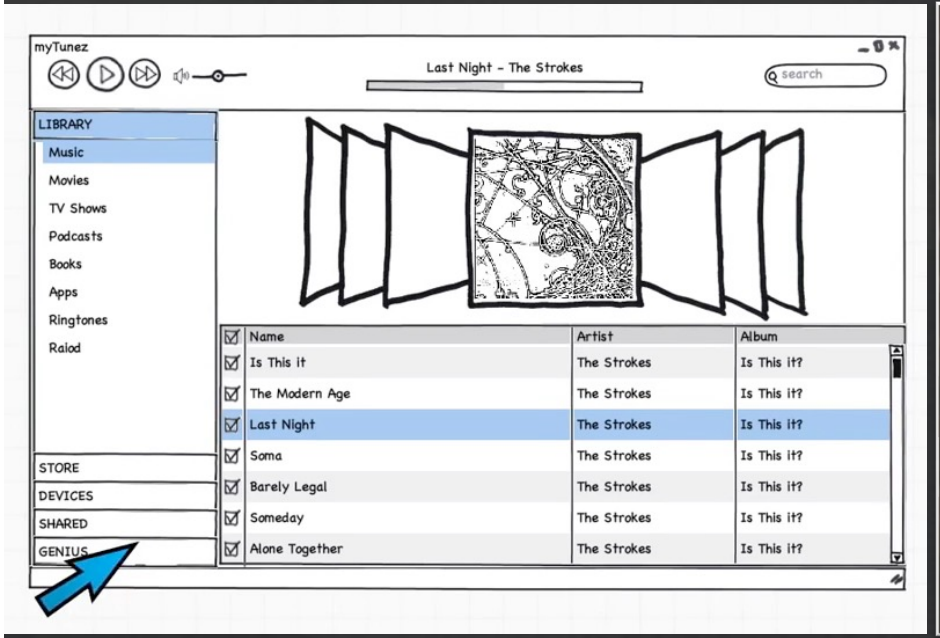
- Takes only a few hours
  - no expensive equipment needed
- Can test multiple alternatives
  - fast iterations
    - number of iterations is tied to final quality
- Almost all interaction can be faked (Wizard of Oz)

Problems with Low-fi Prototypes

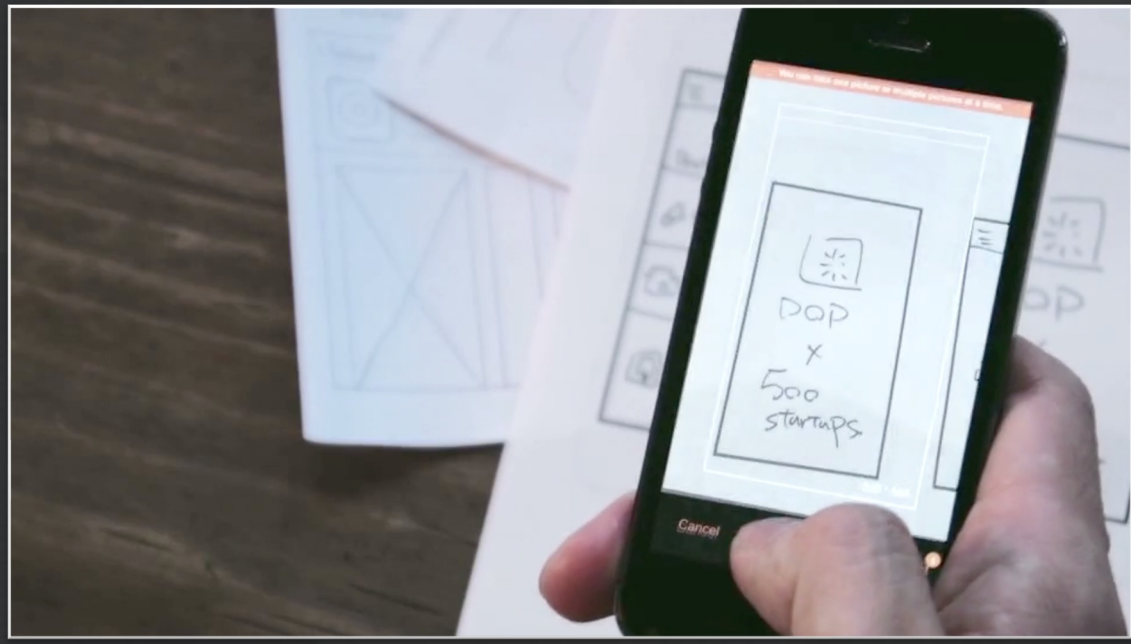
- "Computer" inherently buggy
- Slow compared to real app
  - timings not accurate
- Hard to implement some functionality
  - pulldowns, feedback, drag, viz …
- Won't look like final product
  - some widgets/controls hard to recognize
- End-users can't use by themselves
  - not in context of user's work environment



Interactive Lo-fi Tools



Balsamiq Mockups
http://balsamiq.com



POP
https://marvelapp.com/pop

Remote Testing of Low-fi Prototypes

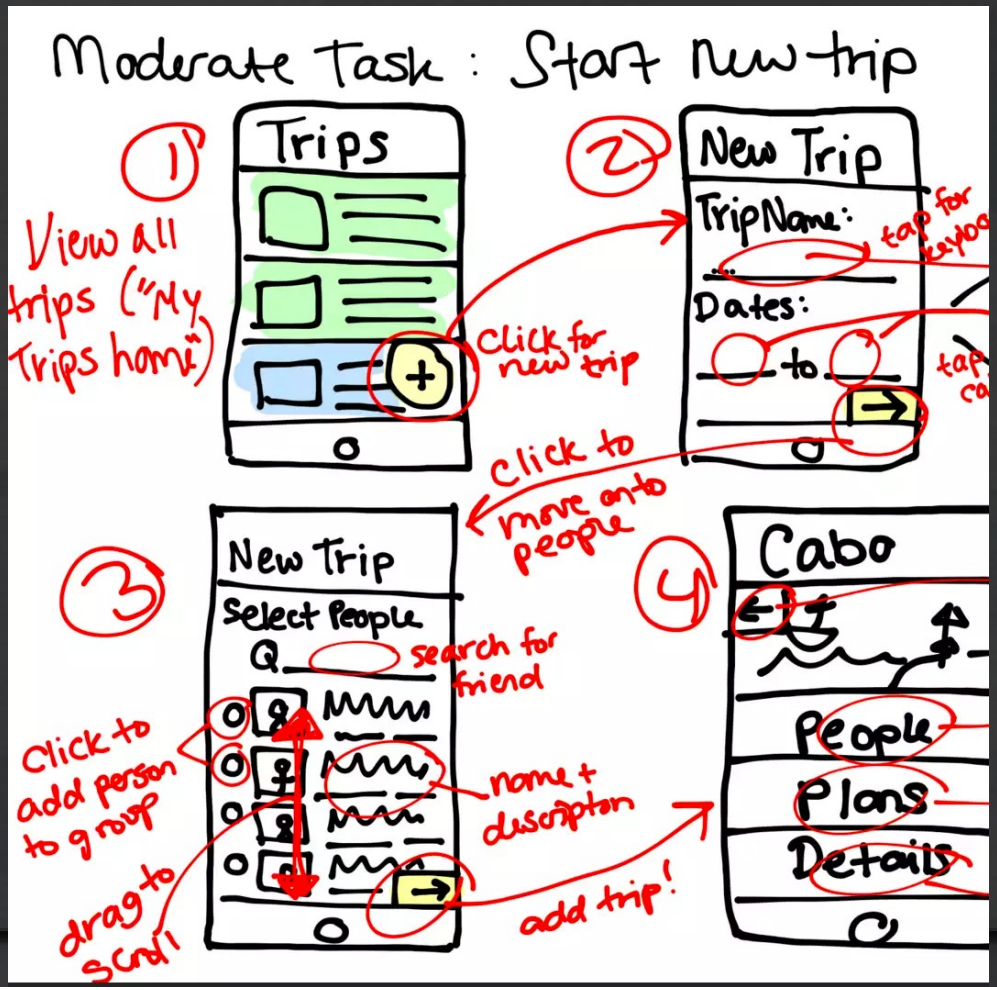
1. Participant runs & records prototype (e.g., Balsamiq/POP) on their phone [hardest]
   - user records interaction by recording screen on iOS/Android
   - you record zoom meeting while participant speaks aloud
   - https://uxdesign.cc/moderating-ux-research-with-zoom-1d4e89614277

2. Participant runs zoom on their phone while you screen share prototype [moderate]
   - user taps on items & verbalizes aloud
   - *you control prototype & record meeting*
   - https://uxdesign.cc/moderating-ux-research-with-zoom-1d4e89614277

3. Participant hugs their laptop [easiest]
   - user runs your prototype (e.g., Balsamiq/POP) on their own phone
   - you record zoom meeting of their screen as *captured by their laptop camera*
   - https://medium.com/@beparticular/were-still-hugging-our-laptops-8c7f22ed800e

Fidelity in Prototyping:

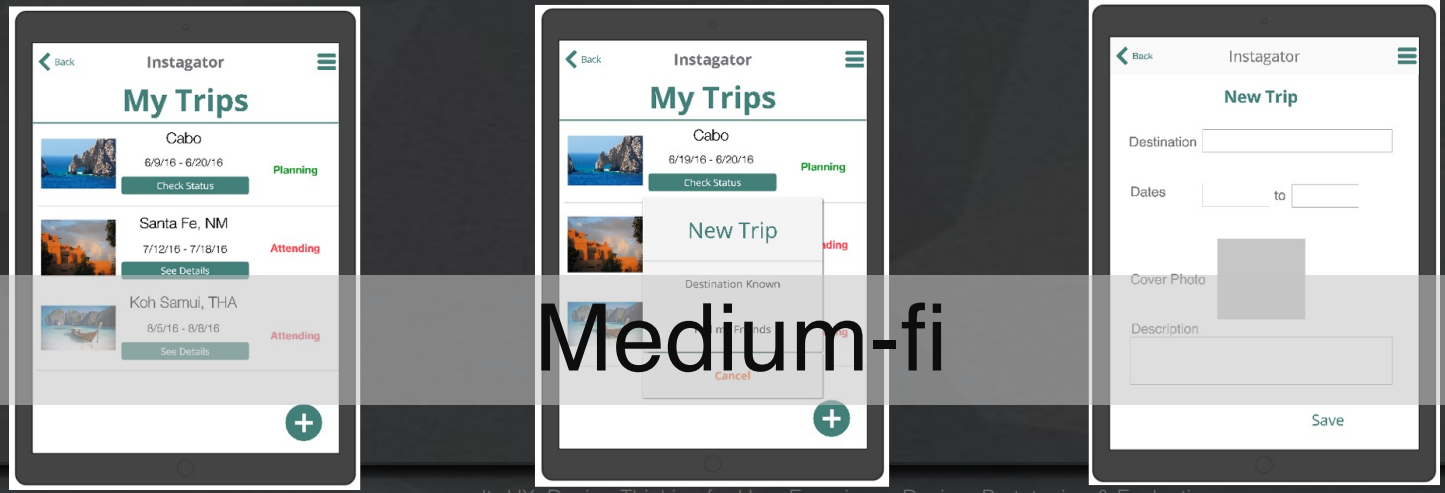
Instagator



Fidelity in Prototyping

Task 1: Take a Destination Poll

Low-fi



Medium-fi

Summary

- Prototypes are a concrete representation of a design or final product
- Low-fi testing allows us to quickly iterate
  - get feedback from users & change right away

Further Reading

Prototyping

- Books
  - Paper Prototyping: The Fast and Easy Way to Design and Refine User Interfaces, by Carolyn Snyder, Morgan Kaufmann, 2003

- Articles
  - "Prototyping for Tiny Fingers" by Marc Rettig, in Communications of the ACM, 1994
  - "Using Paper Prototypes to Manage Risk" by Carolyn Snyder, http://world.std.com/~uieweb/paper.htm
  - "The Perils of Prototyping" by Alan Cooper, http://www.chi-sa.org.za/Documents/articles/perils.htm

Next Time

- Lecture on Wednesday: Human Abilities
- Read/Listen
  - "Learning From Design Critiques" by Fowler and Haskins
  - "Cognitive Aspects in Interaction Design", pages 66-99 from Interaction Design, 3rd Edition by Rogers, Sharp, & Preece
  - Wait Wait... Tell Me!, 99% Invisible, Episode 369 (36 minutes)
- Project next week
  - 15-20 sketches of 3-5 design realizations (start in studio…)
  - pick the top two & storyboard/task flow those
  - pick the top 1 & build/test low-fi prototypes using 3 key tasks for next week's studio presentation
    - recruit representative participants now!