

Building User Interfaces

Design Thinking

from Empathy to Ideas


Professor Yuhang Zhao

Adapted from Prof. Mutlu's slides

What will we learn today?

- Design thinking and process
- Step 1: How to empathize with users
- Step 2: How to turn data into insight
- Step 3: How to generate design ideas
- Sketching, conceptual design, storyboarding

What is *design thinking*?

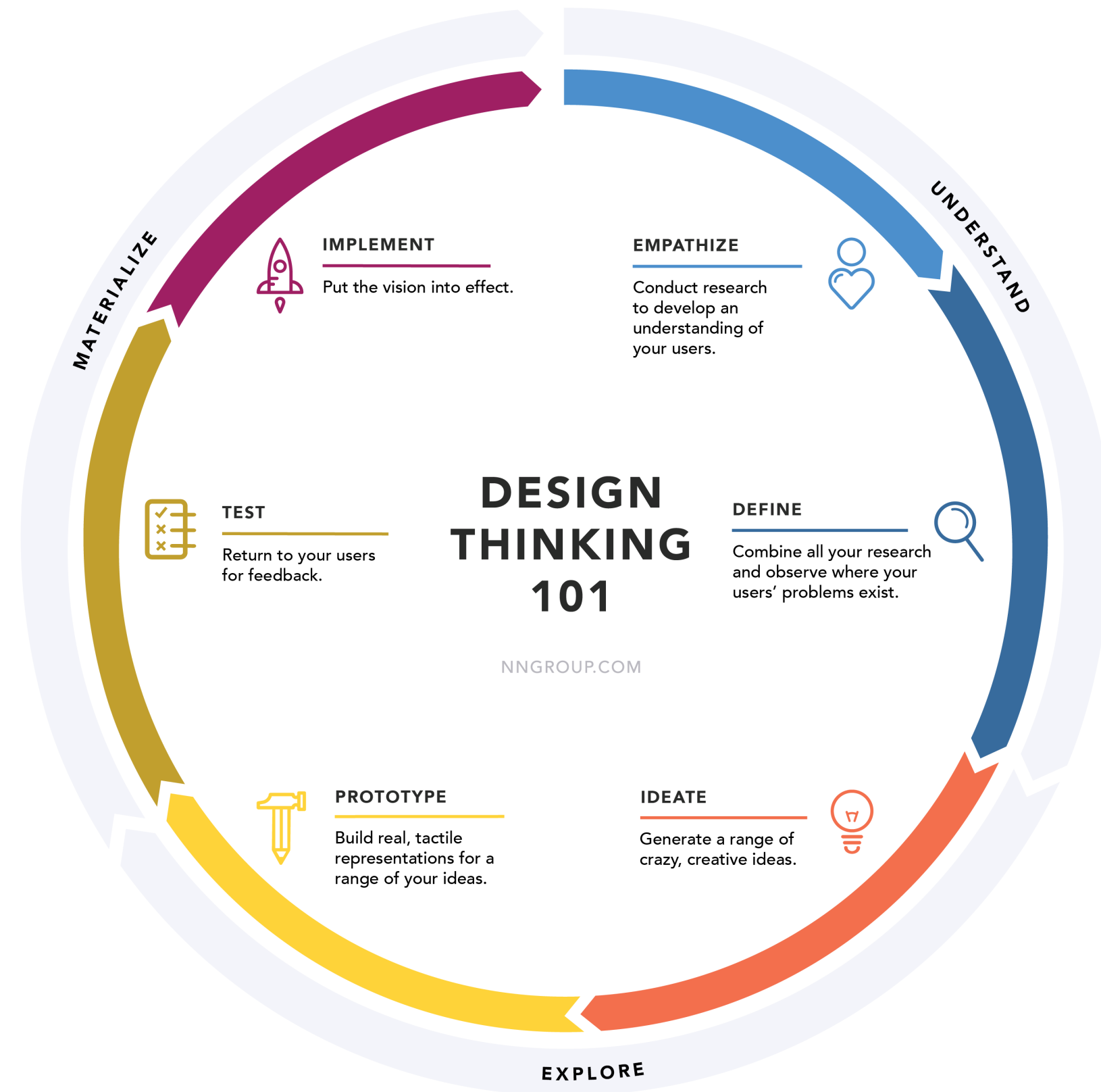


NN/g

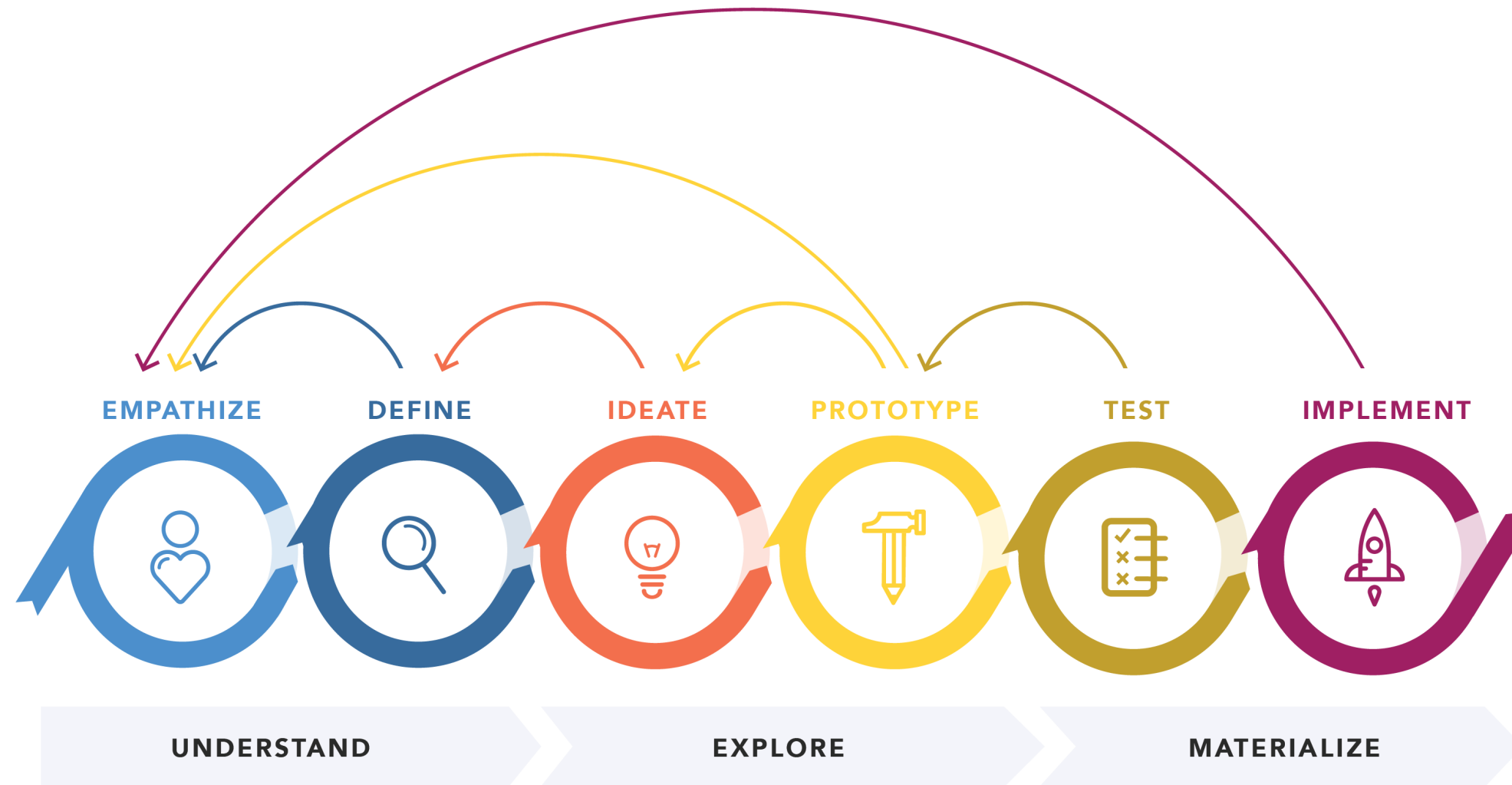
**Design Thinking
101**

*Design thinking*² has two components:

1. An **approach**: a hands-on, user-centric approach to innovative problem solving
2. A **process**: a 6-phase process to understand problems, explore solutions, and materialize them



²NN/g Design Thinking



DESIGN THINKING 101 NNGROUP.COM

³ NN/g Design Thinking

Takeaways

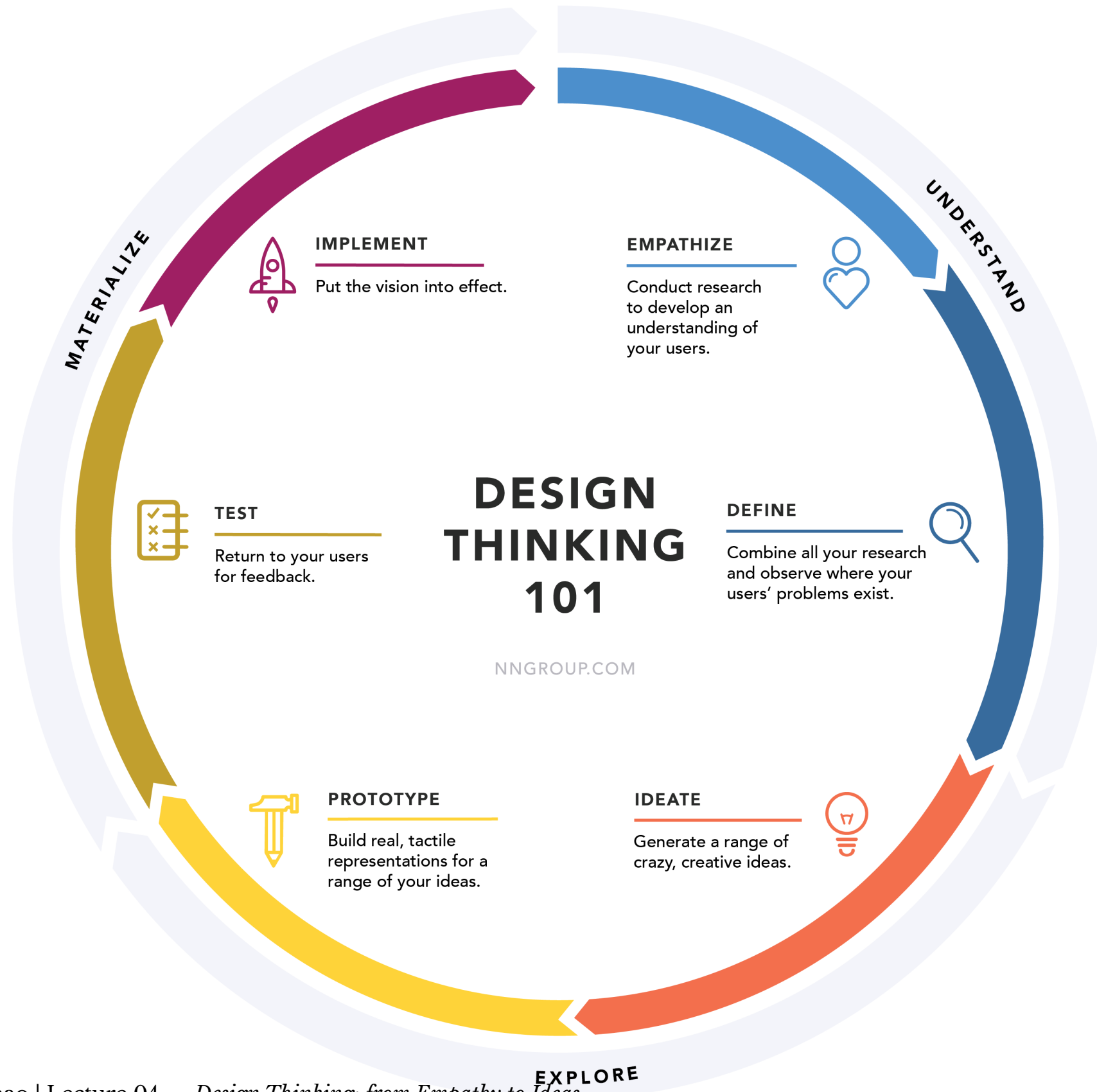
1. Approach problems like a designer
2. Follow a process

Quiz 1

Complete the Canvas quiz.



canvas



Empathize

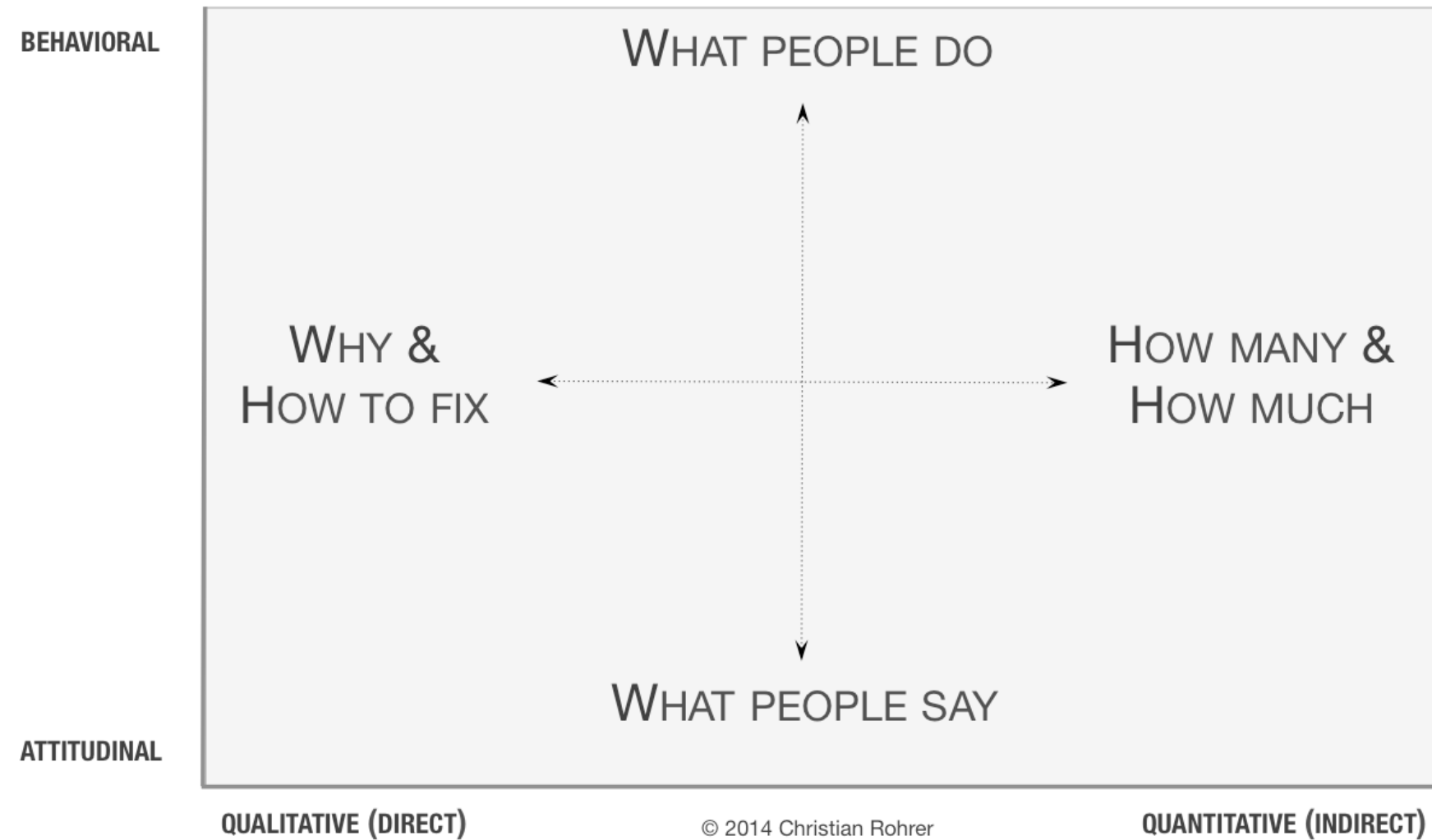
(aka User Research)

How do we empathize with users?

Understanding user needs, preferences, and expectations by studying what users do, say, think, and feel.

There are many methods to build empathy.

QUESTIONS ANSWERED BY RESEARCH METHODS ACROSS THE LANDSCAPE

⁴ NN/g UX Research Methods

The simplest and most powerful method for empathy:

Think-alouds

"The #1 Usability Tool" — Jakob Nielsen

Source⁵



⁵Nomensa

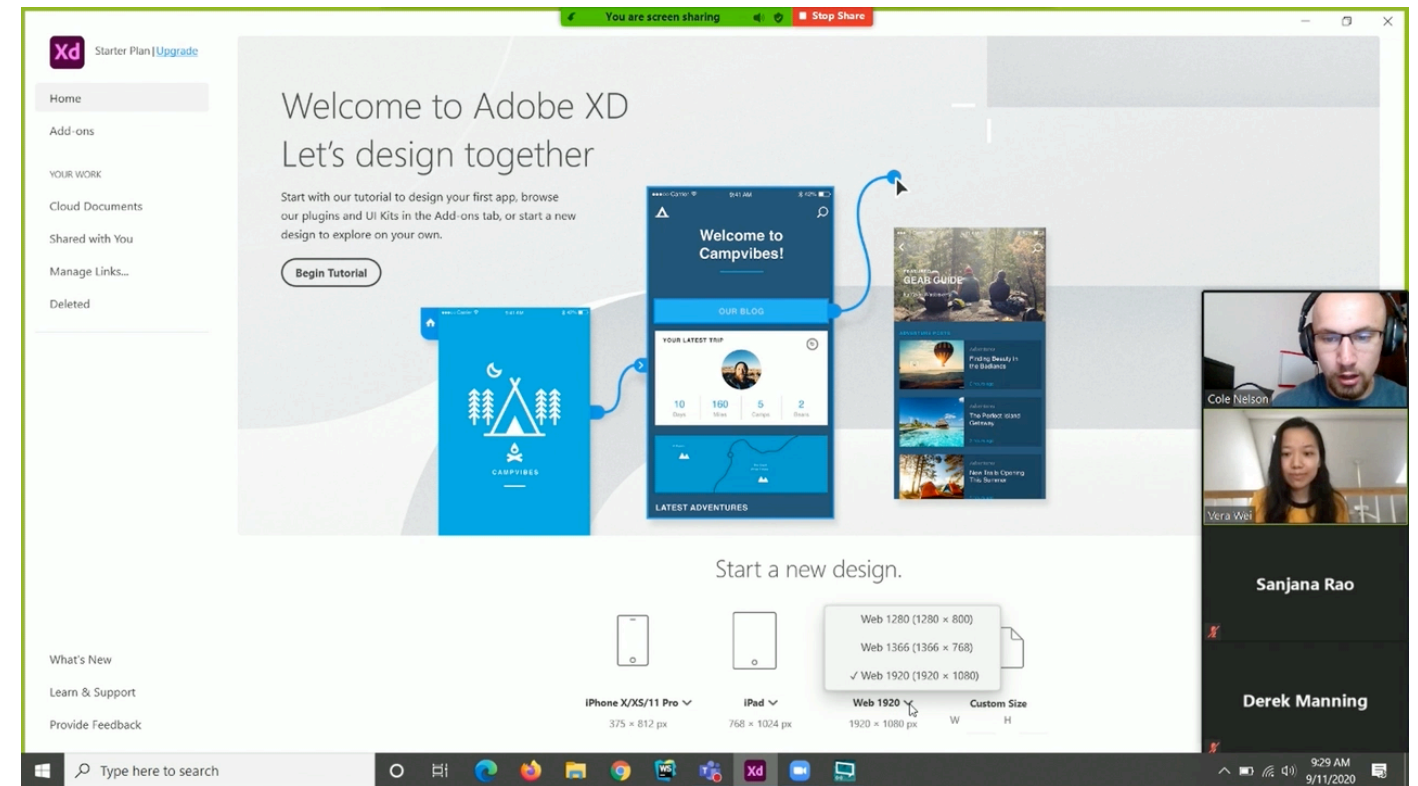
How to conduct a think-aloud

1. Identify representative users
2. Ask users to perform representative tasks
3. Observe and record what they *say* and *do*
4. Analyze your data to develop design insight

In-class Activity: *Adobe XD*

In-class Activity: Part I — *the think-aloud*

We will watch a 10-minute video of a *think-aloud session* with a novice user performing a set of tasks in Adobe XD.



What **you** should do⁶

Do: Grab a post-it note on [this Google Drawings canvas](#) (or create one if none left). Write down one key observation on the post-it note. Hold onto your post-it note until later. 🖱️ *Repeat for additional observations.*

Pro tip: Write concisely but in a way that others can understand; write the name of the source; color-code types of note; use a Sharpie! 🖱️ *Applies to physical post-it notes.*

⁶Cooper-Wright



Think-aloud Tasks

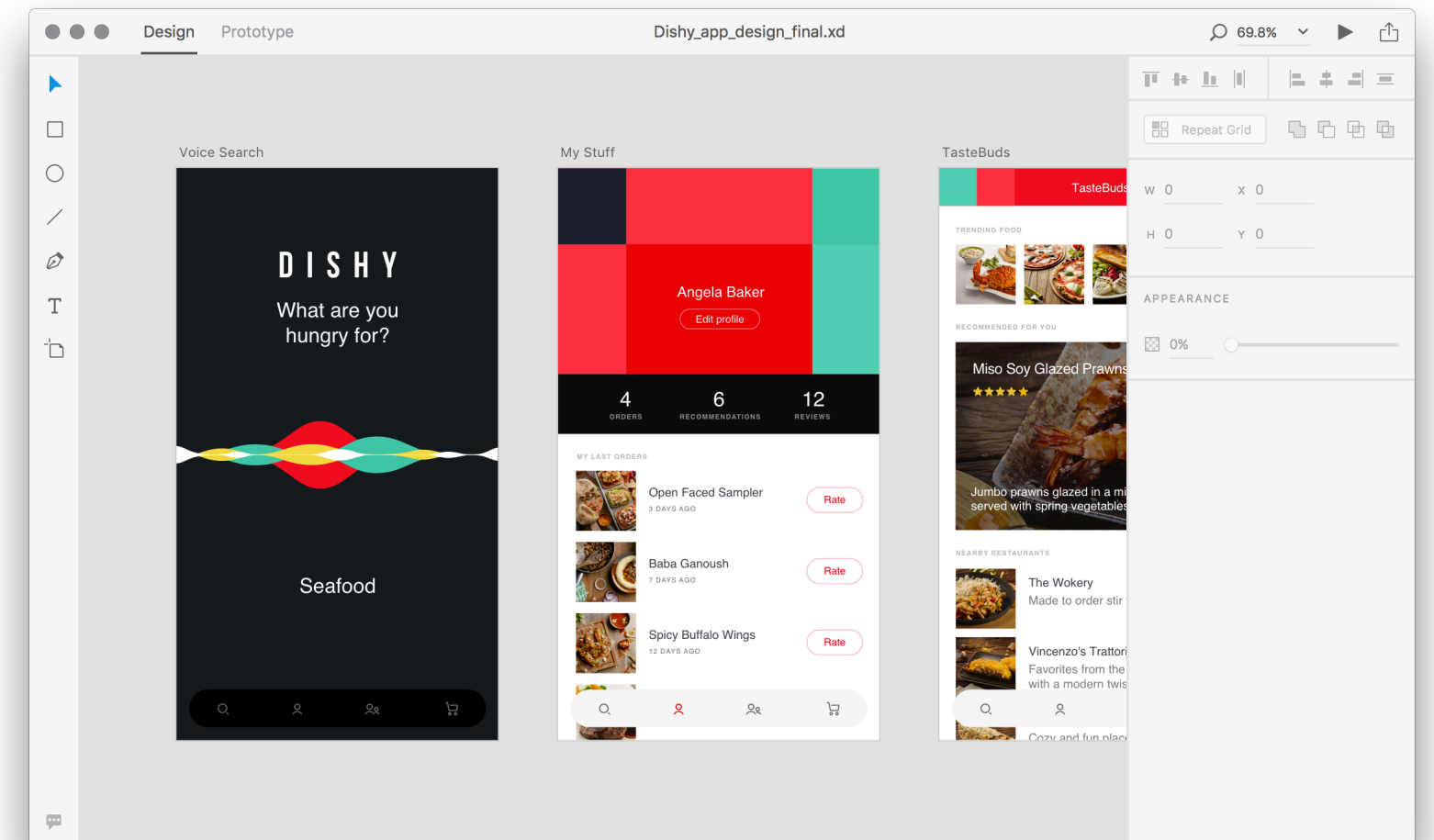
Task 1: Start a new design for the web at size 800 x 600.

Task 2: Create a red button in the center of the canvas.

Task 3: Create a second canvas and place a blue button in the center.

Task 4: Link red button to second canvas and blue button to first.

Task 5: Simulate your design.



Home

Add-ons

YOUR WORK

Cloud Documents

Shared with You

Manage Links...

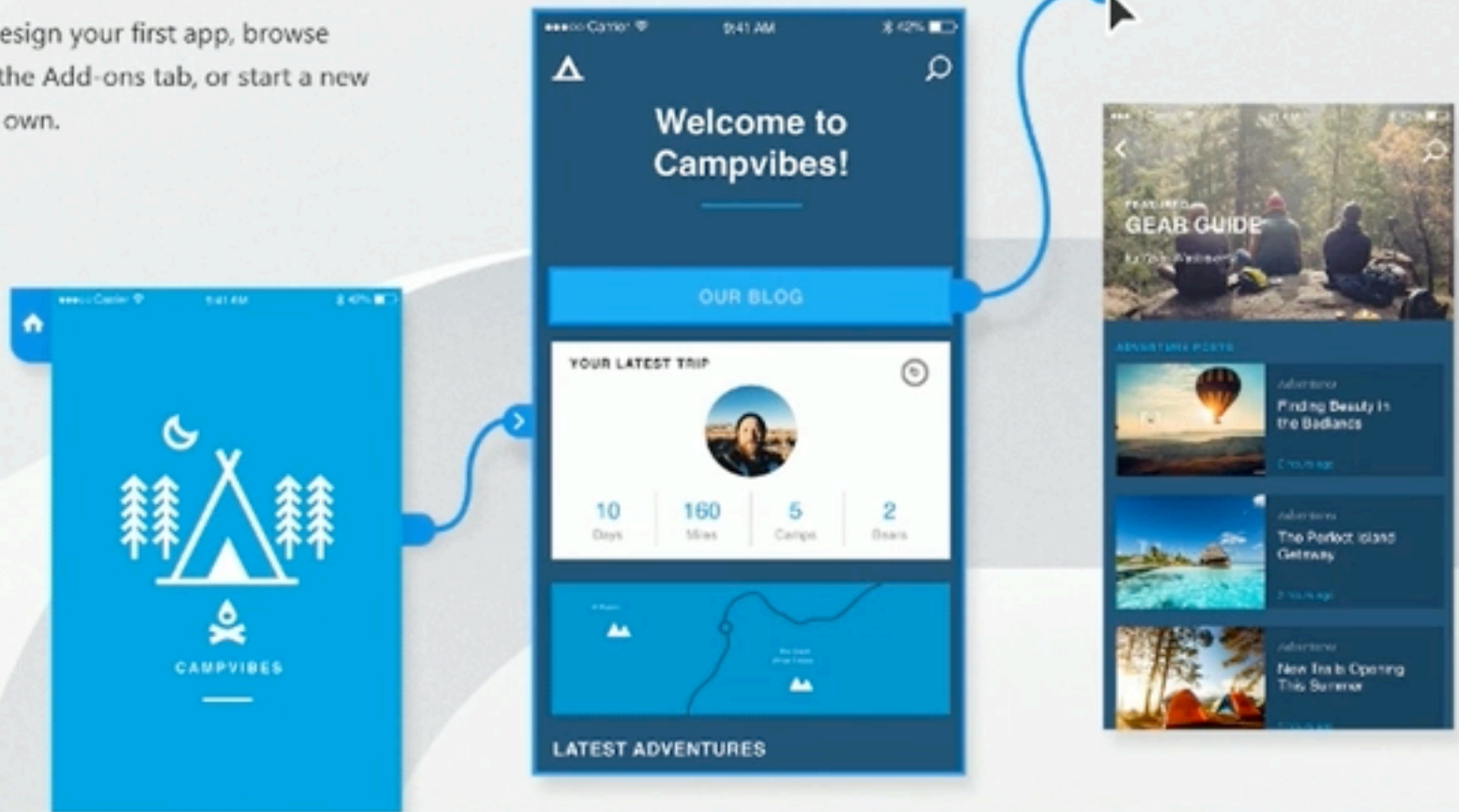
Deleted

Welcome to Adobe XD

Let's design together

Start with our tutorial to design your first app, browse our plugins and UI Kits in the Add-ons tab, or start a new design to explore on your own.

Begin Tutorial



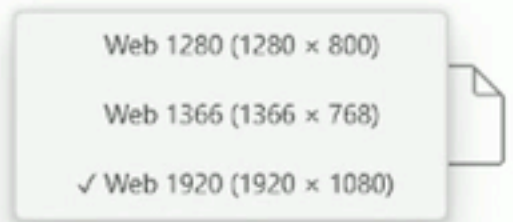
Start a new design.



iPhone X/XS/11 Pro
375 x 812 px



iPad
768 x 1024 px



Web 1280 (1280 x 800)
Web 1366 (1366 x 768)
✓ Web 1920 (1920 x 1080)
Web 1920
1920 x 1080 px

Custom Size
W H

What's New
Learn & Support
Provide Feedback

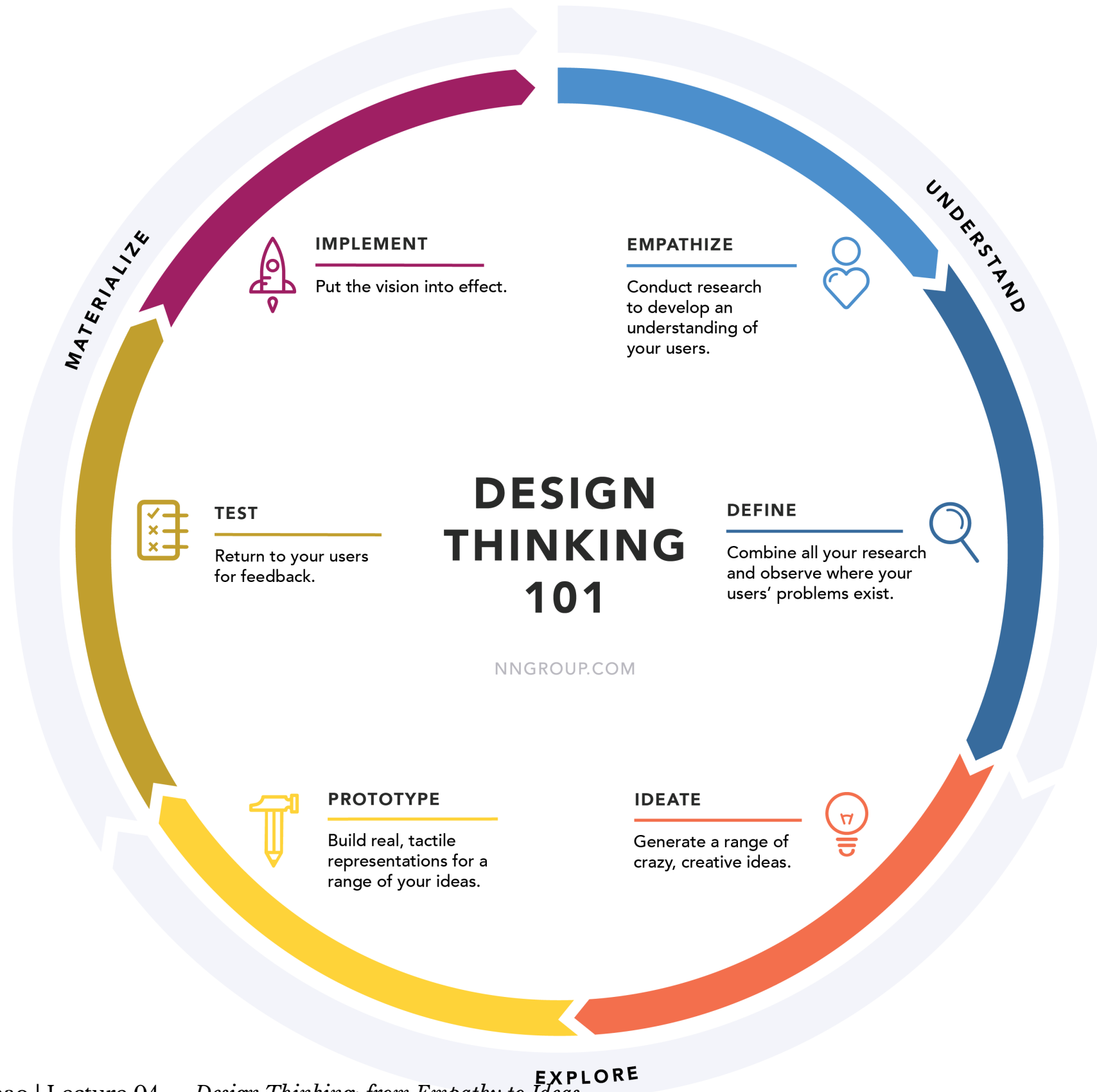


Sanjana Rao

Derek Manning

More on the TA methods

- Can be done *concurrently* or *retrospectively*
- Can be applied to pretty much anything
- Can be done *before* or *after* design



Define

What does that mean?

- Gathering all findings — **gather**
- Consolidating, categorizing, distilling — **analyze**
- Translate into insight — **recommend**

But how do we go about this?

- Again, there are many methods for analysis.
- The simplest and most powerful method is *affinity diagramming*.

Affinity Diagramming

What is it?

- **Definition:** Organizing data into clusters based on "affinity."
- It helps you make sense of qualitative, messy data.
- Also known as *affinity mapping*, *collaborative sorting*, *snowballing*.
- Used across the board in creative, generative industries.



⁷ NN/g Affinity Diagramming

How do we go about it?

- **Step 1:** Start an initial set of categories
- **Step 2:** Sort notes into these categories
- **Step 3:** Add subcategories or consolidate categories as needed
- **Step 4:** Present each category
- **Step 5:** Rank categories in *severity*, combining importance, prevalence, frequency

How do we go about it? Continued.⁸

Pro Tip: Steps 2–3 will likely be iterative.

Pro Tip: Assign team members to categories who will be responsible for all the sorting and presentation of the categories

⁸ Image source: [UX Collective](#)



In-class Activity: Part II — *affinity diagramming*

Now, let's get back to the Google Drawings canvas and follow this process.

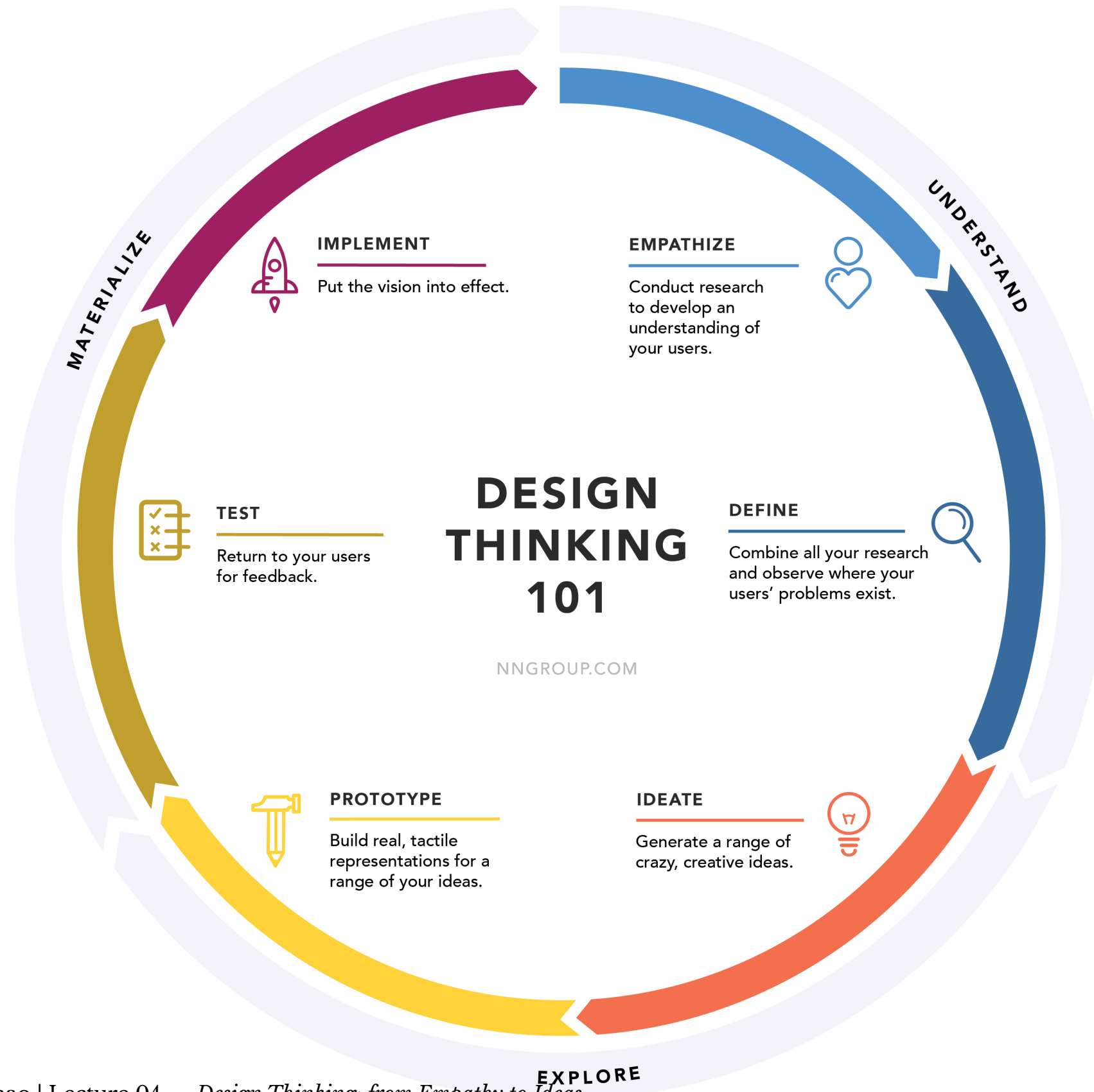


Google Drawings

- **Step 1:** Start an initial set of categories
- **Step 2:** Sort notes into these categories
- **Step 3:** Add subcategories or consolidate categories as needed
- **Step 4:** Present each category
- **Step 5:** Rank categories in *severity*, combining

Voilà!

Your findings will serve as *design insight*.



Ideate

Definition: An active, creative, exploratory, highly iterative, fast-moving collaborative process for forming ideas for design.

Ideation can be done *individually* or *collaboratively*.

**Ideation has two stages:
Idea creation → Critiquing**

Key considerations

- Workspace
- Team
- Process
- Rules of engagement
- Method of capturing ideas

Image source⁹

⁹[GlassDoor](#)



IDEO's Rules of Engagement

1. Defer judgement.
2. Encourage wild ideas.
3. Build on the ideas of others.
4. Stay focused on the topic.
5. One conversation at a time.
6. Be visual.
7. Go for quantity.

Quiz 2

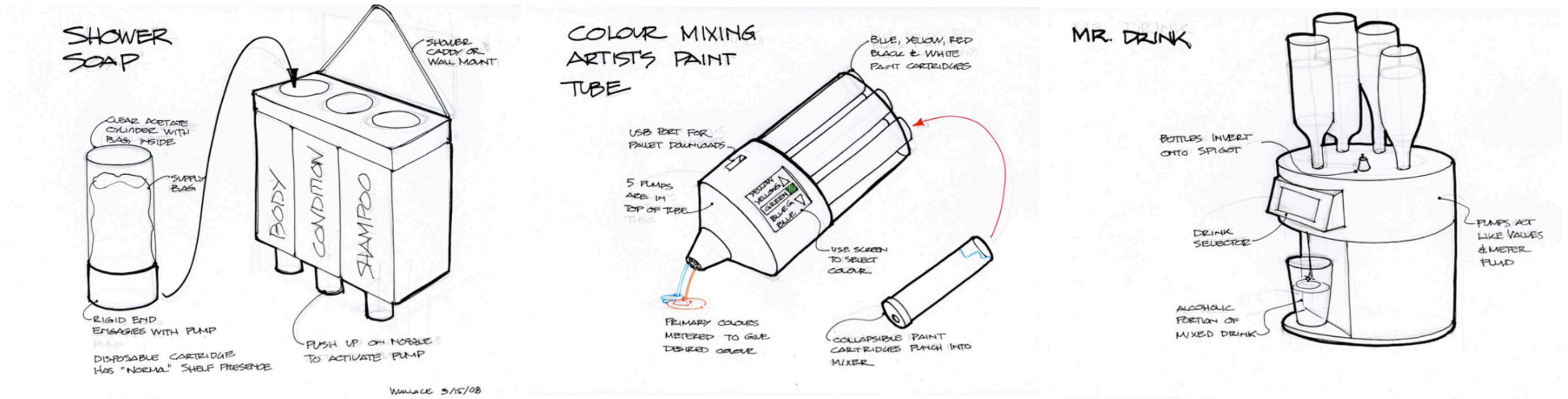
Complete the Canvas quiz.



canvas

Ideation \rightleftharpoons Sketching

Definition: A sketch is a quick and rough drawing that gives a general outline of an idea.¹⁰

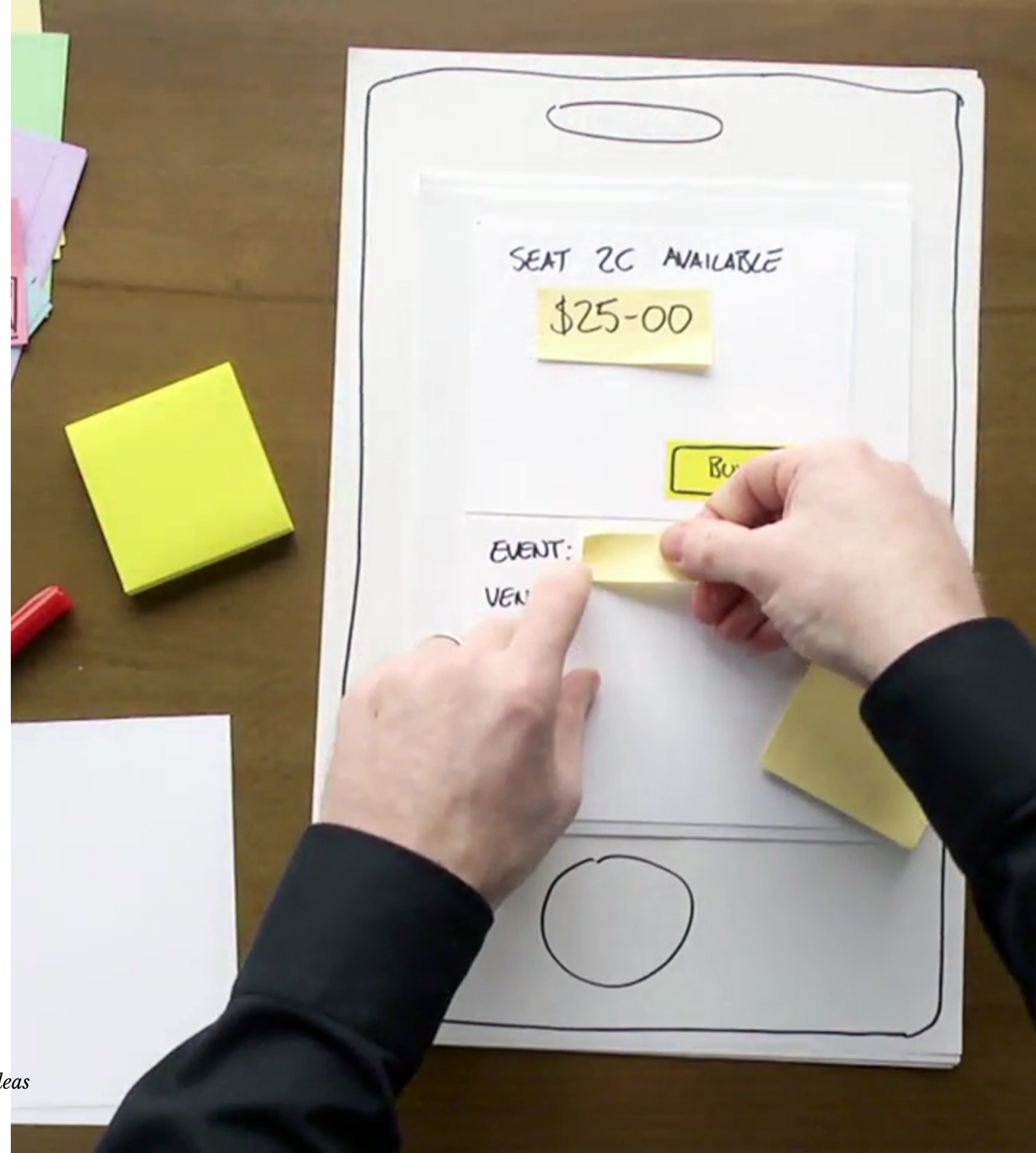


¹⁰ Idea sketch examples: [MIT 2.009](#)

Sketching Principles¹¹

- Everyone can sketch
- Sketching is more effective than words for most ideas
- Quick and inexpensive sketches do not inhibit exploration
- Sketches are disposable

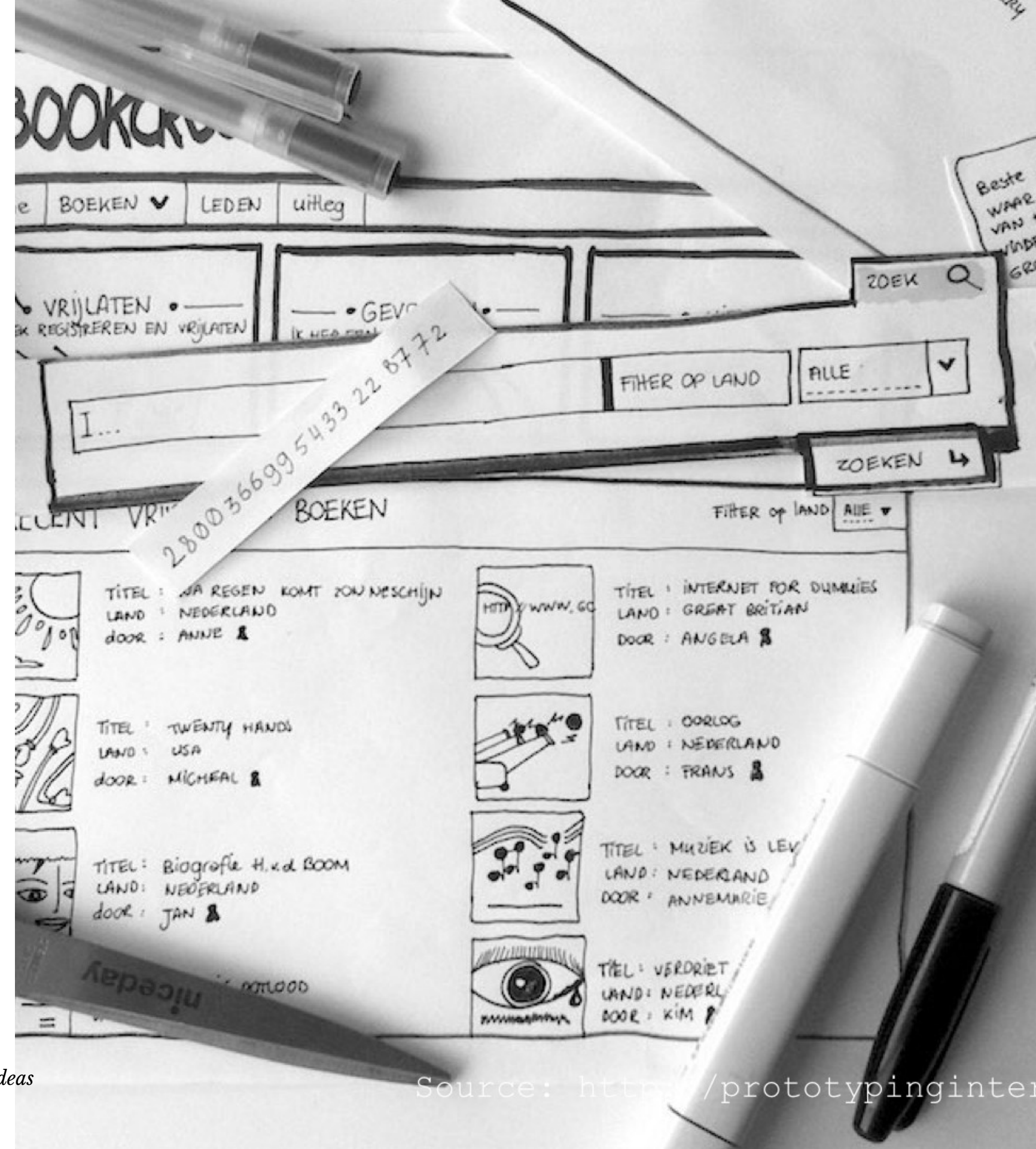
¹¹ Buxton, 2007



Sketching Principles¹² Continued

- Sketches are made just-in-time, in-the-moment, when needed
- Sketches should be plentiful, entertain a large number of ideas, and include multiple sketches of each idea
- Textual annotations can explain what is going on in the sketch

¹² Buxton, 2007



Sketching can do more!¹³

¹³ Medium

SKETCHING

FOR UX DESIGNERS

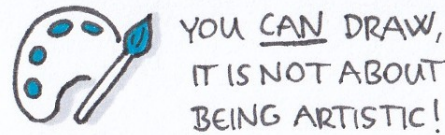
TOOLS:
JUST GRAB THE NEAREST
PEN & PAPER!



IN CASE OF USER INTERFACES:
VARY THE FIDELITY/
DETAIL LEVEL BASED ON

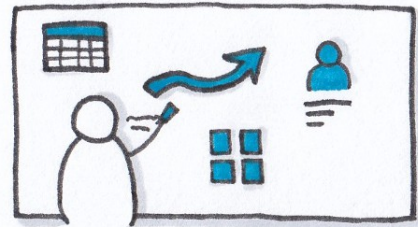
YOUR GOAL
(DELIVERABLE?
QUICK CONCEPT?)

YOUR AUDIENCE
(CLIENT? TEAM?
YOURSELF?)

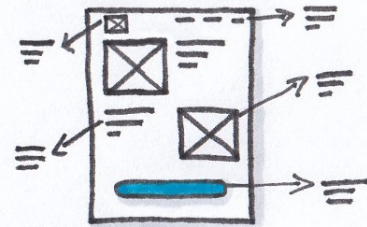


YOU CAN DRAW,
IT IS NOT ABOUT
BEING ARTISTIC!

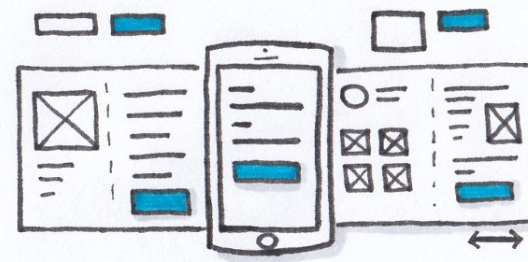
JUST START IT, YOU'LL
BECOME MORE CONFIDENT
OVER TIME!



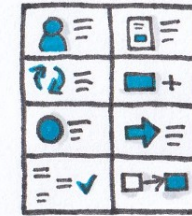
1. FACILITATING MEETINGS &
DESIGN WORKSHOPS,
PROJECT PLANNING



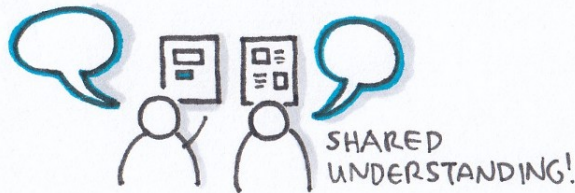
2. WIREFRAMING
DON'T FORGET:
ANNOTATIONS ARE GREAT!



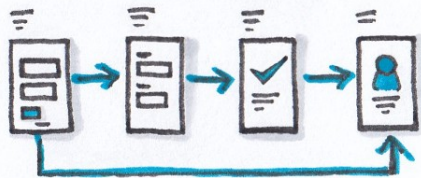
3. PAPER PROTOTYPING -
VALIDATING IDEAS,
TESTING OUT CONCEPTS



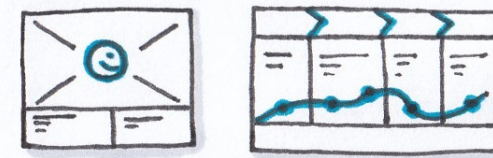
4. IDEATION
QUICK IDEA GENERATION
(E.G. DURING A DESIGN SPRINT,
OR JUST ON YOUR OWN)



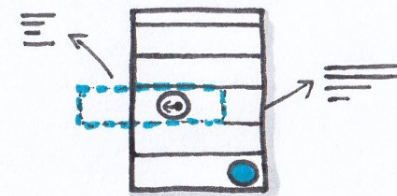
5. TEAMWORK, ANY KIND OF
COLLABORATION
(E.G.: "TALKING SKETCHES")



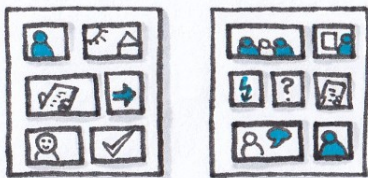
6. USER FLOWS
SITEMAPS
INFORMATION ARCHITECTURE



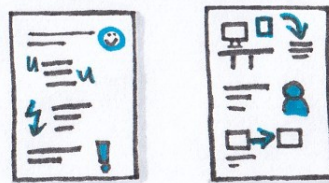
7. MAPPING: EMPATHY MAP,
JOURNEY MAP,
PRODUCT ROADMAP ETC.



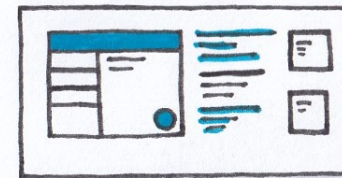
8. UI ANIMATIONS
WHAT CHANGES, HOW,
WHAT THE TRIGGER IS



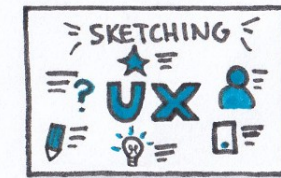
9. STORYBOARDING
VALIDATING
ASSUMPTIONS



10. APPLYING ICONS, VISUALS
IN UX RESEARCH NOTES
(E.G. USER INTERVIEW,
CONTEXTUAL INQUIRY)



11. DOCUMENTATION,
PRESENTATION
TO CLARIFY &
TO MAKE IT MORE ENGAGING



12. SKETCHNOTING
- CONFERENCE TALKS
- BOOKS
- MEETINGS

CREATED BY KRISTINA SEERONAY
WWW.SKETCHINGFORUX.COM

Quiz 3

Complete the Canvas quiz.



canvas

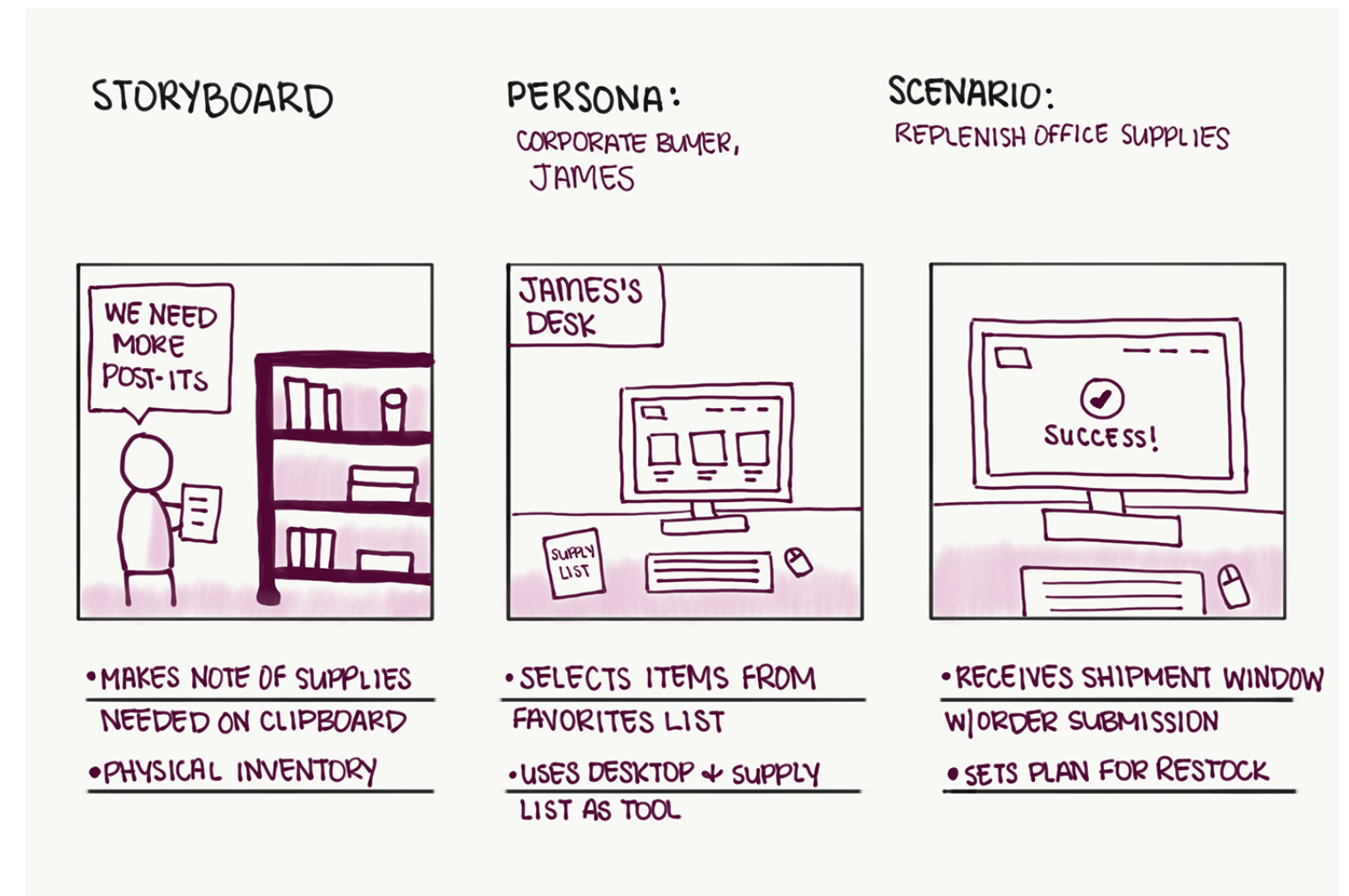
In ideation, sketches illustrate *conceptual designs*.

What is Conceptual Design?

Definition: An abstract characterization of the context, use, or experience with an envisioned design solution that highlights the main premise of the solution.

Storyboarding¹⁴

Definition: A sequence of visual frames that illustrate user interaction with the envisioned system, capturing social, environmental, and technical factors that shape user experience.

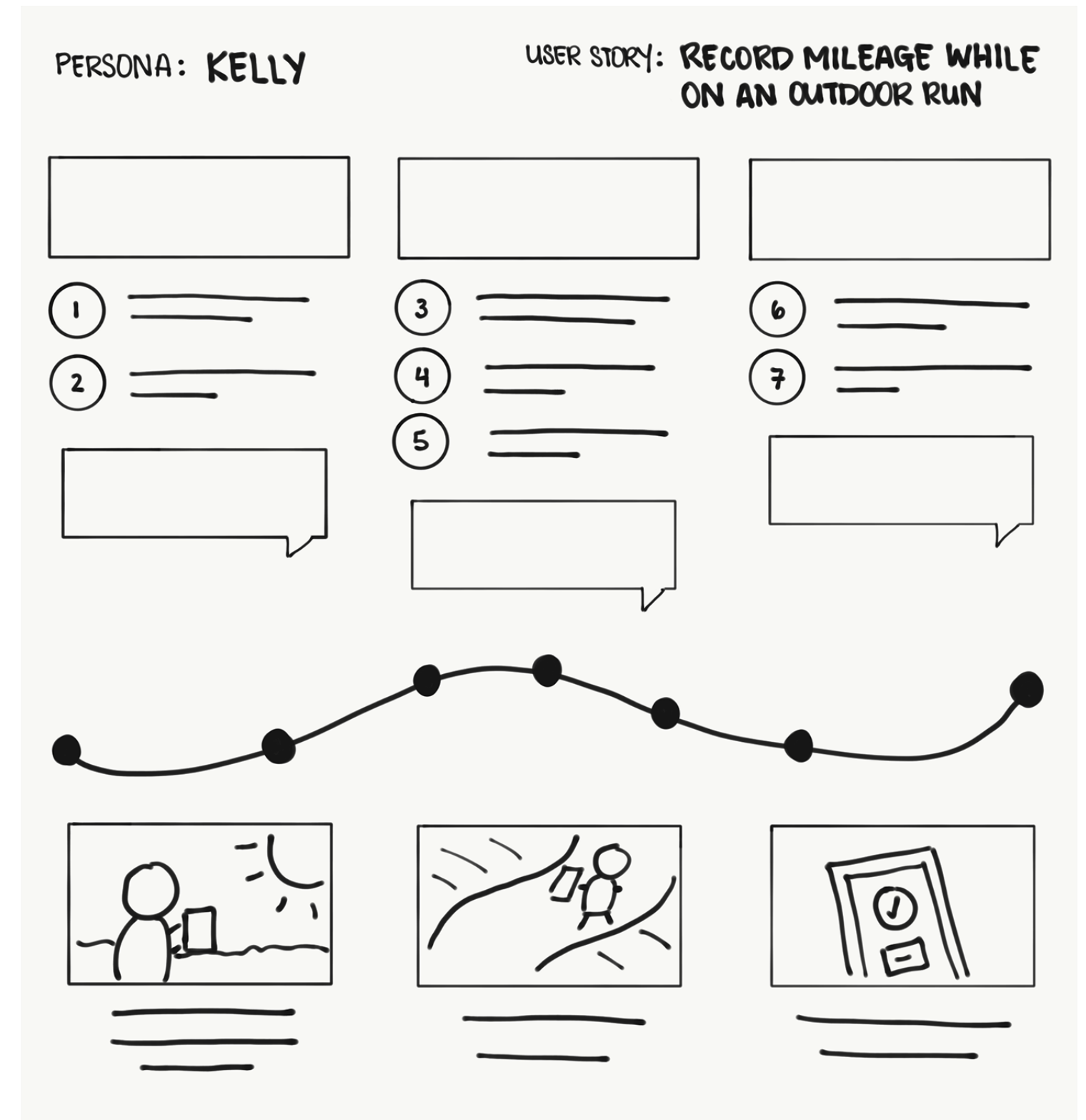


¹⁴ NN/g: Storyboards Help Visualize UX Ideas

Journey Maps¹⁵

Definition: A visualization of the process that a person goes through in order to accomplish a goal.

User actions, thoughts, and emotions mapped onto a timeline to create a narrative.



¹⁵ NN/g: Journey Mapping 101

Quiz 4

Complete the Canvas quiz.



canvas

What did we learn today?

- Design thinking and process
- Step 1: How to empathize with users
- Step 2: How to turn data into insight
- Step 3: How to generate design ideas
- Sketching, conceptual design, storyboarding

What's next?

- Next lecture on *Visual Design* on Wednesday
- *Javascript β* will be released Wednesday at 4 pm