App Design and User Experience

Lecture 11

Please sit with your project team!

CIS 1951

Last time, in CIS 1951…

UIKit & UIKit Integration with SwiftUI

- UIKit basics: MVC
- User interaction in UIKit: event and input management
- Integrating UIKit in SwiftUI: using UIViewRepresentable
- Combining UIKit & SwiftUI: navigation and data sharing strategies
- **Questions? Comments? Feedback?**

CIS 1951 as a whole

Lectures 1-6: The Basics

Lectures 7-10: Technologies

Lectures 11-13: Beyond Development

The App Design Process

How do we get an app from scratch?

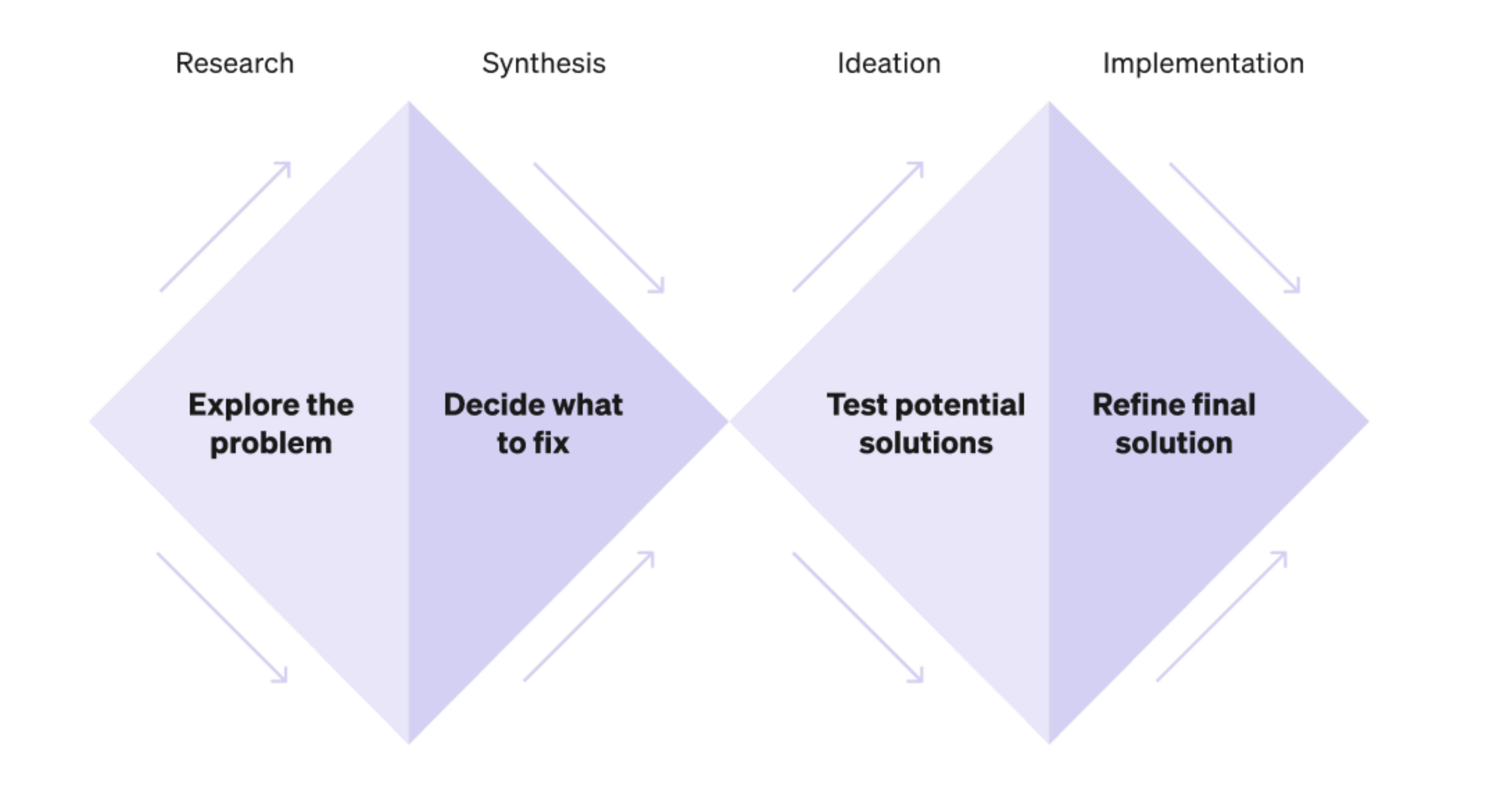
What do we need to know?

- **Problem:** What problem do we want to solve?
- **Solution/Features:** How do we solve it?
- **UI/UX:** How will people access/use our solution?
- **Implementation:** How do we build our solution?

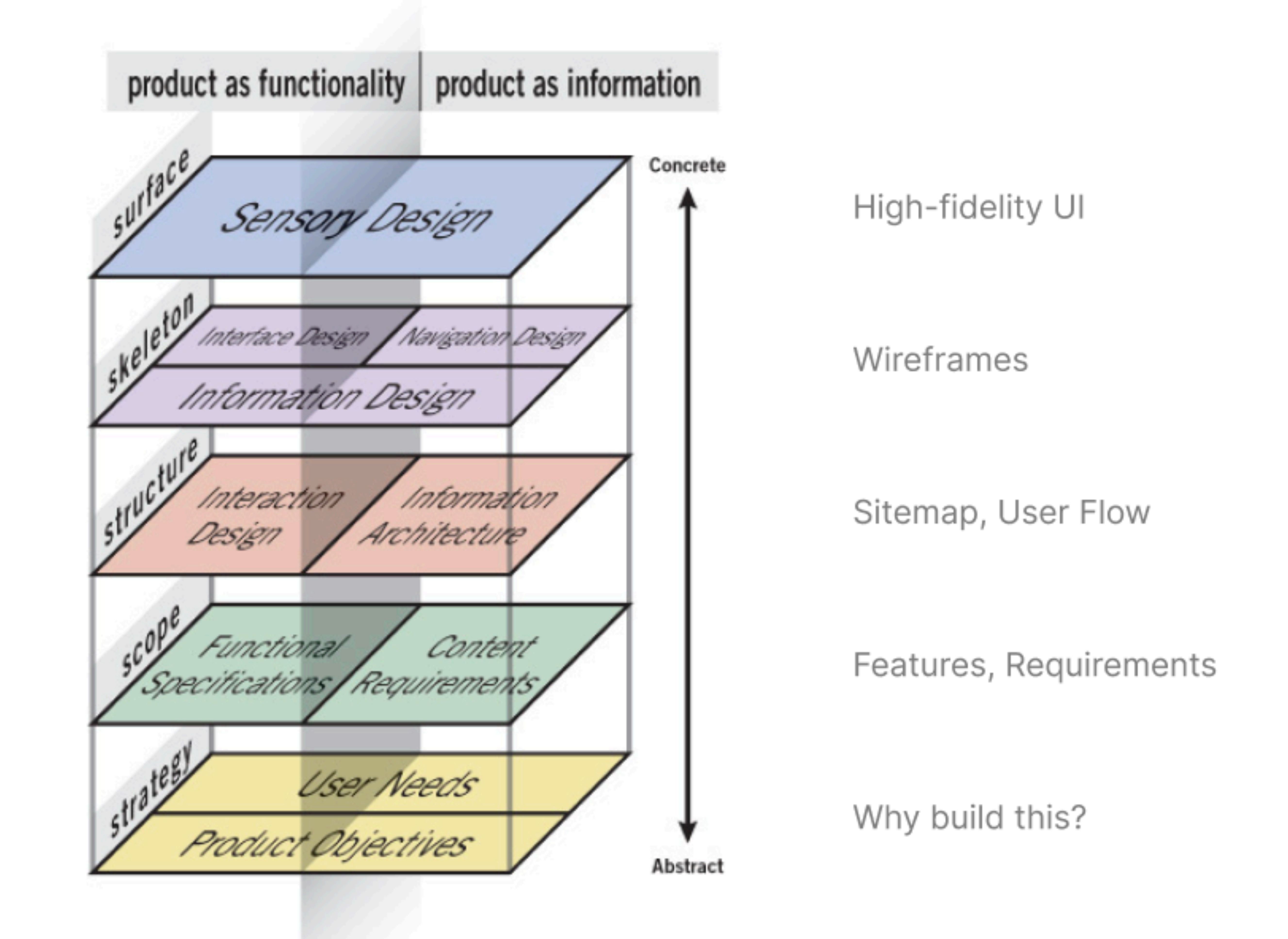
What is UI/UX?

- **UI** = User interface, aka what the user **sees** on our app
- **UX** = User experience, aka how the user **interacts** with our app

Design Thinking

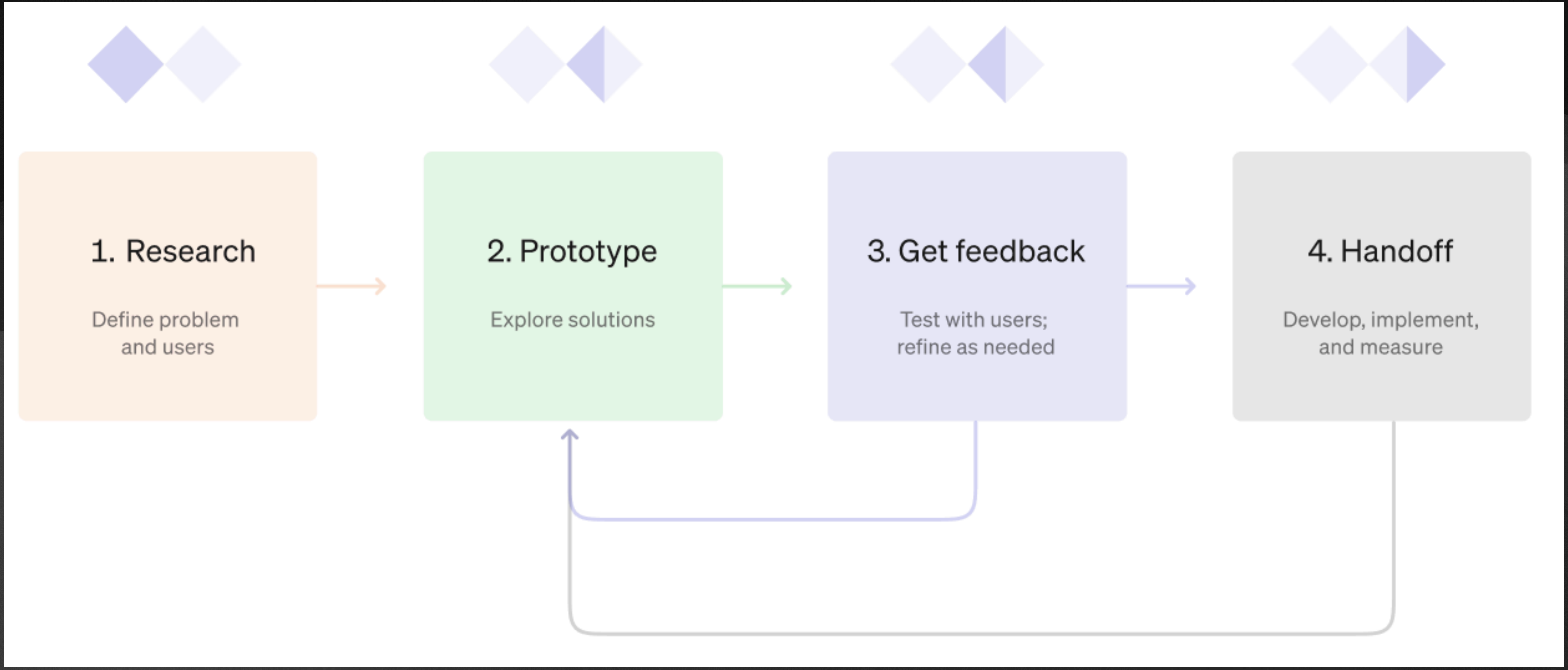


The Planes of UX



From The Elements of User Experience by Jesse James Garrett

The UX Process



1. Research

Define problem and users

2. Prototype

Explore solutions

3. Get feedback

Test with users; refine as needed

4. Handoff

Develop, implement, and measure

The App Design Process

Steps

- User Stories
- Low-fi Sketch
- User Flow
- View Hierarchy Diagram
- High-fi Sketch

User Stories

User Stories

Definition

“Brief, informal explanations of software features written from the perspective of the end user”

https://www.atlassian.com/agile/project-management/user-stories

User Stories

Structure

“As a [persona], I [want to], [so that].”

https://www.atlassian.com/agile/project-management/user-stories

User Stories

Examples

- Consider our HW4 weather app:
  - “As a frequent traveler, I want to quickly check the weather forecast for multiple cities I plan to visit, so that I can pack appropriately and make informed travel arrangements.”
  - “As a gardening enthusiast, I want to monitor the weather conditions of my local area and save historical weather data, so that I can plan my gardening activities based on past weather trends and upcoming forecasts.”

User Stories

Your Turn!

Generate 5 user stories for your project app.

User Stories

Your Turn!

Pick 1 to share!

Say your app idea, then your selected user story.

Low-fi Sketch

Low-fi Sketch

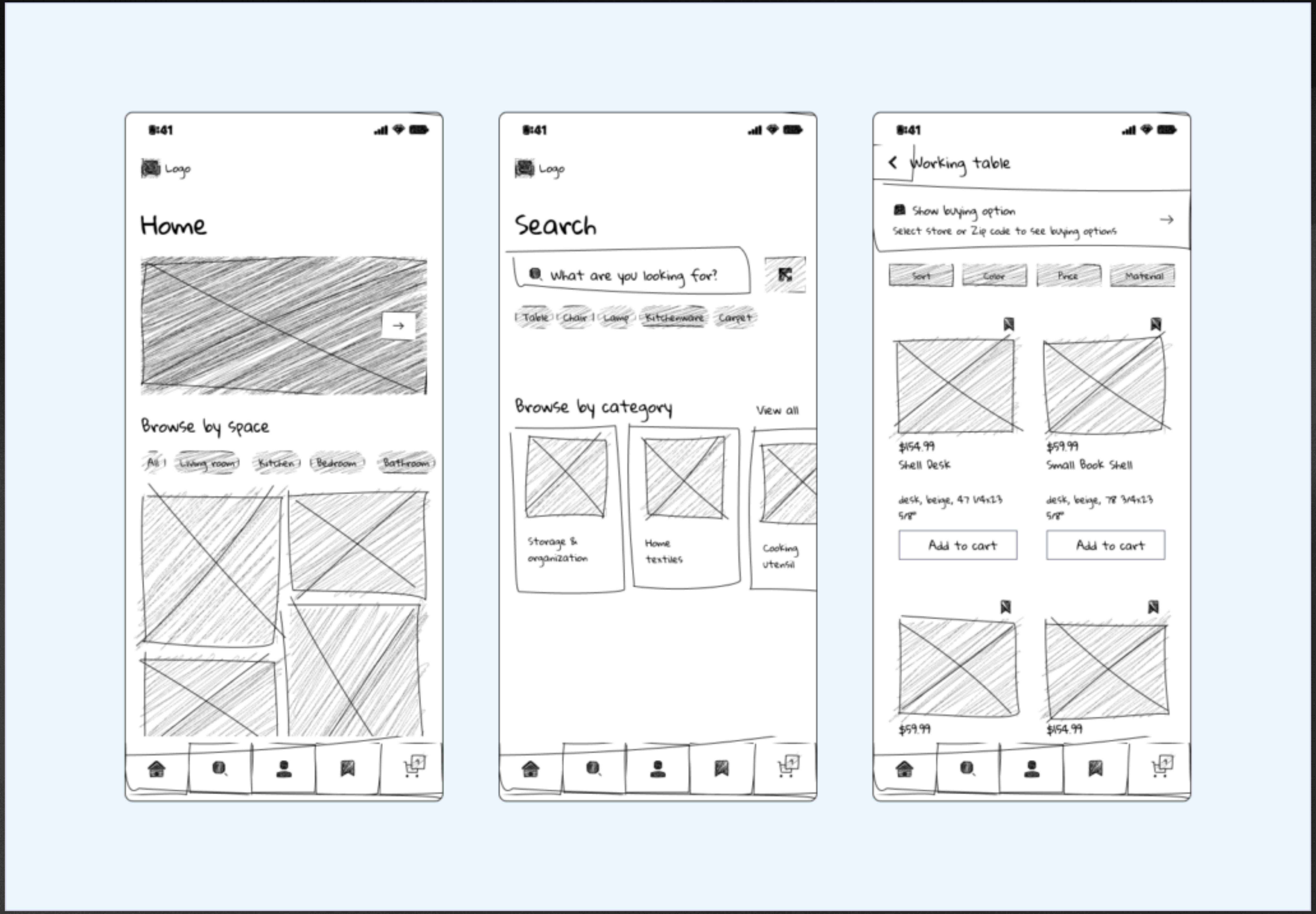
Definition

A rough drawing or skeleton of how your app will look and work.

*Sometimes also called a “wireframe”

Low-fi Sketch

Example



https://www.visily.ai/blog/what-is-low-fidelity-wireframe/

Low-fi Sketch

Your Turn!

Use pencil and paper, sketch a wireframe of your app.

Which screens do you plan to have?

What’s on each screen?

Low-fi Sketch

Your Turn!

Pass your sketch to your neighbor.

Write down what you think your neighbor’s app does based on the sketch you see.

What features can you see?

User Flow

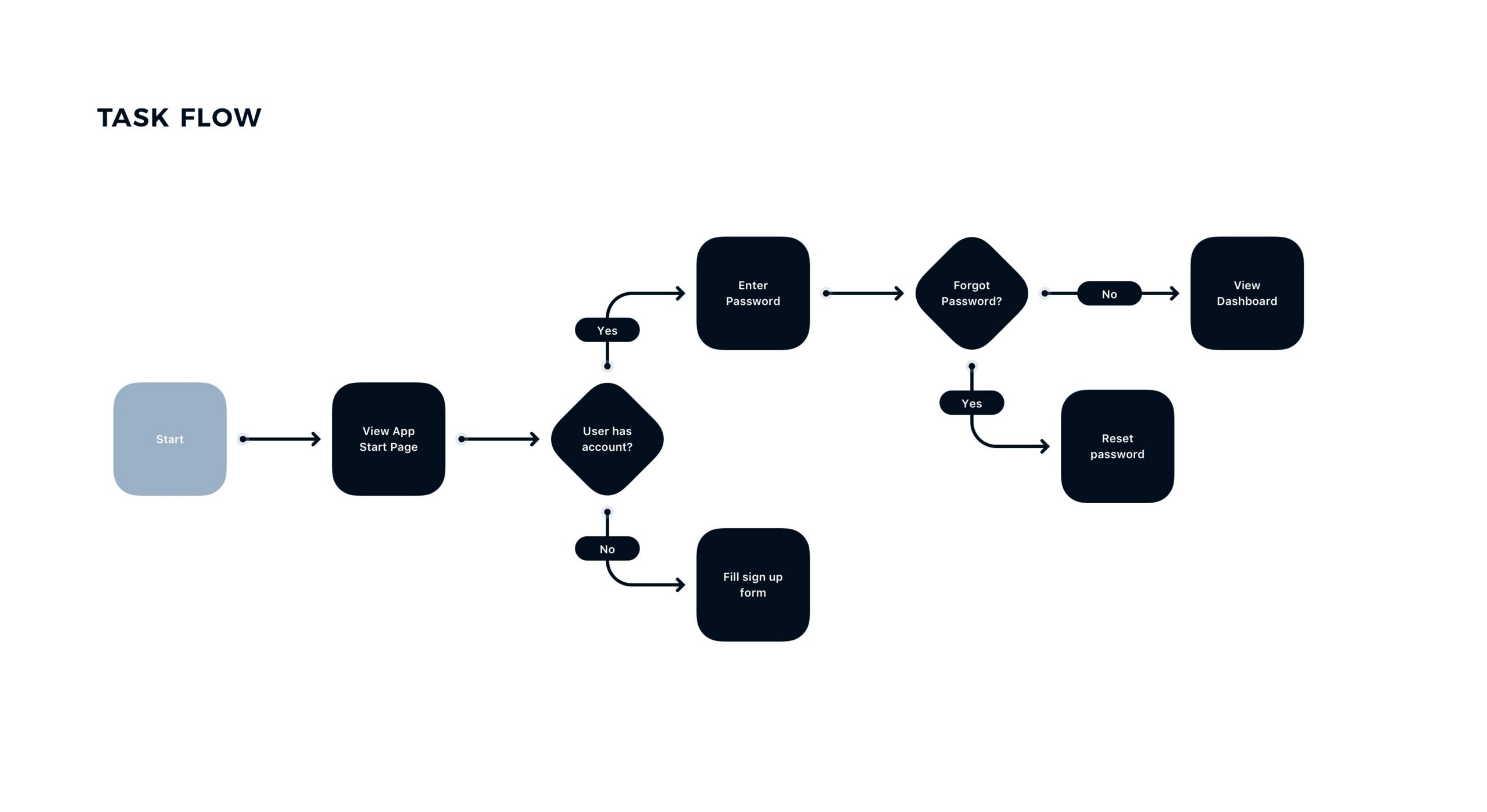
User Flow

Definition

A visualized path that the user follows through an app to complete single or multiple tasks.

User Flow

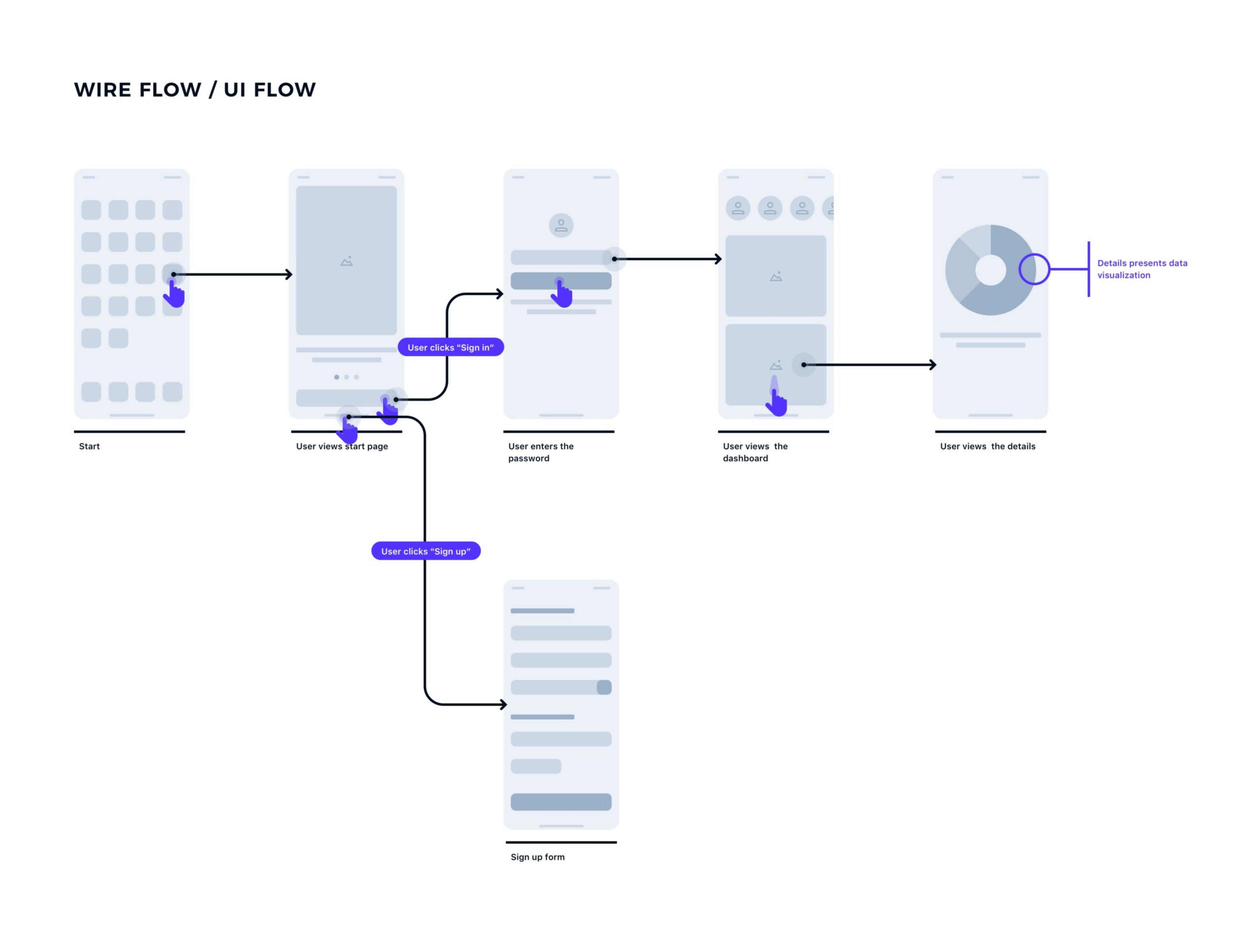
Example



https://uxmisfit.com/2020/08/17/what-is-a-user-flow-everything-you-need-to-know/

User Flow

Example



https://uxmisfit.com/2020/08/17/what-is-a-user-flow-everything-you-need-to-know/

User Flow

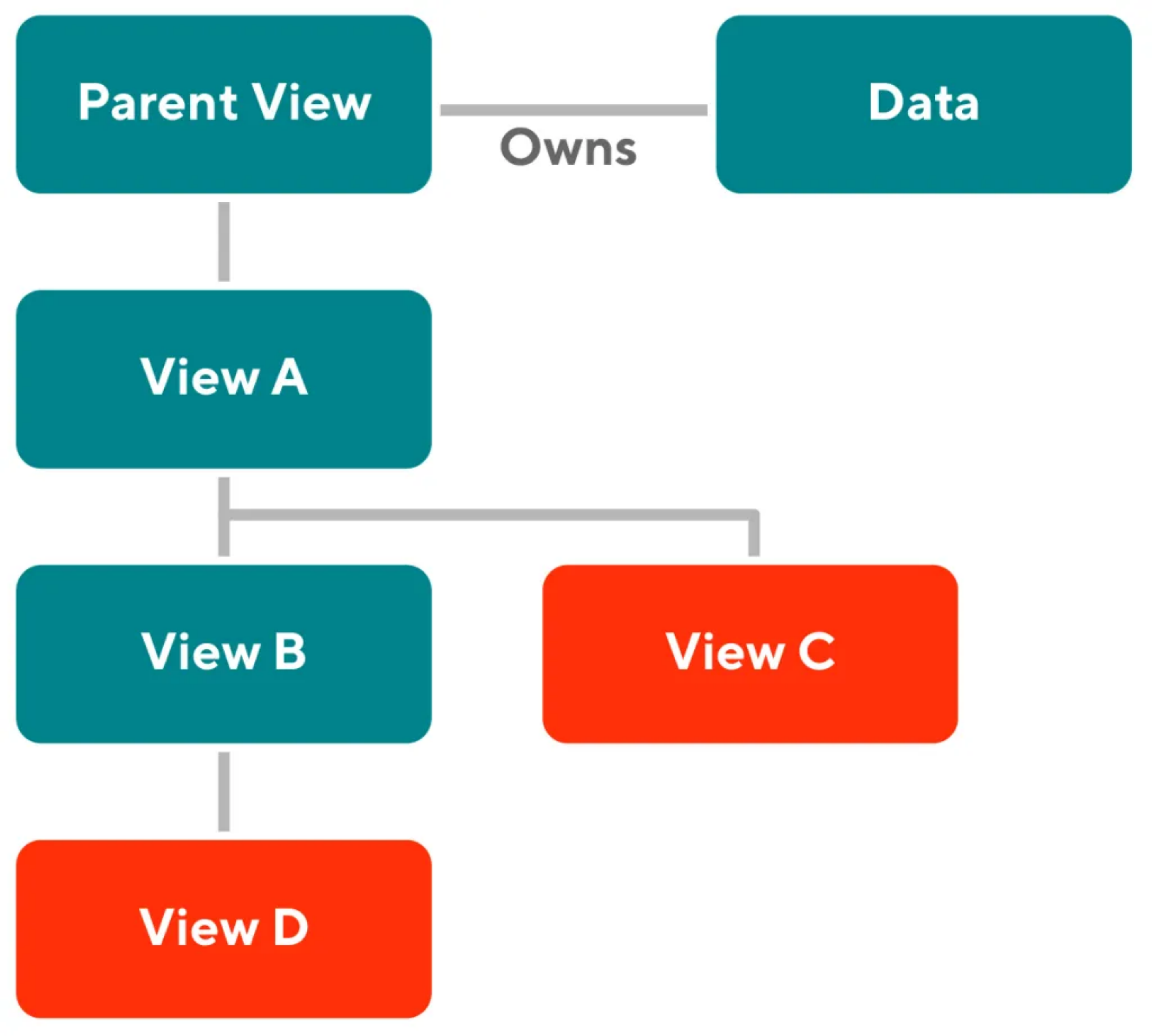
Your Turn!

On your low-fi sketch, draw at least 3 user interactions using arrows across components.

View Hierarchy Diagram

View Hierarchy Diagram

Review from Week 4!



High-fi Sketch

High-fi Sketch

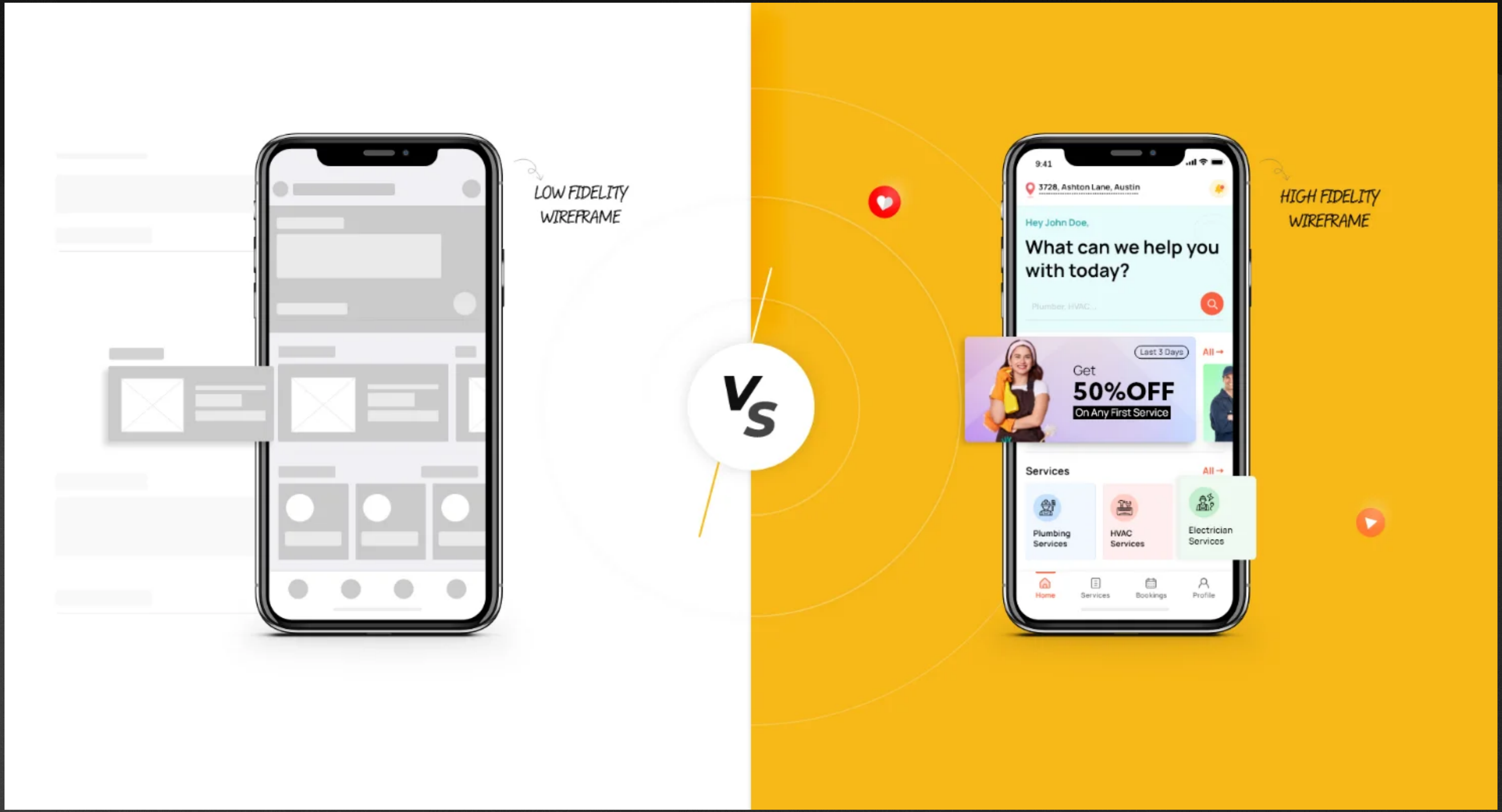
Definition

A realistic, interactive prototype that closely resembles the final design of a project.

*Sometimes also called a “high-fi wireframe” or “prototype”

High-fi Sketch

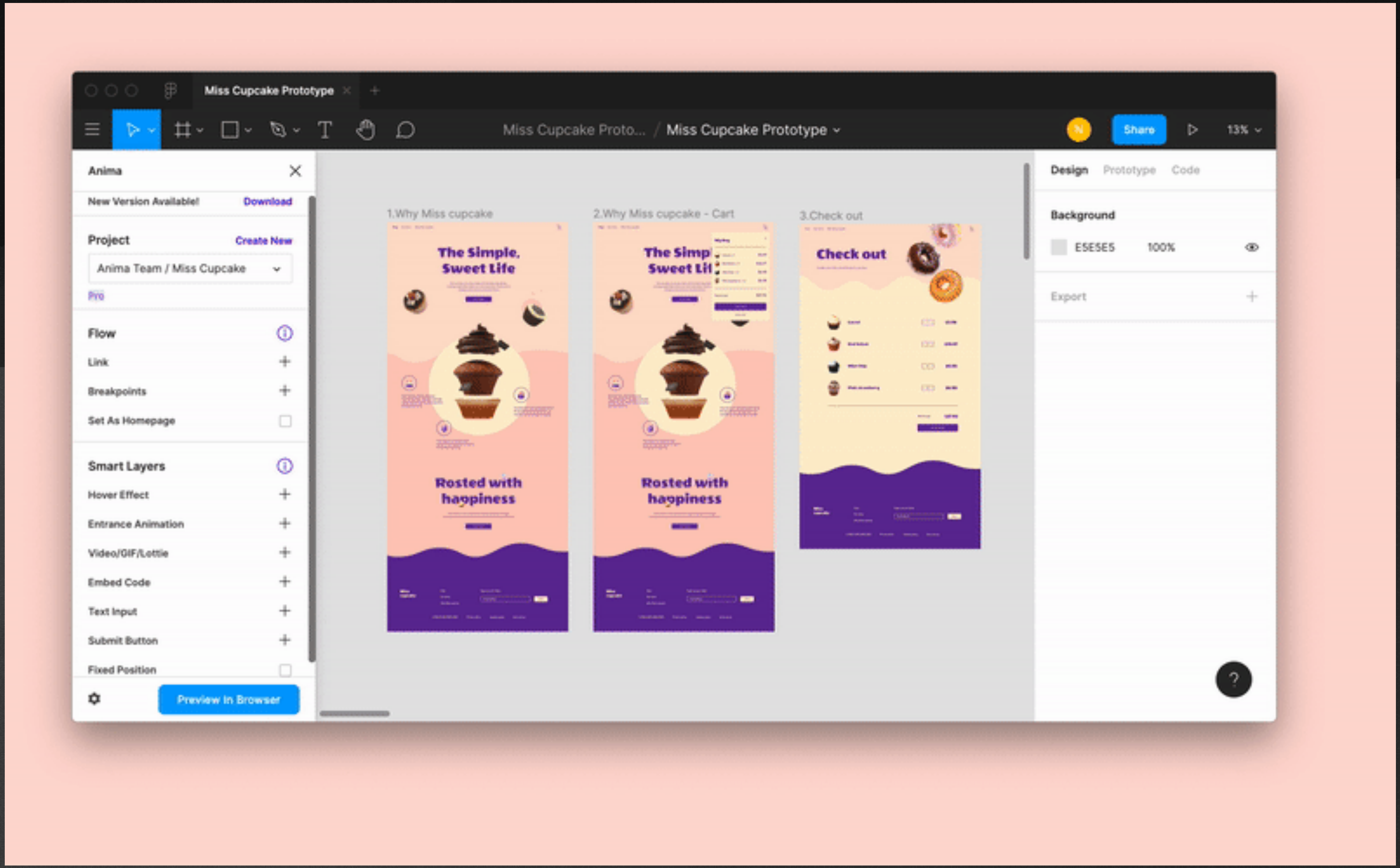
Example



https://codiant.com/blog/low-fidelity-vs-high-fidelity-prototypes/

High-fi Sketch

Tool: Figma



- Draw
- Prototype interactions
- Simulate
- Access community assets/tools

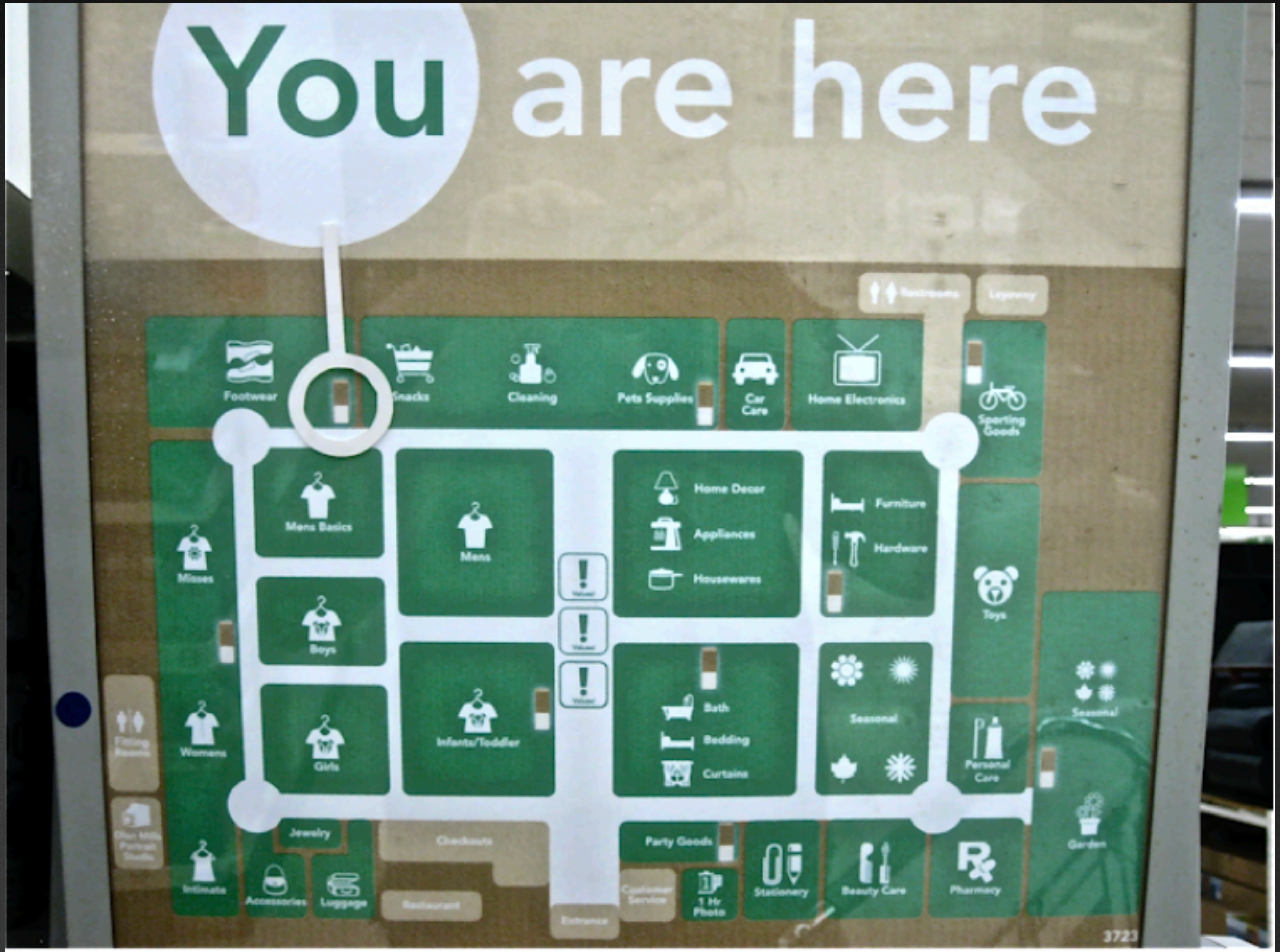
UI/UX Design: Starter Tips

1. Visibility of system status

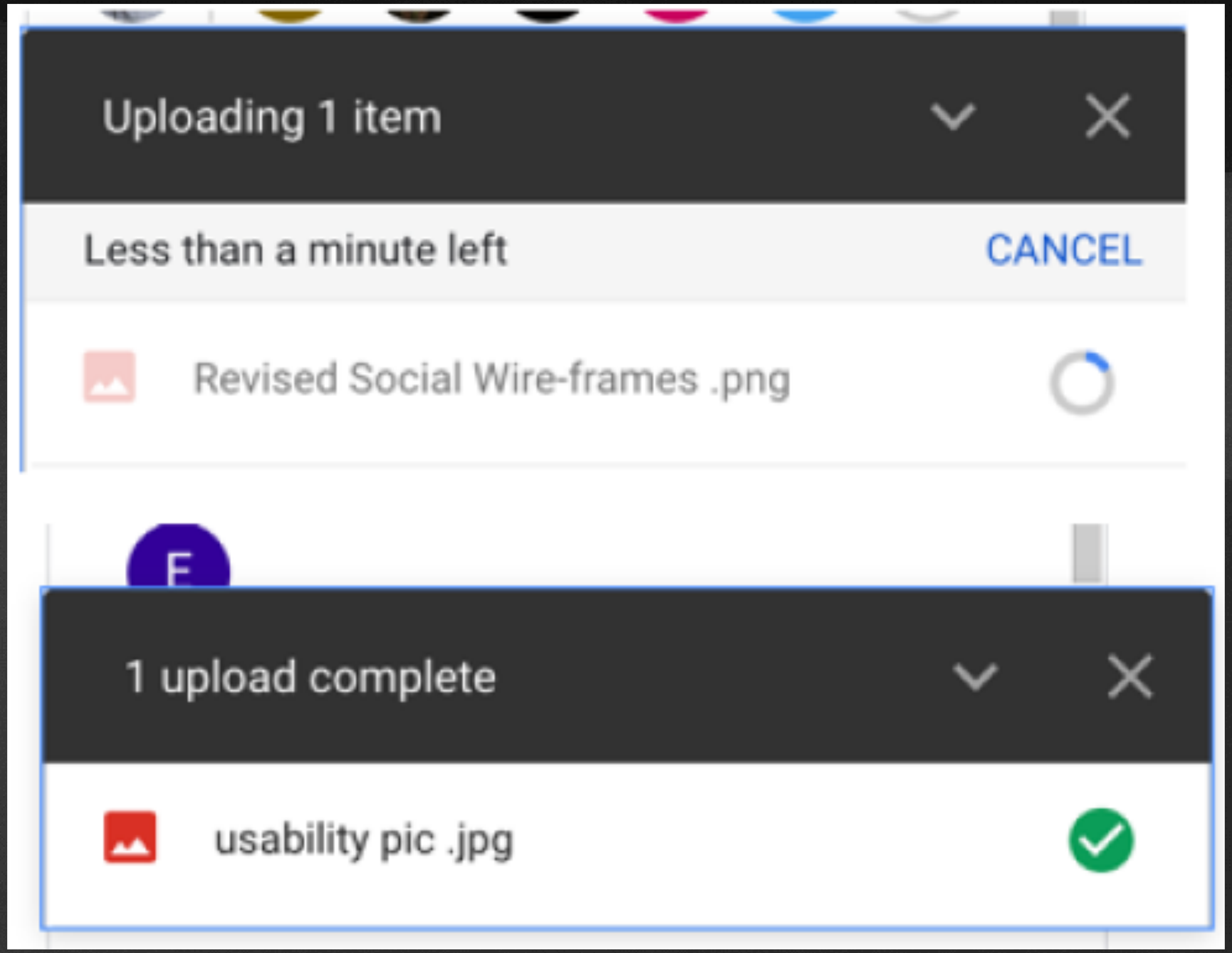
Visibility of system status

Keep users informed about what’s going on.

Visibility of system status



Visibility of system status



Uploading 1 item

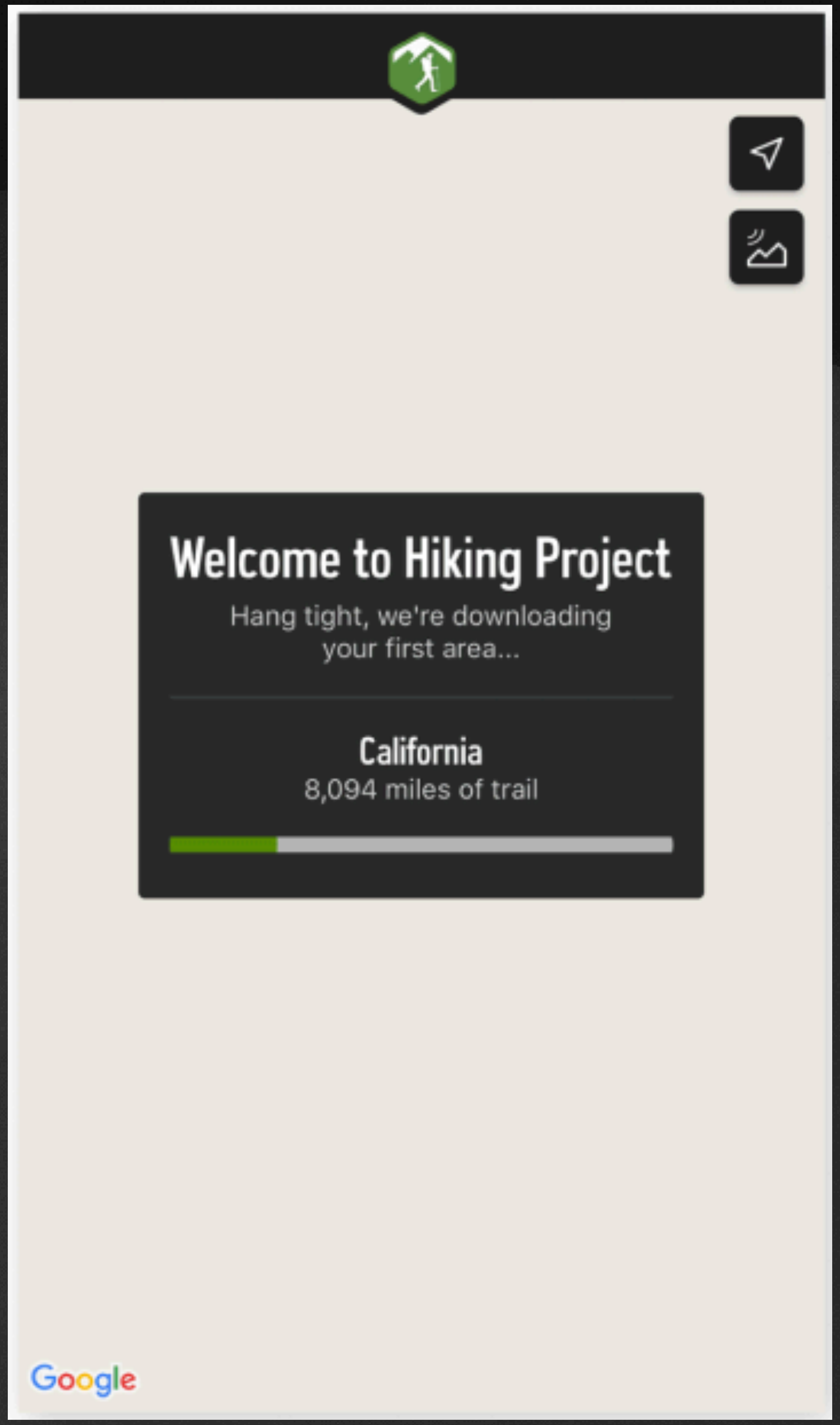
Less than a minute left

Revised Social Wire-frames .png

1 upload complete

usability pic .jpg

Visibility of system status



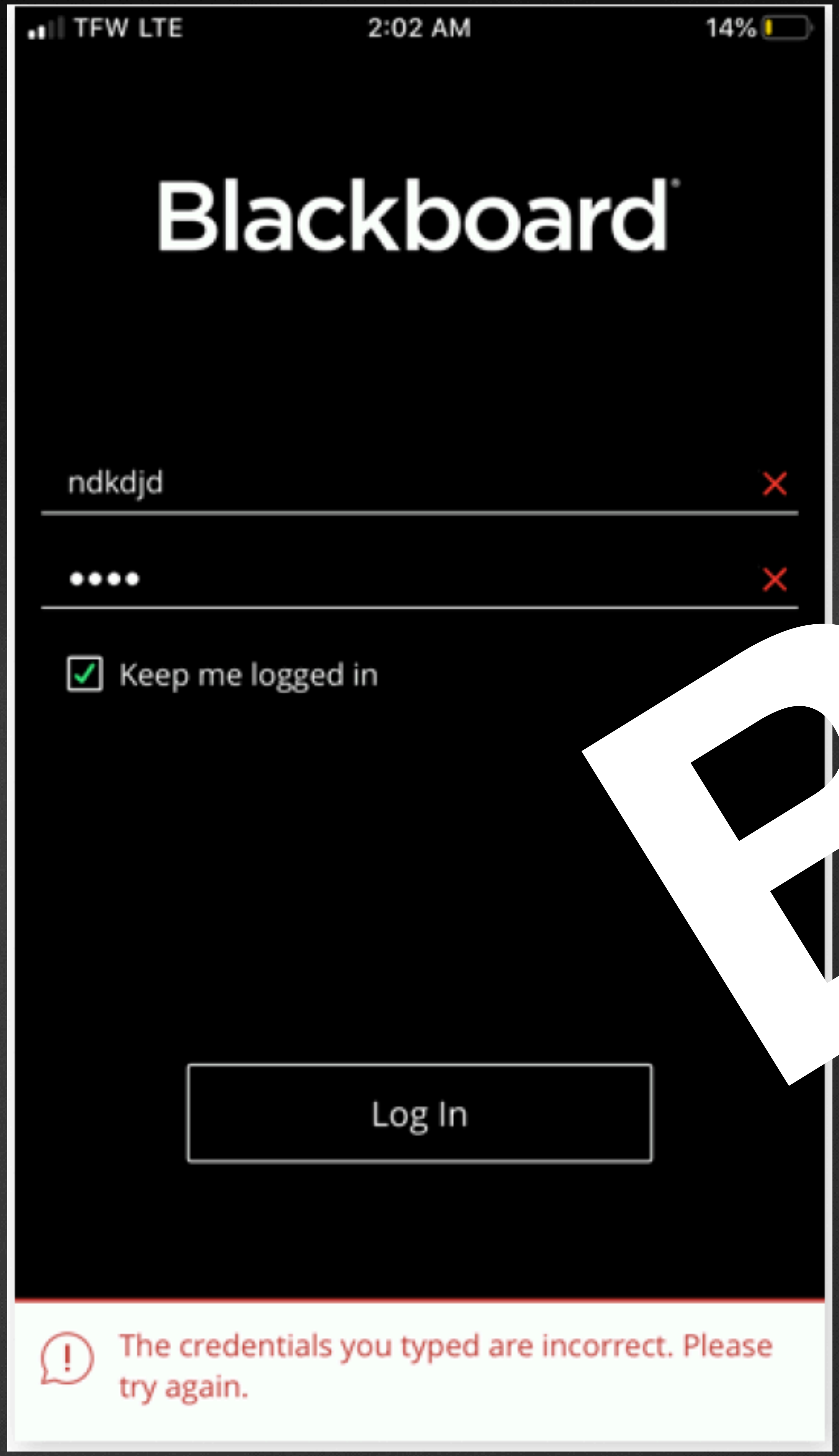
Welcome to Hiking Project

Hang tight, we're downloading your first area...

California

8,094 miles of trail

Visibility of system status



ndkdjd

••••

☑ Keep me logged in

The credentials you typed are incorrect. Please try again.

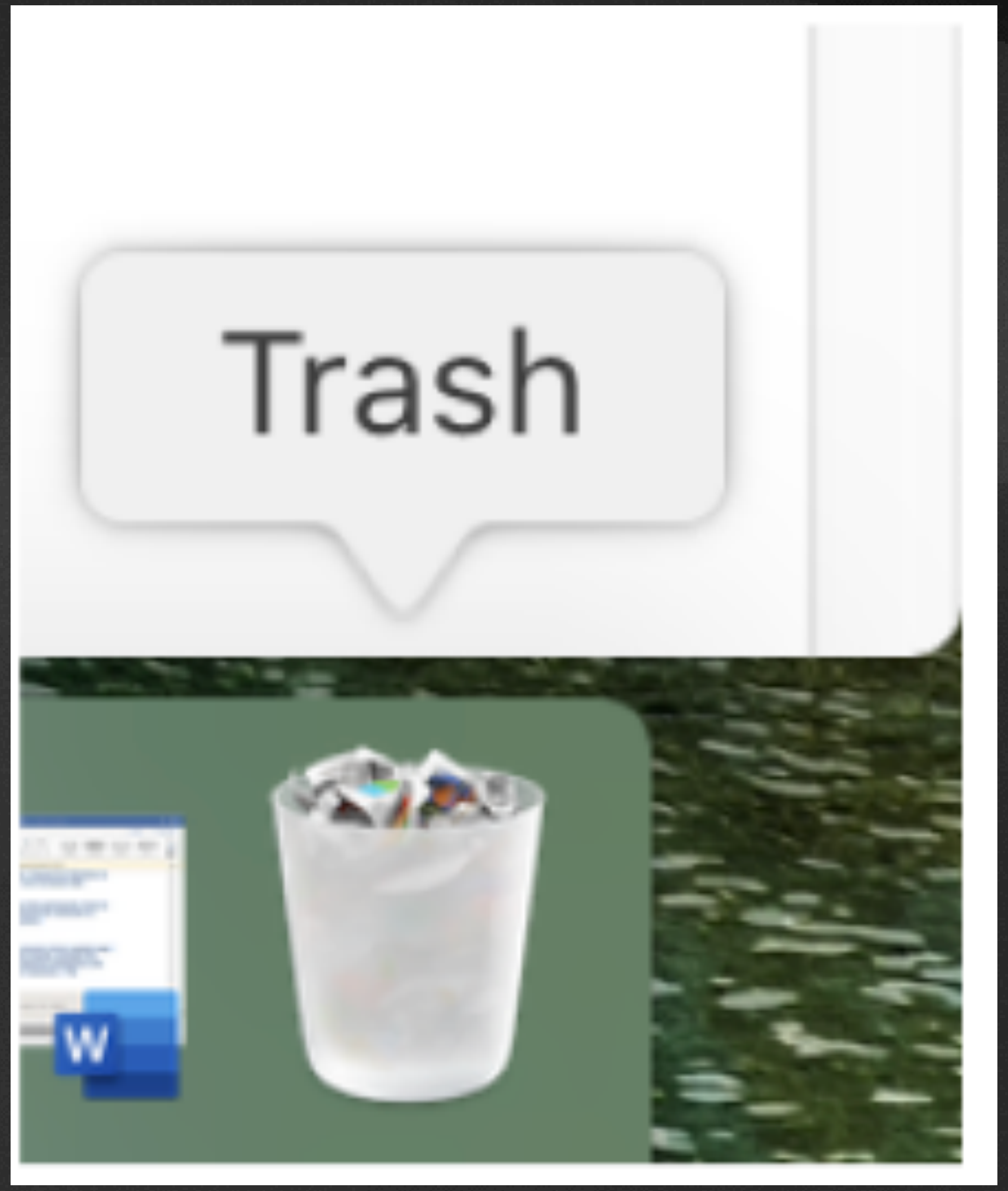
BAD

2. Match between system and the real world

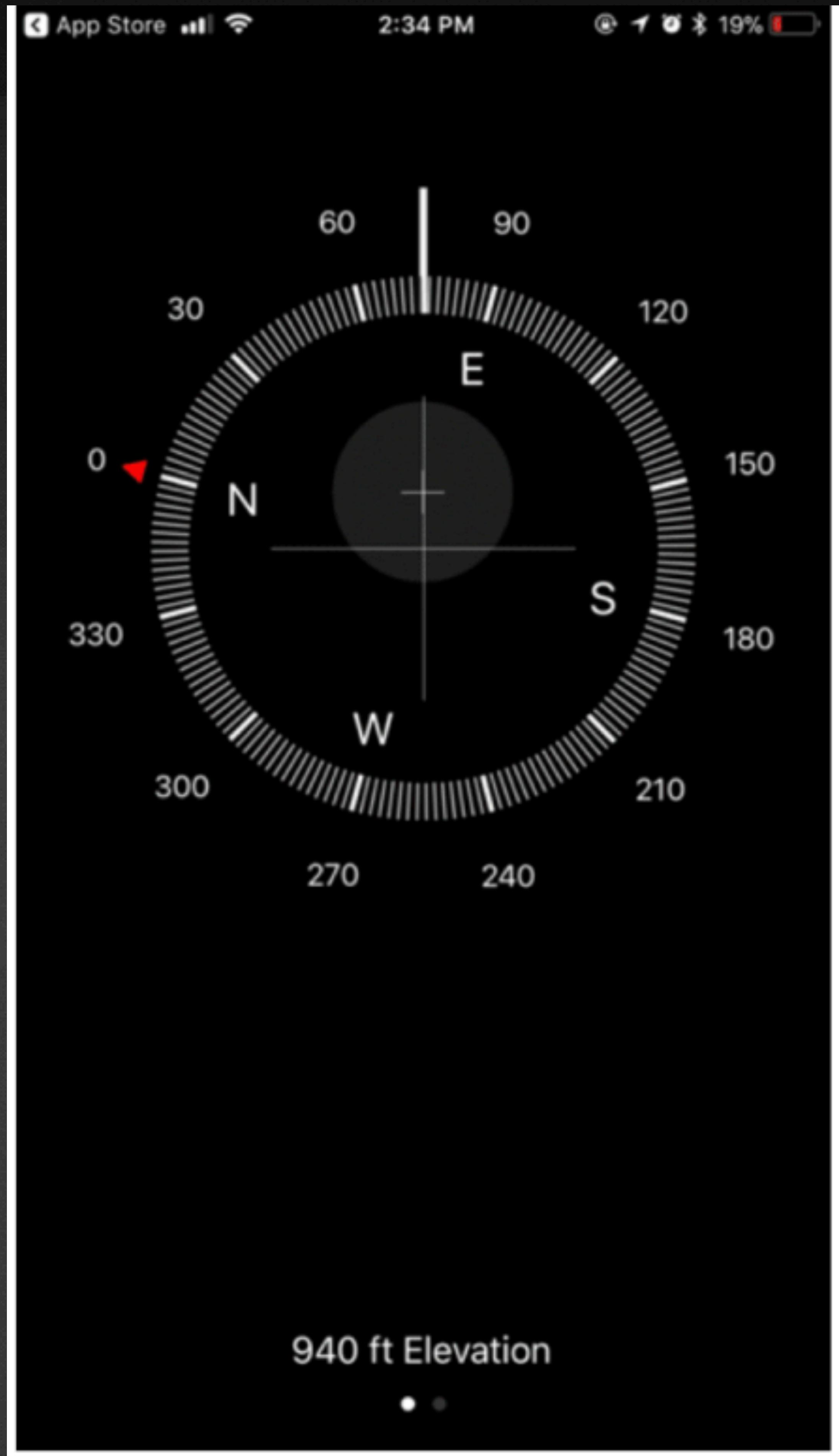
Match between system and the real world

Speak the users’ language

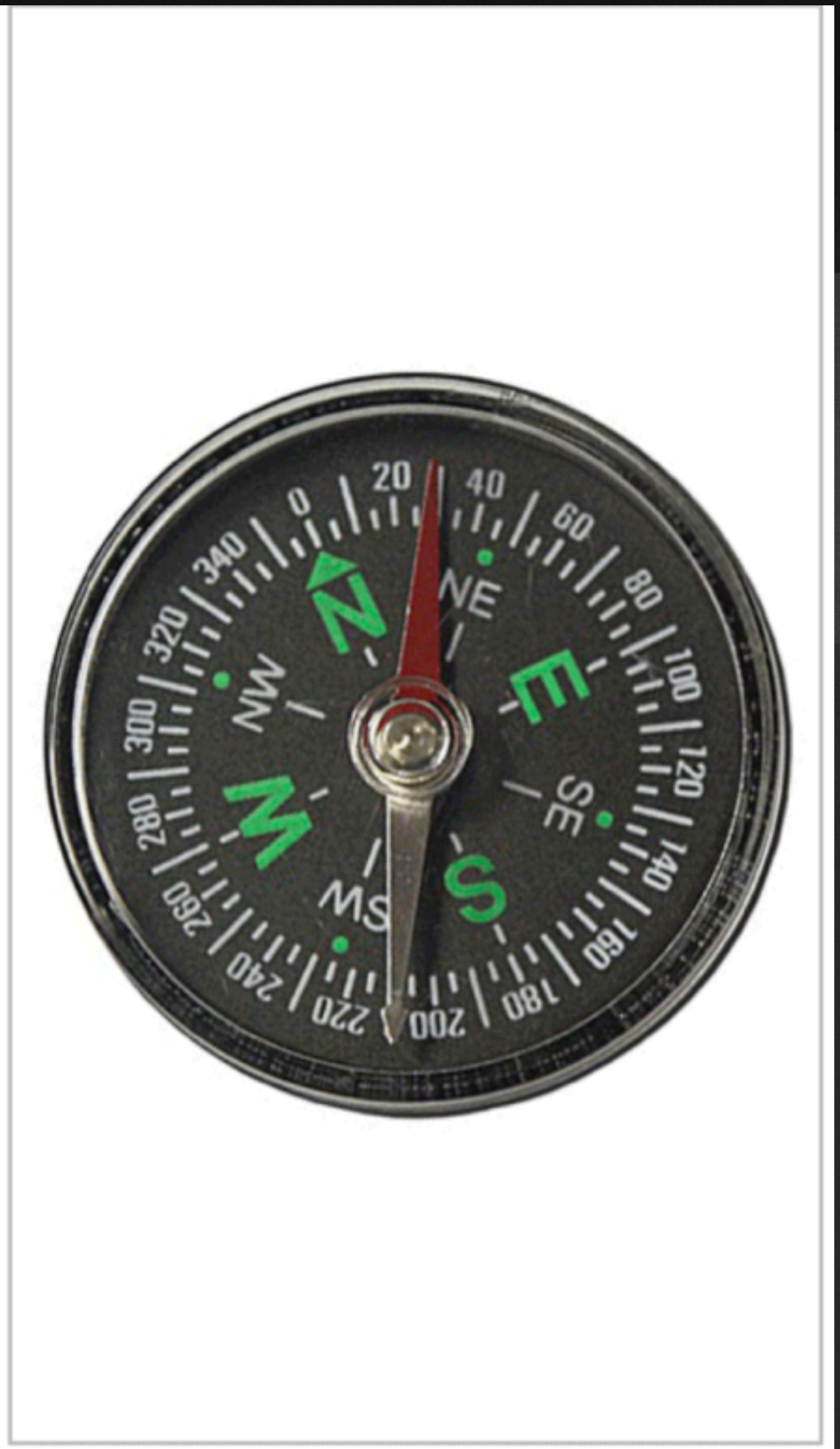
Match between system and the real world



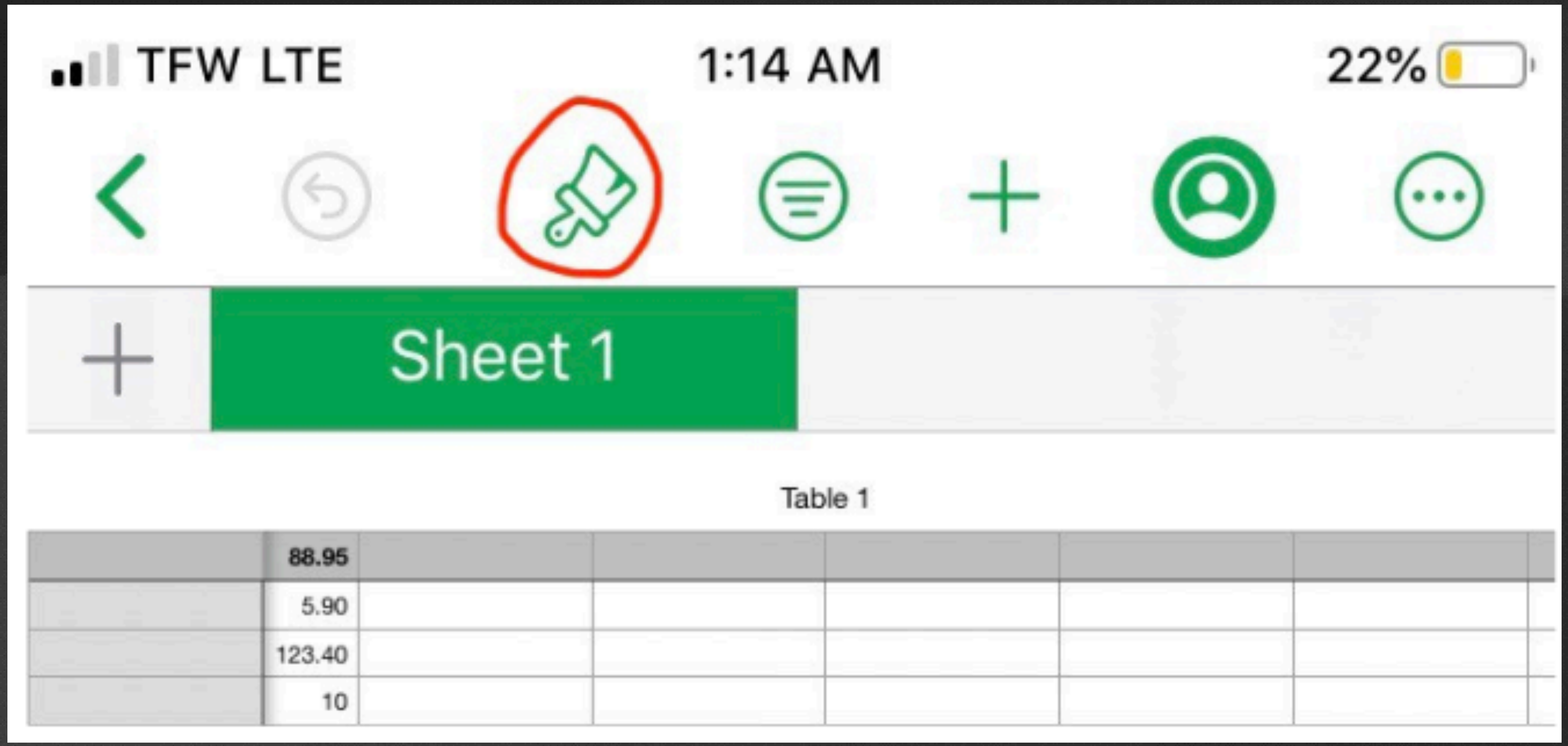
Match between system and the real world



940 ft Elevation



Match between system and the real world



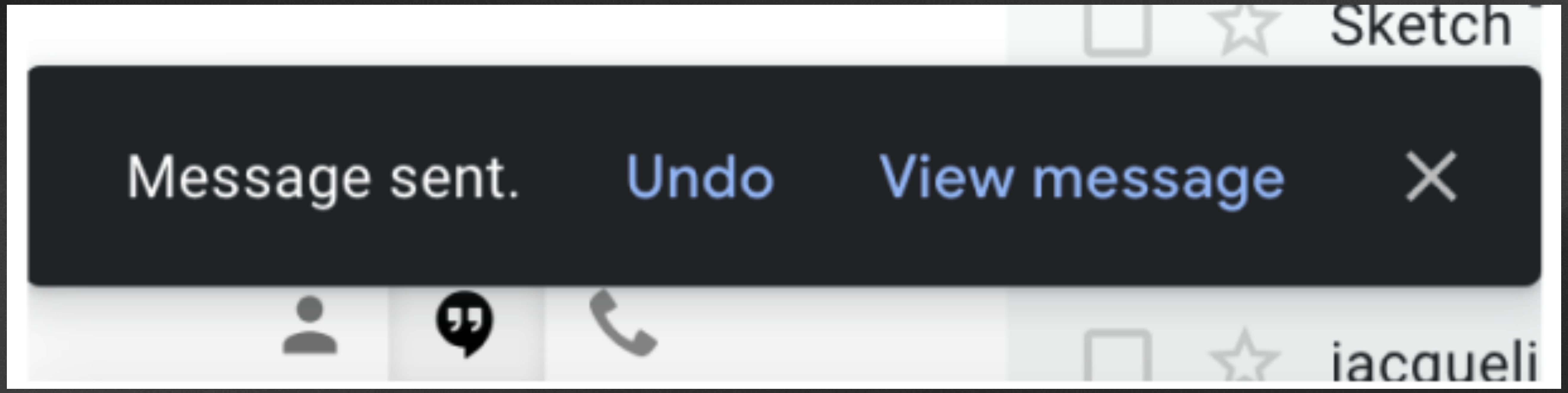
BAD

3. User control and freedom

User control and freedom

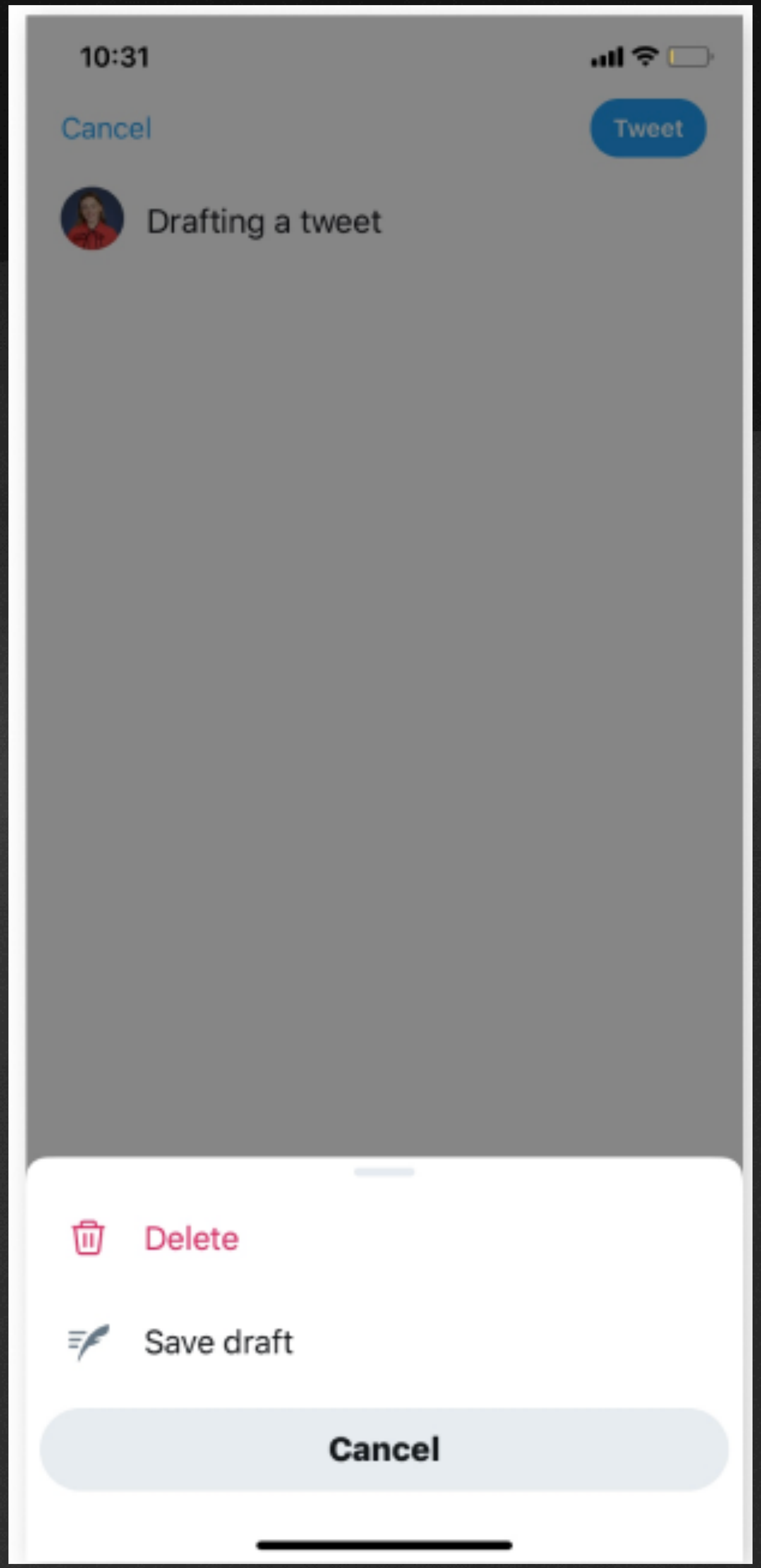
Make it easy to leave a flow or undo an action

User control and freedom

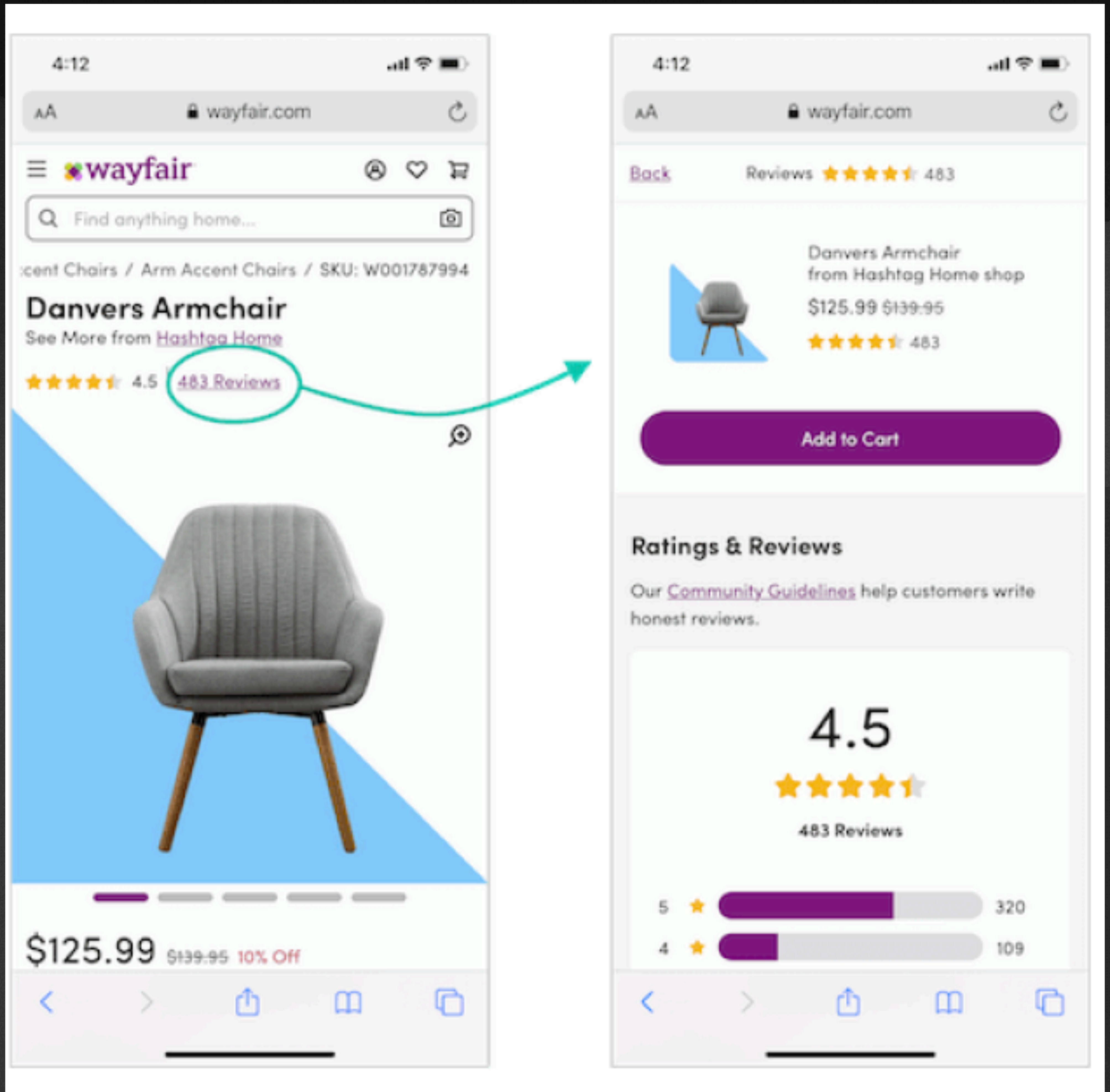


Message sent.

User control and freedom

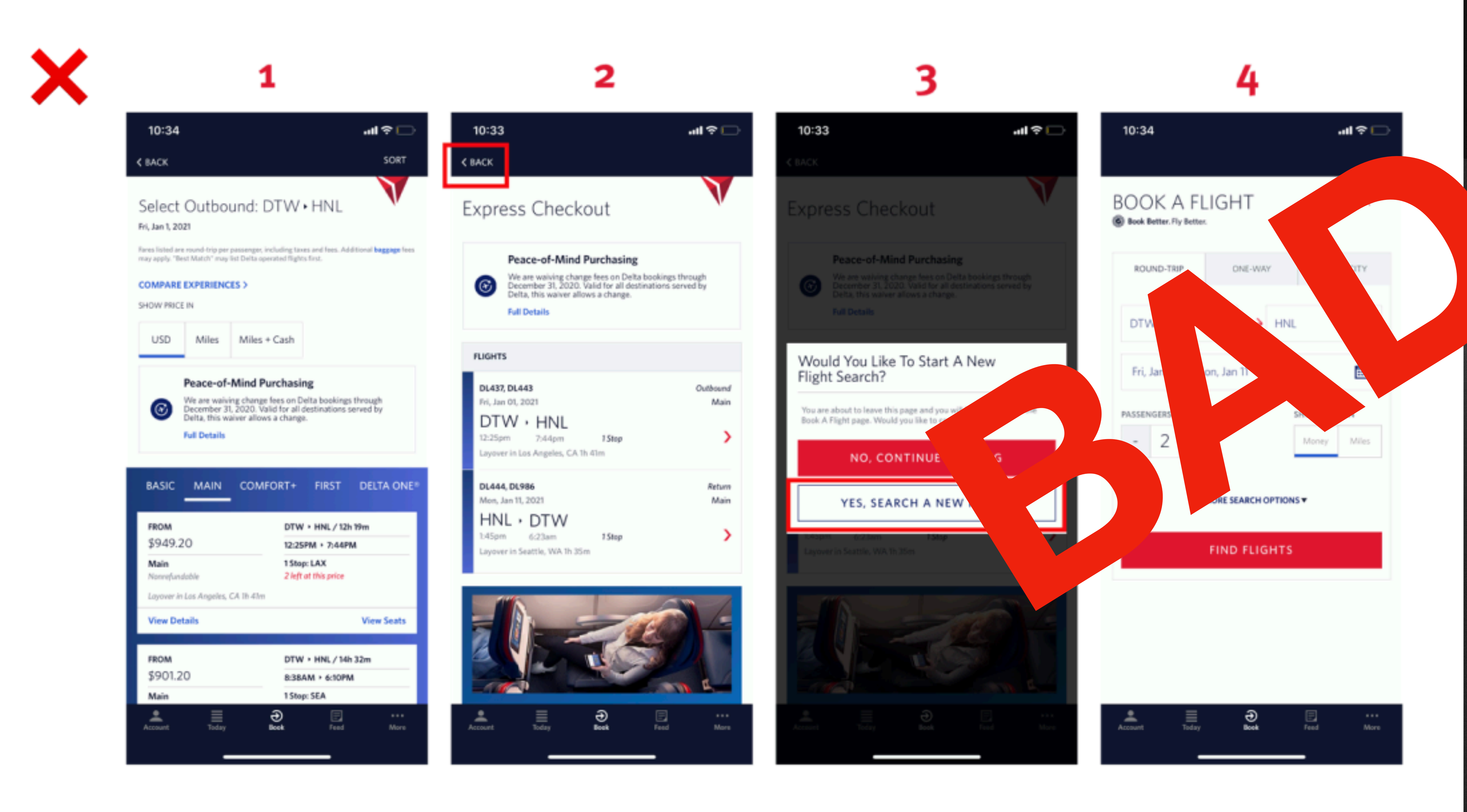


User control and freedom



Our Community Guidelines help customers write honest reviews.

User control and freedom



1

10:34

< BACK SORT

Select Outbound: DTW ▸ HNL

Fri, Jan 1, 2021

Fares listed are round-trip per passenger, including taxes and fees. Additional baggage fees may apply. "Best Match" may list Delta operated flights first.

COMPARE EXPERIENCES >

SHOW PRICE IN

USD | Miles | Miles + Cash

Peace-of-Mind Purchasing

We are waiving change fees on Delta bookings through December 31, 2020. Valid for all destinations served by Delta, this waiver allows a change.

Full Details

BASIC MAIN COMFORT+ FIRST DELTA ONE®

FROM
$949.20
Main
Nonrefundable

DTW • HNL / 12h 19m
12:25PM • 7:44PM
1 Stop: LAX
2 left at this price

Layover in Los Angeles, CA 1h 41m

View Details View Seats

FROM
$901.20
Main

DTW • HNL / 14h 32m
8:38AM • 6:10PM
1 Stop: SEA

Account Today Book Feed More

2

10:33

< BACK

Express Checkout

Peace-of-Mind Purchasing

We are waiving change fees on Delta bookings through December 31, 2020. Valid for all destinations served by Delta, this waiver allows a change.

Full Details

FLIGHTS

DL437, DL443 Outbound
Fri, Jan 01, 2021 Main
DTW • HNL
12:25pm 7:44pm 1 Stop
Layover in Los Angeles, CA 1h 41m

DL444, DL986 Return
Mon, Jan 11, 2021 Main
HNL • DTW
1:45pm 6:23am 1 Stop
Layover in Seattle, WA 1h 35m

Account Today Book Feed More

3

10:33

< BACK

Express Checkout

Peace-of-Mind Purchasing

We are waiving change fees on Delta bookings through December 31, 2020. Valid for all destinations served by Delta, this waiver allows a change.

Full Details

Would You Like To Start A New Flight Search?

You are about to leave this page and you wi Book A Flight page. Would you like to co

NO, CONTINUE G

YES, SEARCH A NEW

Layover in Seattle, WA 1h 35m

Account Today Book Feed More

4

10:34

BOOK A FLIGHT

Book Better. Fly Better.

ROUND-TRIP ONE-WAY ITY

DTW HNL

Fri, Jan on, Jan 11

PASSENGERS
- 2

Money Miles

RE SEARCH OPTIONS ▾

FIND FLIGHTS

Account Today Book Feed More

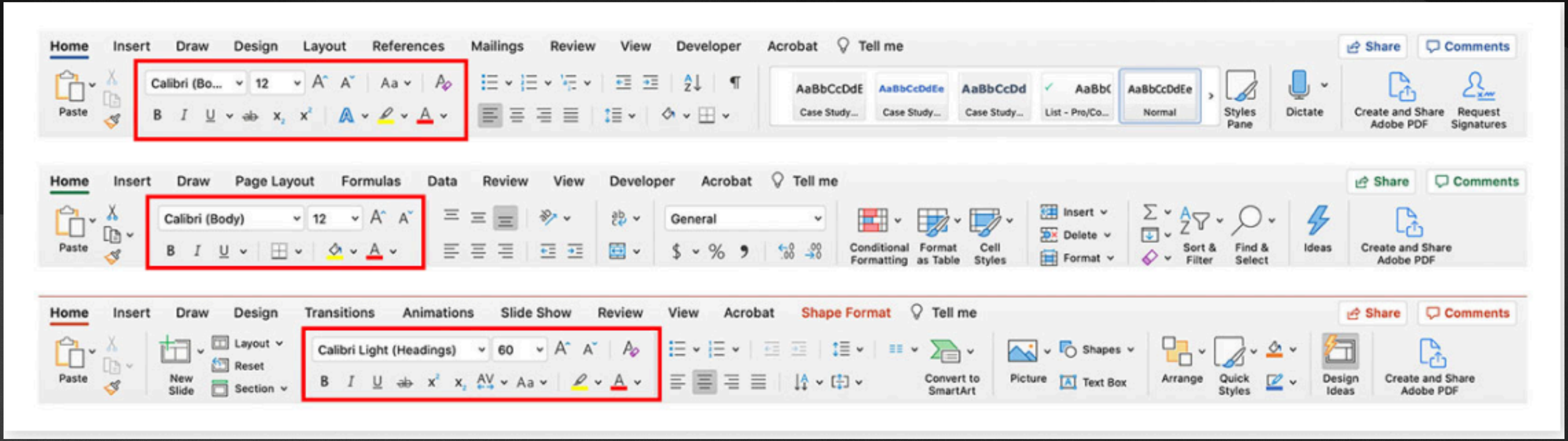
4. Consistency and standards

Consistency and standards

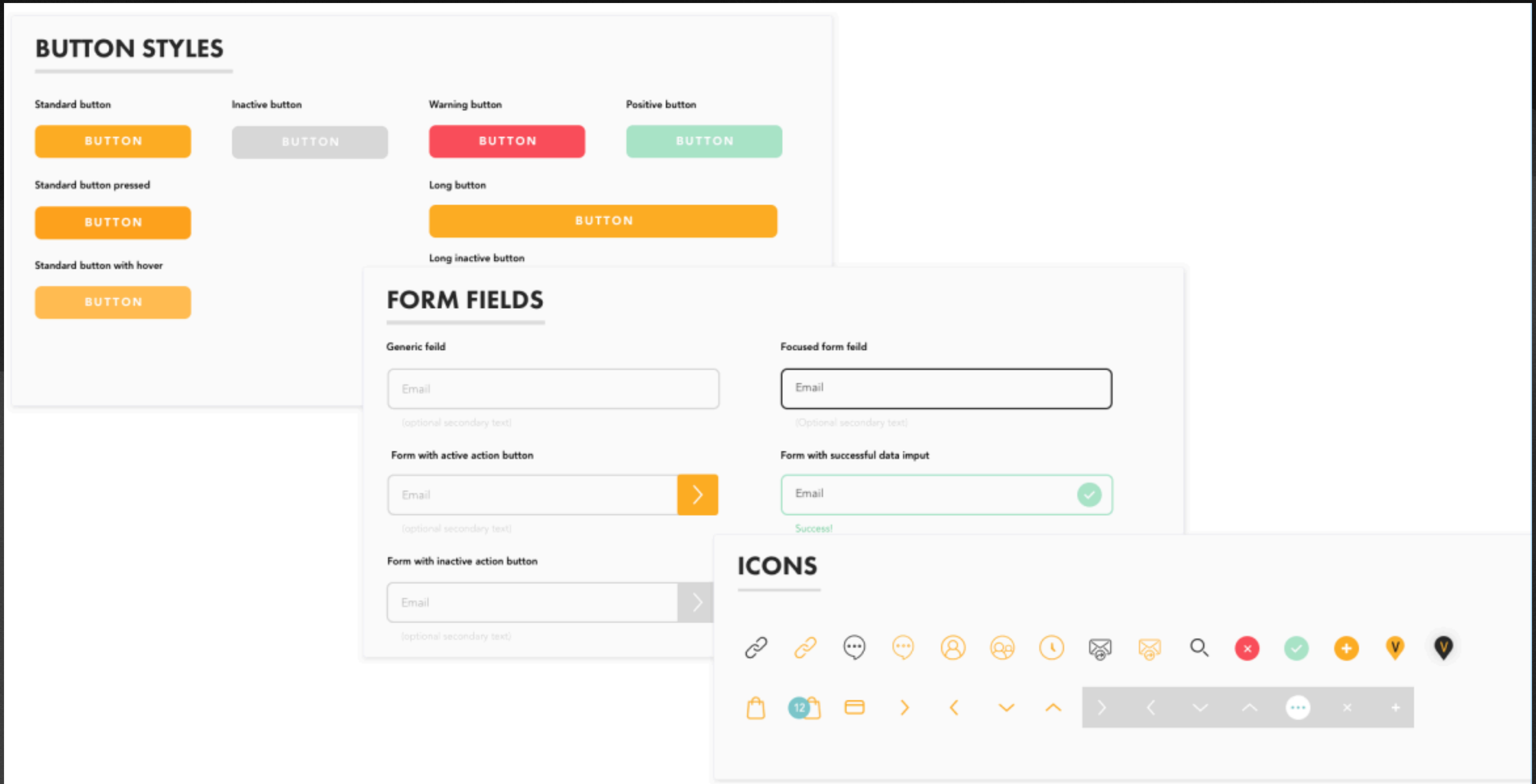
Jakob’s Law:

Users spend the majority of their time using products other than yours. They will expect your product to behave like all of those other products.

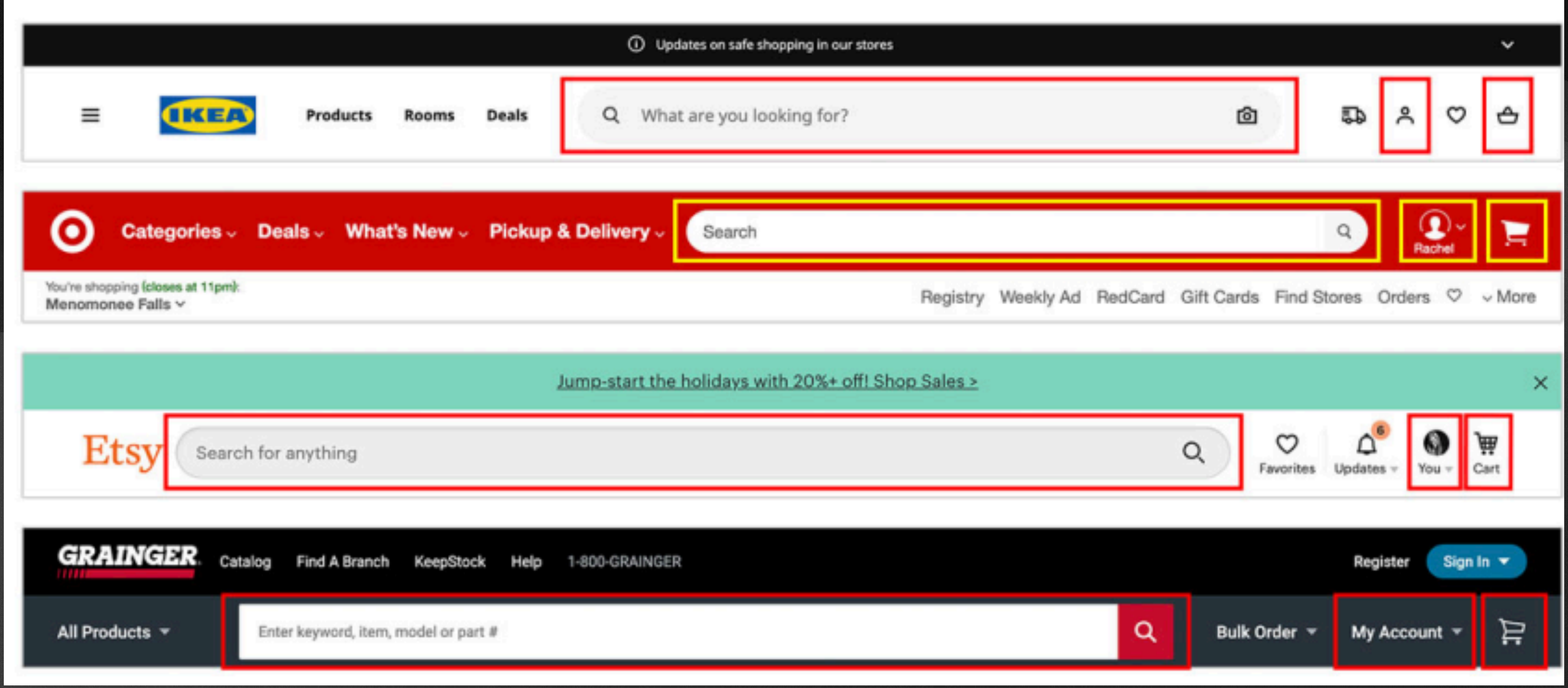
Consistency and standards



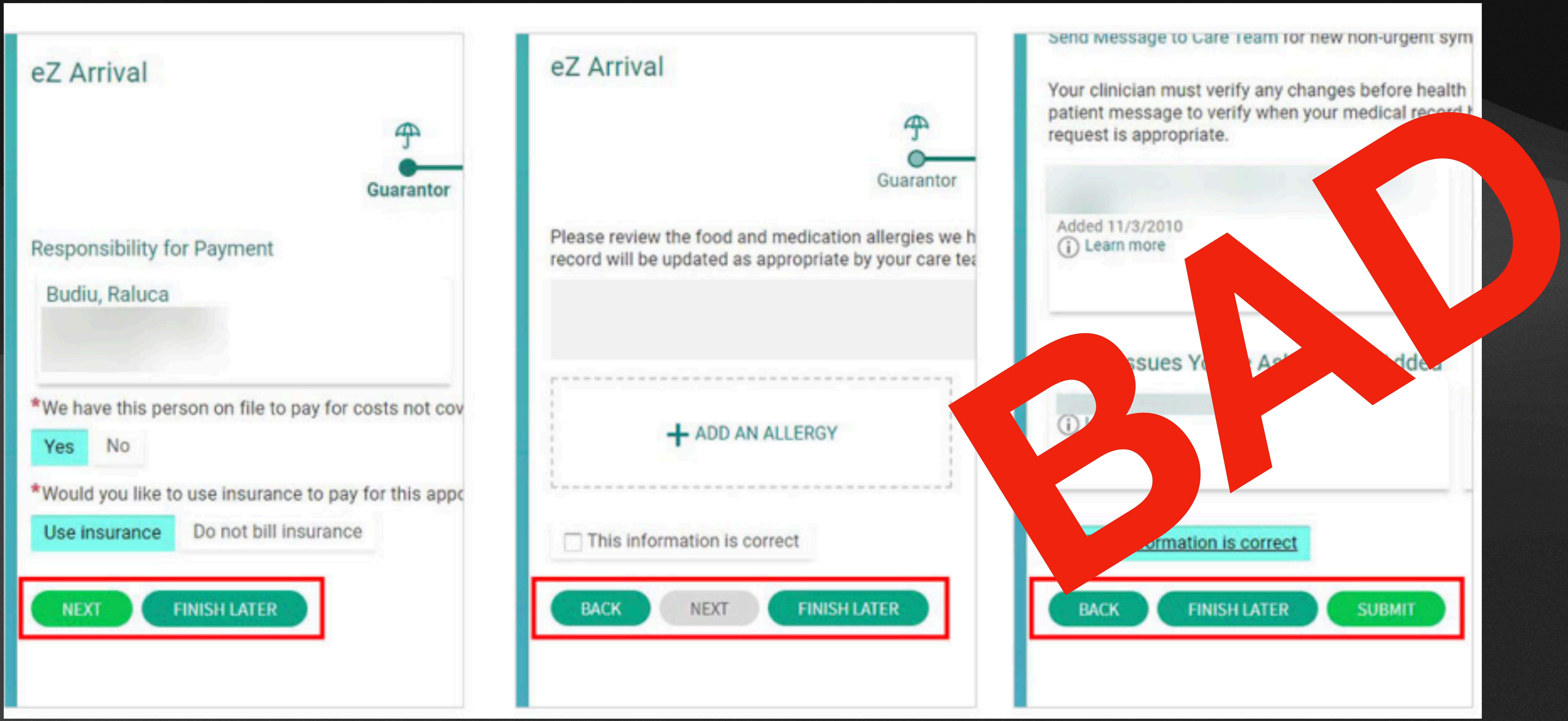
Consistency and standards



Consistency and standards



Consistency and standards



eZ Arrival

Guarantor

Responsibility for Payment

Budiu, Raluca

*We have this person on file to pay for costs not cov

Yes No

*Would you like to use insurance to pay for this appo

Use insurance Do not bill insurance

eZ Arrival

Guarantor

Please review the food and medication allergies we h record will be updated as appropriate by your care tea

□ This information is correct

Send Message to Care Team for new non-urgent sym

Your clinician must verify any changes before health patient message to verify when your medical record i request is appropriate.

Added 11/3/2010

Learn more

ssues Y A dded

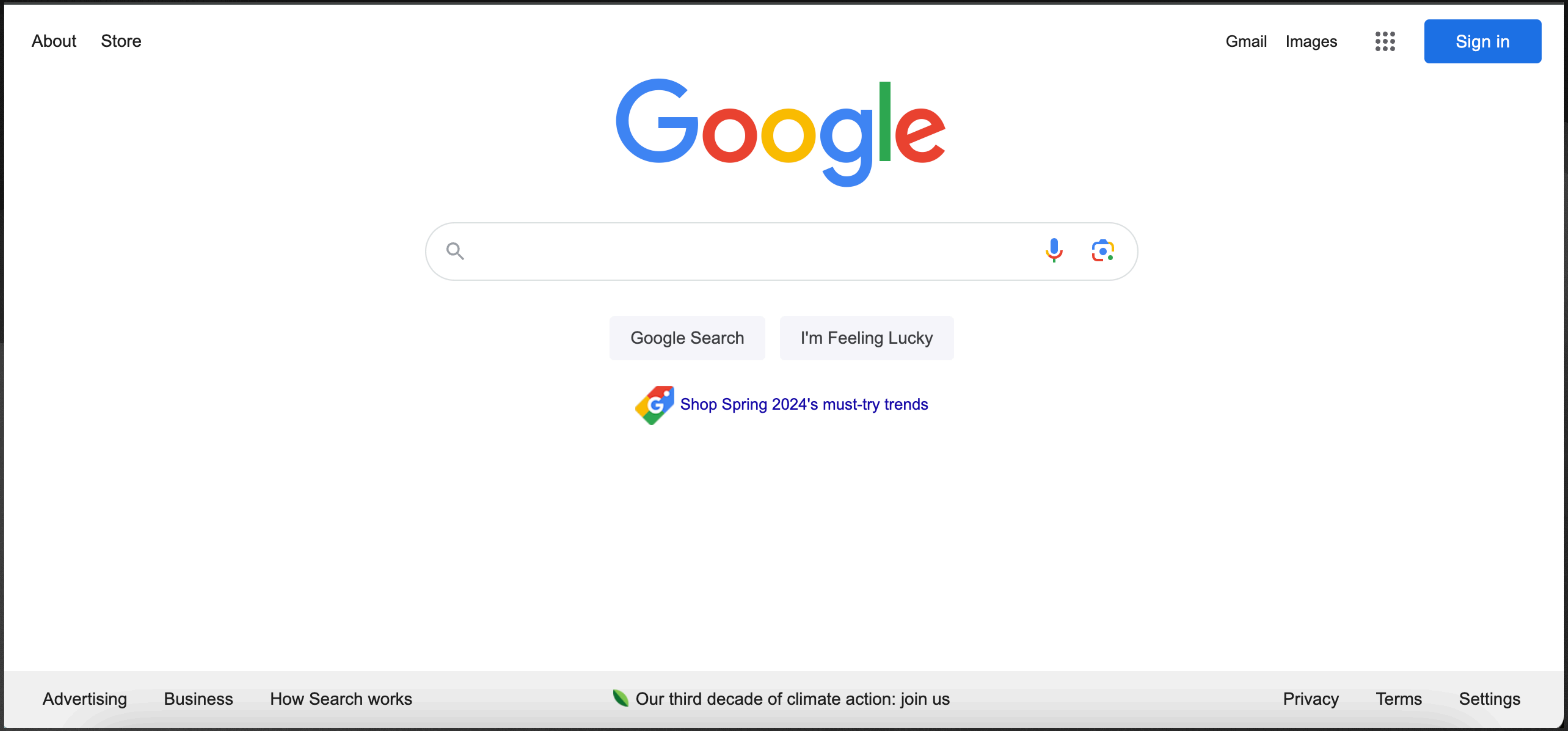
ormation is correct

5. Aesthetic and minimalist design

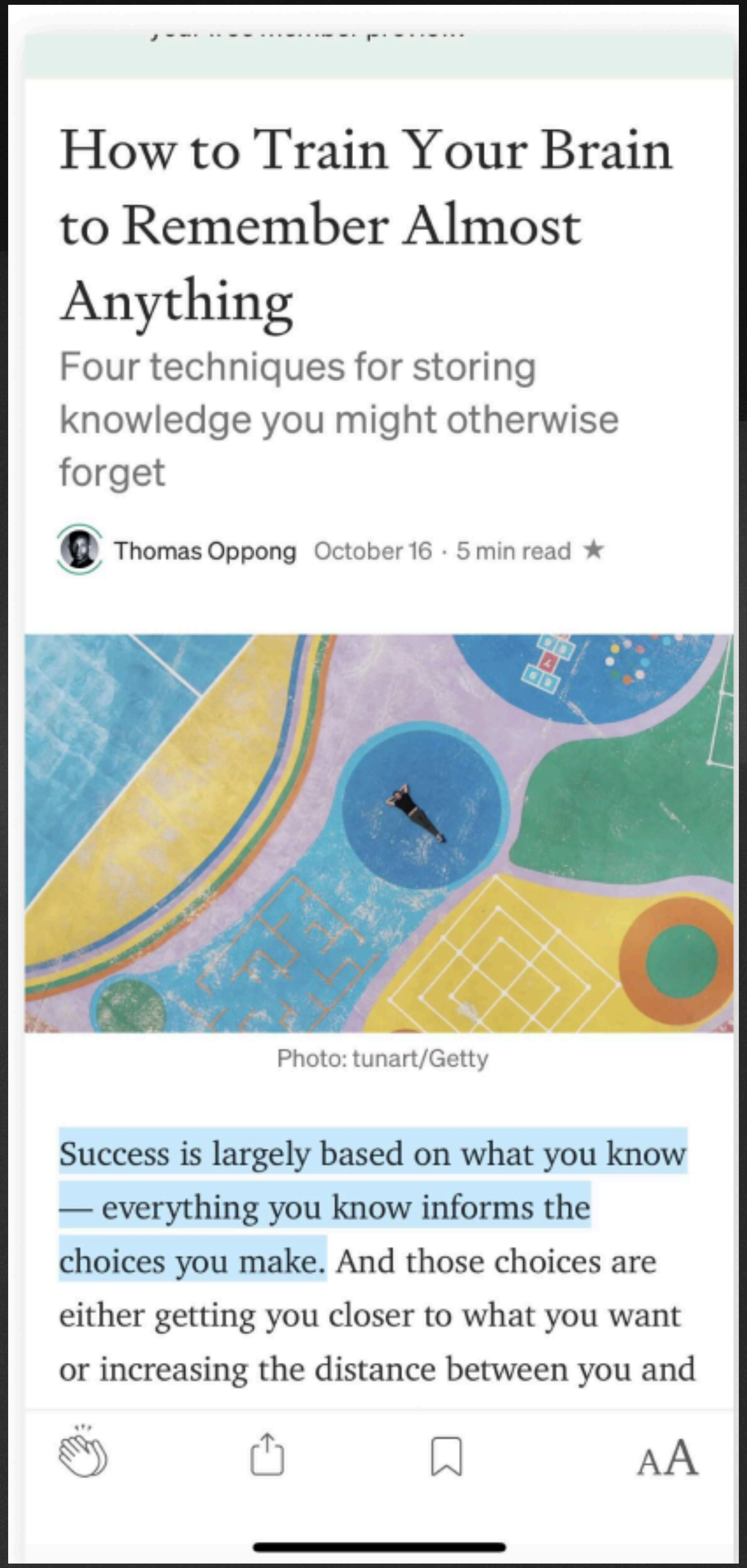
Aesthetic and minimalist design

Provide relevant information. Remove clutter.

Aesthetic and minimalist design



Aesthetic and minimalist design



How to Train Your Brain to Remember Almost Anything

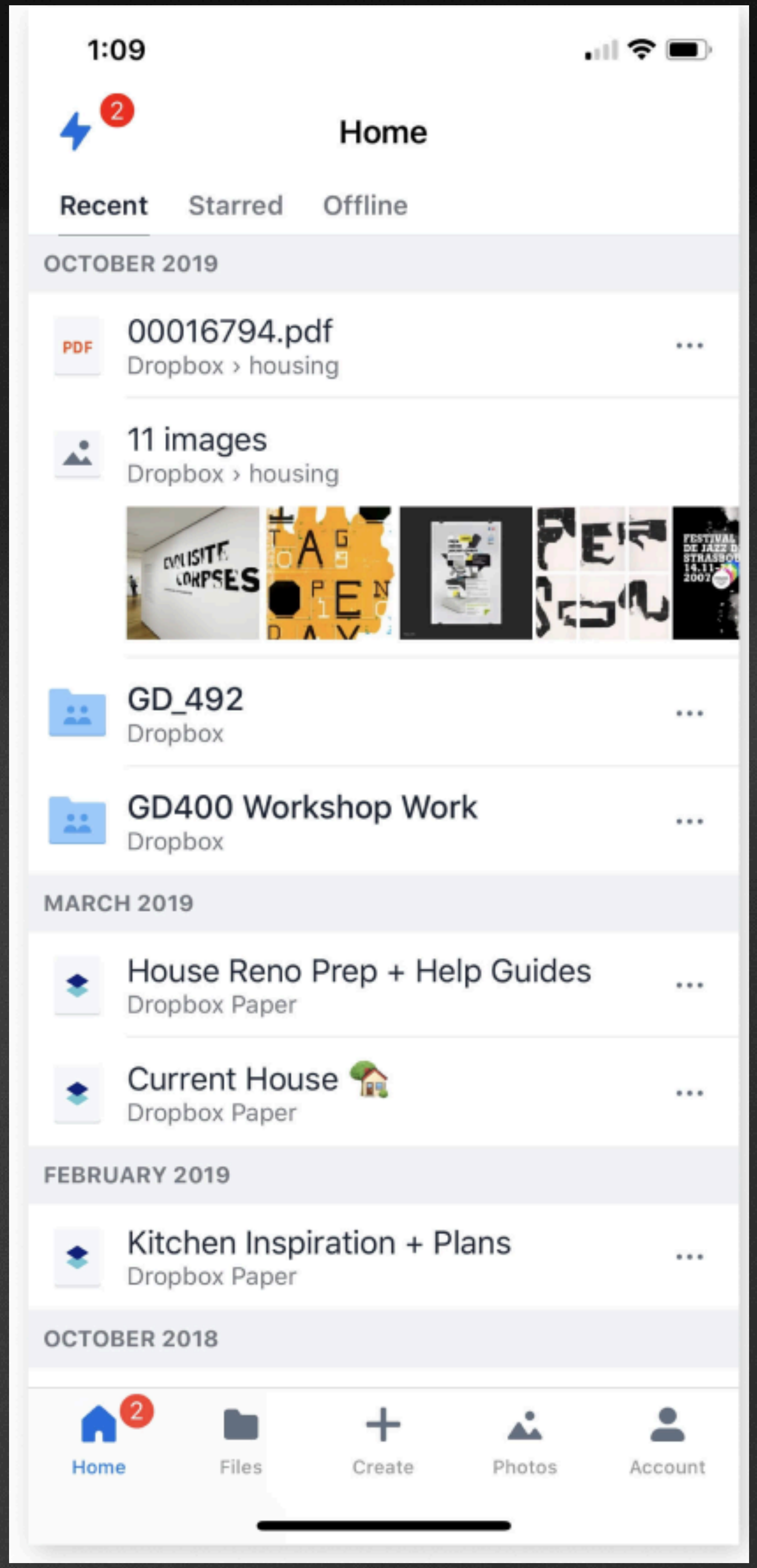
Four techniques for storing knowledge you might otherwise forget

Thomas Oppong October 16 · 5 min read ★

Photo: tunart/Getty

Success is largely based on what you know — everything you know informs the choices you make. And those choices are either getting you closer to what you want or increasing the distance between you and

Aesthetic and minimalist design



OCTOBER 2019

00016794.pdf
Dropbox › housing

11 images
Dropbox › housing

GD_492
Dropbox

GD400 Workshop Work
Dropbox

MARCH 2019

House Reno Prep + Help Guides
Dropbox Paper

Current House 🏡
Dropbox Paper

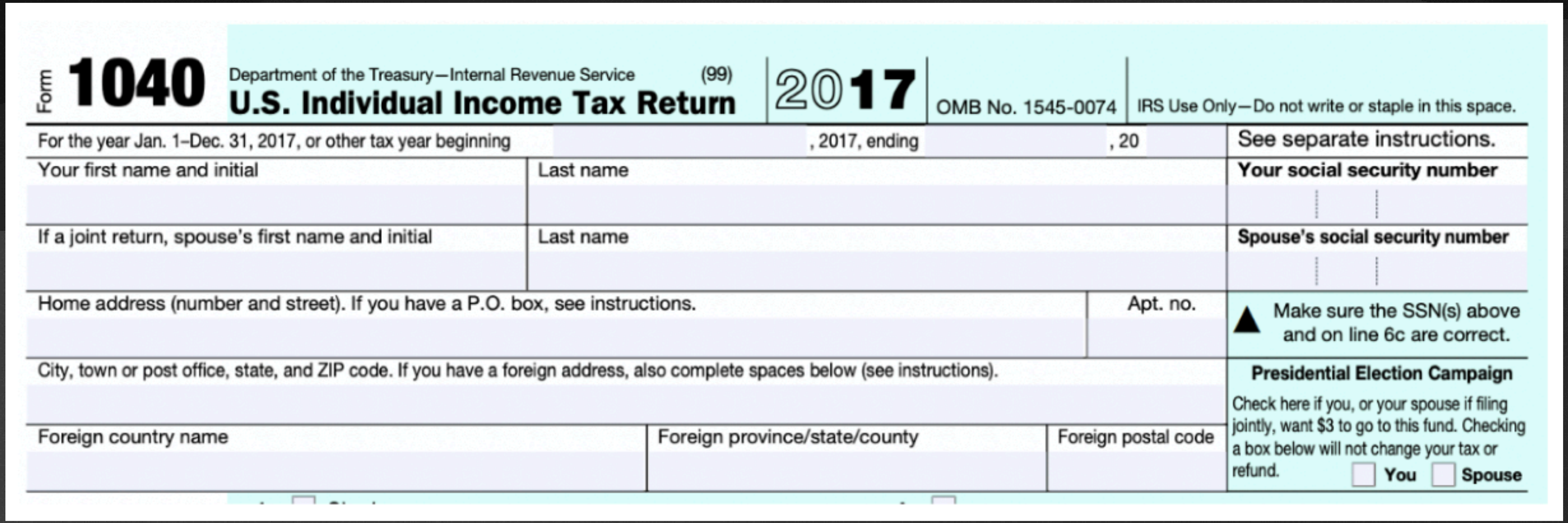
FEBRUARY 2019

Kitchen Inspiration + Plans
Dropbox Paper

OCTOBER 2018

BAD

Aesthetic and minimalist design



Form **1040** Department of the Treasury—Internal Revenue Service (99)

U.S. Individual Income Tax Return **2017** OMB No. 1545-0074 IRS Use Only—Do not write or staple in this space.

For the year Jan. 1–Dec. 31, 2017, or other tax year beginning , 2017, ending , 20 See separate instructions.

Your first name and initial | Last name | **Your social security number**

If a joint return, spouse's first name and initial | Last name | **Spouse's social security number**

Home address (number and street). If you have a P.O. box, see instructions. | Apt. no. | ▲ Make sure the SSN(s) above and on line 6c are correct.

City, town or post office, state, and ZIP code. If you have a foreign address, also complete spaces below (see instructions).

Foreign country name | Foreign province/state/county | Foreign postal code

Presidential Election Campaign

Check here if you, or your spouse if filing jointly, want $3 to go to this fund. Checking a box below will not change your tax or refund. □ **You** □ **Spouse**

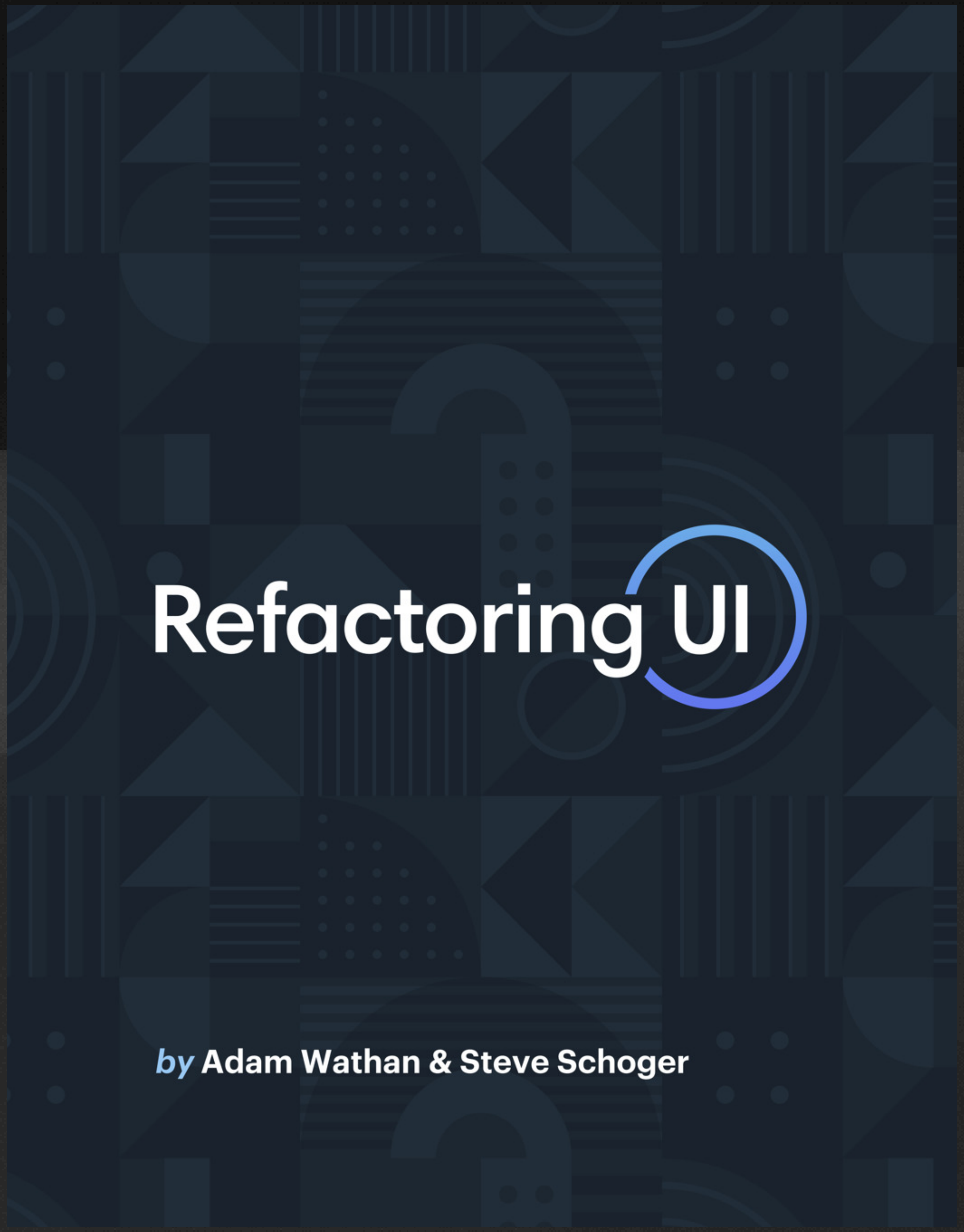
BAD

Read More…

If you have time, check this out:

Book: ***Refactoring UI***

https://www.dropbox.com/s/q1gmc3fftuhwxgq/Refactoring UI v1.0.2.pdf?dl=0



Accessibility

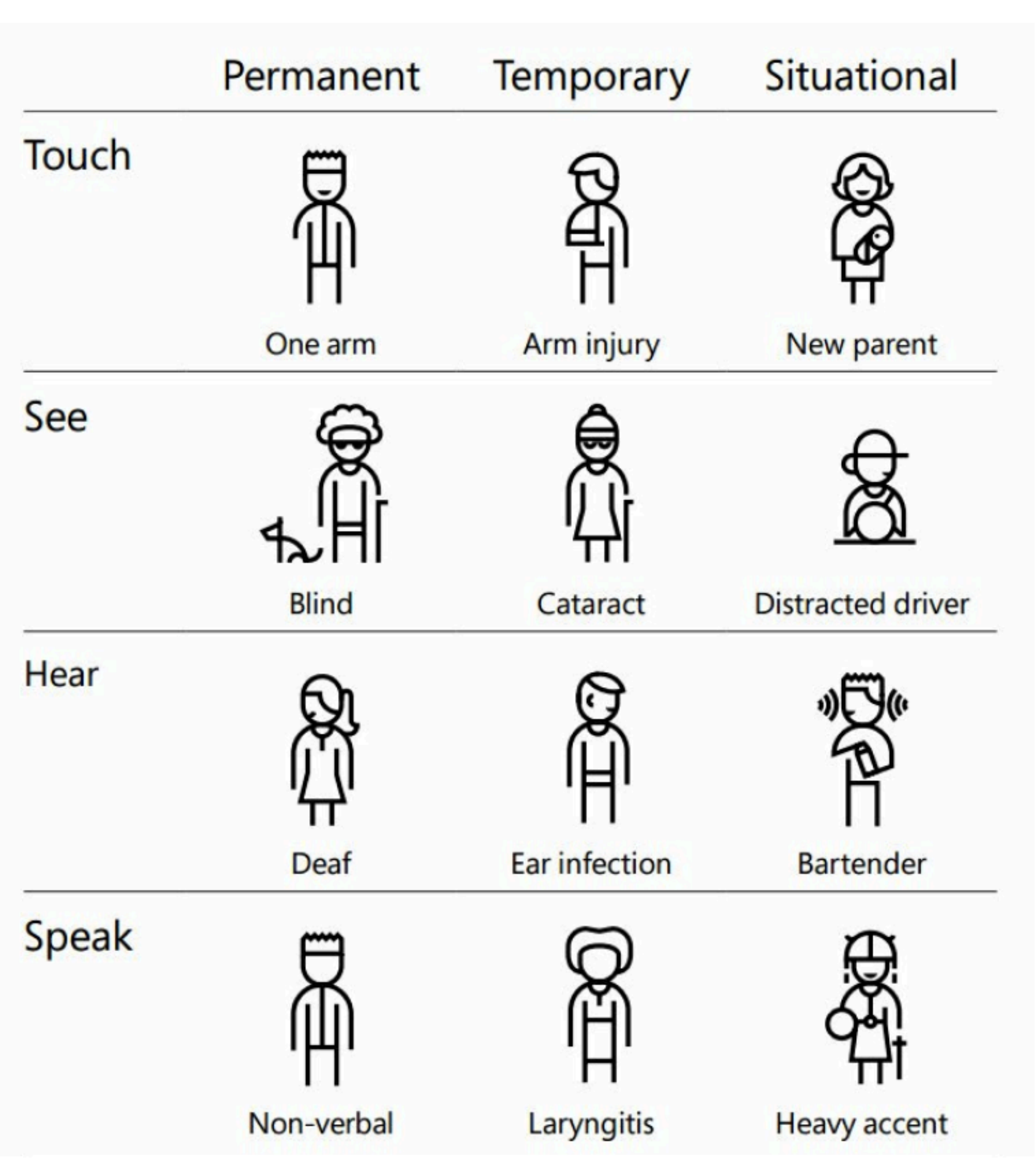
Why Accessibility?

- By making your product accessible, you are ensuring that users with disabilities have a good user experience
- Many existing sites have accessibility barriers that make them difficult or impossible for some people to use

Who Determines What’s Accessible?

- The World Wide Web Consortium (W3C) is an international community that develops web standards
- Their Web ContentAccessibility Guidelines (WCAG) covers a wide range of accessibility best practices: https://www.w3.org/TR/WCAG20/

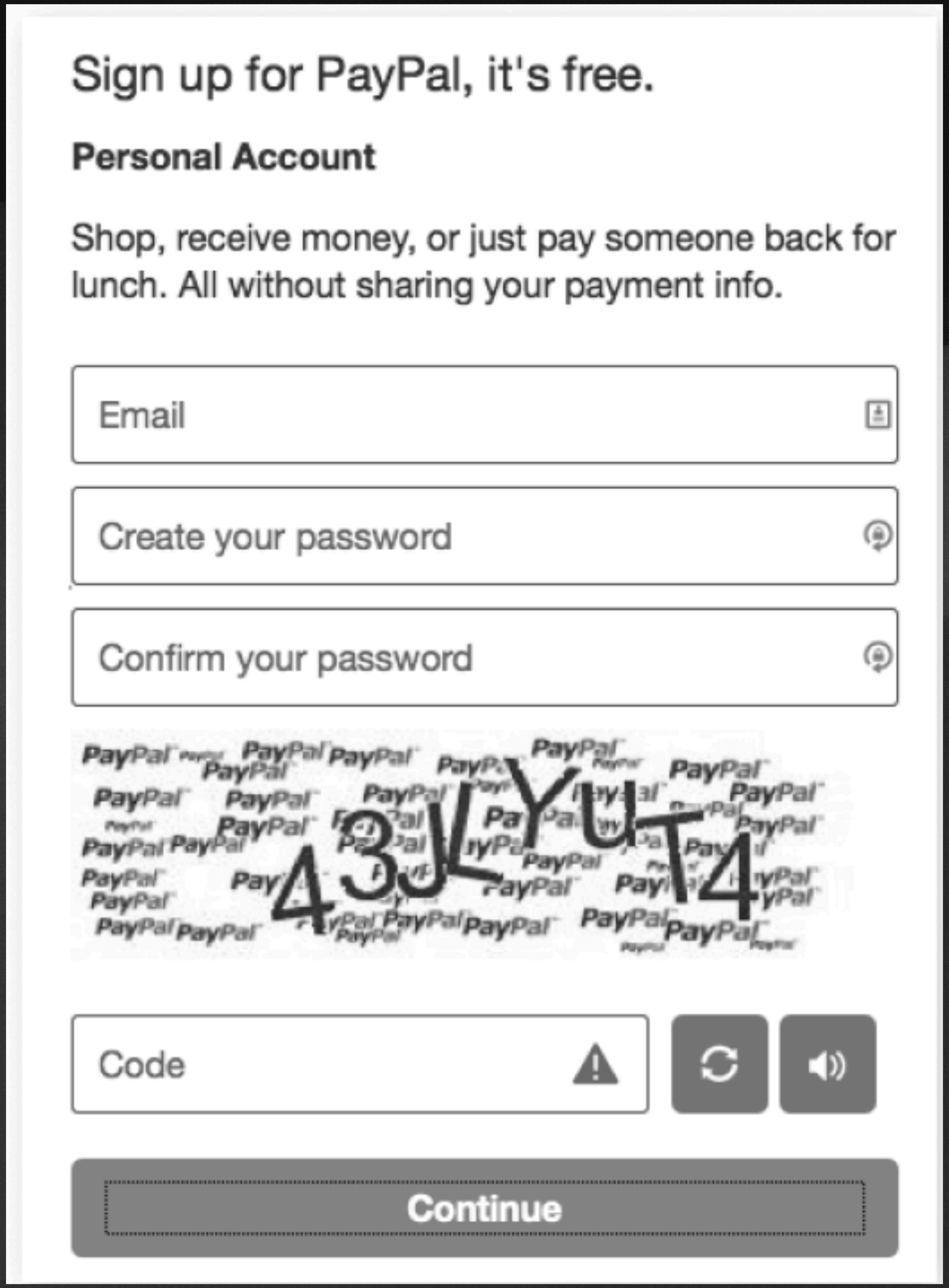
Groups to Consider for



	Permanent	Temporary	Situational
Touch	One arm	Arm injury	New parent
See	Blind	Cataract	Distracted driver
Hear	Deaf	Ear infection	Bartender
Speak	Non-verbal	Laryngitis	Heavy accent

Accessibility and Color

Don’t Use Color Alone to Convey Information



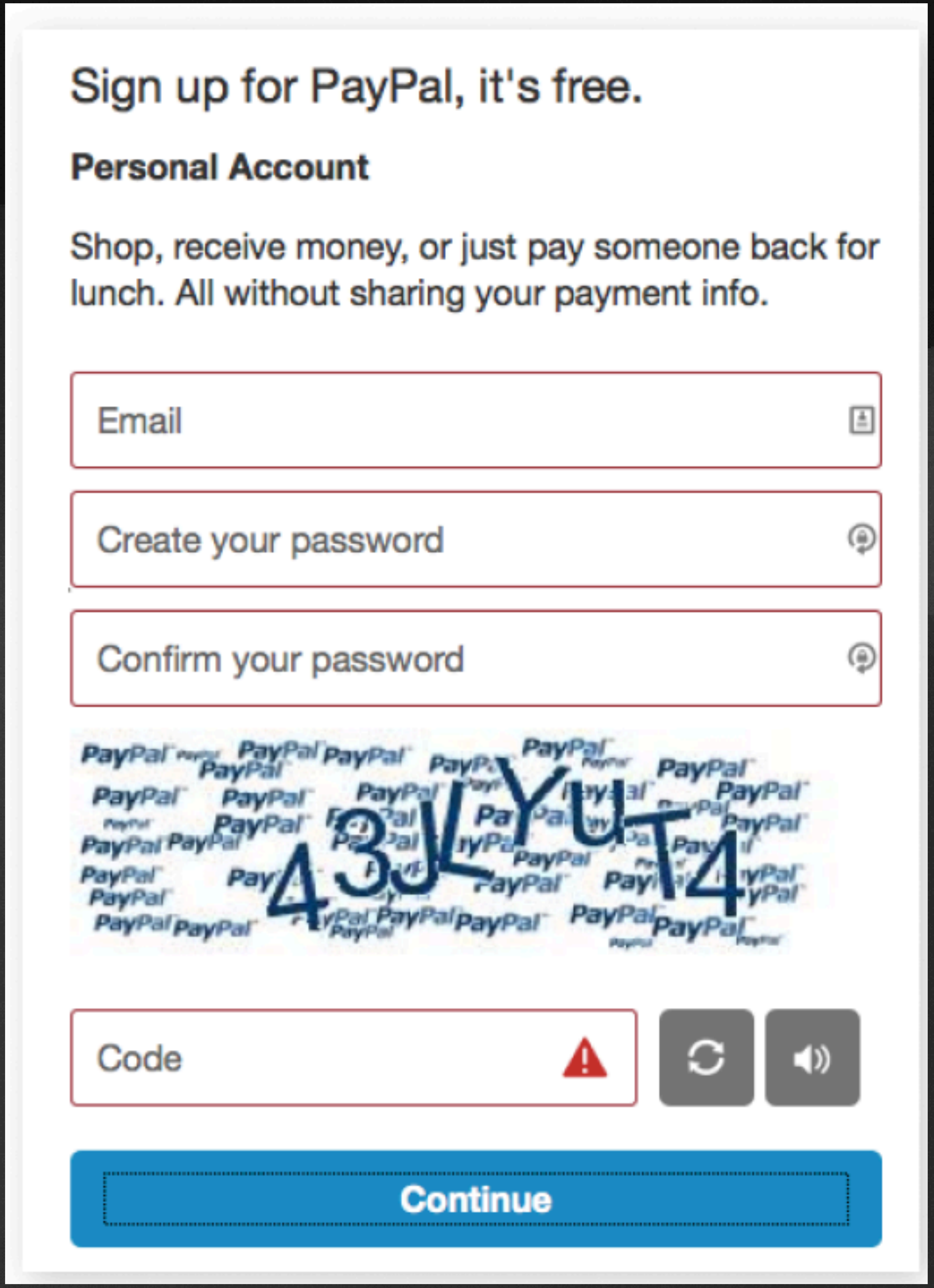
Sign up for PayPal, it's free.

Personal Account

Shop, receive money, or just pay someone back for lunch. All without sharing your payment info.

Huh?

Don’t Use Color Alone to Convey Information



Sign up for PayPal, it's free.

Personal Account

Shop, receive money, or just pay someone back for lunch. All without sharing your payment info.

Email

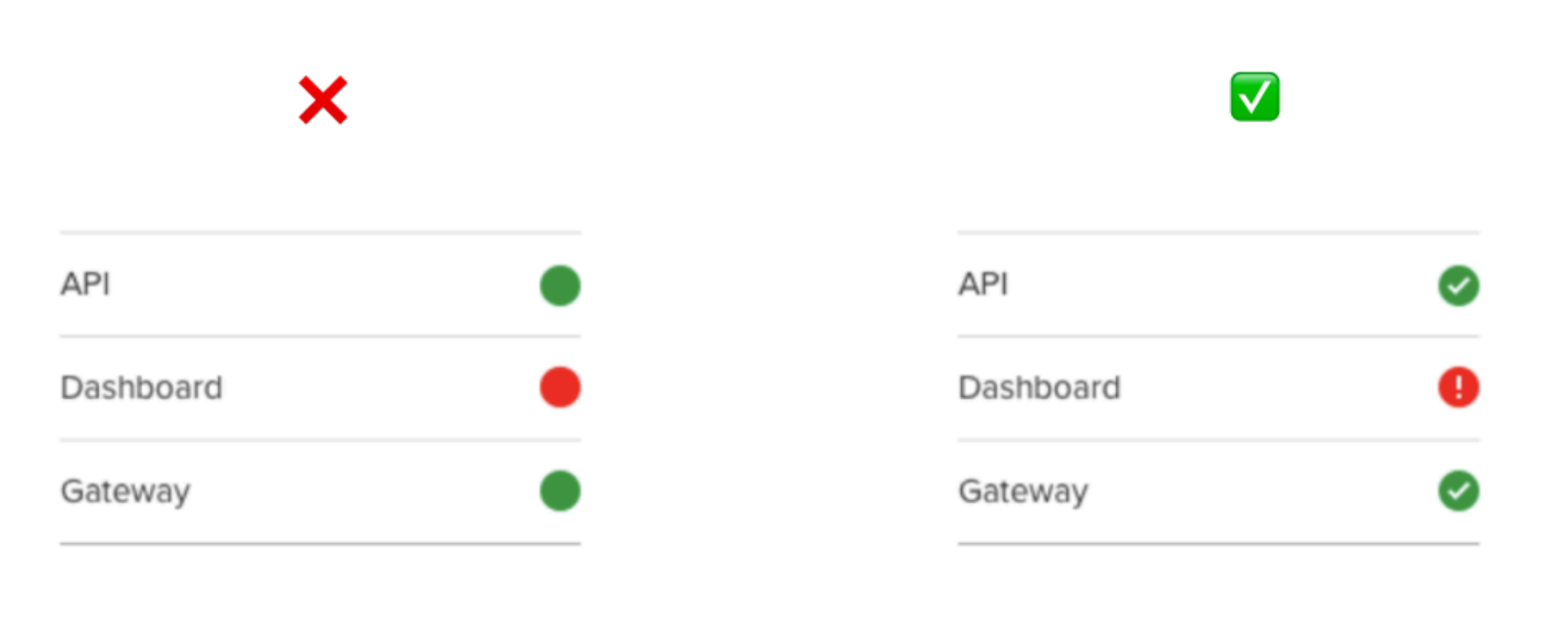
Create your password

Confirm your password

Code

Oh.

Don’t Use Color Alone to Convey Information



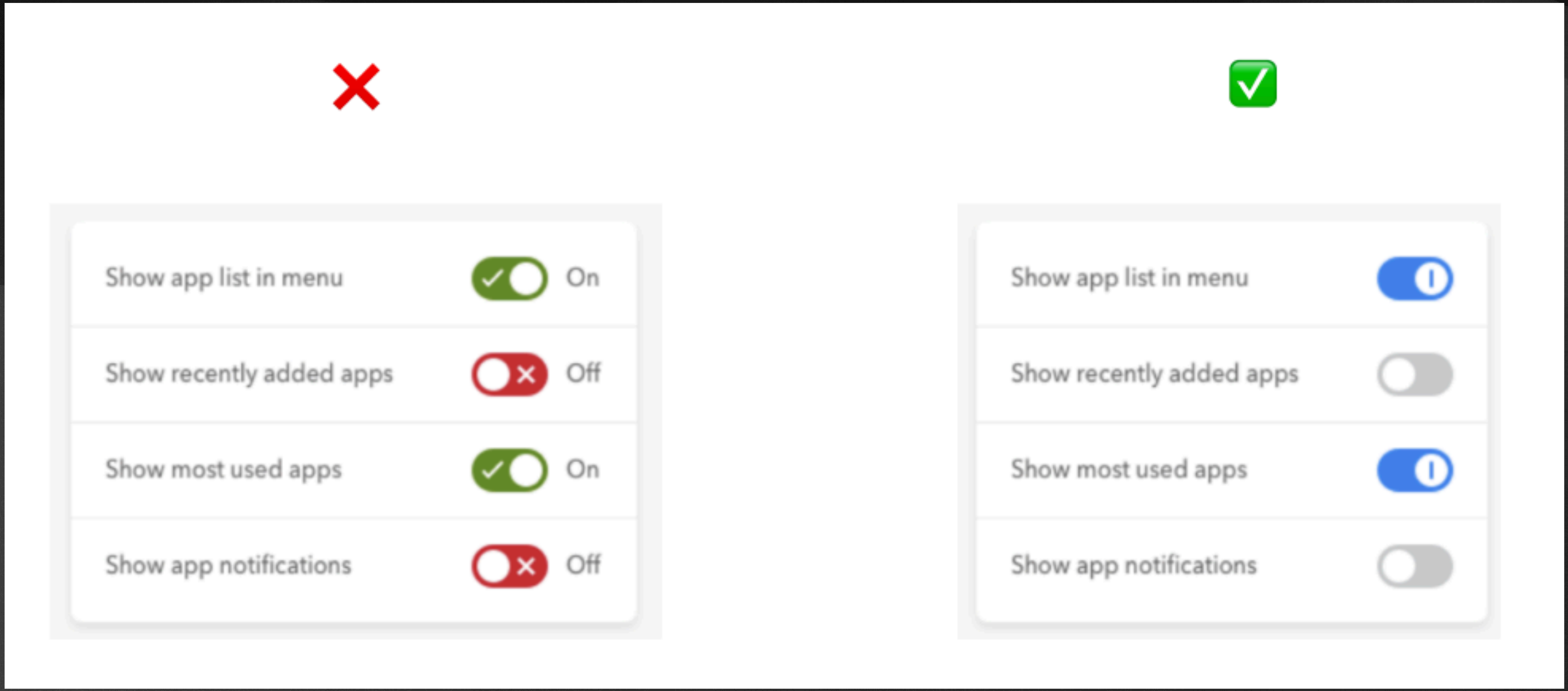
❌

API	🟢
Dashboard	🔴
Gateway	🟢

✅

API	✓
Dashboard	!
Gateway	✓

...but don’t take it too far, either



❌

Show app list in menu ✓ On

Show recently added apps ✕ Off

Show most used apps ✓ On

Show app notifications ✕ Off

✅

Show app list in menu

Show recently added apps

Show most used apps

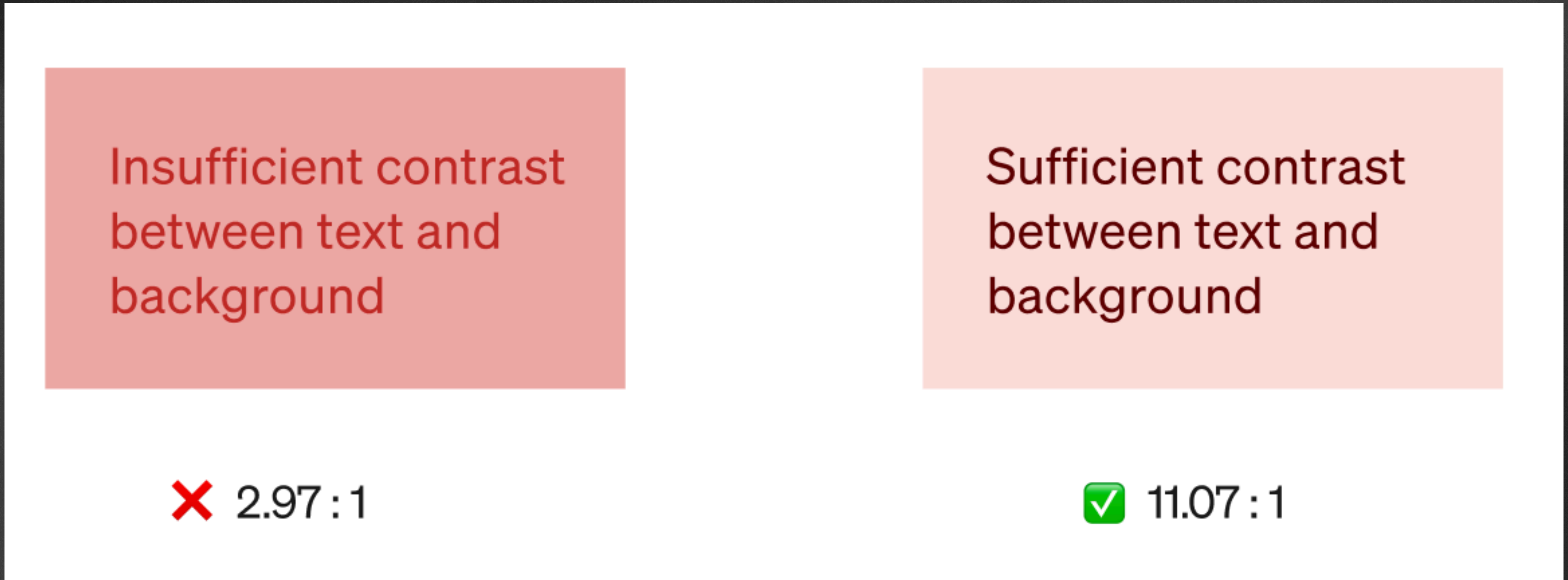
Show app notifications

Color Contrast

- We determine whether there is enough visual contrast between two colors in our UI using **contrast ratios**
- Contrast ratios can range from 1 to 21 (commonly written 1 : 1 or 21 : 1)

Sufficient contrast between text and background

- WCAG defines **4.5 : 1** as the minimum contrast ratio a piece of <24px text can have. The minimum ratio for text >24px is **3 : 1**.



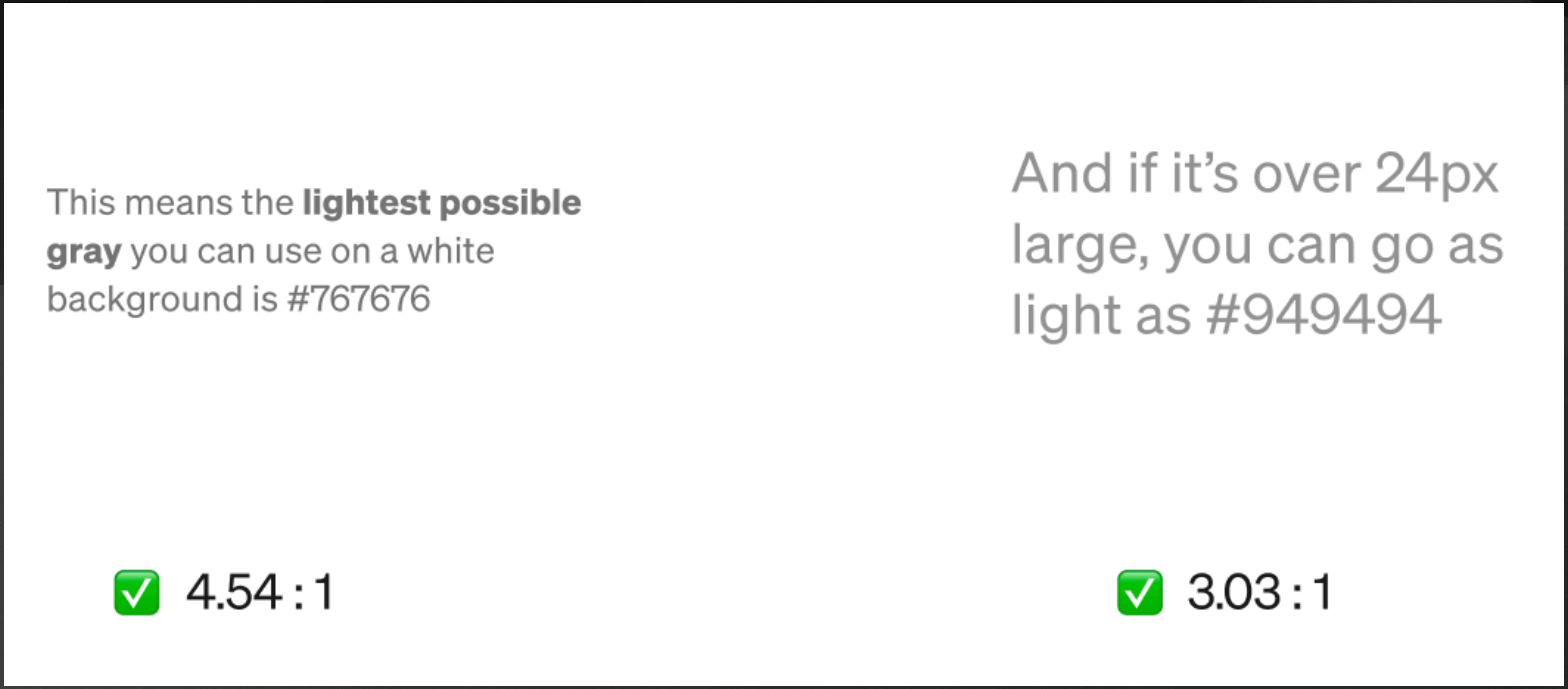
Insufficient contrast between text and background

❌ 2.97 : 1

Sufficient contrast between text and background

✅ 11.07 : 1

Sufficient contrast between text and background



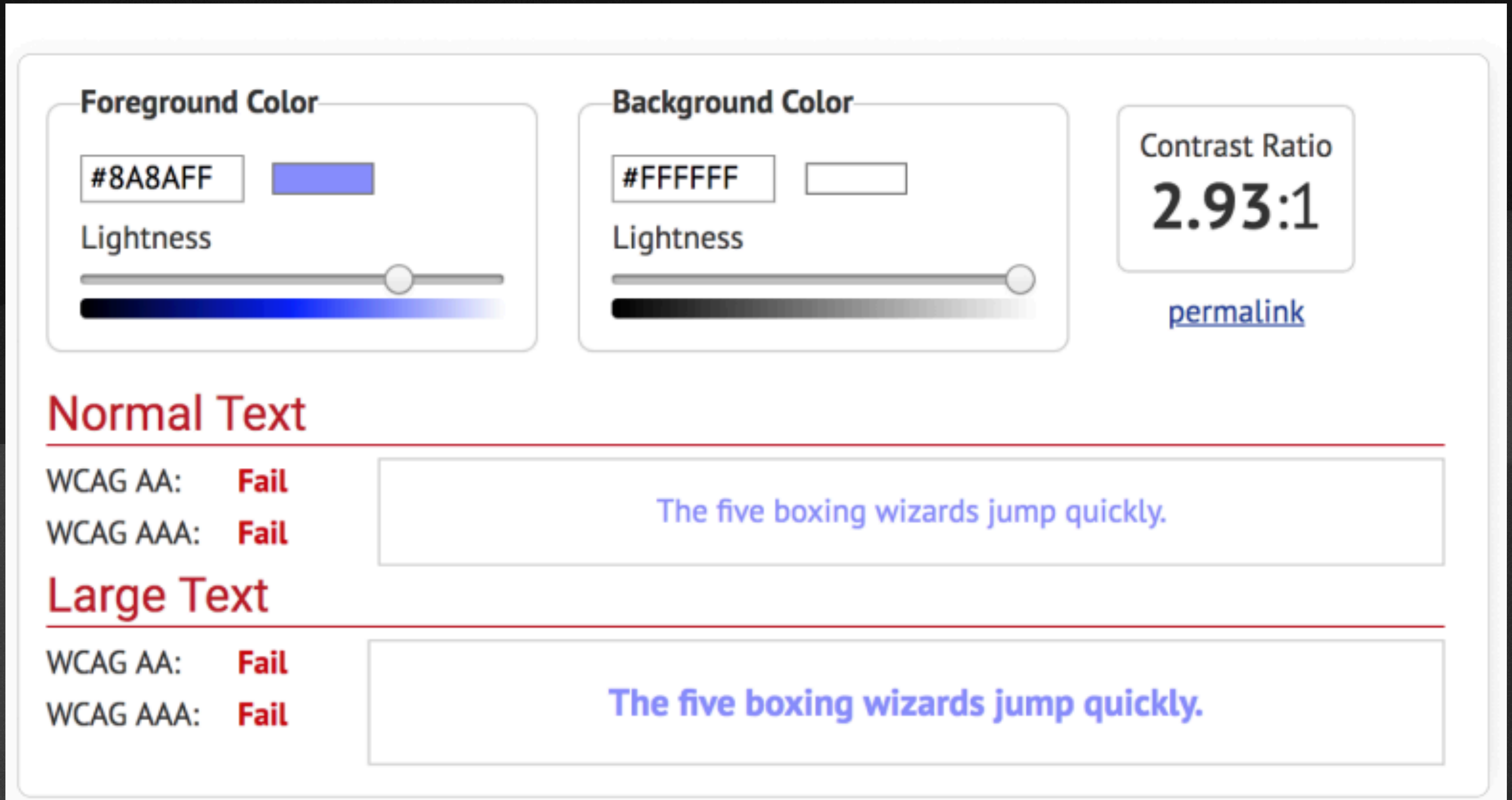
This means the **lightest possible gray** you can use on a white background is #767676

✅ 4.54 : 1

And if it's over 24px large, you can go as light as #949494

✅ 3.03 : 1

How do we determine a contrast ratio?



Foreground Color

#8A8AFF

Lightness

Background Color

#FFFFFF

Lightness

Contrast Ratio

2.93:1

permalink

Normal Text

WCAG AA: **Fail**

WCAG AAA: **Fail**

The five boxing wizards jump quickly.

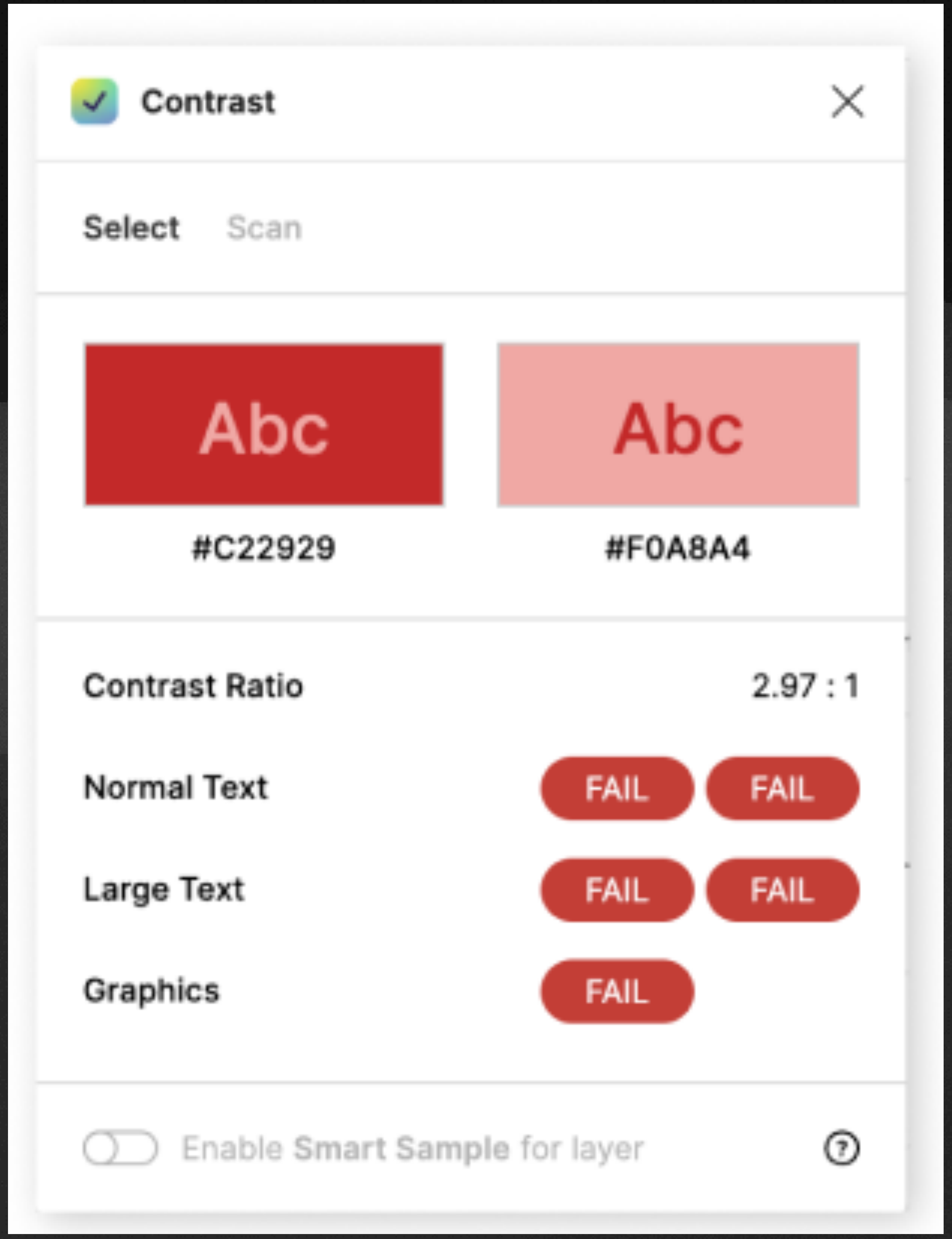
Large Text

WCAG AA: **Fail**

WCAG AAA: **Fail**

The five boxing wizards jump quickly.

WebAIM online tool



Contrast

Select Scan

Abc Abc

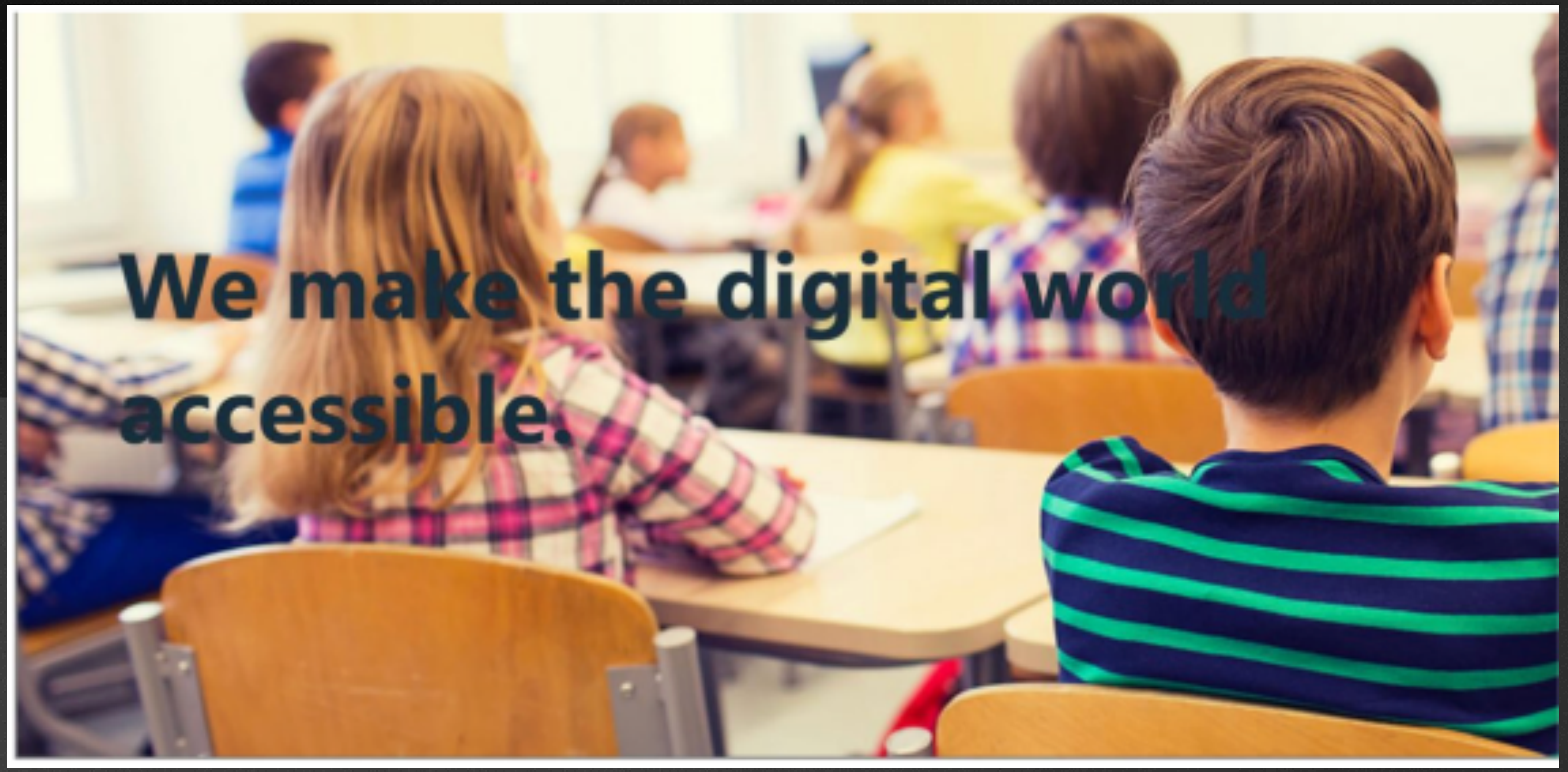
#C22929 #F0A8A4

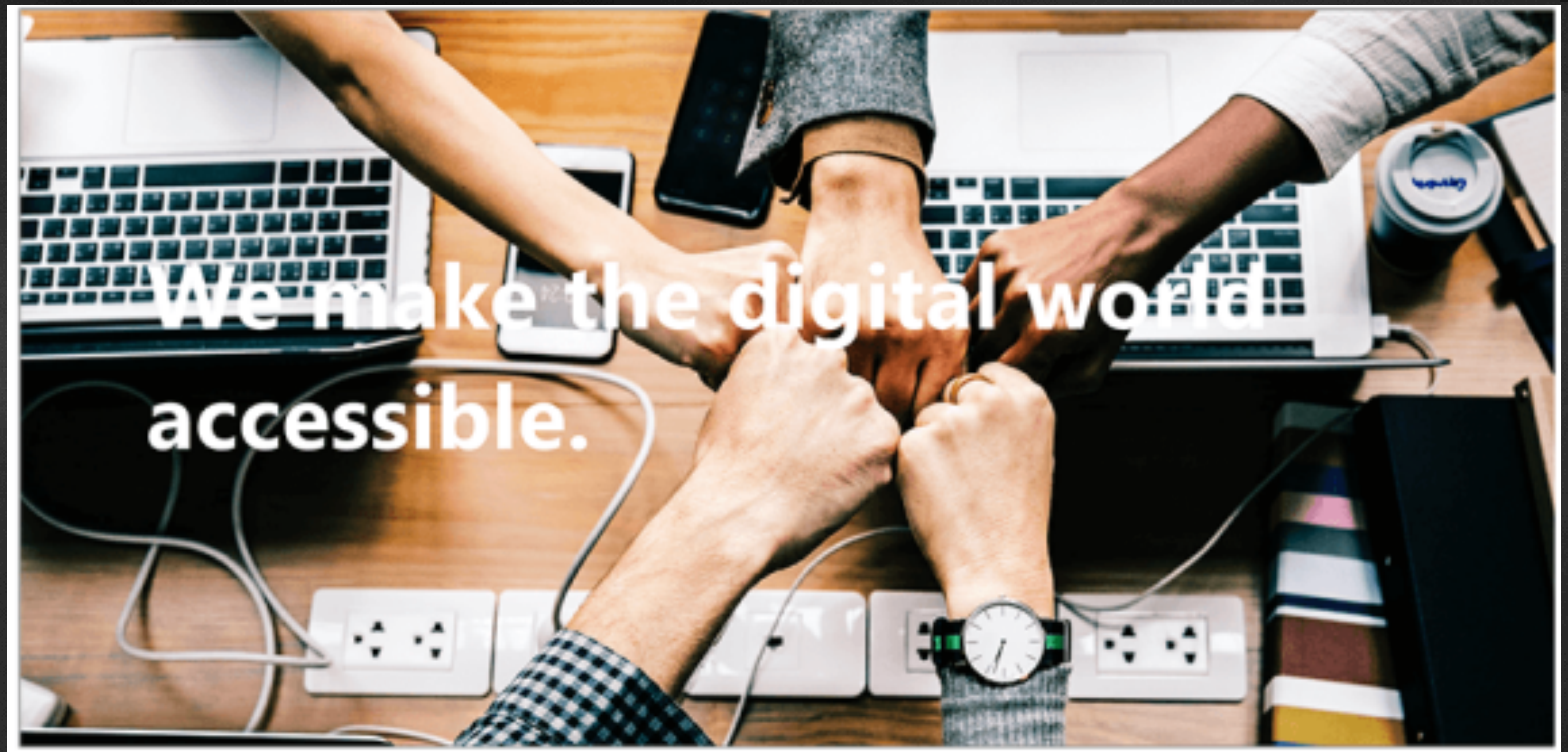
Contrast Ratio	2.97 : 1
Normal Text	FAIL FAIL
Large Text	FAIL FAIL
Graphics	FAIL

Enable Smart Sample for layer

Figma Contrast Plugin

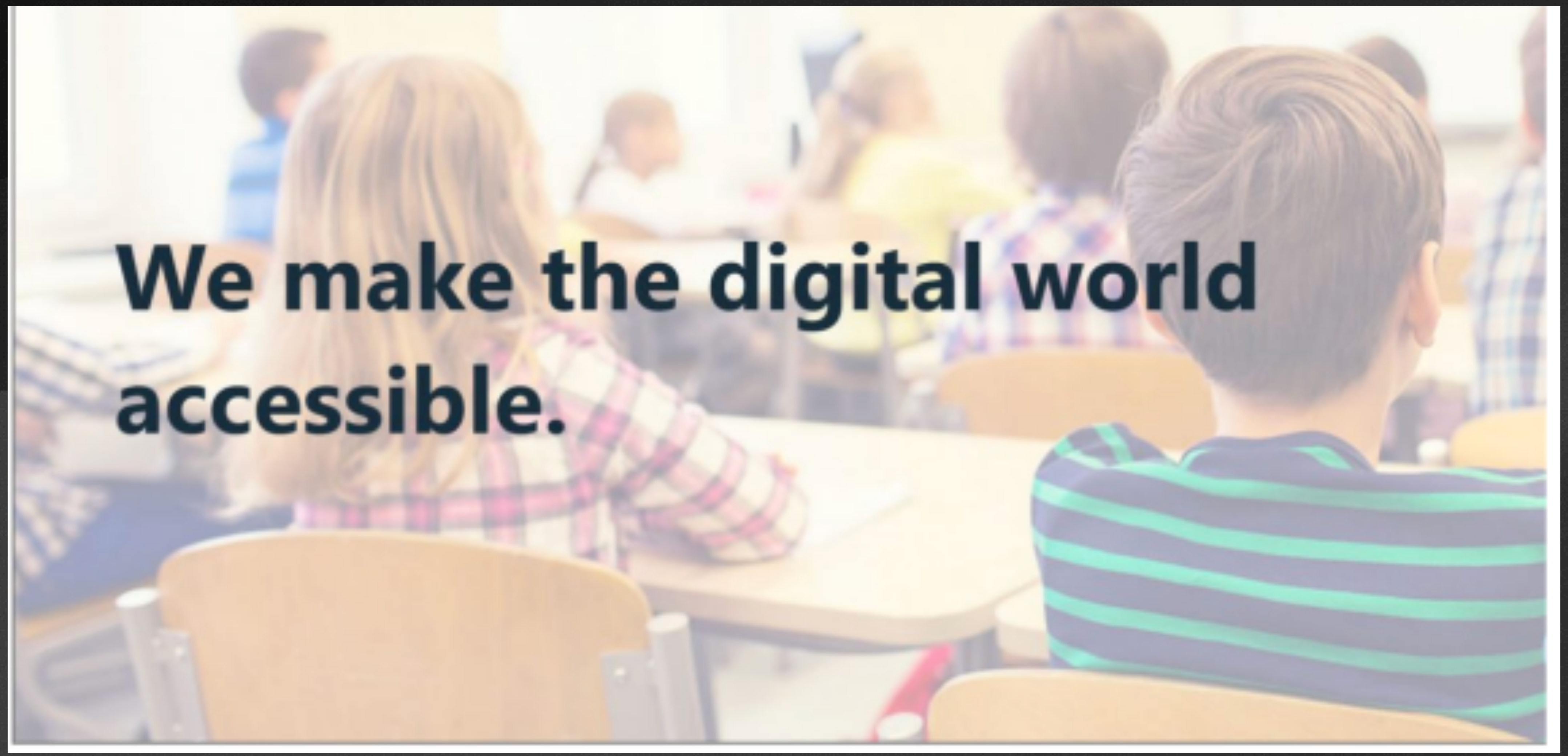
This applies to image backgrounds as well

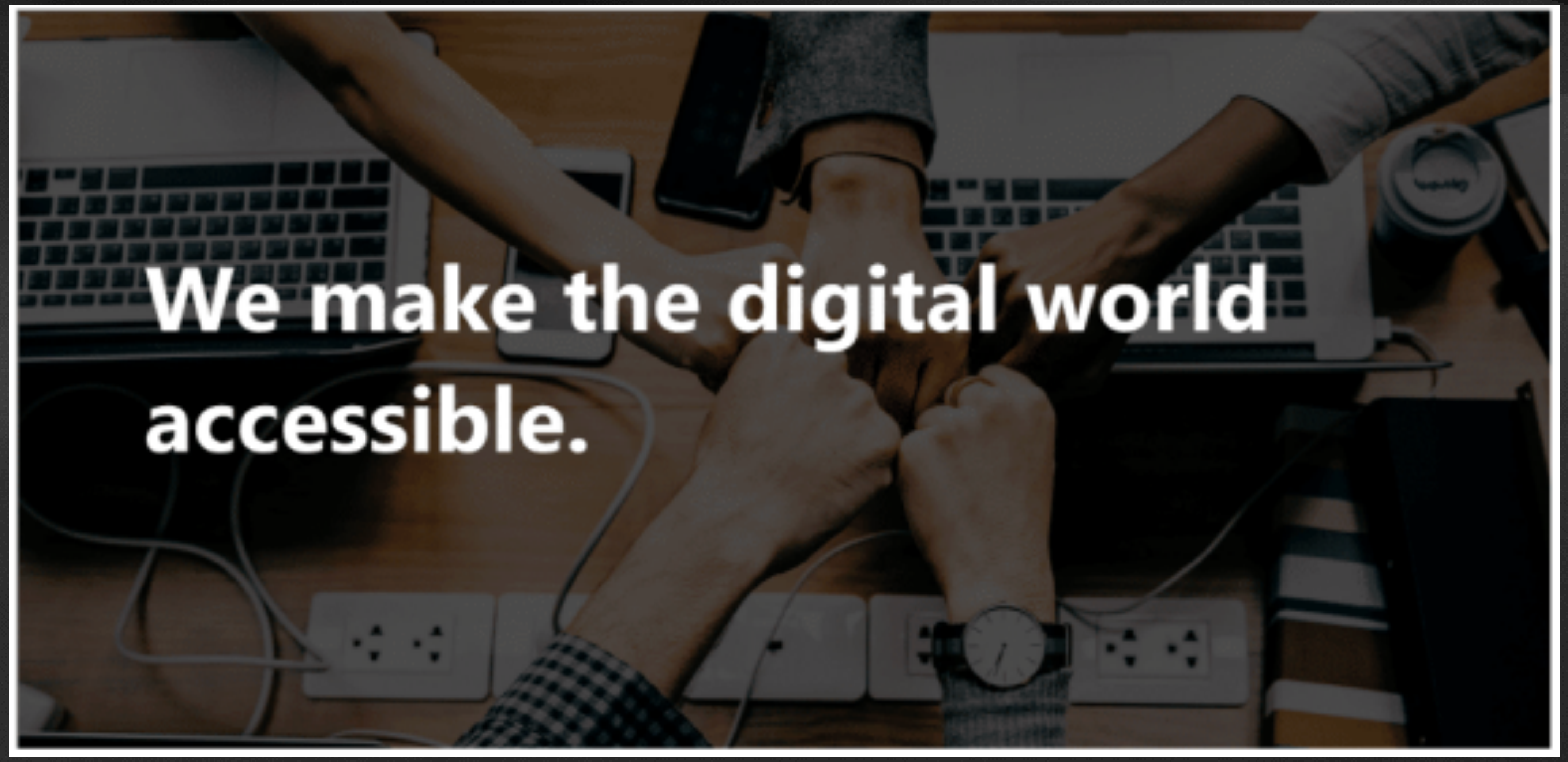




This applies to image backgrounds as well

Lighten and darken as necessary





Do this by overlaying a white or black rectangle of x% opacity :))

Mobile Typography

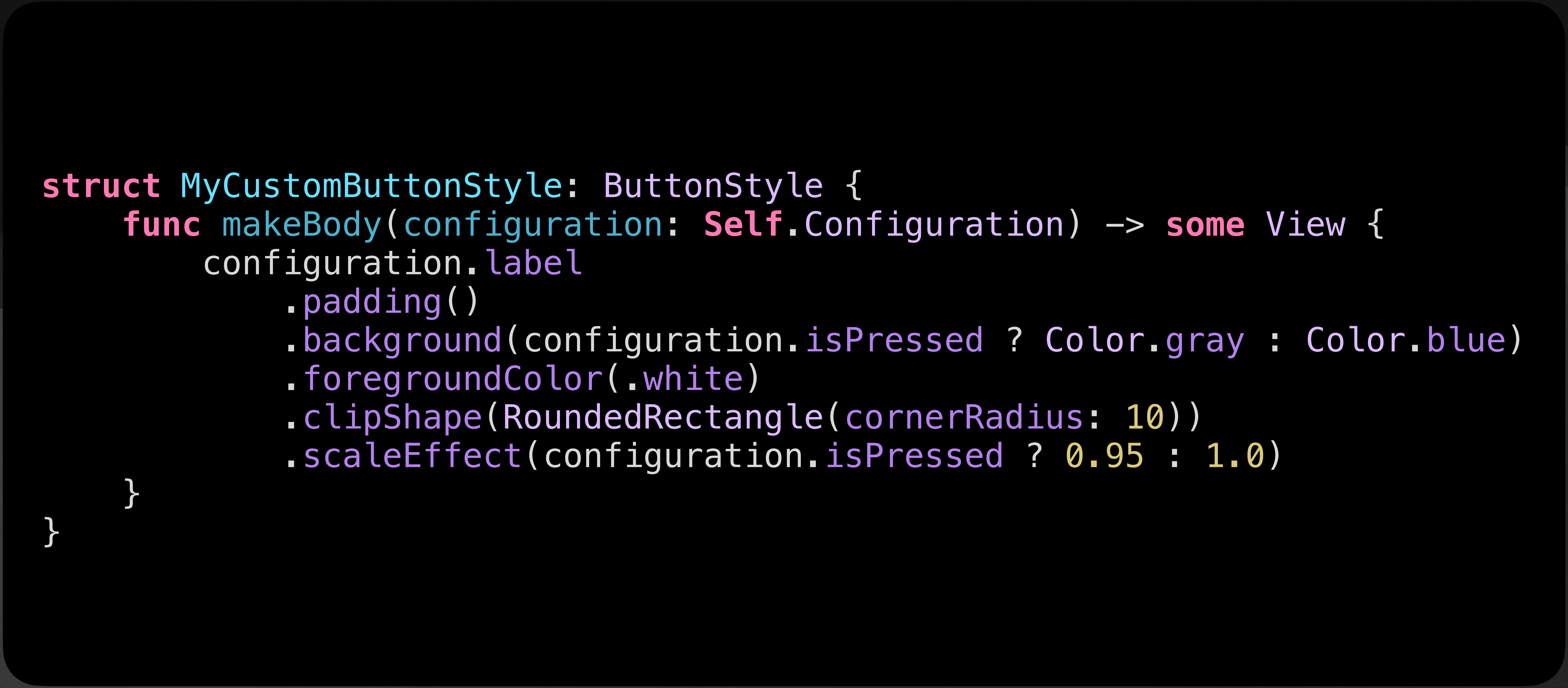
Mobile Typography

- **16px is a good base size to start with!**
- Increase to 18-20px for long-form reading
- Decrease as low as 10px for tertiary elements
- Always test on your real device to get a feel for sizing!

Coding for Custom UI

Custom Button Style

1 Defining a Custom Button Style



```
struct MyCustomButtonStyle: ButtonStyle {
    func makeBody(configuration: Self.Configuration) -> some View {
        configuration.label
            .padding()
            .background(configuration.isPressed ? Color.gray : Color.blue)
            .foregroundColor(.white)
            .clipShape(RoundedRectangle(cornerRadius: 10))
            .scaleEffect(configuration.isPressed ? 0.95 : 1.0)
    }
}
```

2 Using a Custom Button Style

```swift
struct ContentView: View {
    var body: some View {
        Button("Press Me") {
            print("Button pressed!")
        }
        .buttonStyle(MyCustomButtonStyle())
    }
}
```

Custom View Modifier

1 Defining a Custom View Modifier

```swift
struct MyCustomModifier: ViewModifier {
    var backgroundColor: Color = .green

    func body(content: Content) -> some View {
        content
            .padding()
            .background(backgroundColor)
            .clipShape(Circle())
            .shadow(radius: 10)
    }
}
```

2 Wrapping a Custom View Modifier

```swift
extension View {
    func myCustomStyle(backgroundColor: Color = .green) -> some View {
        self.modifier(MyCustomModifier(backgroundColor: backgroundColor))
    }
}
```

3 Using a Custom View Modifier

```
struct ContentView: View {
    var body: some View {
        Text("Hello, World!")
            .myCustomStyle(backgroundColor: .blue)
    }
}
```

More…

- App Icon
- App Launch Animation
- Custom Color Set
- Compatibility for multiple OS versions/platforms

Thank You!