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?

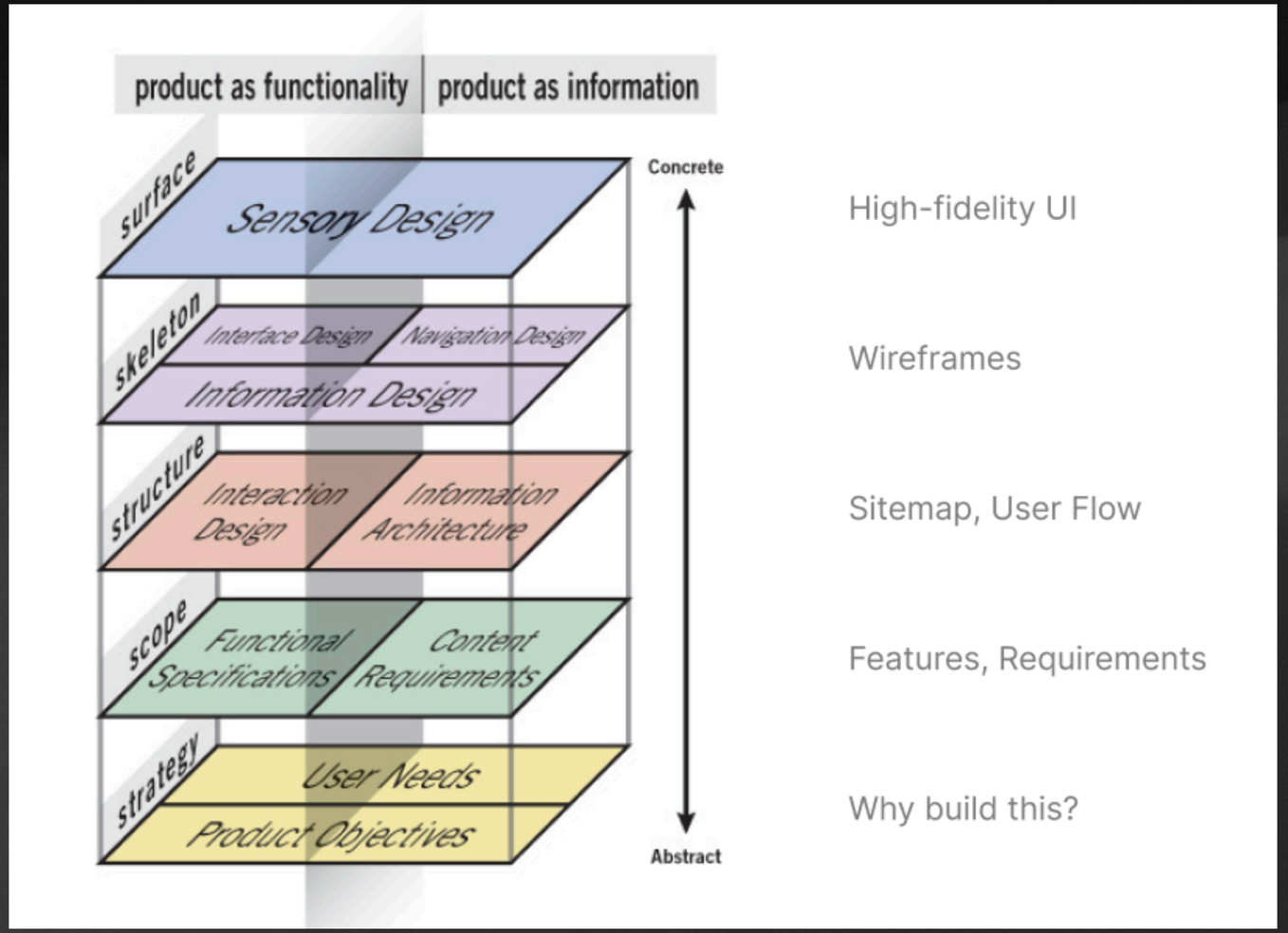
What do we need to know?

- **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?

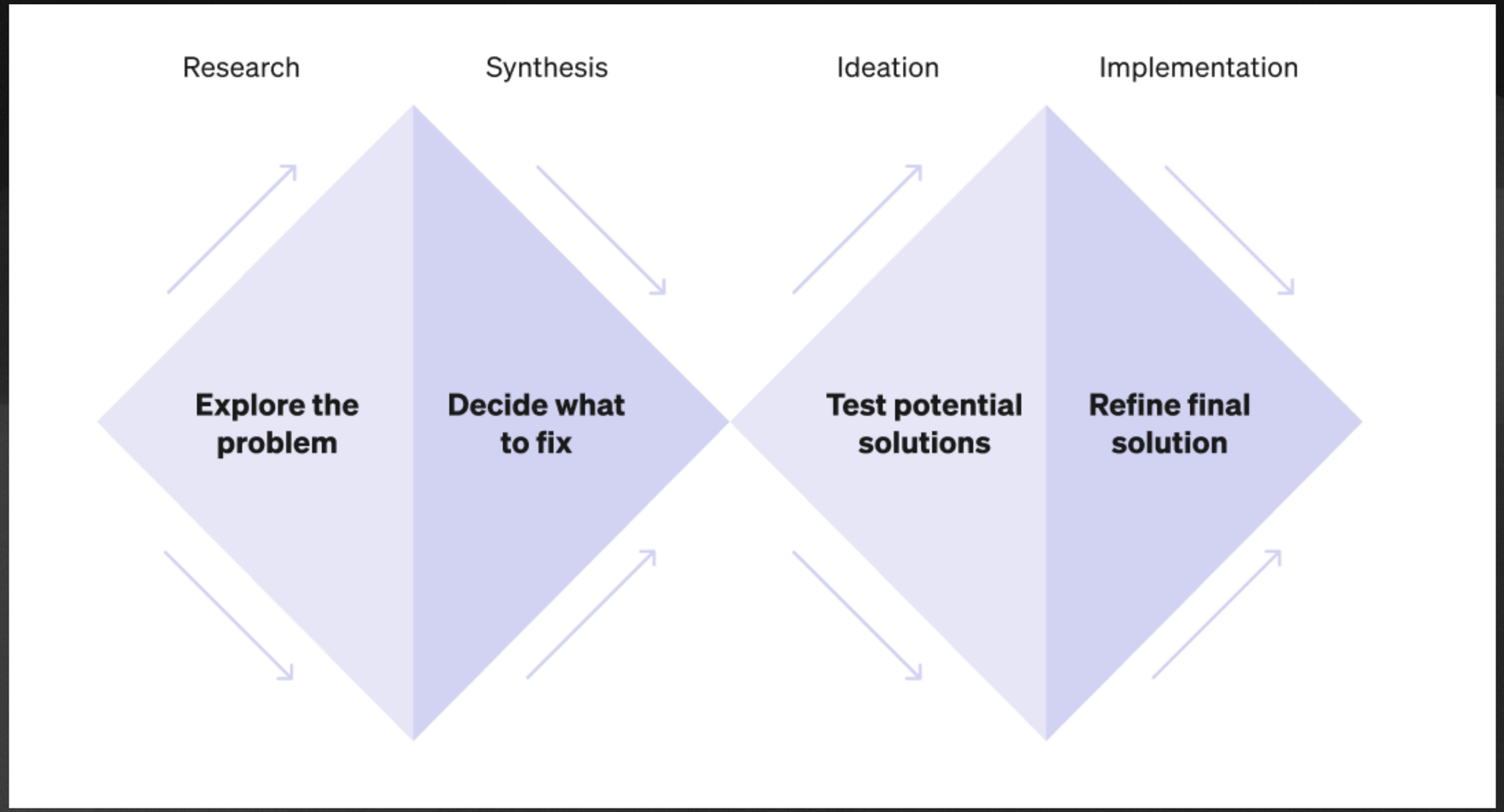
- **UI** = User interface, aka what the user **sees** on our app
- **UX** = User experience, aka how the user **interacts** with our app

The Planes of UX

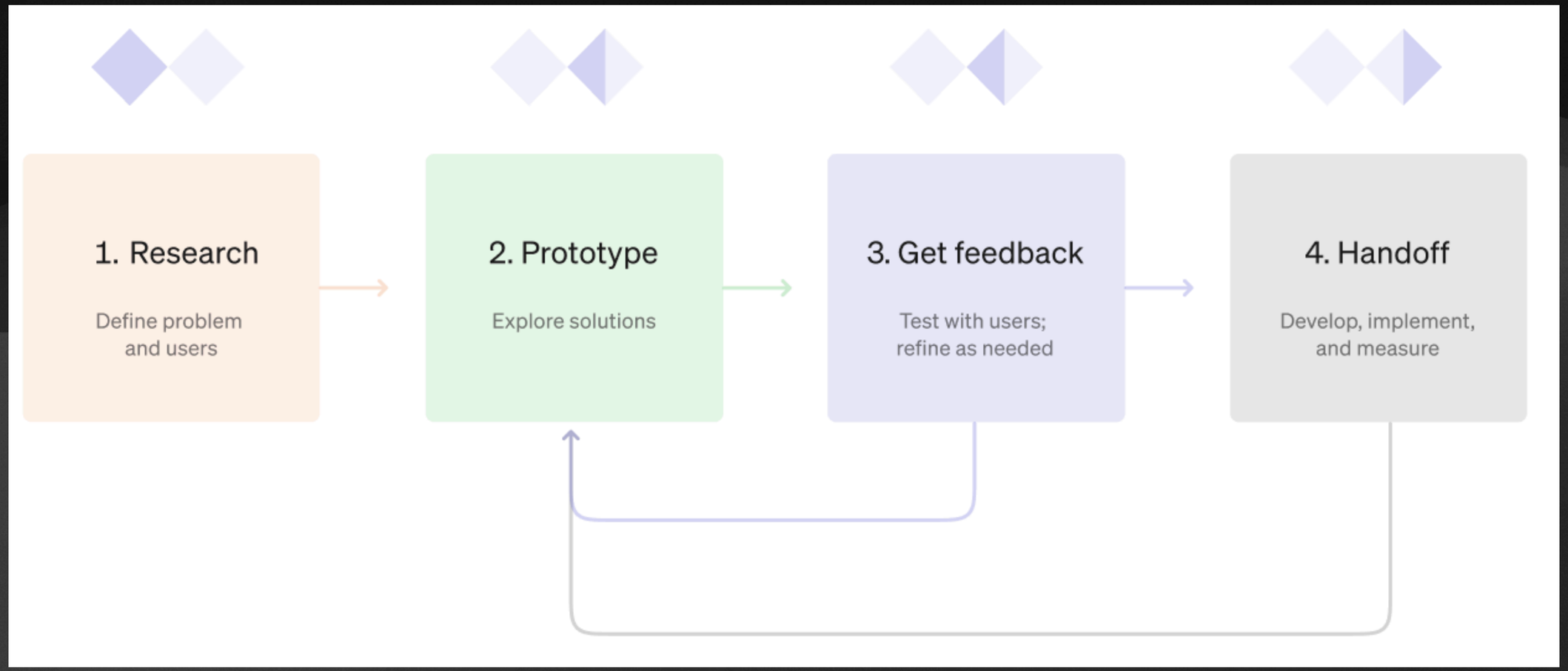


From The Elements of User Experience by Jesse James Garrett

Design Thinking



The UX Process



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

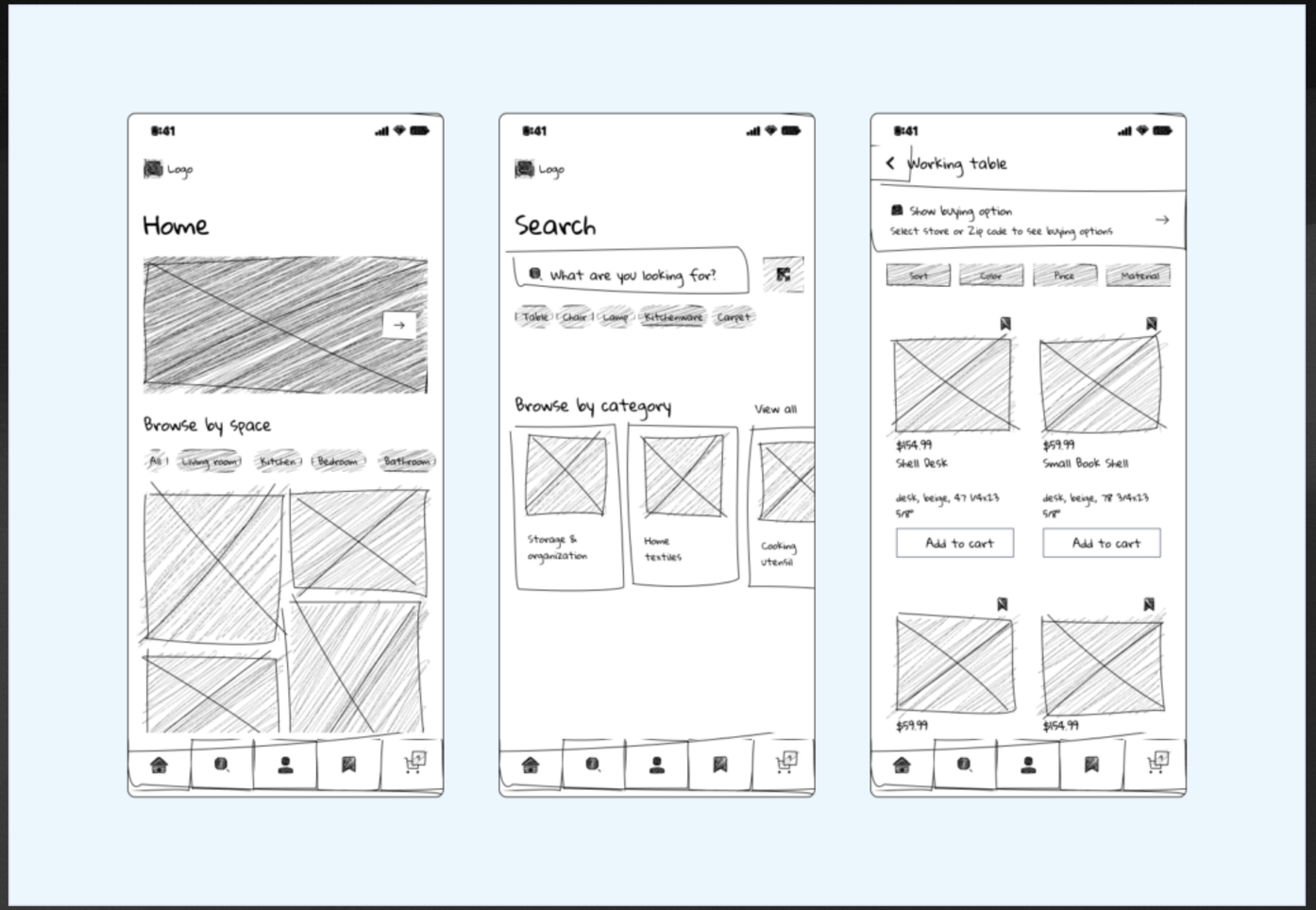
Definition

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

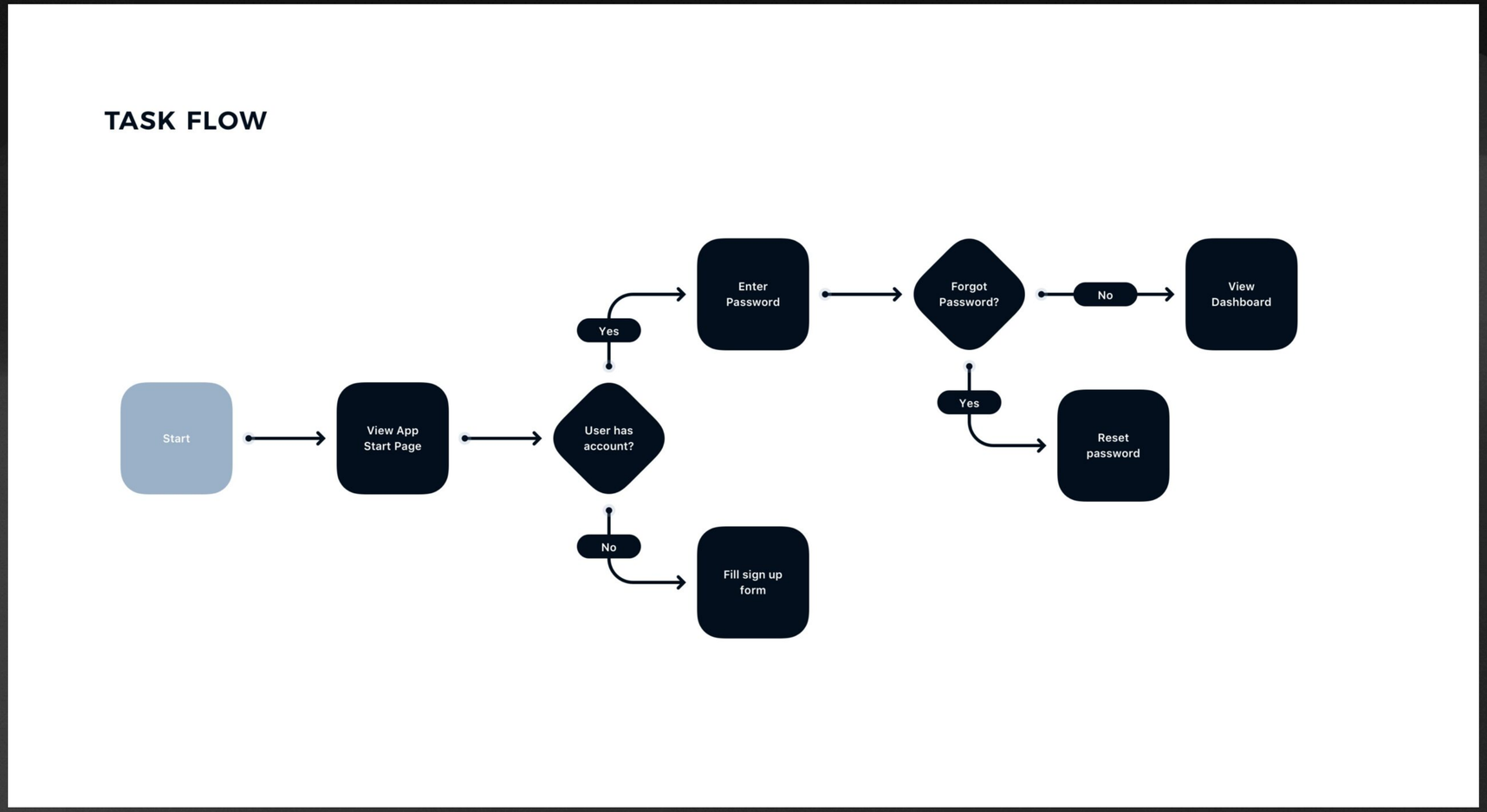
User Flow

Definition

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

User Flow

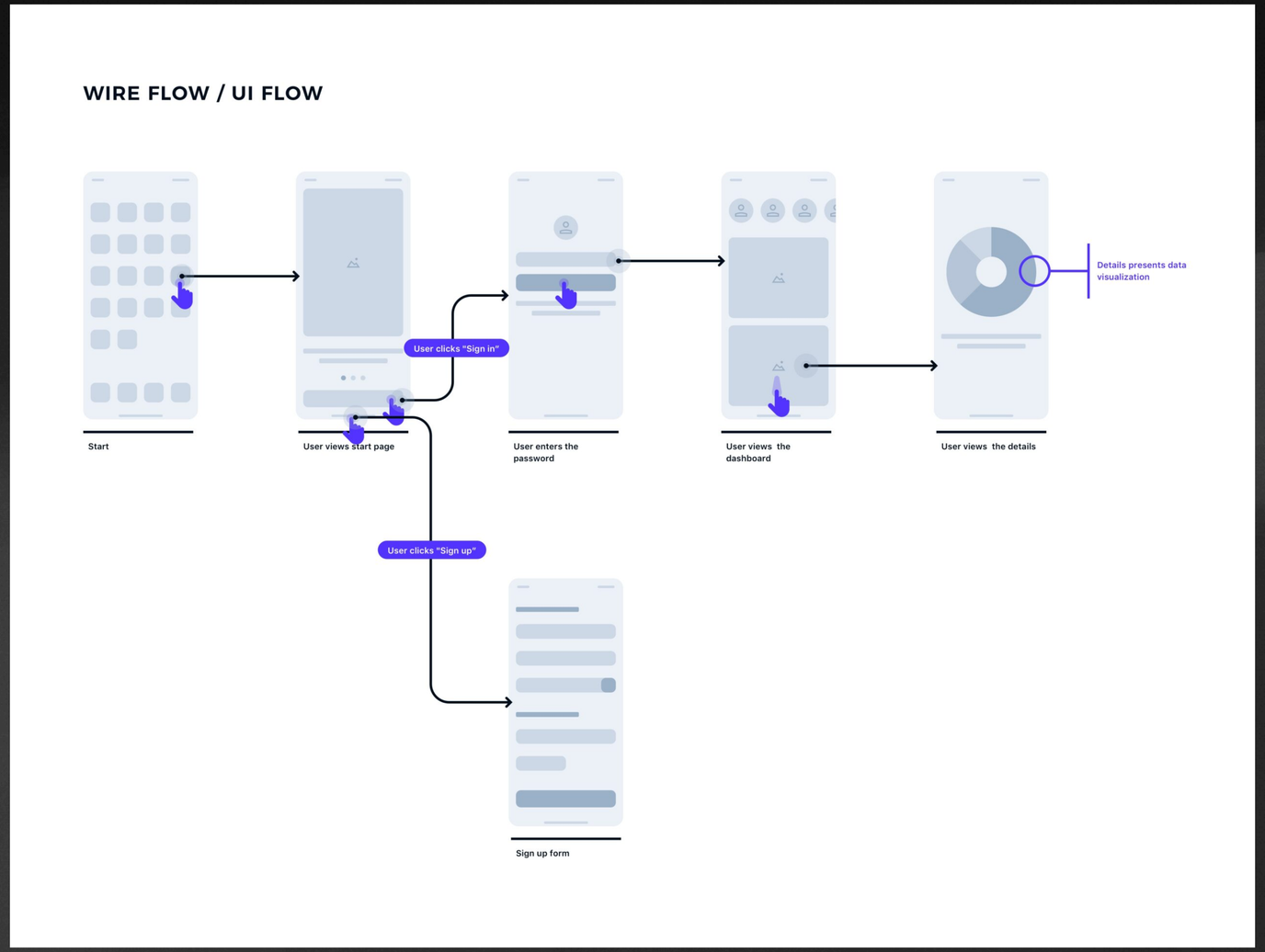
Example



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

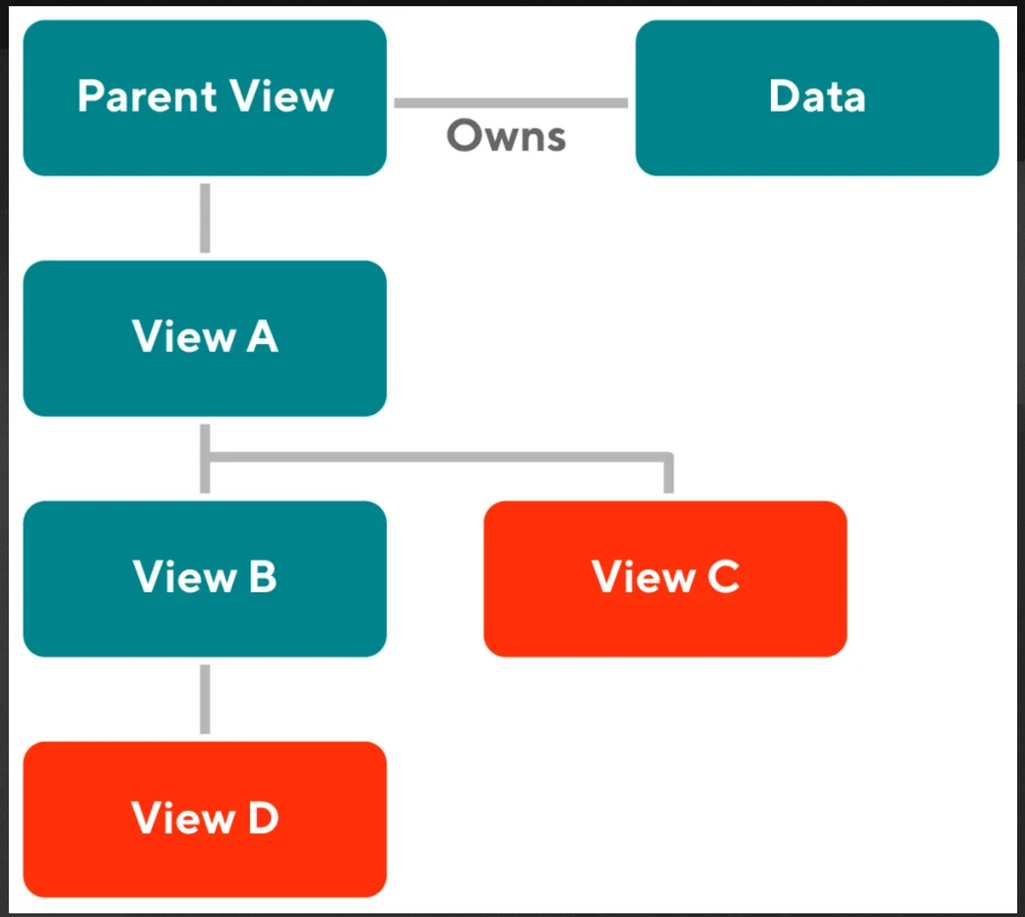
Your Turn!

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

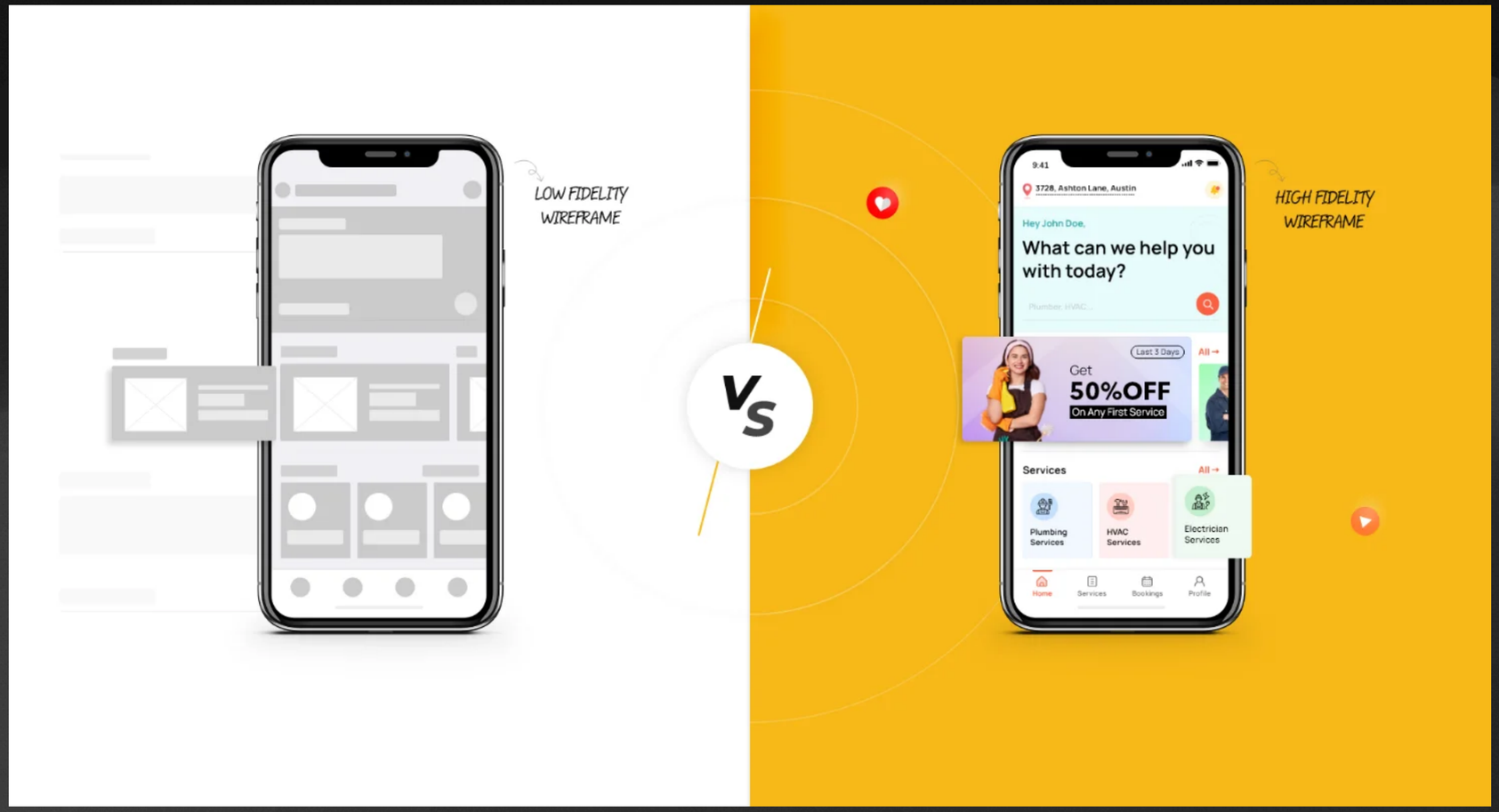
Definition

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

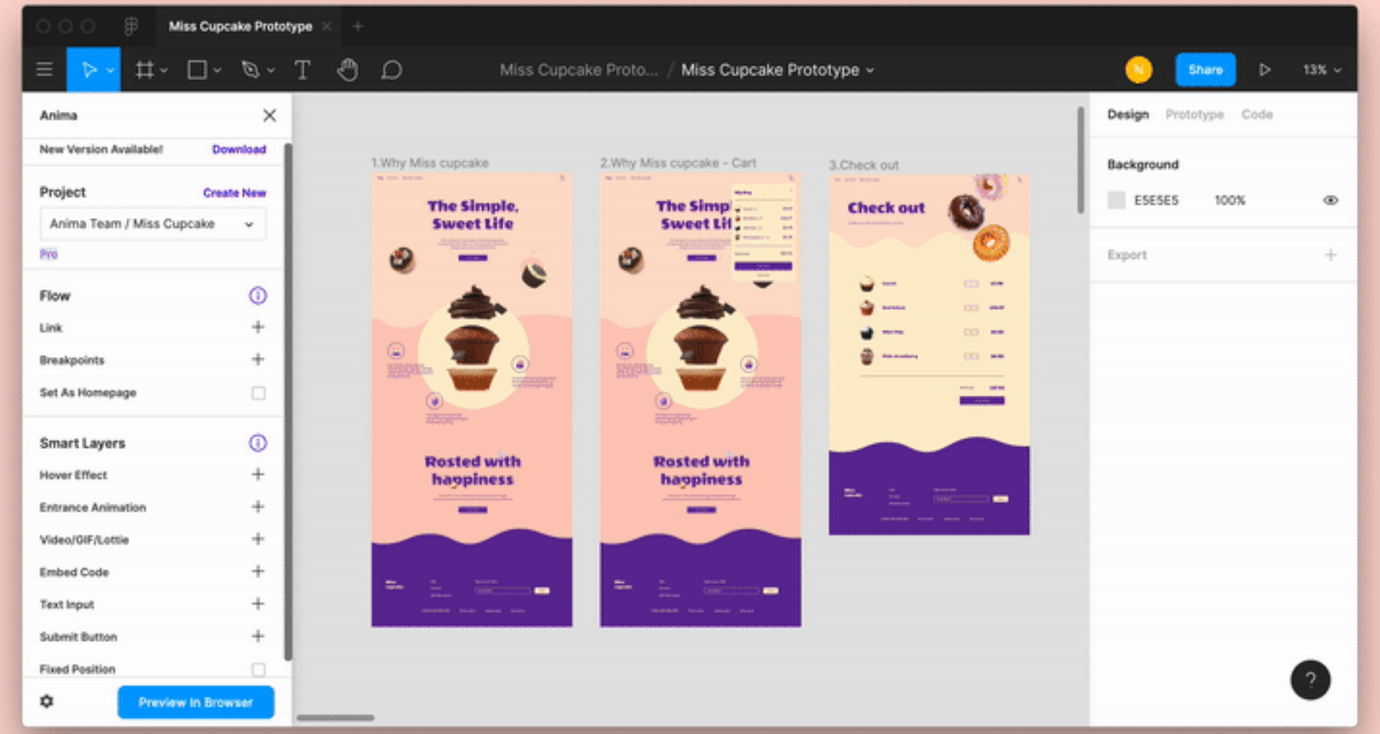
Example



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

DSGN 2570, Tom McQuaid, University of Pennsylvania

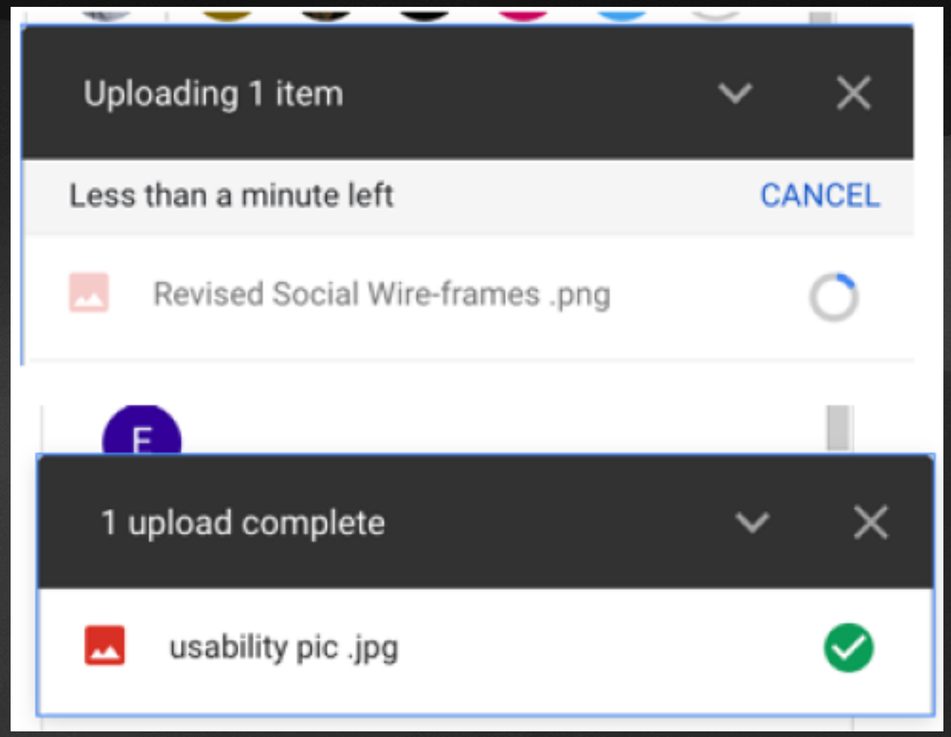
1. Visibility of system status

Visibility of system status

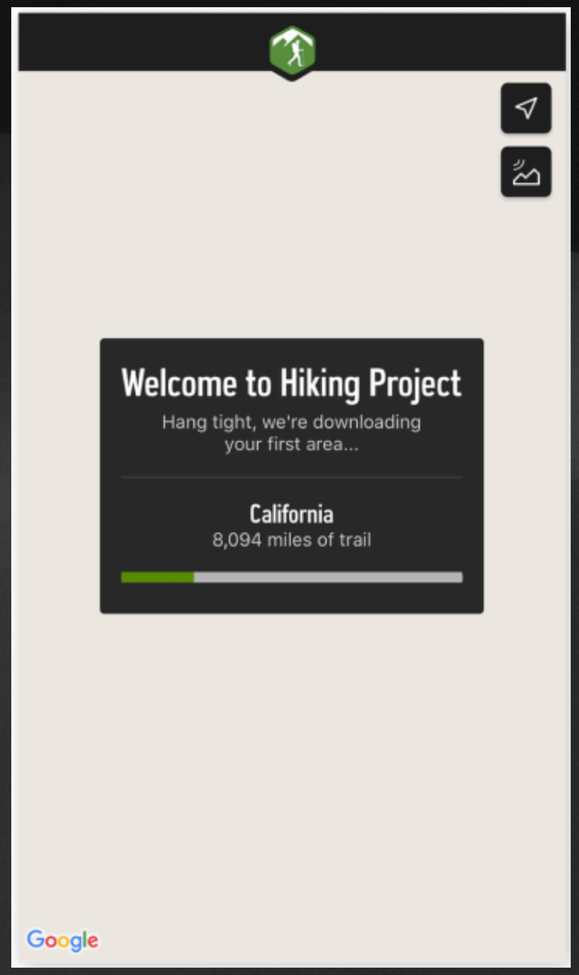
Keep users informed about what’s going on.

Visibility of system status

Visibility of system status



Visibility of system status

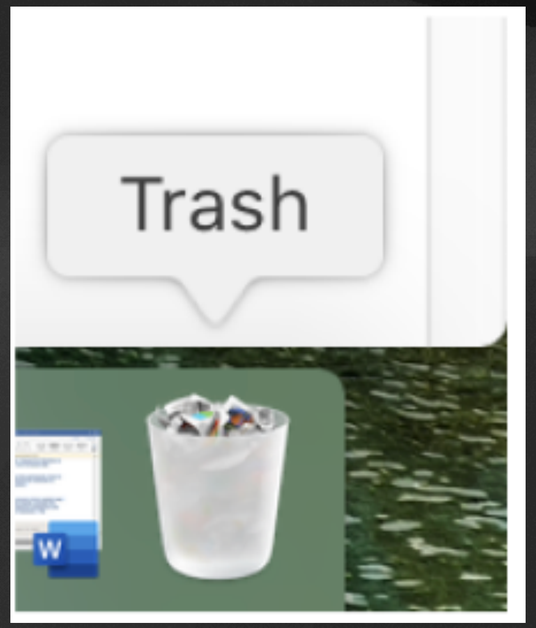


2. Match between system and the real world

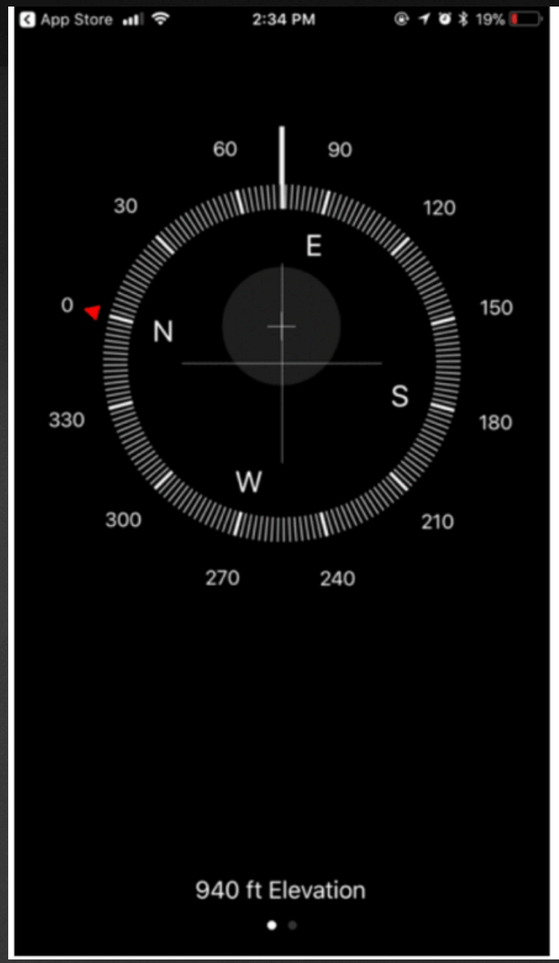
Match between system and the real world

Speak the users’ language

Match between system and the real world



Match between system and the real world

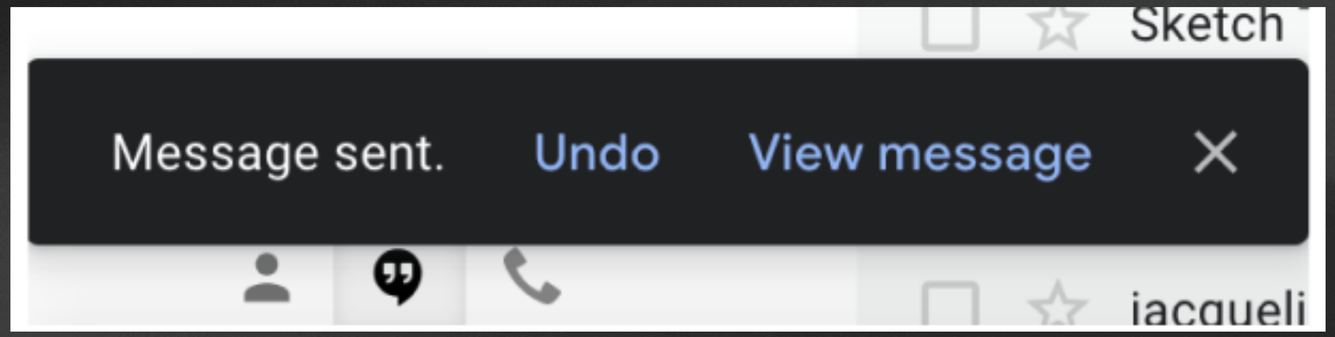


3. User control and freedom

User control and freedom

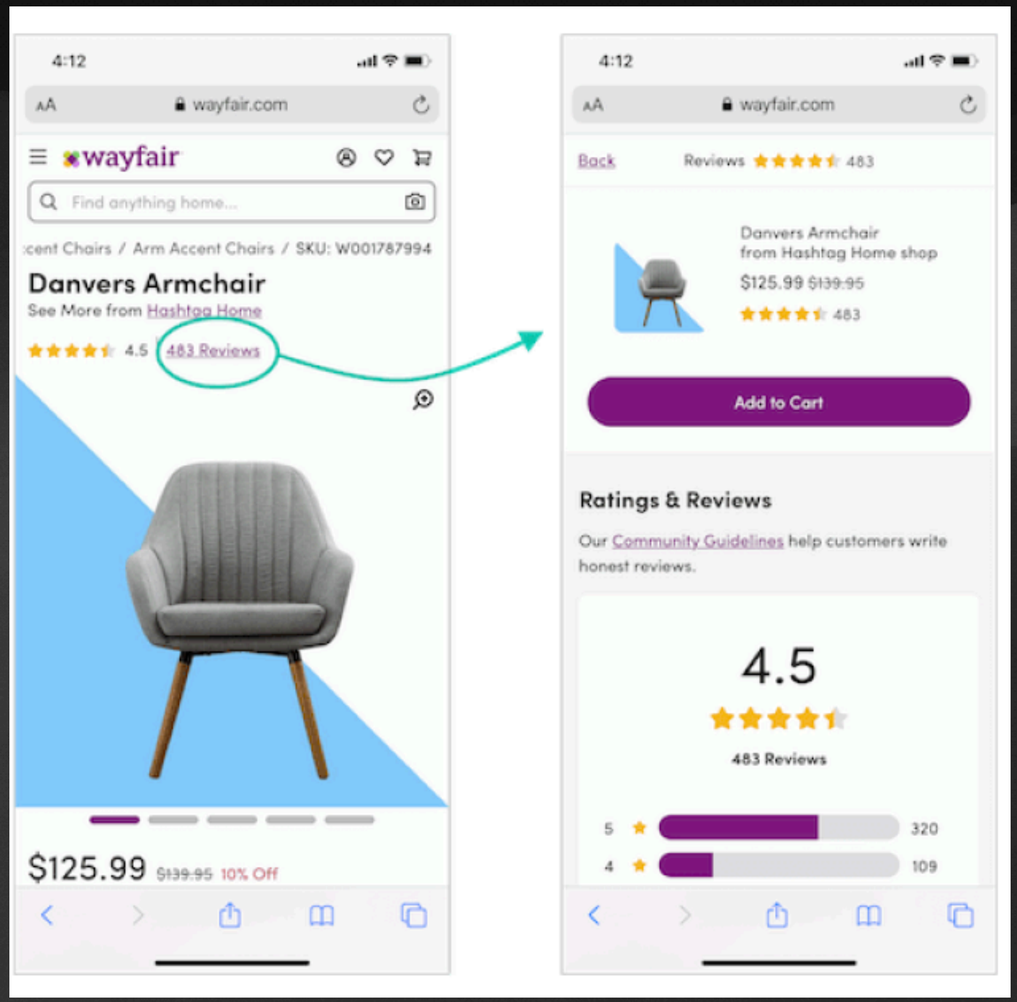
Make it easy to leave a flow or undo an action

User control and freedom

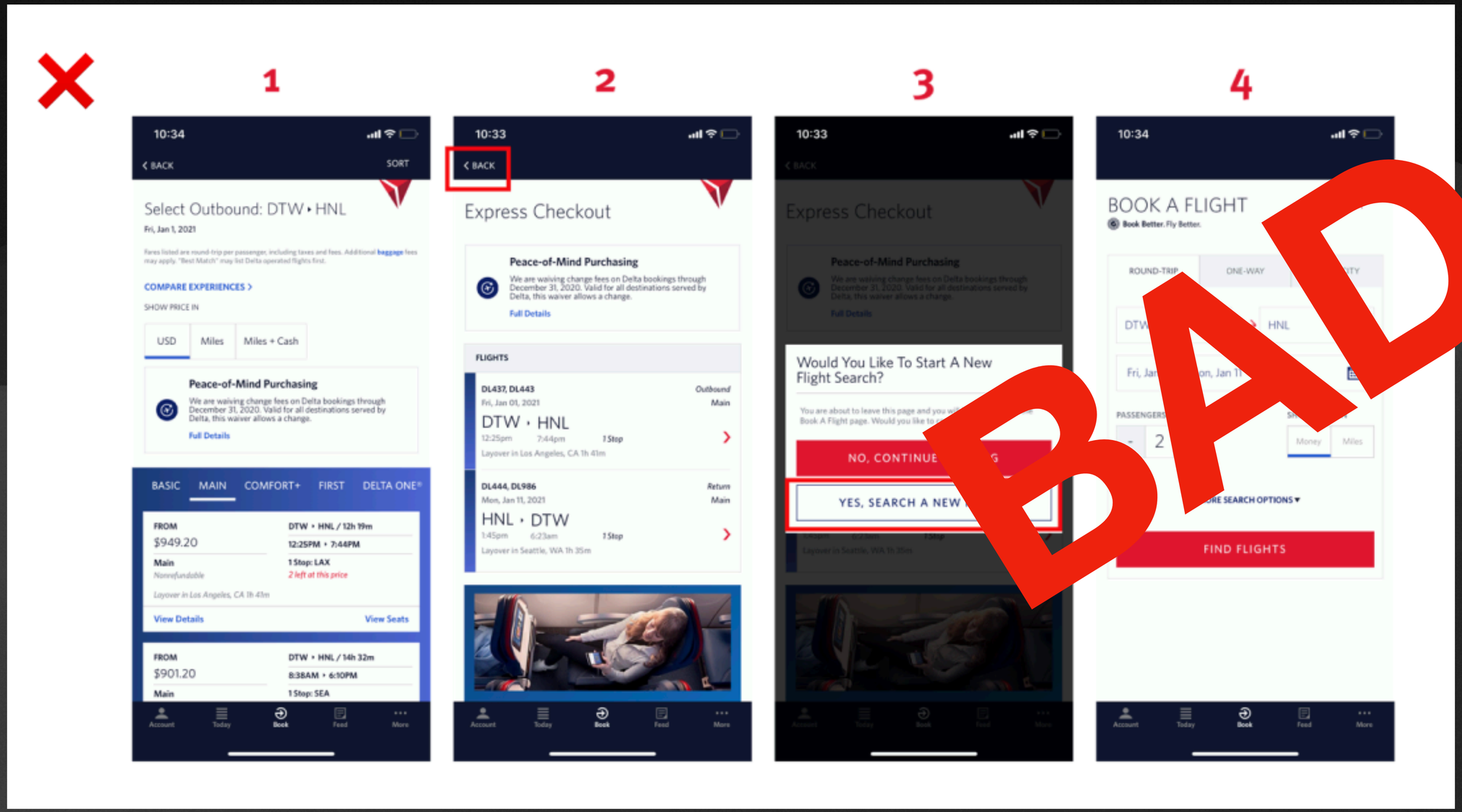


User control and freedom

User control and freedom



User control and freedom



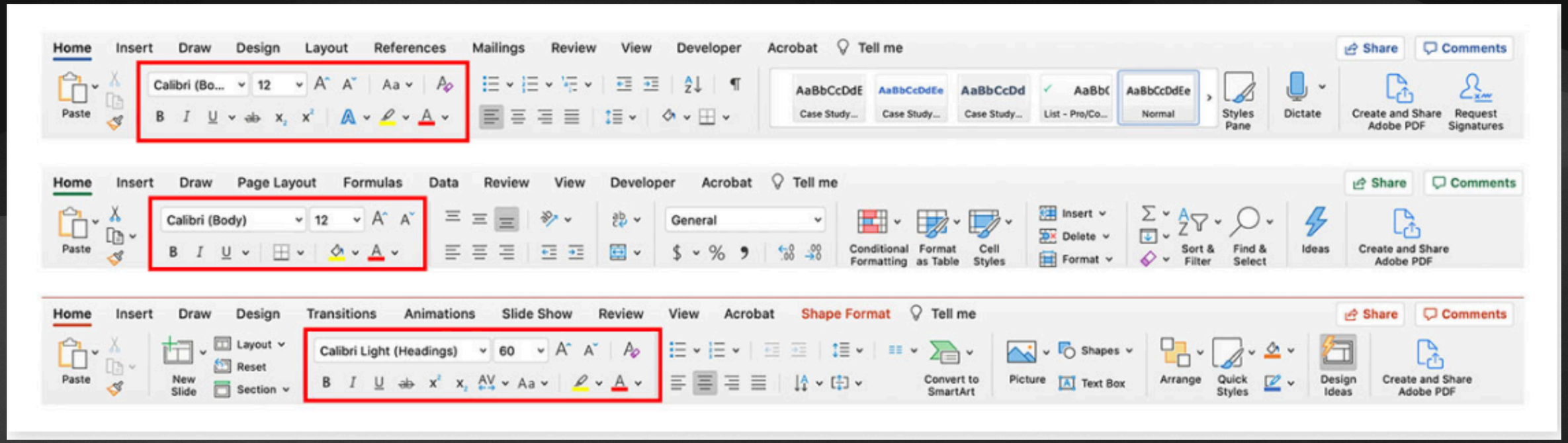
4. Consistency and standards

Consistency and standards

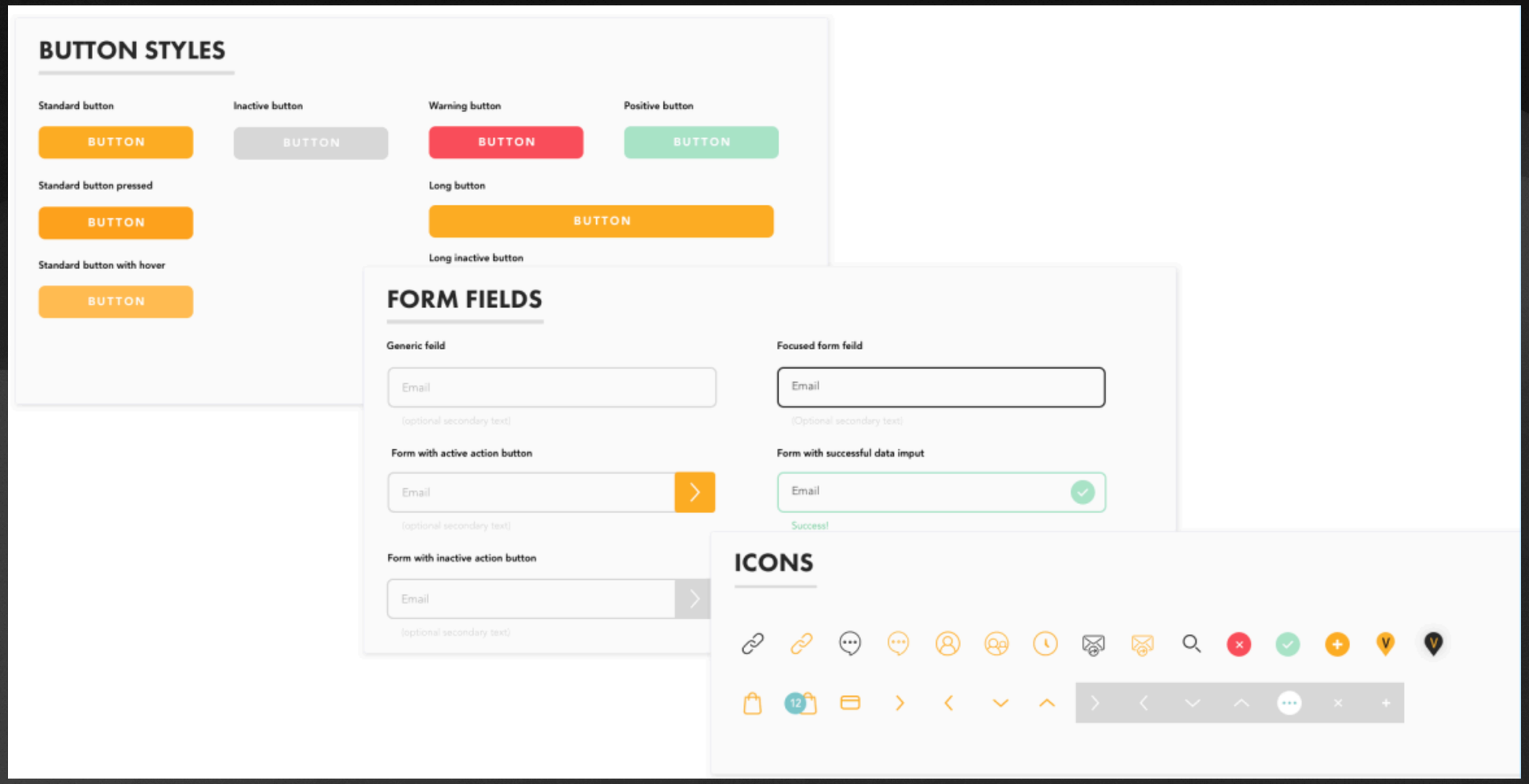
Jakob’s Law:

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.

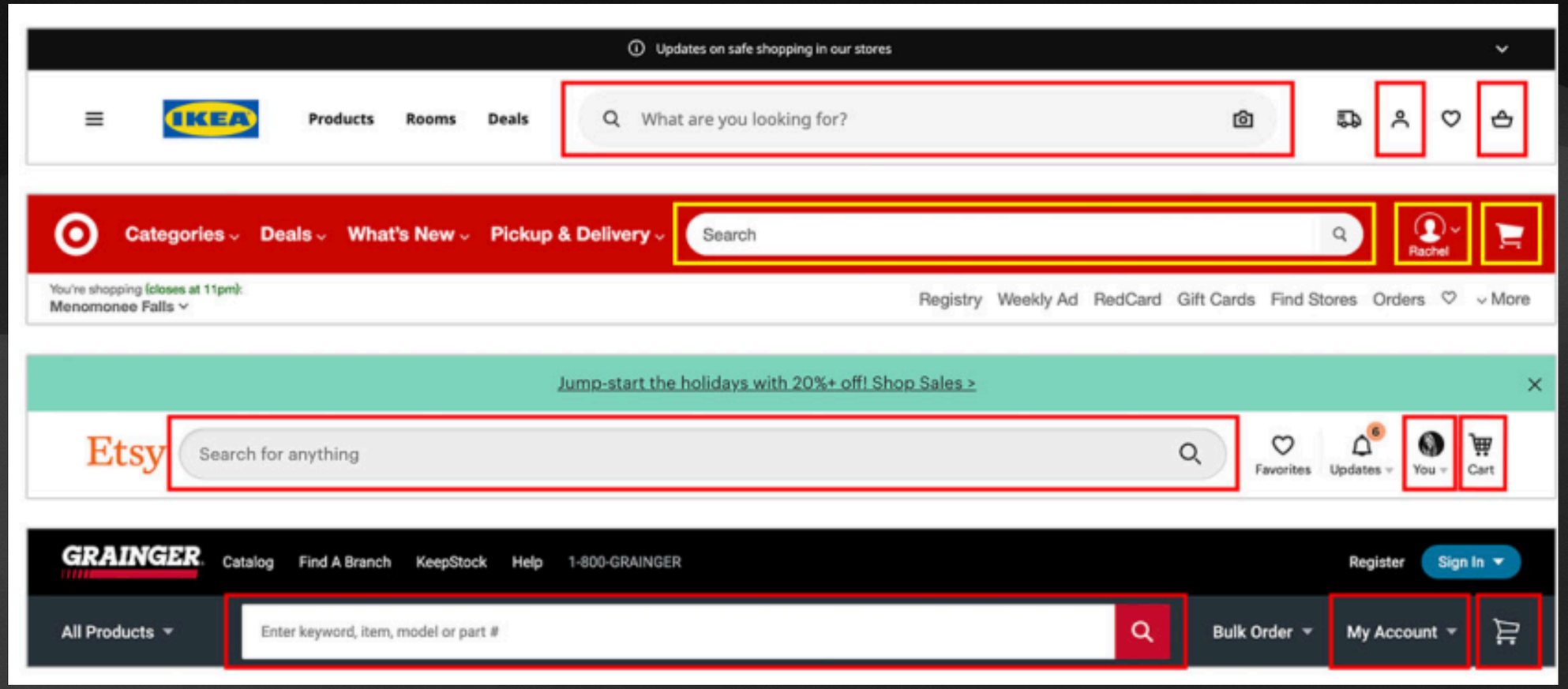
Consistency and standards



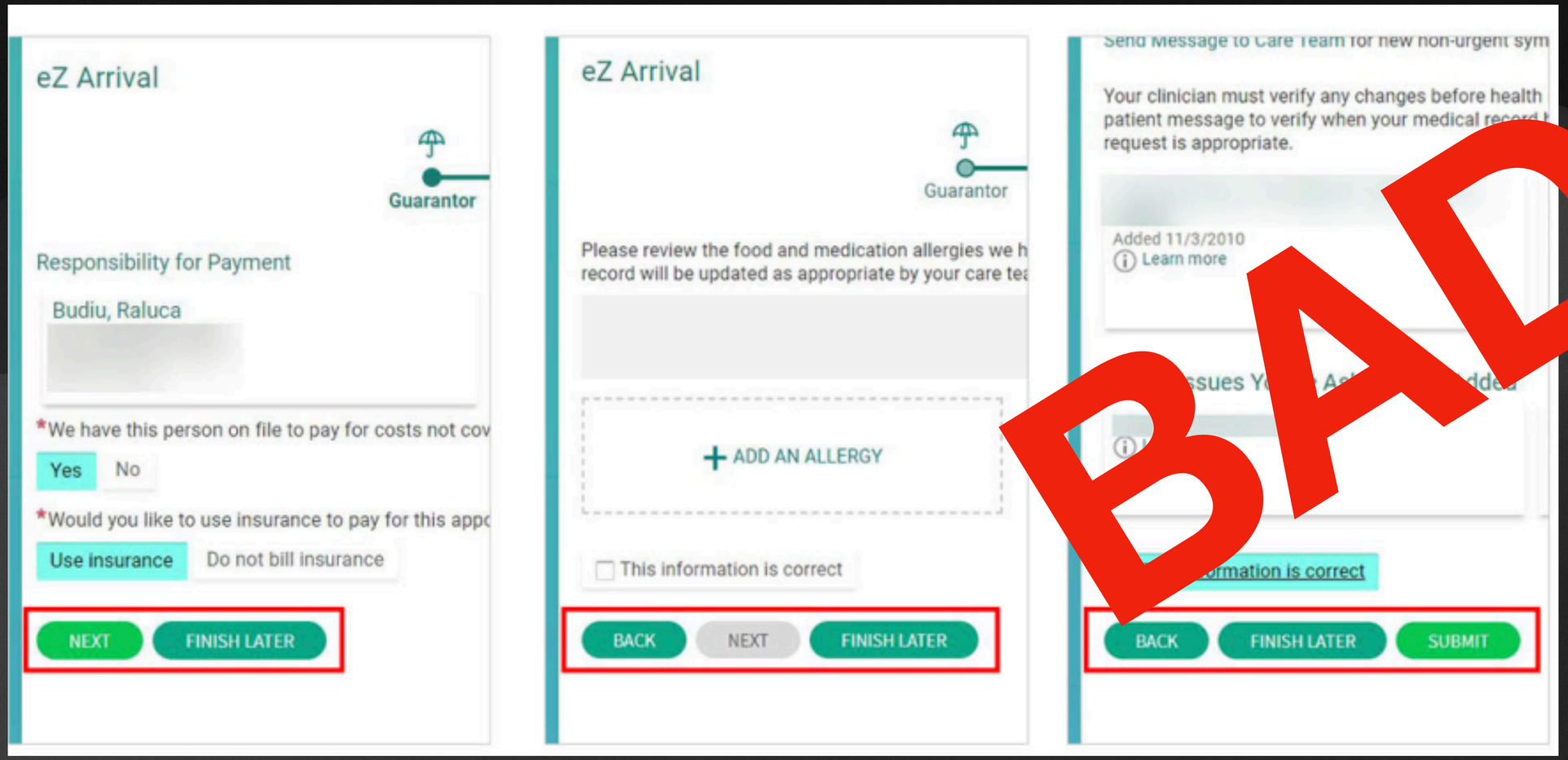
Consistency and standards



Consistency and standards



Consistency and standards

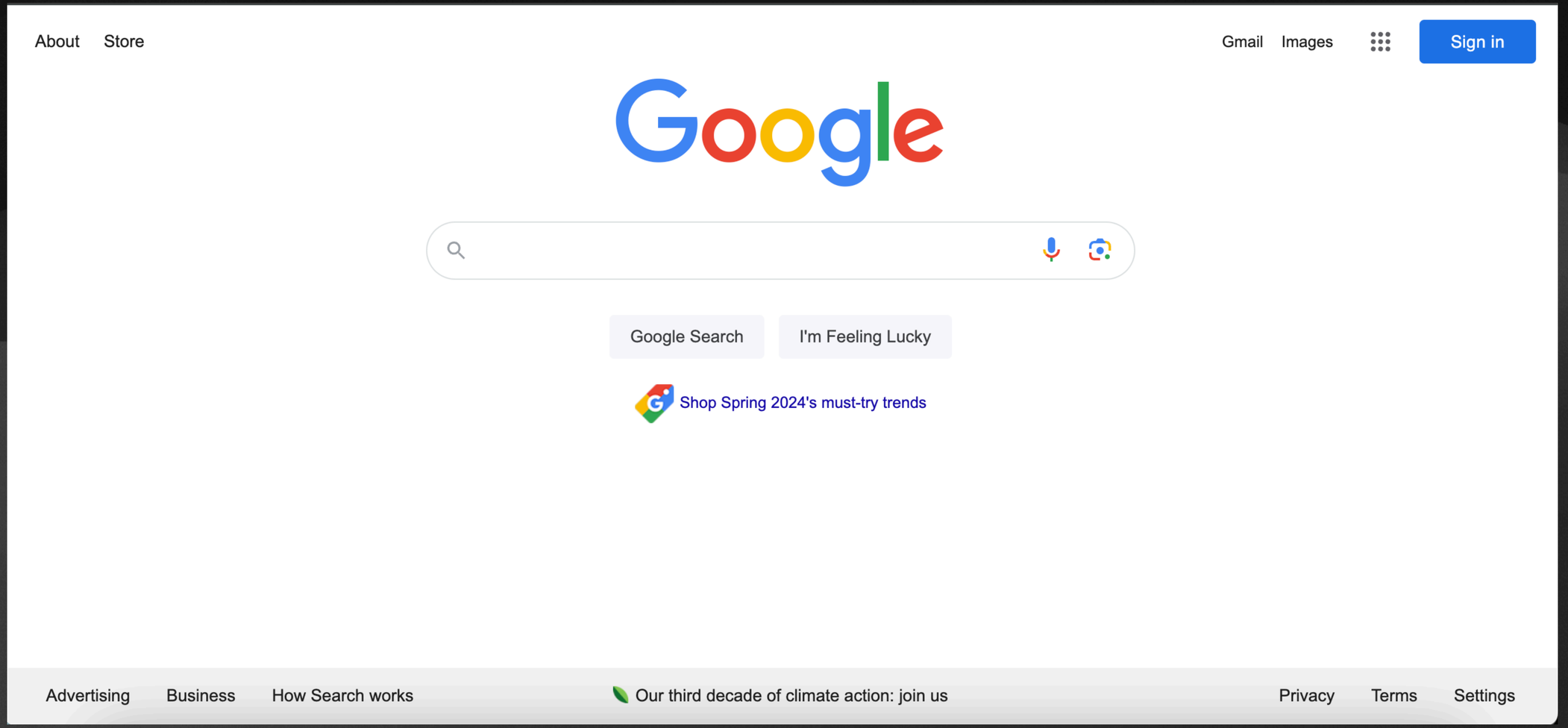


5. Aesthetic and minimalist design

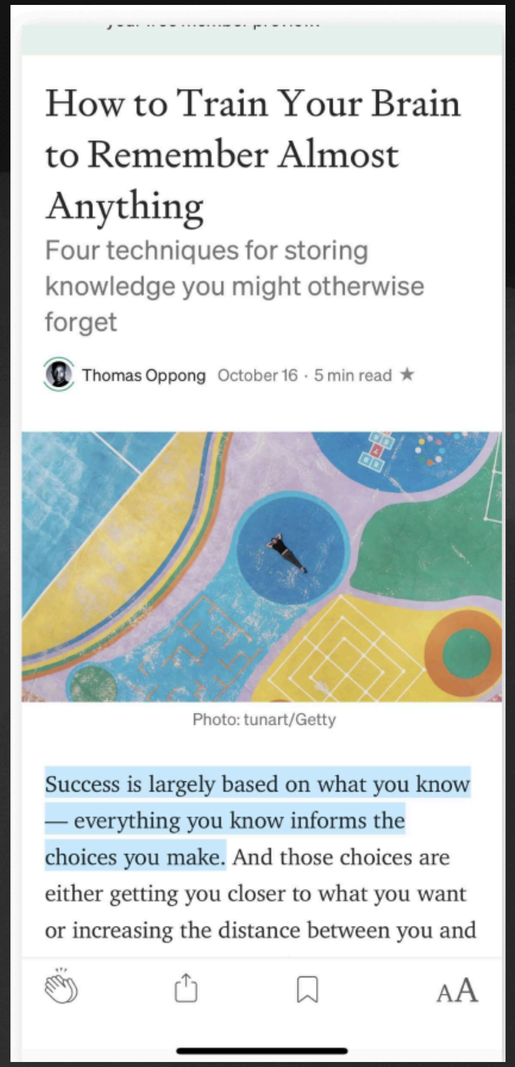
Aesthetic and minimalist design

Provide relevant information. Remove clutter.

Aesthetic and minimalist design



Aesthetic and minimalist design



How to Train Your Brain to Remember Almost Anything

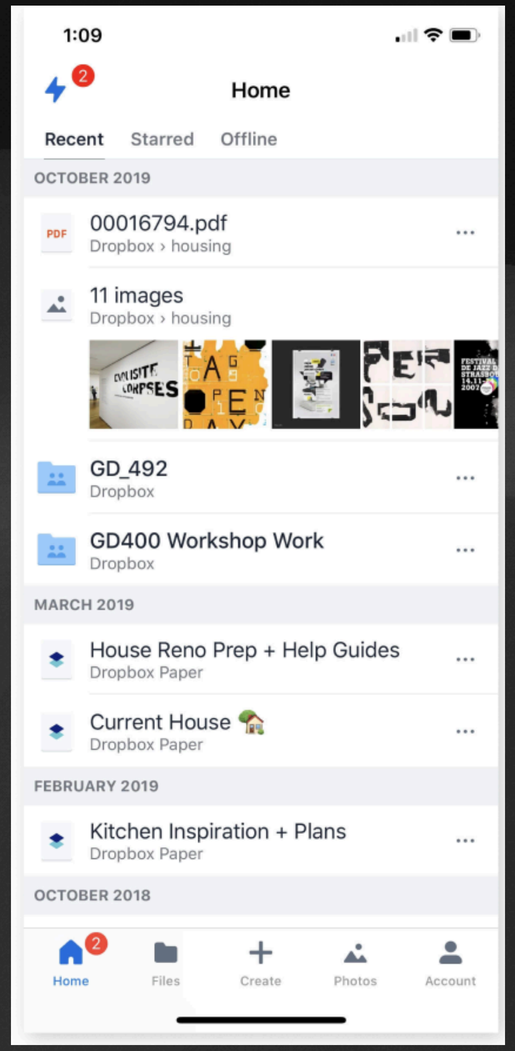
Four techniques for storing knowledge you might otherwise forget

Thomas Oppong October 16 · 5 min read ★

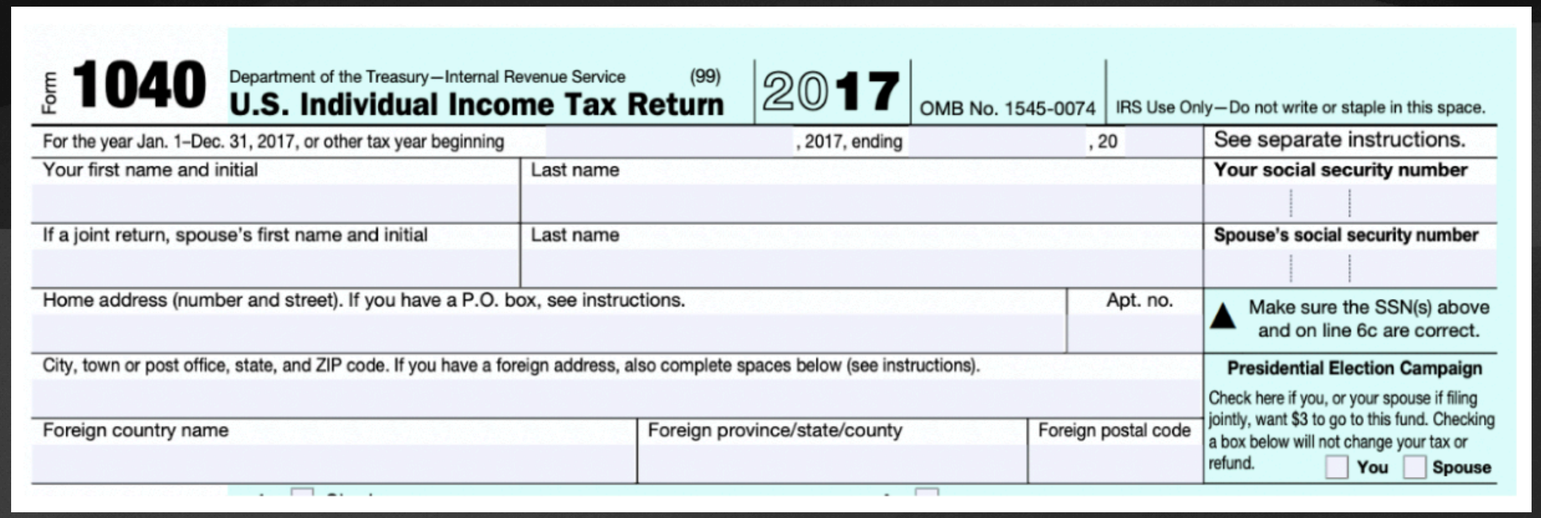
Photo: tunart/Getty

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



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).

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**

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

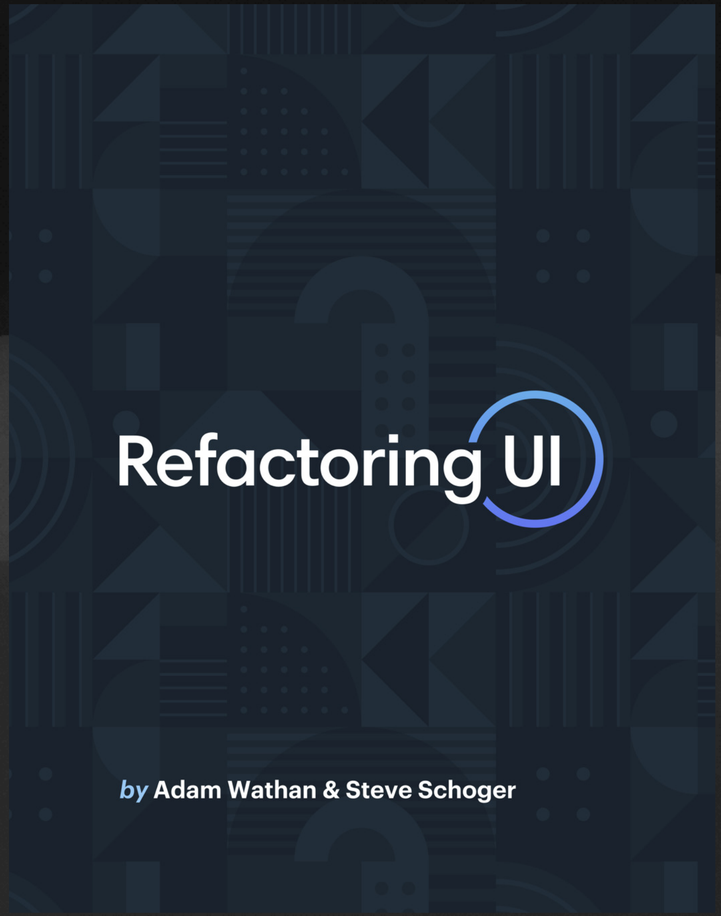
BAD

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?

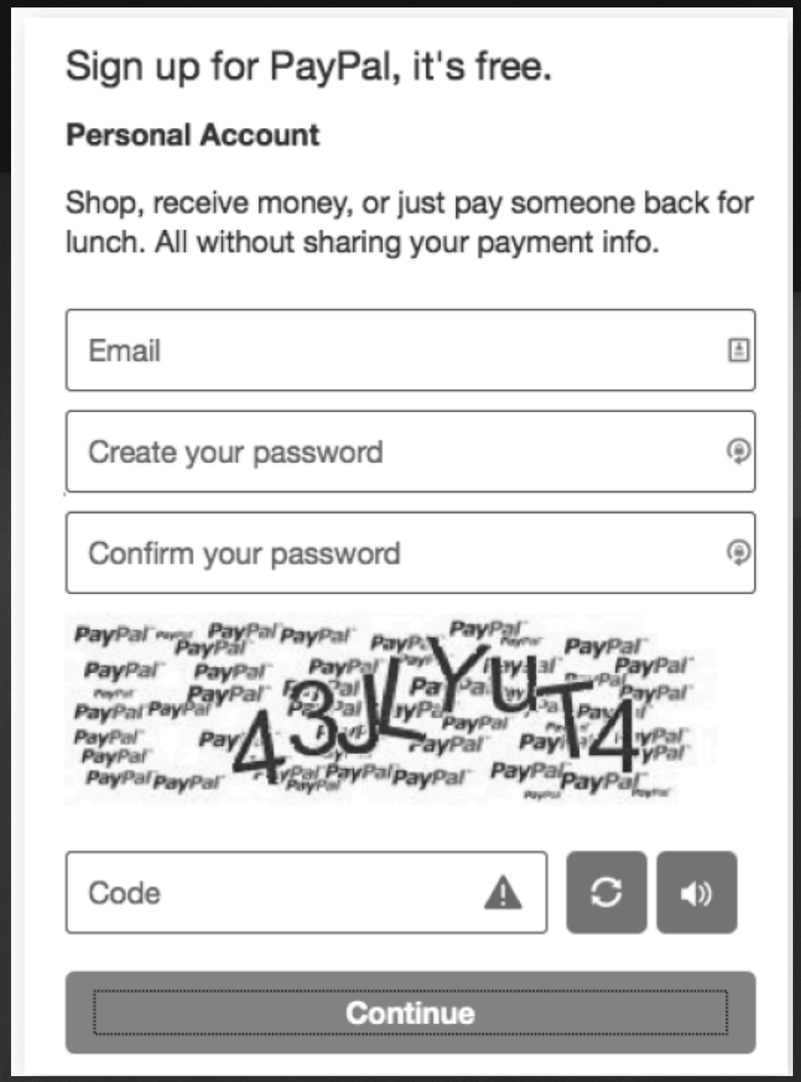
- The World Wide Web Consortium (W3C) is an international community that develops web standards
- Their Web ContentAccessibility Guidelines (WCAG) covers a wide range of accessibility best practices: https://www.w3.org/TR/WCAG20/

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

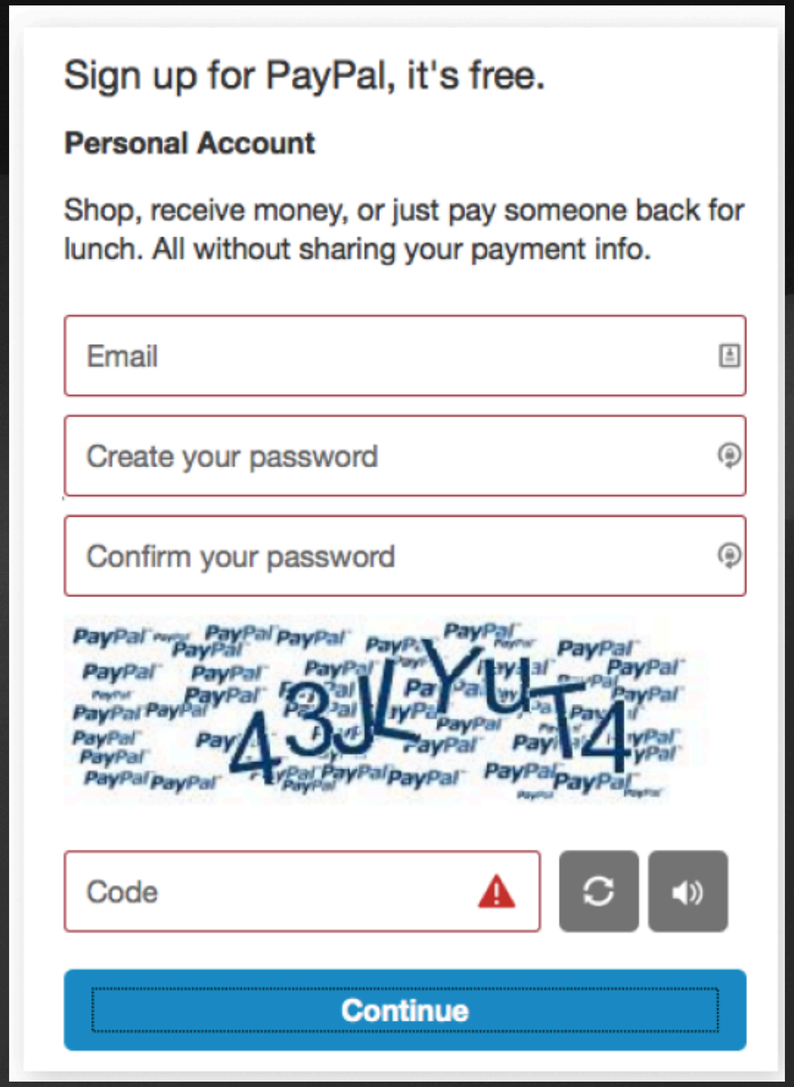
Accessibility and Color

Don’t Use Color Alone to Convey Information



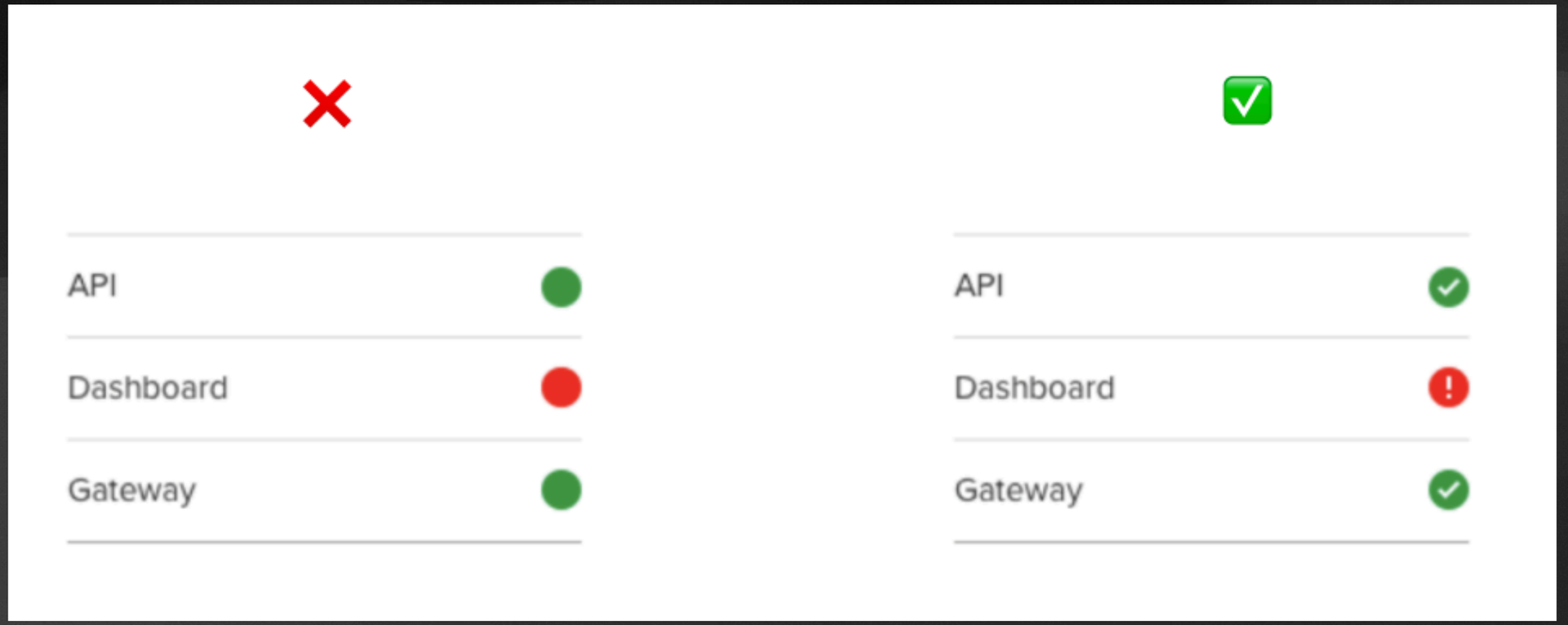
Huh?

Don’t Use Color Alone to Convey Information



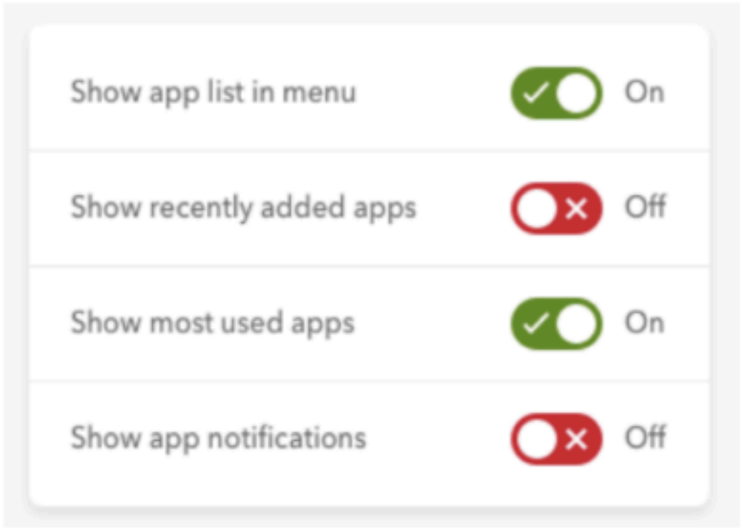
Oh.

Don’t Use Color Alone to Convey Information



...but don’t take it too far, either

❌



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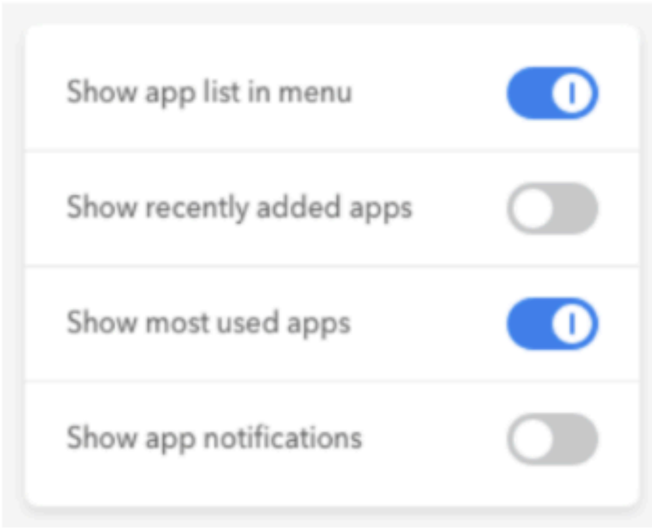


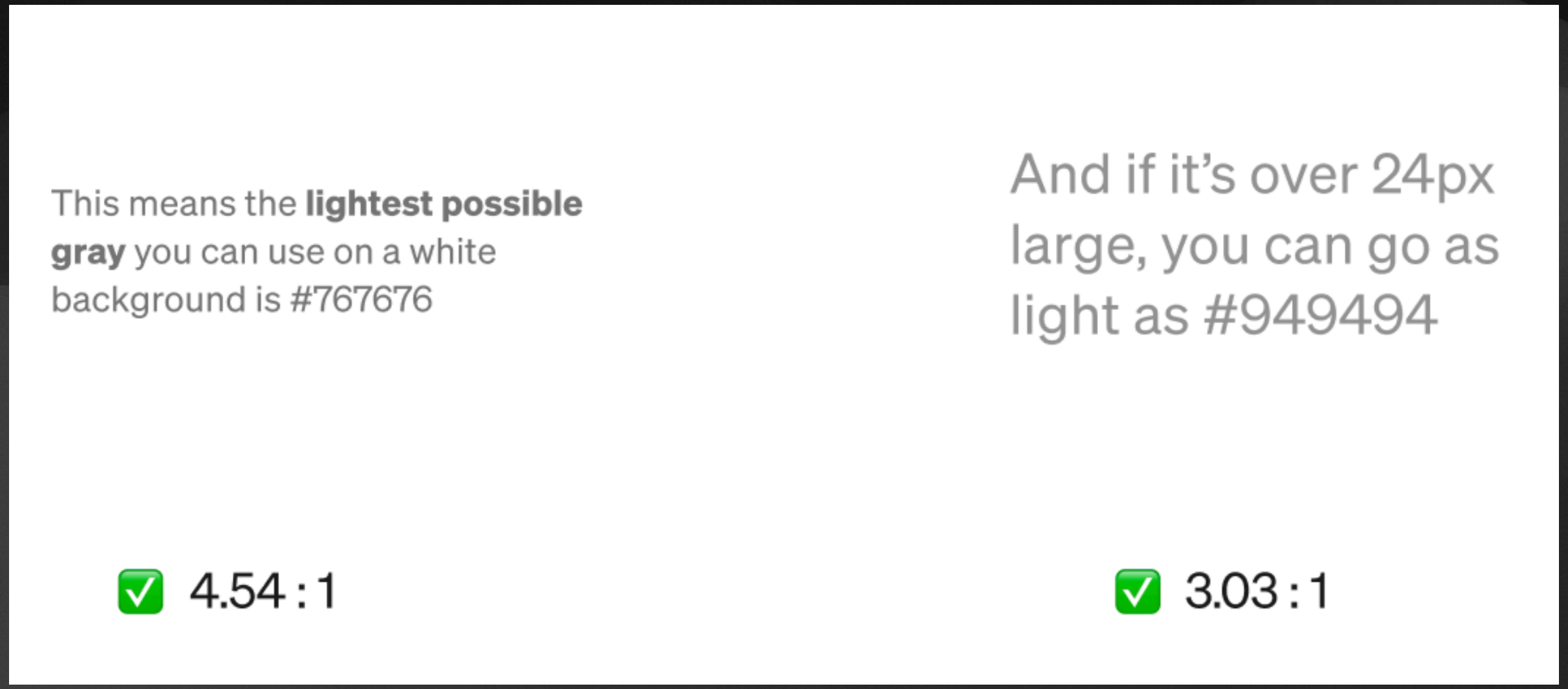
Color Contrast

- 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)

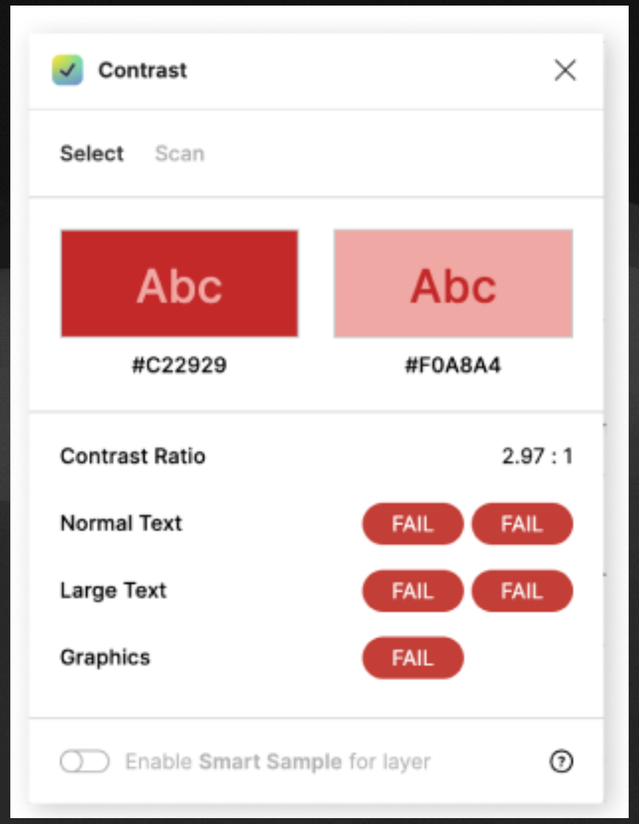
Sufficient contrast between text and background

- 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**.

Sufficient contrast between text and background



How do we determine a contrast ratio?



WebAIM online tool

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

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

Custom View Modifier

1 Defining a Custom View Modifier

```
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

```
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!