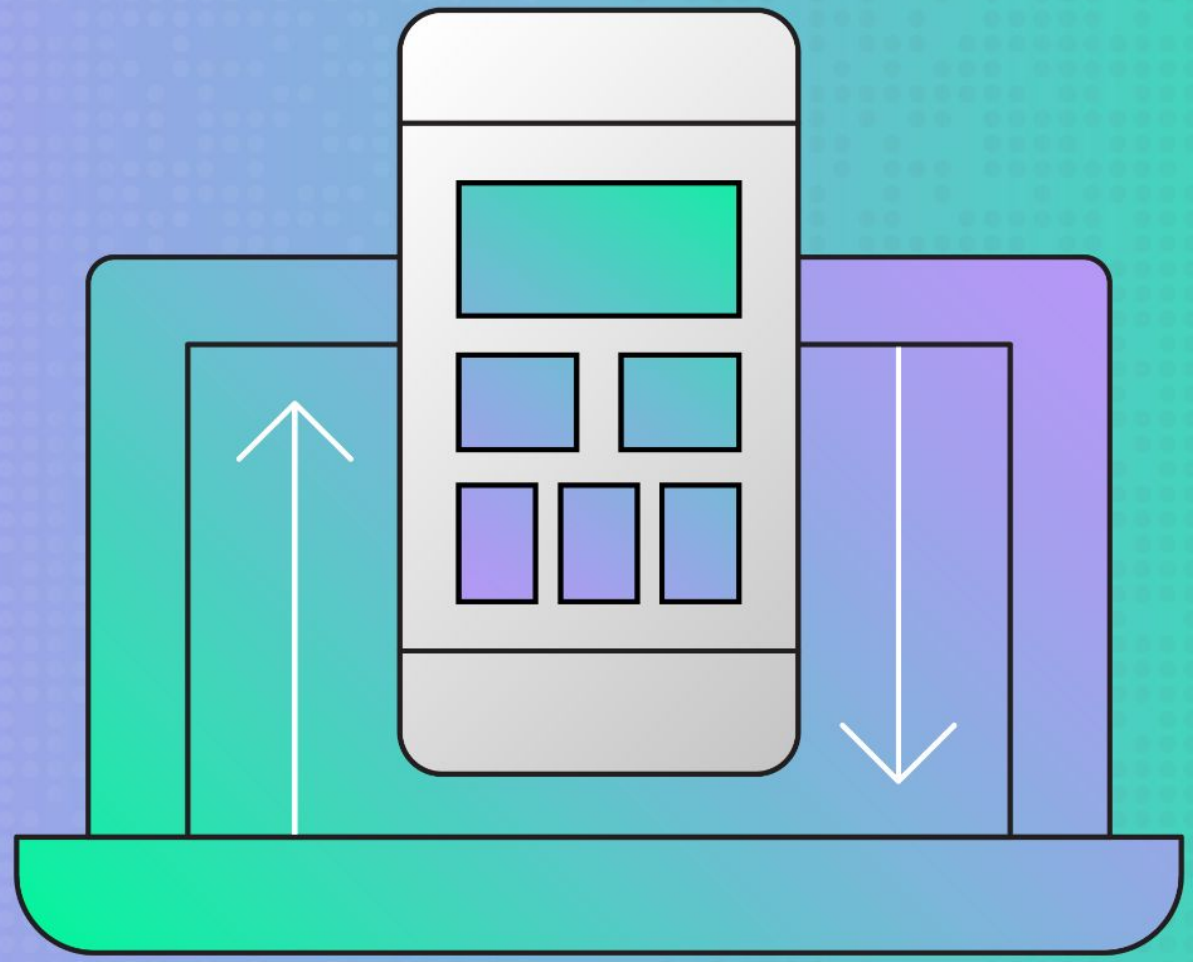
Design Like a Pro:

Mobile-Responsive HMIs for Any Screen



Presenters

Kent Melville

Director of Sales Engineering

Inductive Automation

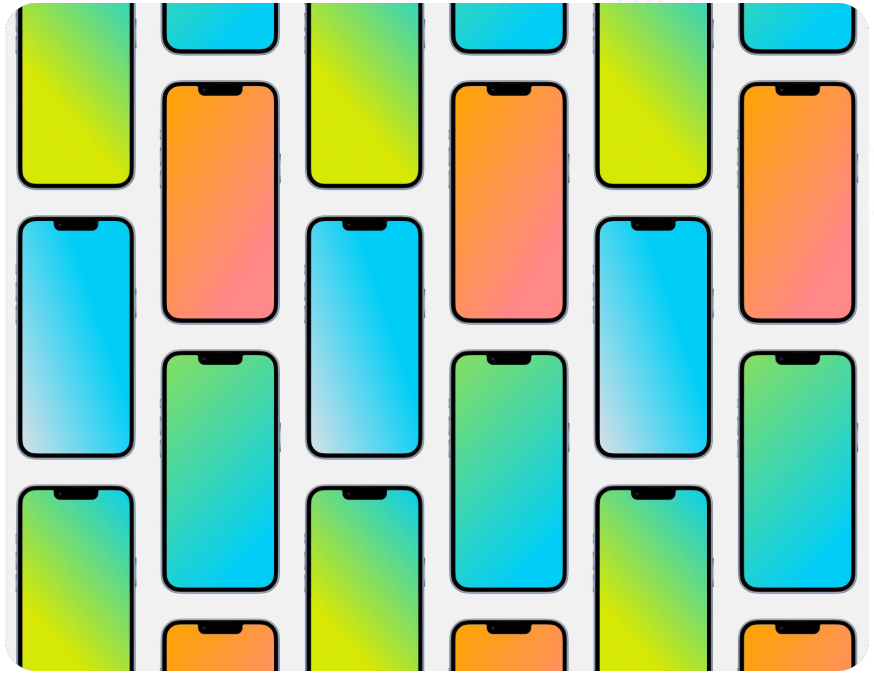
Ray Sensenbach

Design Department Manager

Inductive Automation

Agenda

- **Introduction to Ignition**
- **The Mobile Mindset**
- **The Four Principles of Mobile UI Design**
- **Audience Q&A**



Ignition!®
by inductive automation
The Unlimited Platform for SCADA and So Much More
• Connect, Design, Deploy Without Limits:
- One central hub for everything on the plant floor
- Create any kind of industrial application
- Web-deploy clients to desktops, industrial displays & mobile devices
• Unlimited licensing
• Industrial-strength security and stability
• Trusted by thousands of companies worldwide

Tips and Patterns, Not Rules

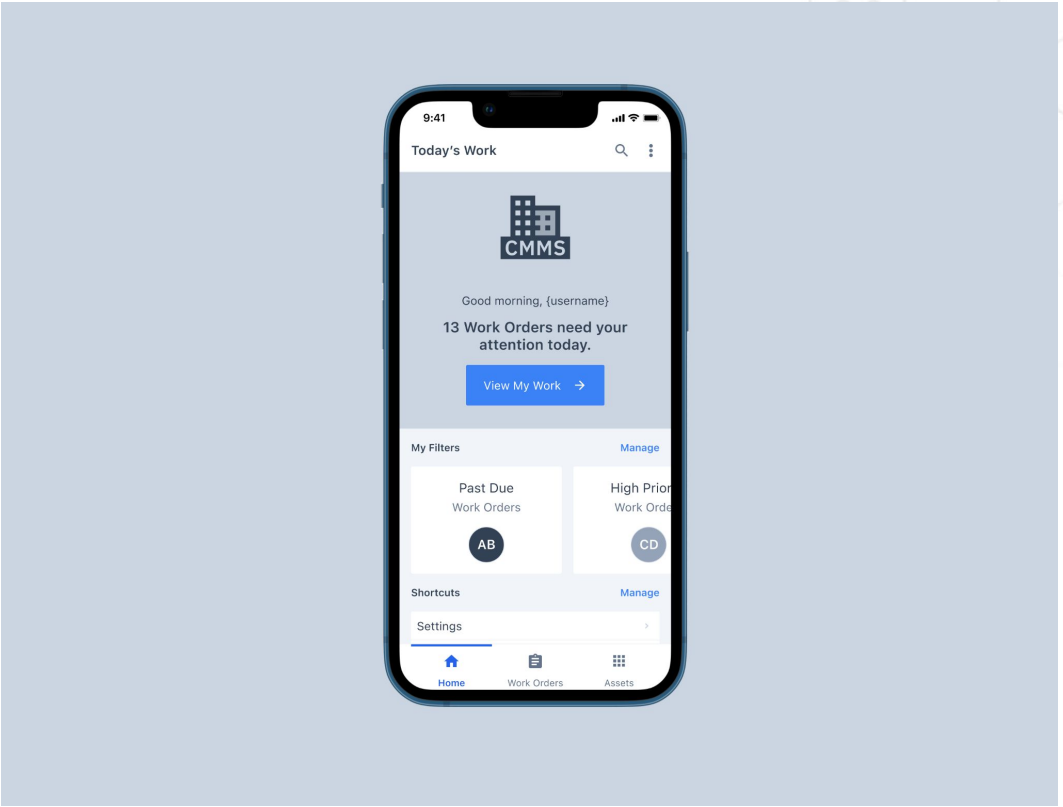
Every mobile app design is unique!

Especially in our industries. We are:

- Solving unique problems
- Providing unique functionality
- Deploying in unique environments

Mobile Design for Industrial Automation

- Mobile design within our industries remains a largely unexplored niche.
- At-large, mobile design standards and best practices are mature.



Complete ICC ‘22 Content Available

The Mobile Mindset

- Content strategy
- Desktop feature parity
- App structure
  a. User Flow Diagrams
  b. Wireframes
  c. Prototypes

Mobile UI Design Principles

User control & freedom

a. Intuitive Navigation
b. Reversible Actions
c. Informative Feedback

Comfortable interaction

d. Content Reduction
e. Smart Defaults
f. Avoiding Jargon
g. Touch Ergonomics
h. Accessibility
i. Error Design
j. Protecting User Work

Reducing cognitive load

a. Chunking Content
b. Recognition
c. Metaphor
d. Visual Clarity
e. Progressive Disclosure

Consistency

f. Visual Style
g. Functional Behavior
h. User Expectations

https://inductiveautomation.com/resources/icc/2022/top-tips-for-great-mobile-interface-design

The Mobile Mindset

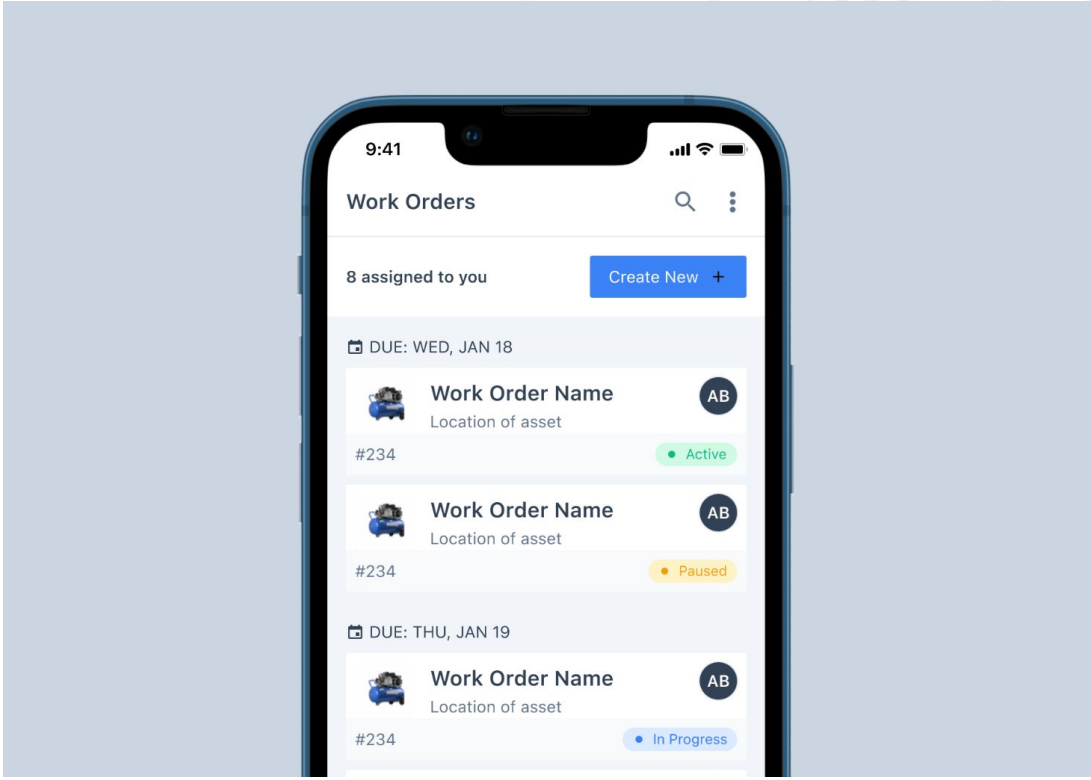
Focus on *information* and *tasks*

- What **information** might someone be looking for and what **tasks**, or actions might they need to take?
- Designing in a mobile context doesn't necessarily mean delivering less.
- It may mean prioritizing information in a different way.
- Feature parity between desktop and mobile applications is recommended.

Your mobile experience should be laser-focused on what users need and your software was created to do

Mobile Interface Design

- A balance between visual **form** and technical **functionality**.
- Bridge between the system and user.
- Regardless of functionality, if the interface is difficult to use it won't be.



Four Principles of Mobile UI Design

1. Place users in control of the interface
2. Make it comfortable for a user to interact with the app
3. Reduce cognitive load
4. Make user interfaces consistent

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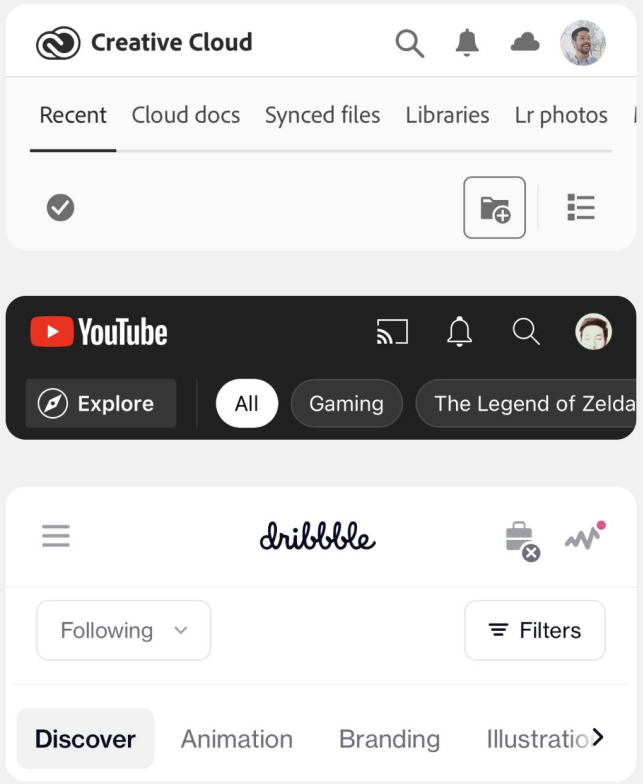
Create an easy-to-navigate interface

- Navigation should always be clear and self-evident.
- Provide user's context of where they are, where they've been and where they can go next.
- Use **visual cues**, including:
  - Page and section titles
  - "You are here" nav indicators
  - Search and filtering



Create an easy-to-navigate interface

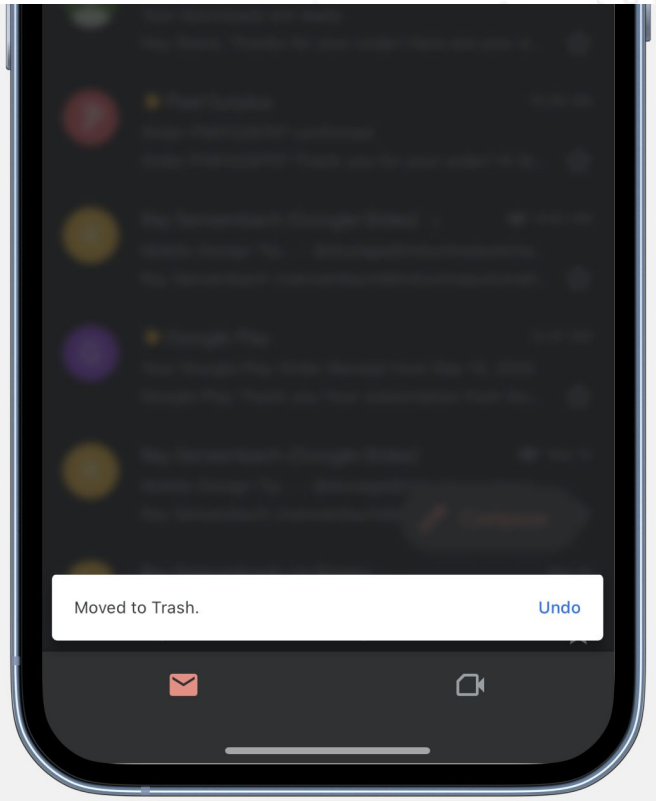
Can you answer these question from any screen in your app?

- Where am I?
- How did I get here?
- What can I do here?
- Where can I go from here?

Try the trunk test, a strategy for analyzing the navigability of an app.

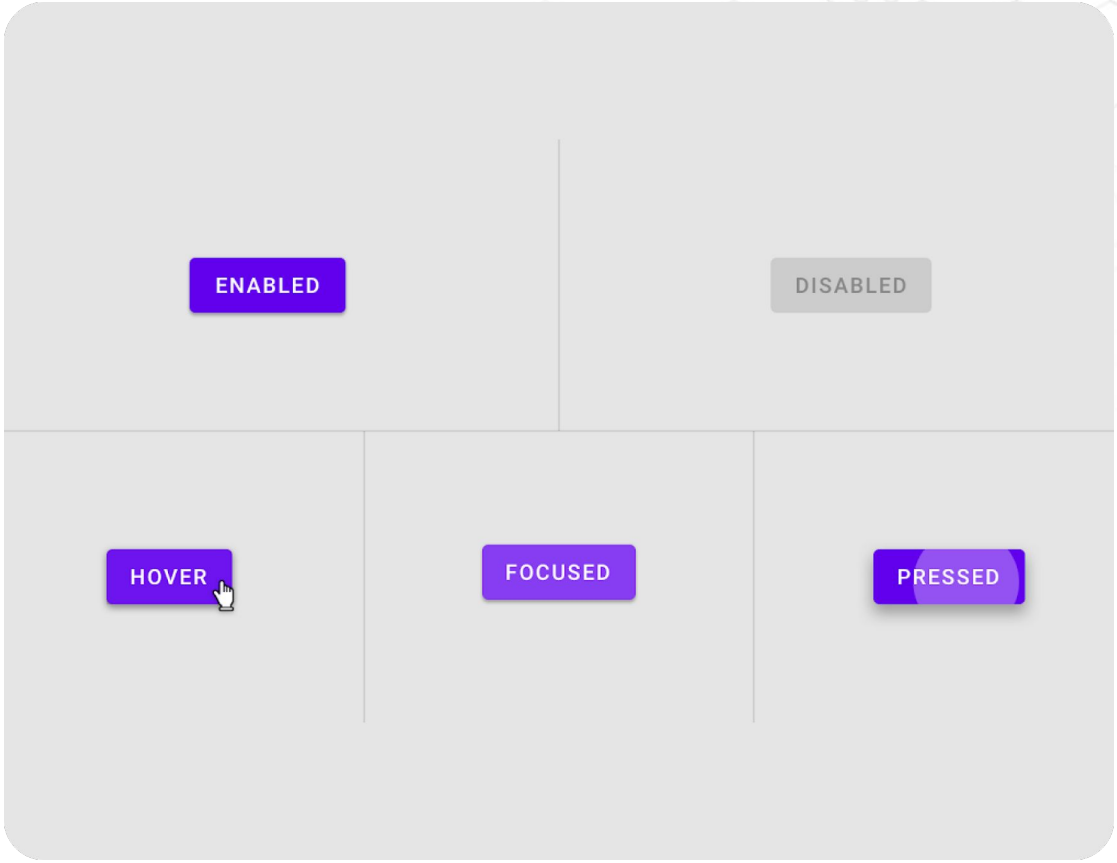
Make actions reversible

- Be forgiving!
- Users should always be able to quickly backtrack.
- Encourage exploration without the fear of failure or errors.
- Provide a clearly marked emergency exit for when users find themselves in an unwanted state.



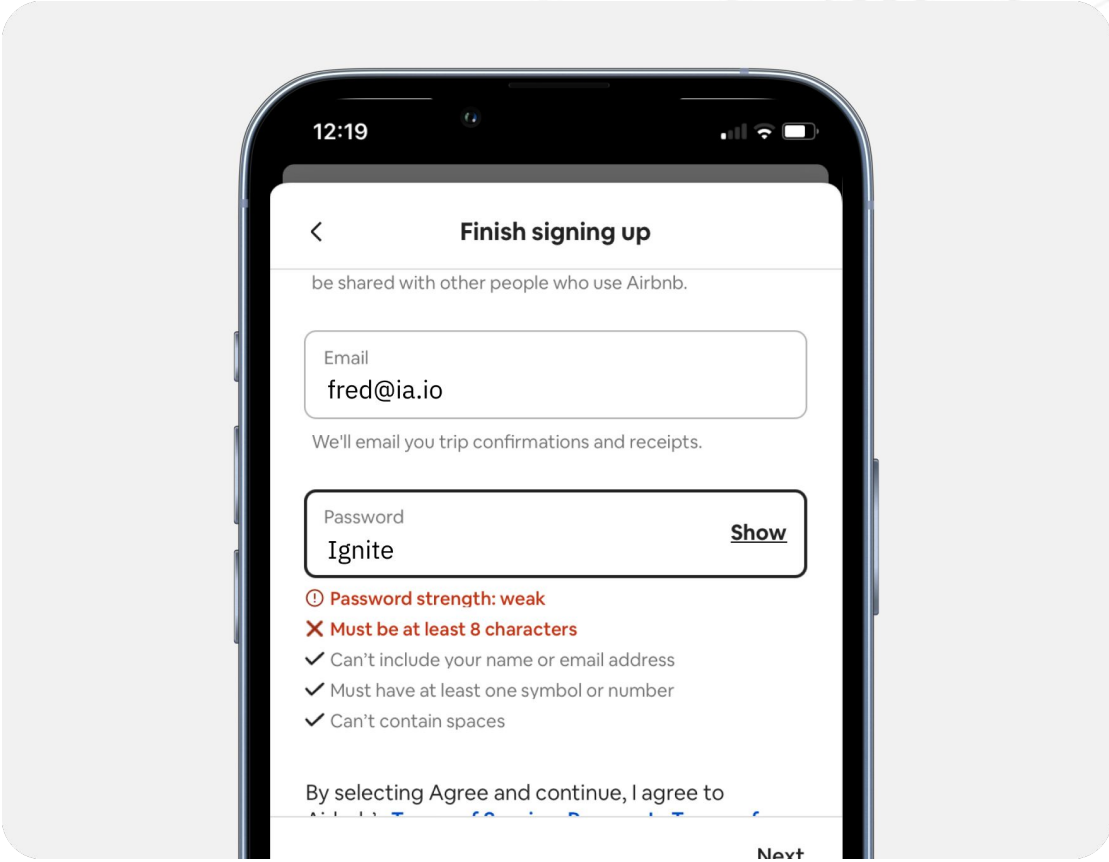
Provide informative feedback

- Be acknowledging!
- For every action, the system should show a meaningful, clear reaction.
- For frequent actions, the response can be modest.



Provide informative feedback

- For infrequent or significant actions, response may be more substantial.



Demos: User Control & Freedom

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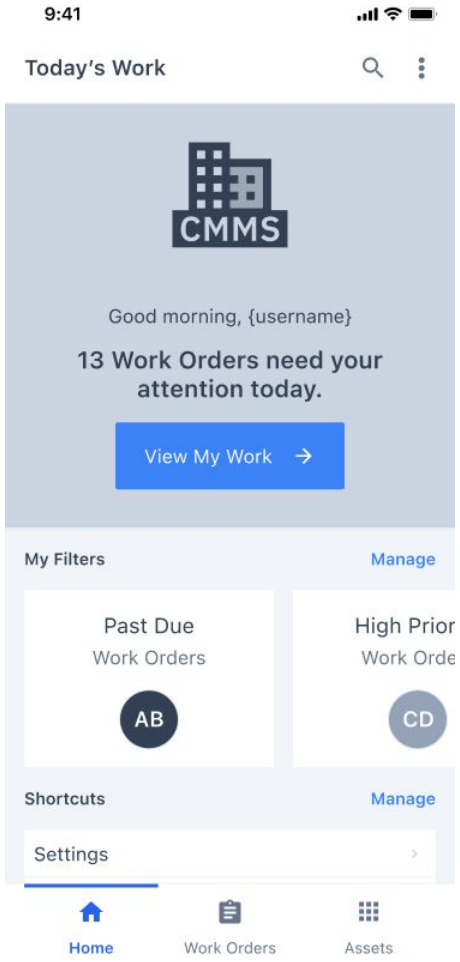
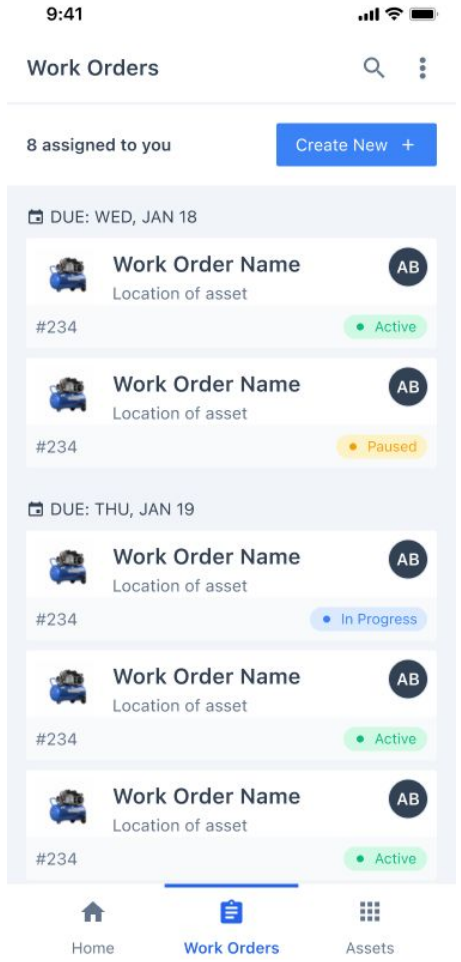
Demo: Intuitive Navigation





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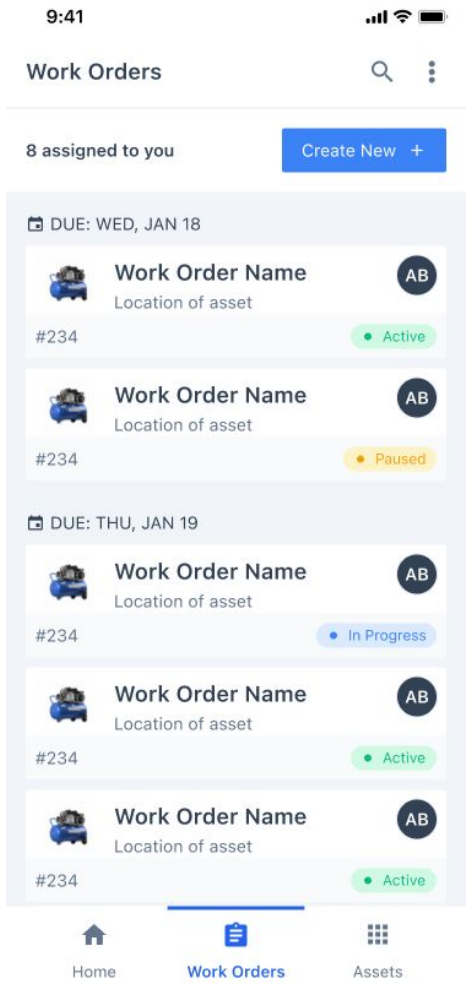
Demo: Navigation “Trunk Test”



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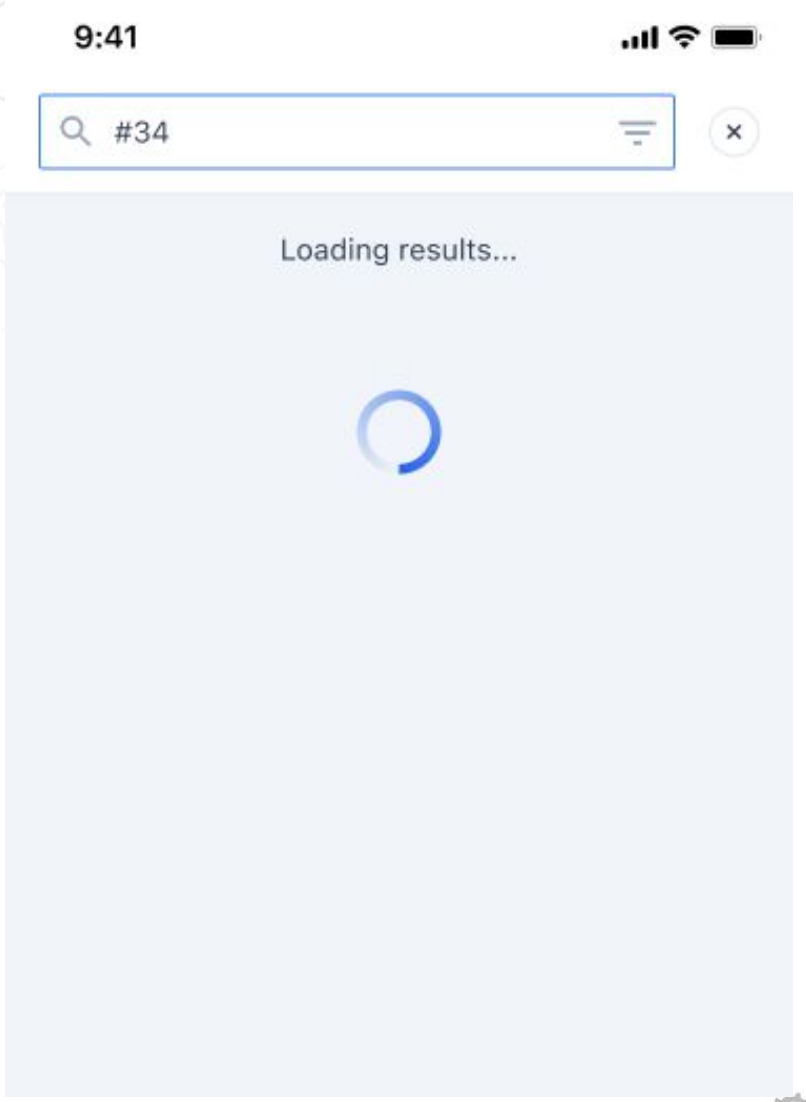
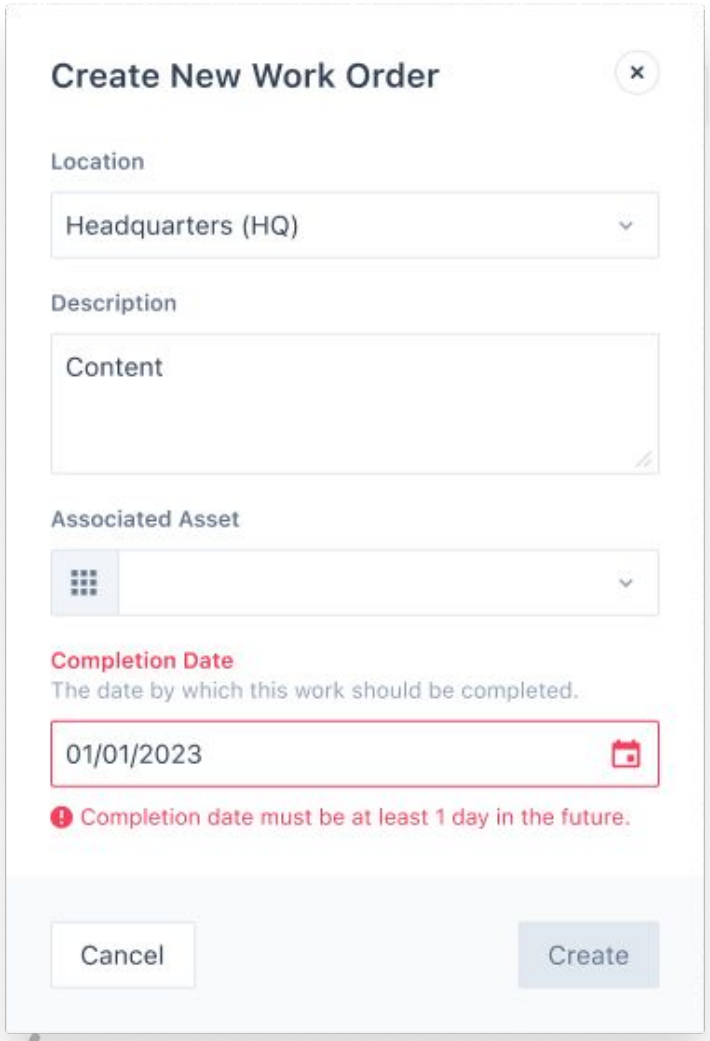
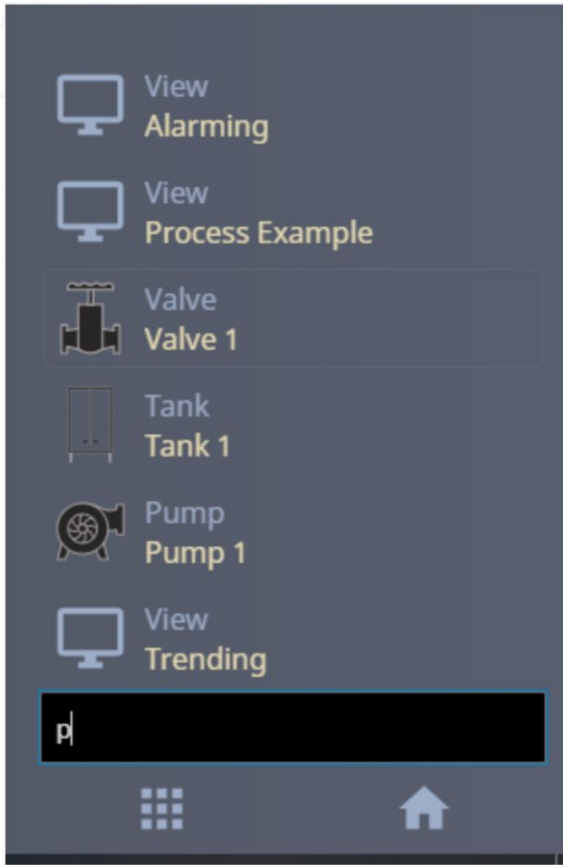
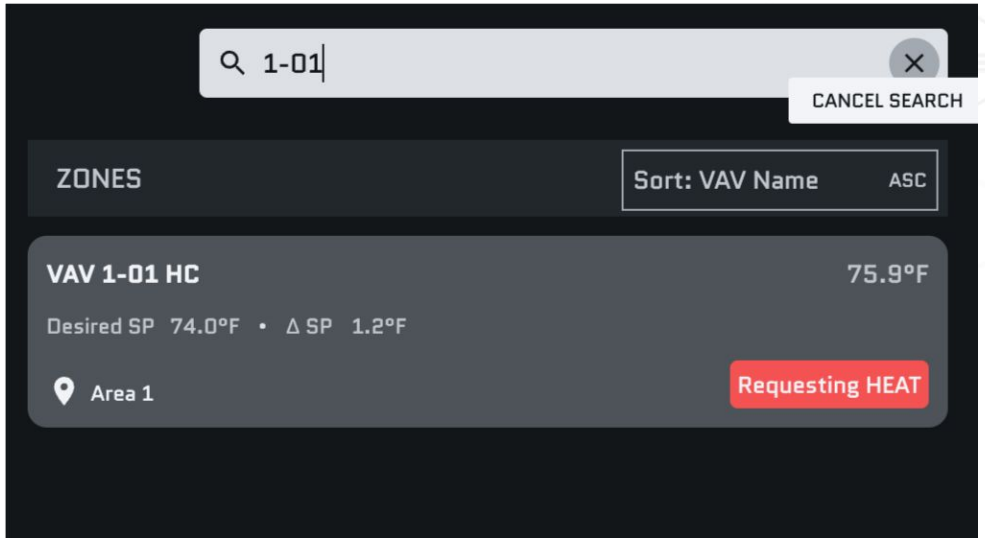
Demo: Informative Feedback





Demo: Search Interactions

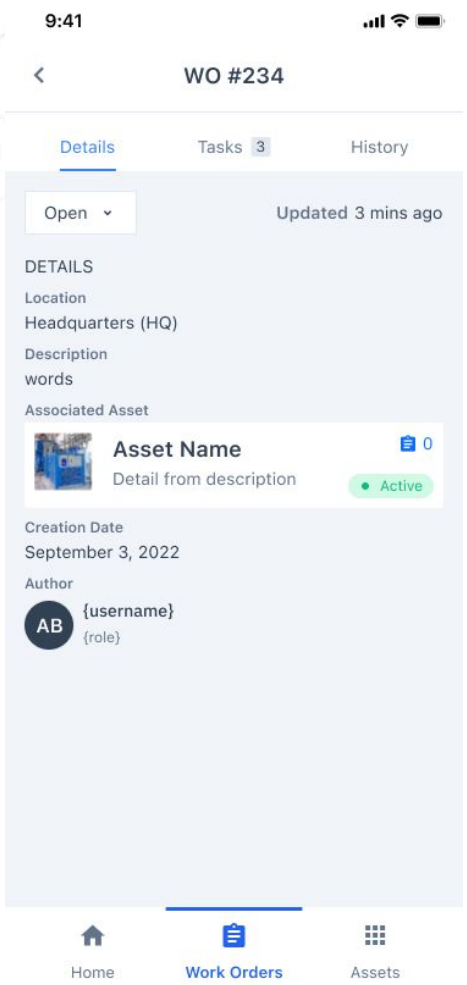


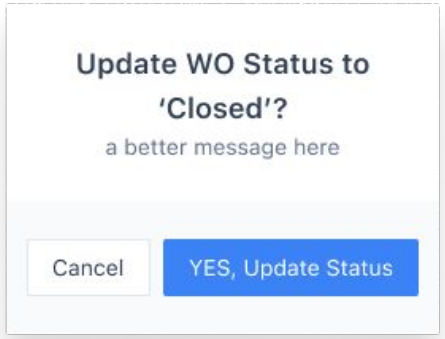


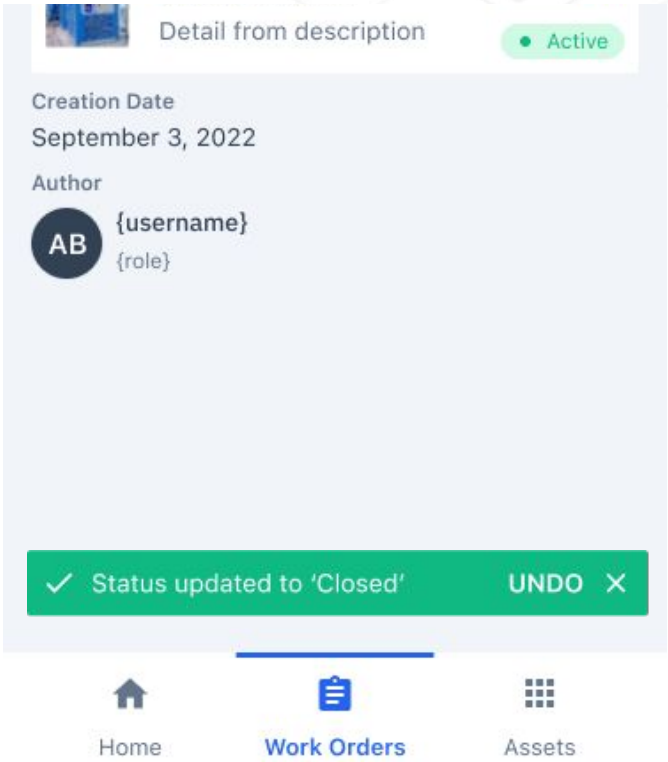
Building Automation Demo Project:
https://demo.ia.io/data/perspective/client/building-management-system-demo/

Perspective HMI Framework (Flexware):
https://inductiveautomation.com/exchange/2211/overview

Demo: Reversible Actions







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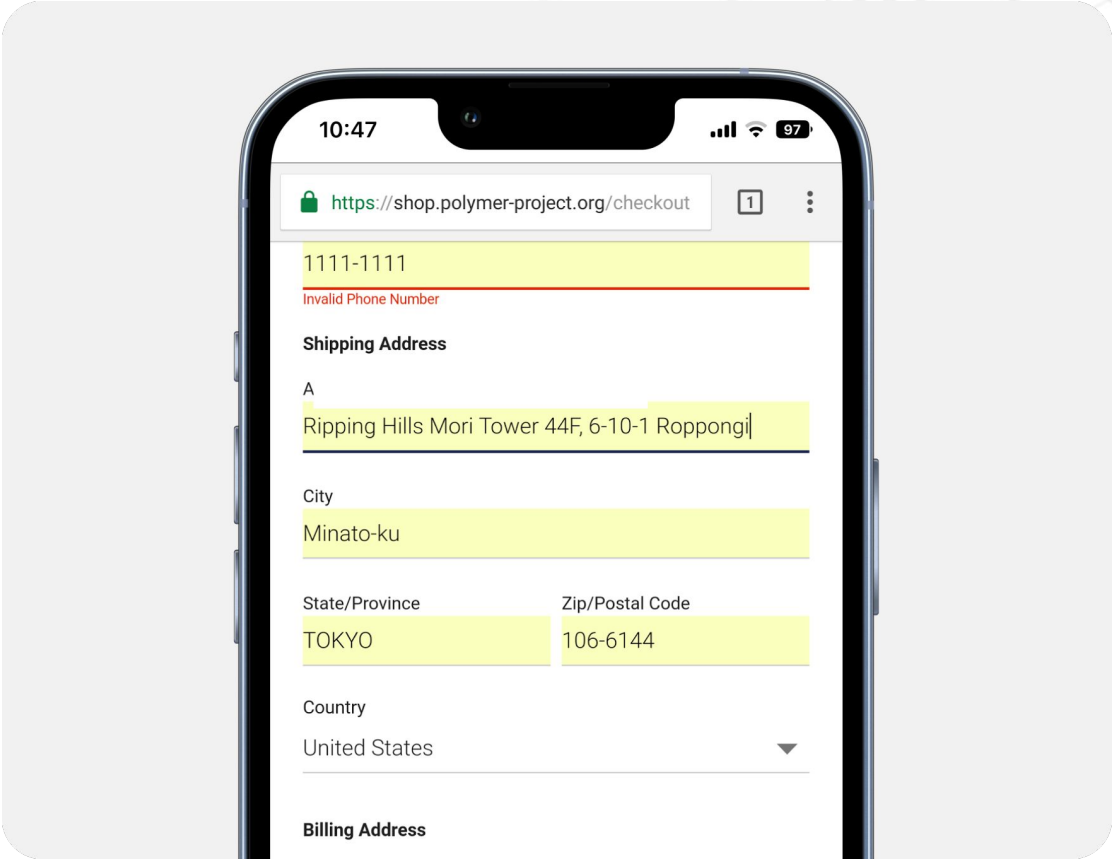
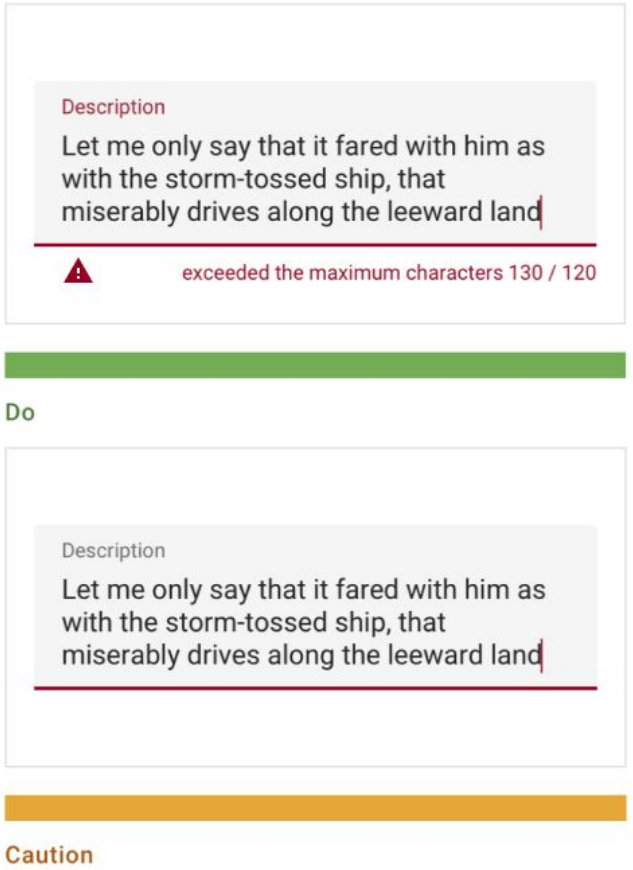
Don’t ask users for data they’ve already entered

- Don’t force users to have to repeat data they’ve previously entered.
- Use **smart defaults** when possible.
- Great mobile apps perform maximum work, while requiring minimum input from users.



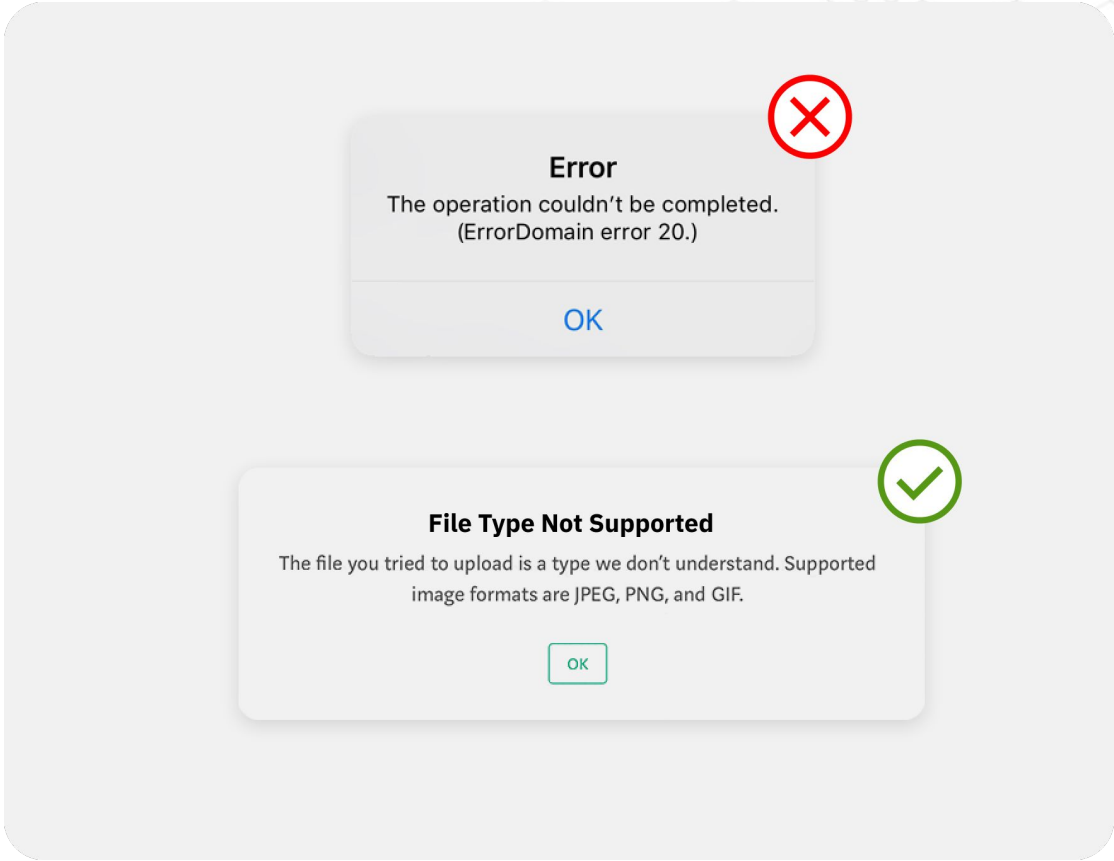
Design accessible interfaces

- Improving your product's accessibility enhances the usability for everyone.
- Avoid using color as the only way to convey information or states.
- Double-encode with color + text or icons to reinforce messages



Engineer for Errors

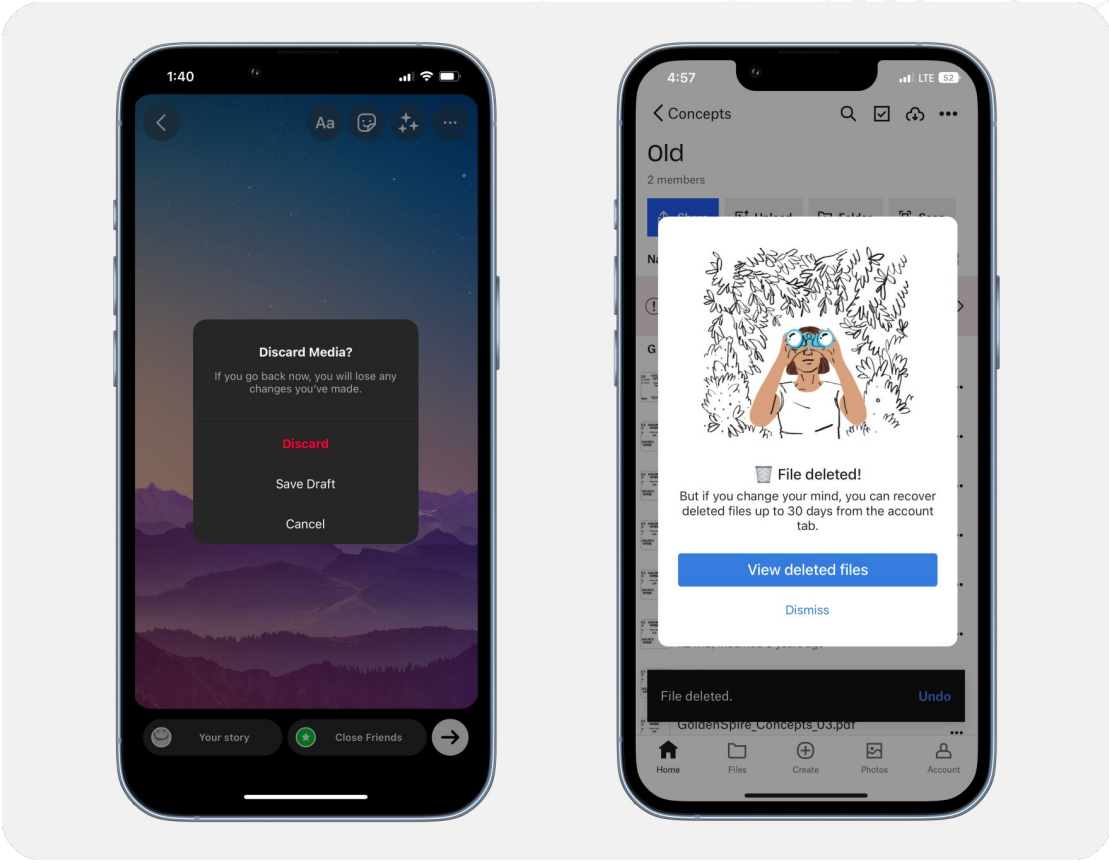
- Errors are unavoidable, design for these experiences.
- Effective errors include both clear messaging and solution paths.
- Explore error prevention strategies.



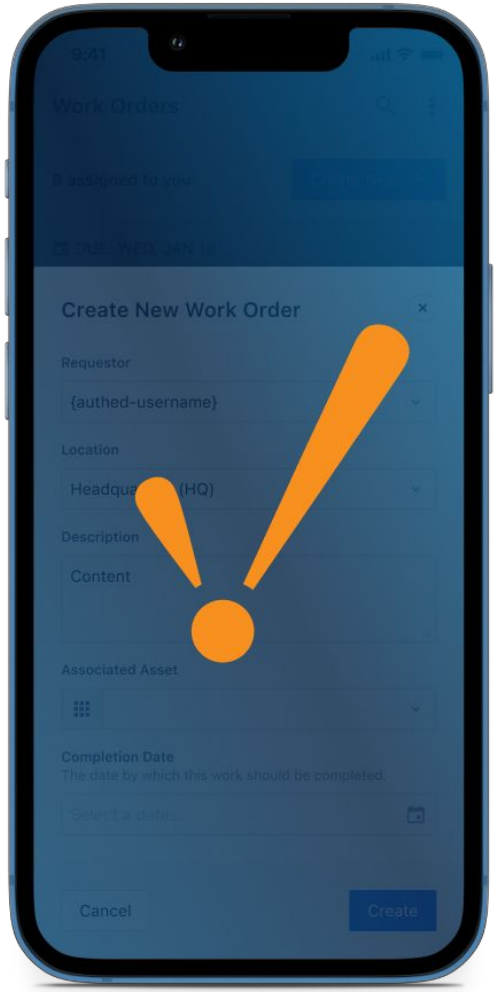
Make it comfortable to interact with the app

Protect the User’s Work

- Ensure that users never lose their work or data.
- Account for system errors as well as user errors.



Demos: Comfortable Interaction



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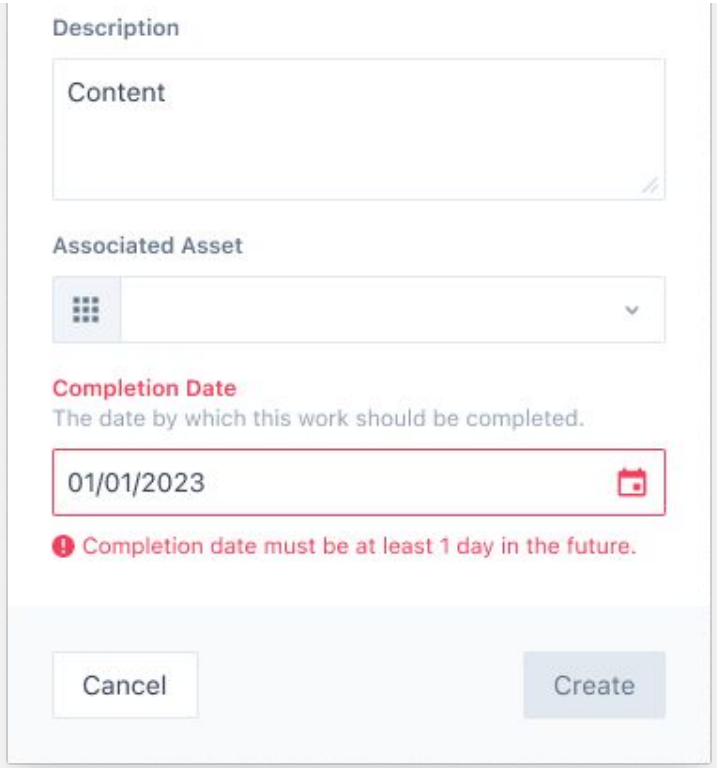
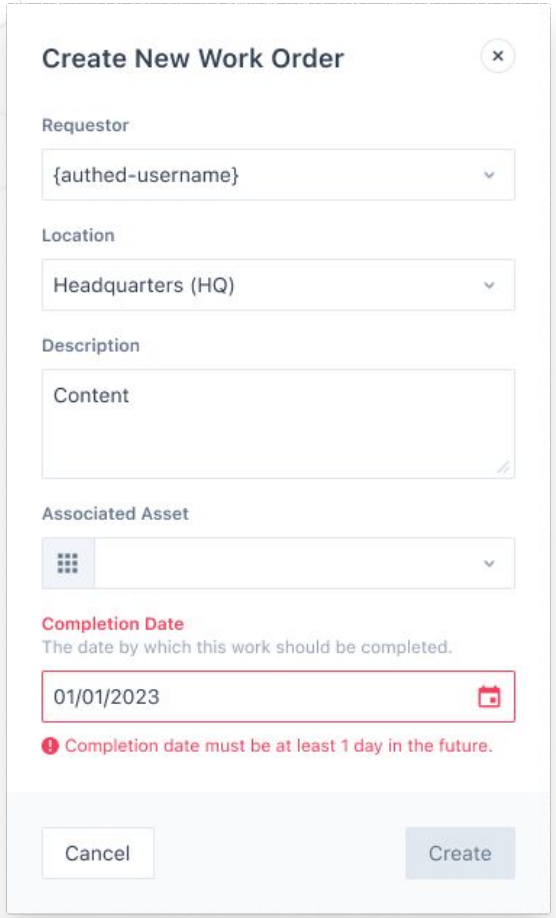
Demo: Smart Defaults



Demo: Accessibility



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--neutral-10 #F1F5F9	Text DNP 1.1		Text DNP 1.1	Text DNP 1.3	Text DNP 2.3	Text AA18 4.3	Text AAA 9.4	Text AAA 19.1	Text AA18 3.3	Text AA18 3.3	Text DNP 2.8
--neutral-20 #E2E8F0	Text DNP 1.2	Text DNP 1.1		Text DNP 1.2	Text DNP 2	Text AA18 3.8	Text AAA 8.4	Text AAA 17	Text DNP 2.9	Text DNP 2.9	Text DNP 2.5
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--success #0DA572	Text AA18 3.1	Text DNP 2.8	Text DNP 2.5	Text DNP 2.1	Text DNP 1.2	Text DNP 1.5	Text AA18 3.2	Text AA 6.6	Text DNP 1.1	Text DNP 1.1	

https://contrast-grid.eightshapes.com/

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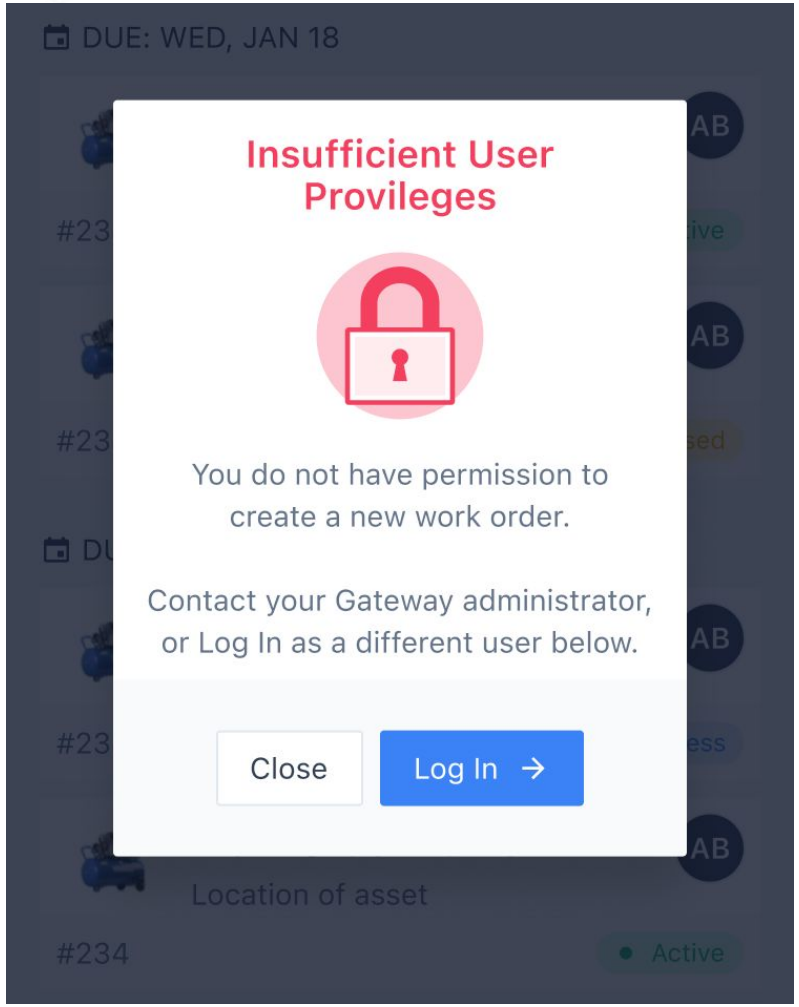
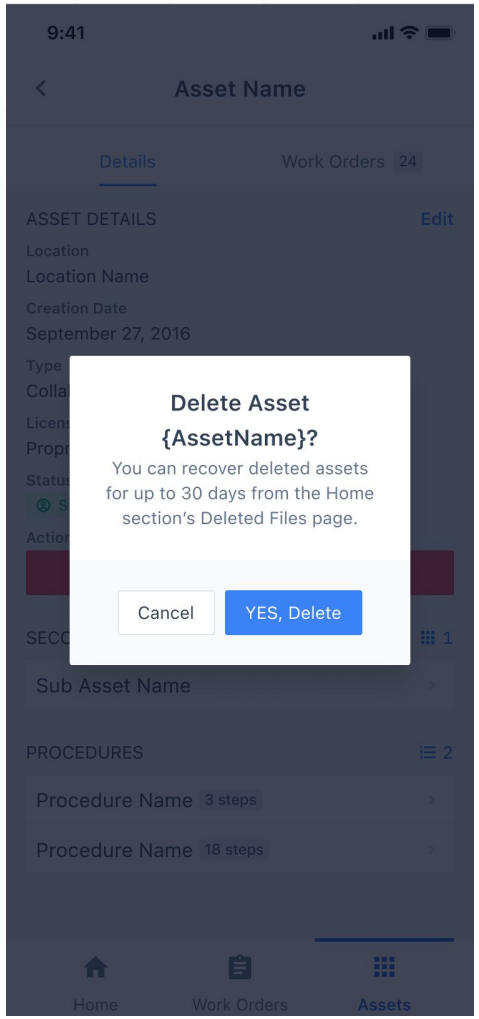
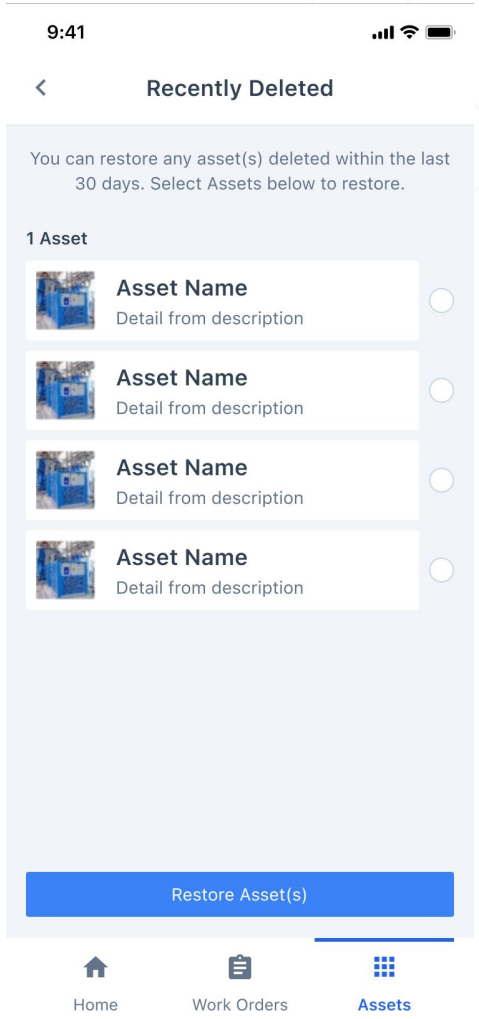
Demo: Errors


DUE: WED, JAN 18
Insufficient User Provileges
You do not have permission to create a new work order.
Contact your Gateway administrator, or Log In as a different user below.
Close
Log In
Location of asset
#234
Active

Demo: Protecting Work





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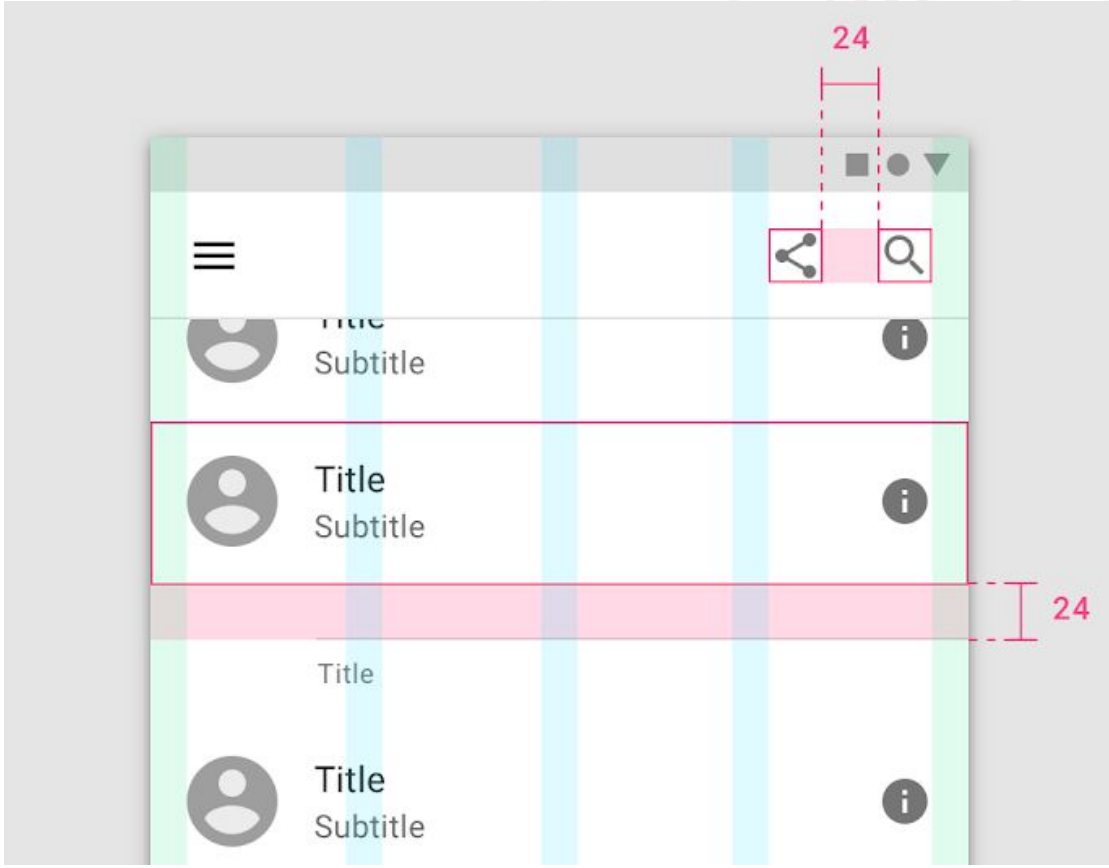
Promote Visual Clarity

Good visual organization improves usability and legibility. Allow users to quickly find information.

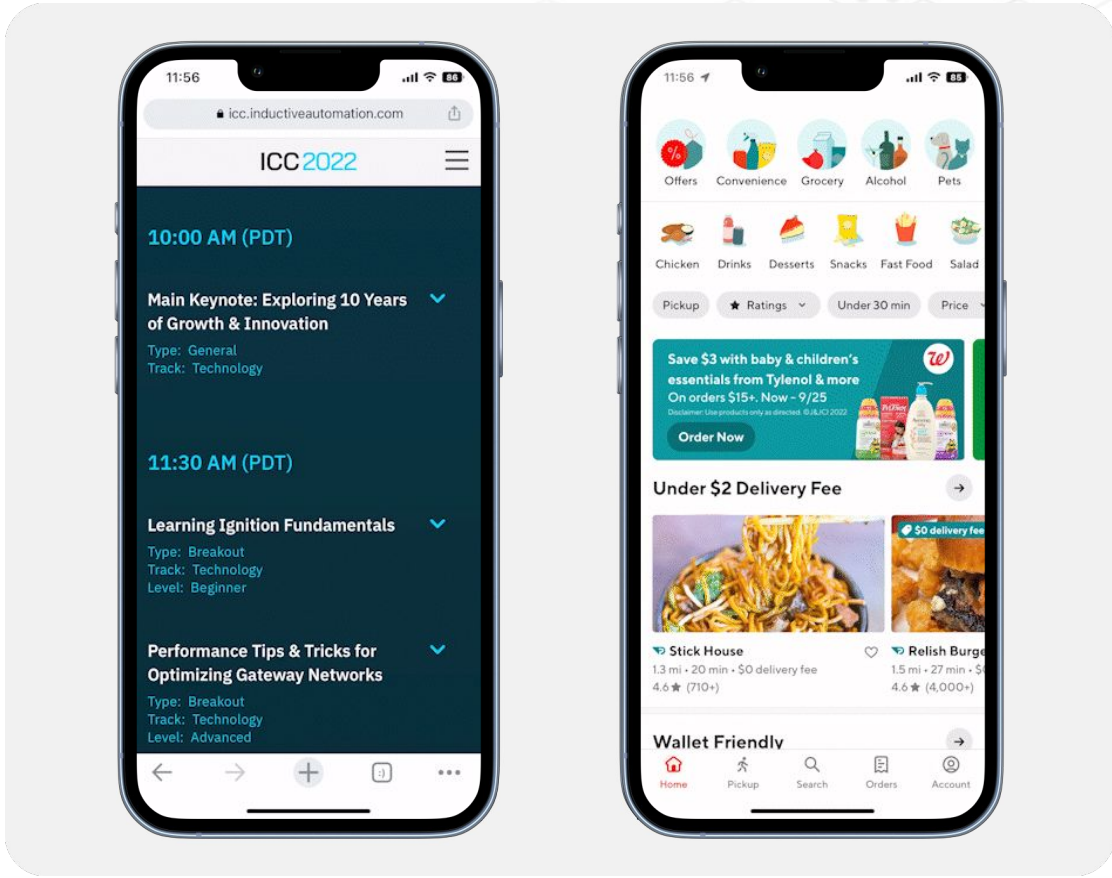
When designing layouts:

- Use a grid/spacing system
- Group similar items together, using headings and subheadings
- Avoid presenting too much at once



Progressively disclose information

- Initially, show users only the most important actions and information.
- Offer the rest upon request.



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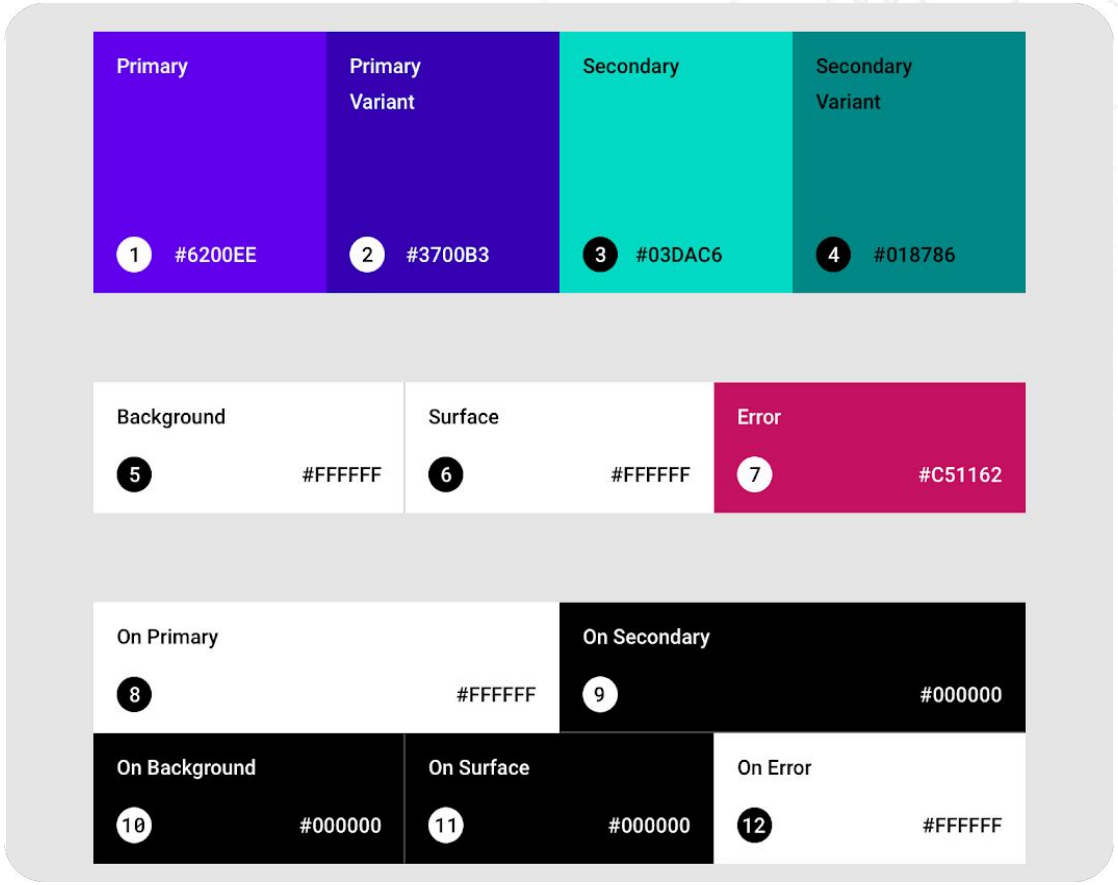
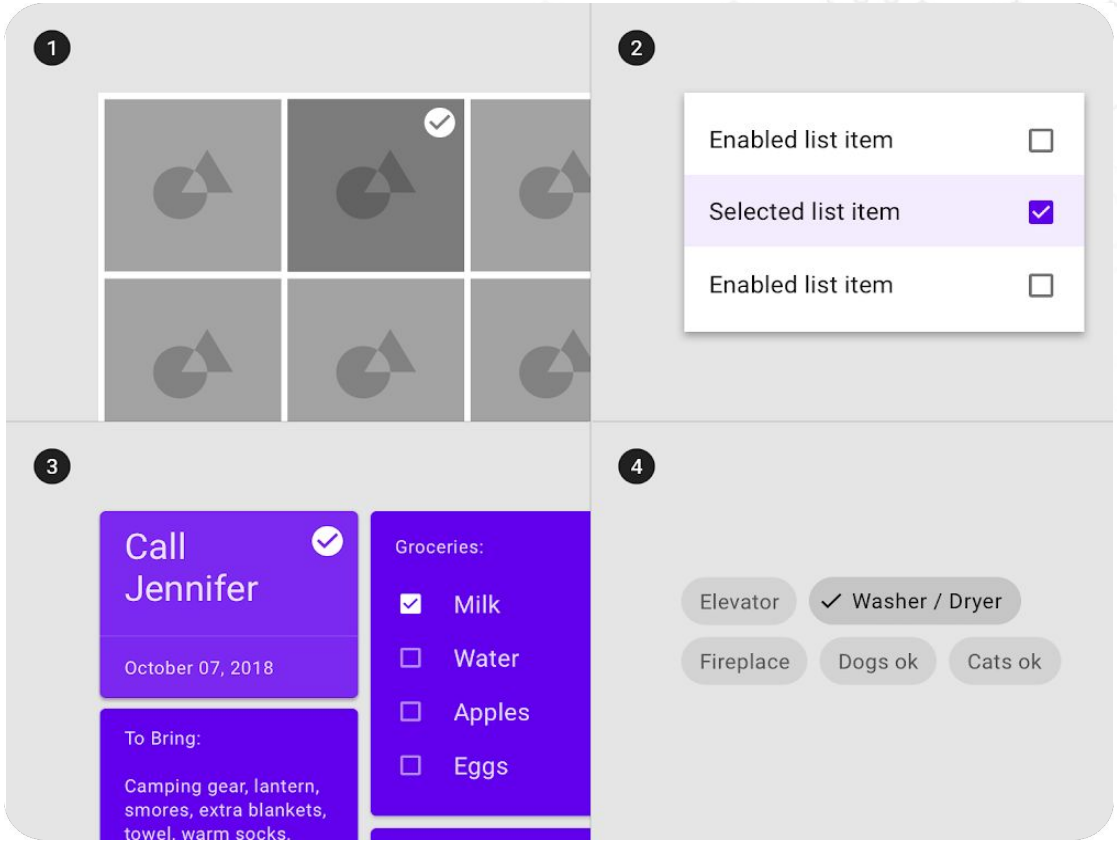
Visual Consistency (style)

- The same colors, fonts, and icons should be used throughout the app.
- Colors or style that conveys meaning should be strictly applied.

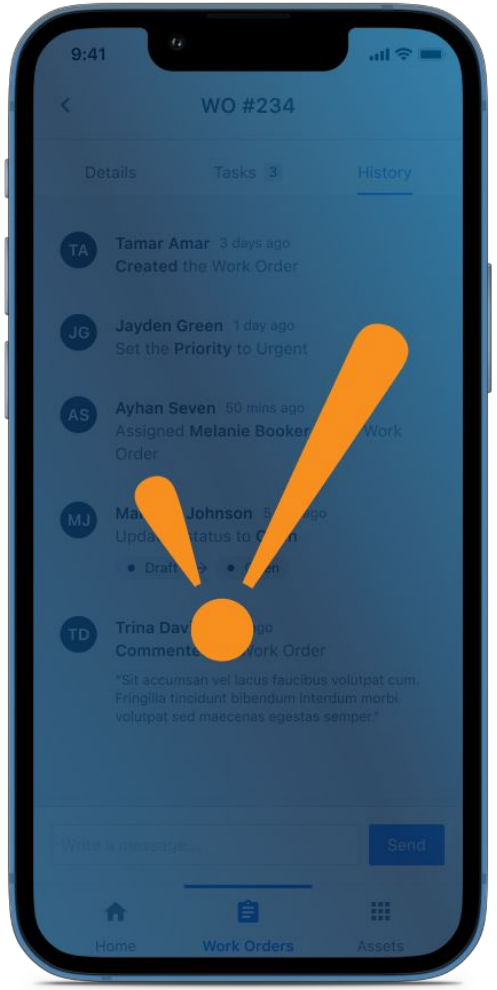


Functional Consistency (behavior)

- Interface controls should work the same way across the application.
- Don’t surprise your user by changing the way that things function.
- Changing functionality reduces confidence and inhibits exploration.



Demos: Cognitive Load & Consistency



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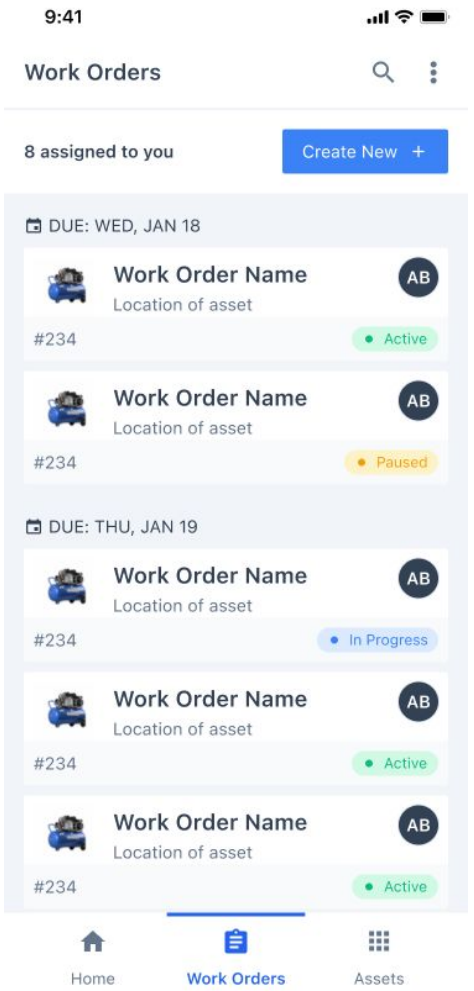
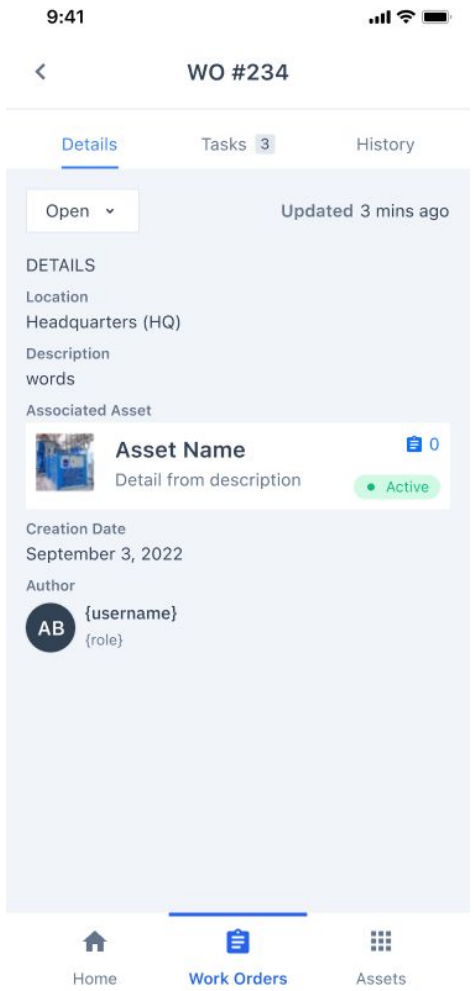
Demo: Progressive Disclosure





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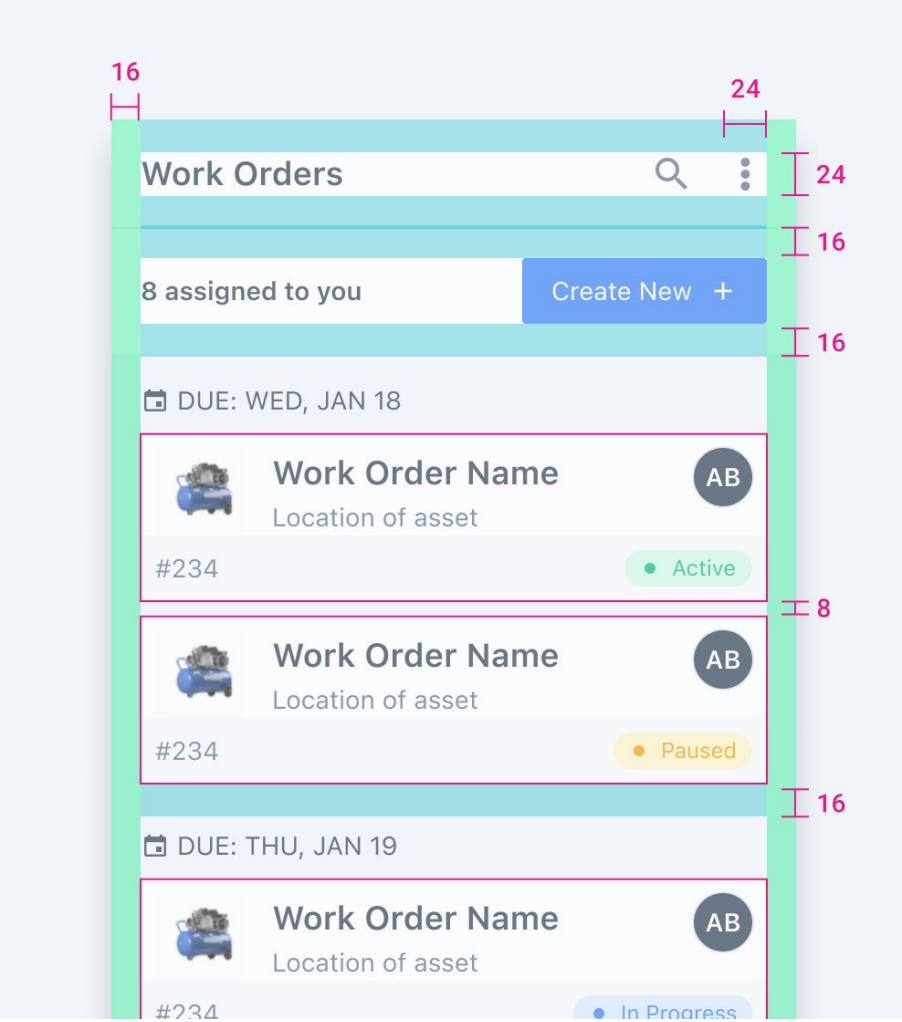
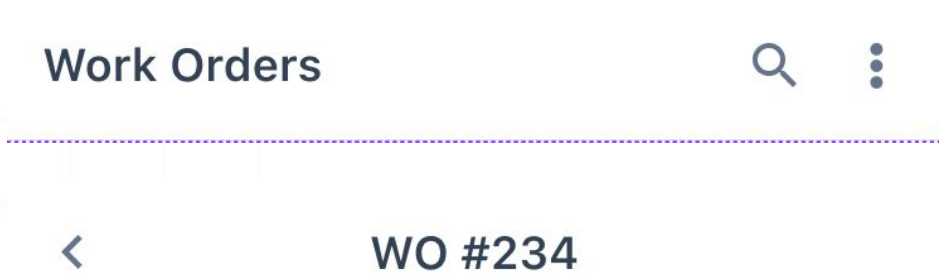
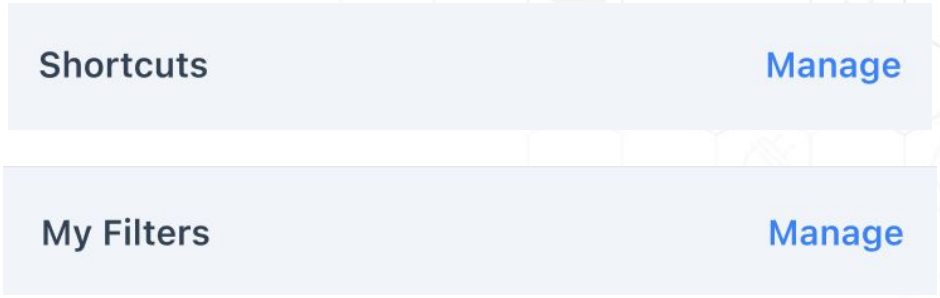
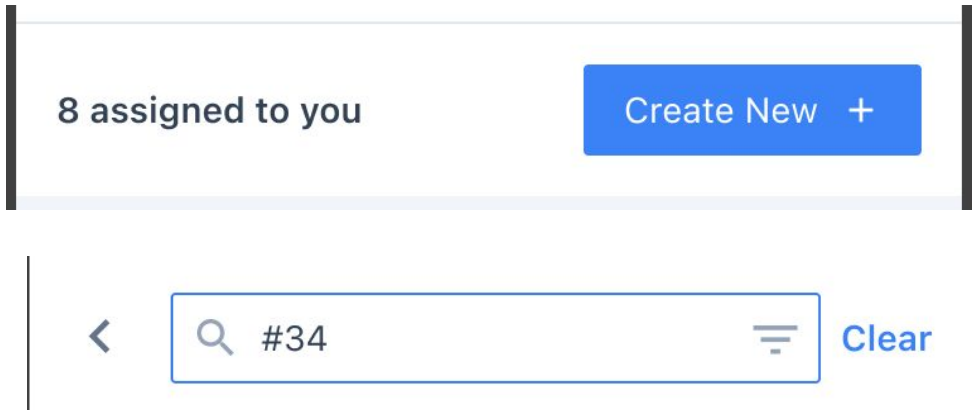
Example: Visual Clarity



Example: Visual Consistency





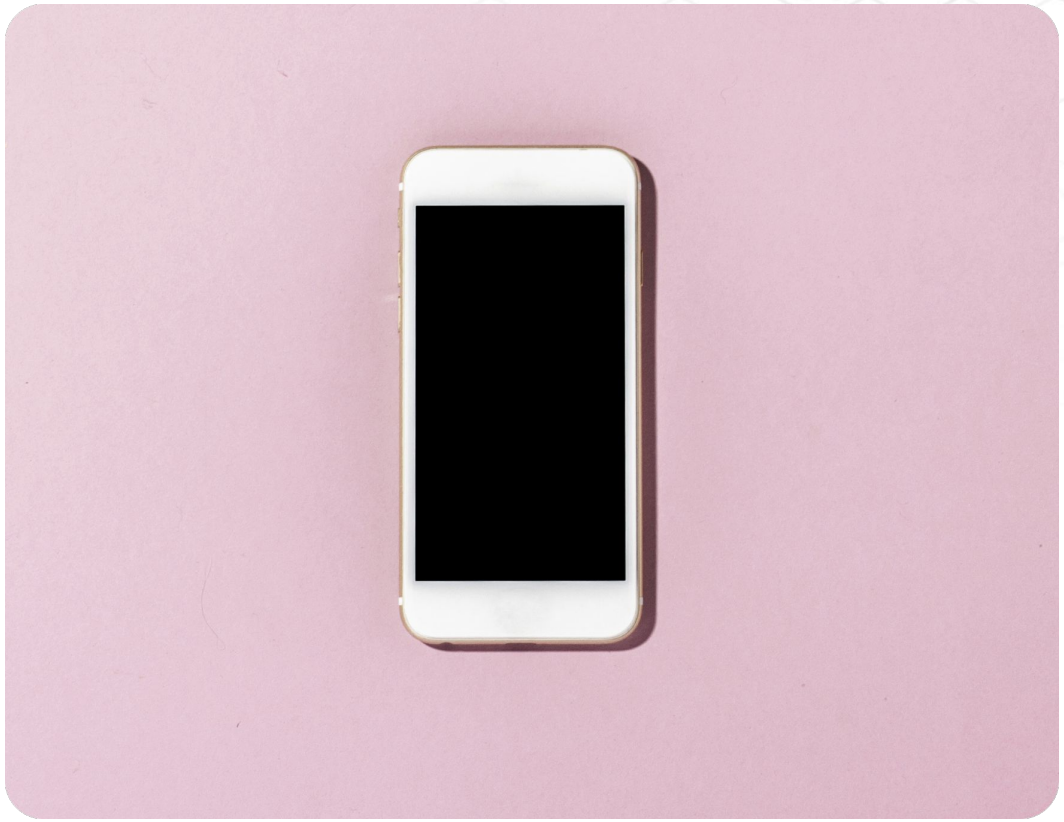


Design is a Process

- Planning is equally important to interface design execution.
- Talk to your users! A lot.
- Iterate.
- Follow mobile OS best practices.

Resources

- Full ICC ‘22 Session: Mobile Design Principles
  - *https://inductiveautomation.com/resources/icc/2022/top-tips-for-great-mobile-interface-design*
- Design Fundamentals Course
  - *https://inductiveuniversity.com/courses/elective-studies/design-fundamentals*
- Mobile Application Demo: CMMS
  - *Coming soon to the Ignition Exchange!*



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Ignition User Manual also available at:

docs.inductiveautomation.com

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