Handling User Input

Andrew Bancroft

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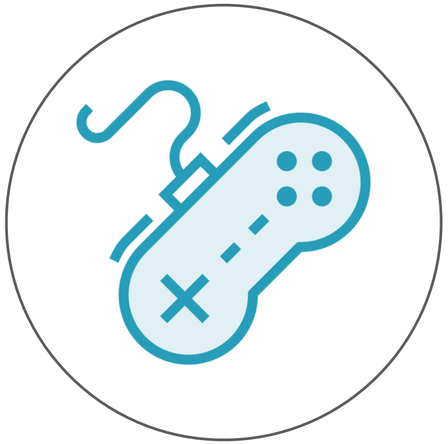
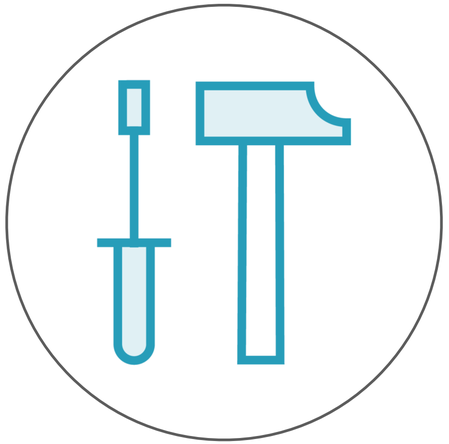


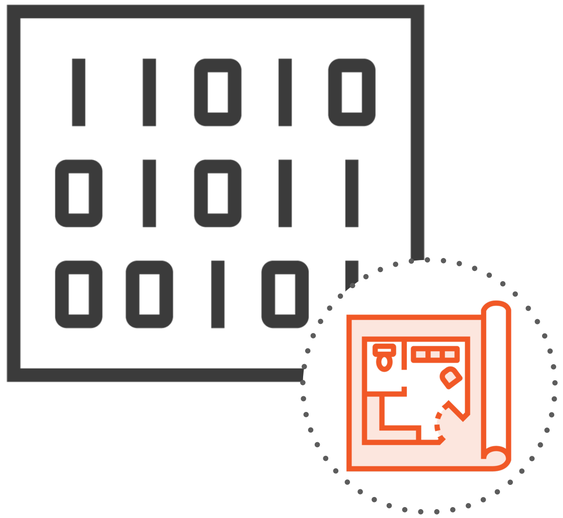
Game

Productivity



Utility

Entertainment

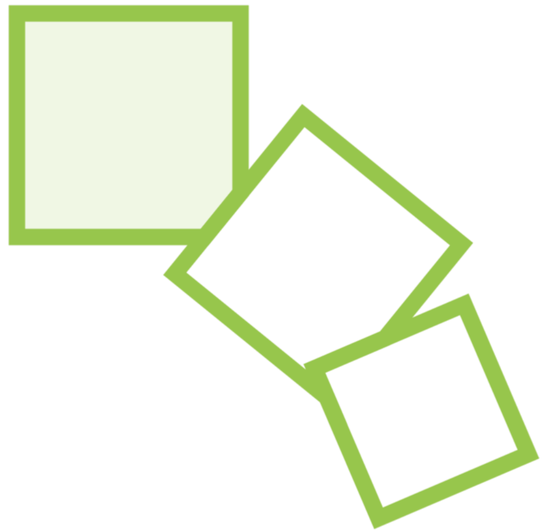


The way data is represented in a game is much different than how it might be represented in an app that focuses on a business process.

Data dictates what should be shown on the user's screen at any given time.

A View has one critical job:

Accurately represent the data of an application
at all times in what gets displayed on the screen.



Data is dynamic... it can be changed.

Overview

How do we model real-world objects and concepts as data that SwiftUI can work with?

How do we integrate data into an app so that it's usable in the right views at the right time?

How do we...

- **-load data that's been saved**
- **-display it**
- **-change it using different editing controls with SwiftUI**
- **-save the changes back and preserve them?**

Overview

How do we model real-world objects and concepts as data that SwiftUI can work with?

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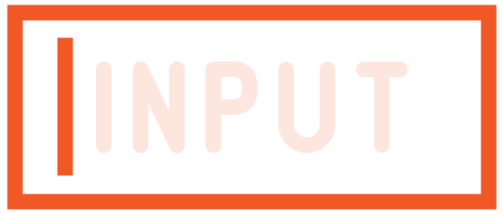
iOS App Development Learning Path Resources

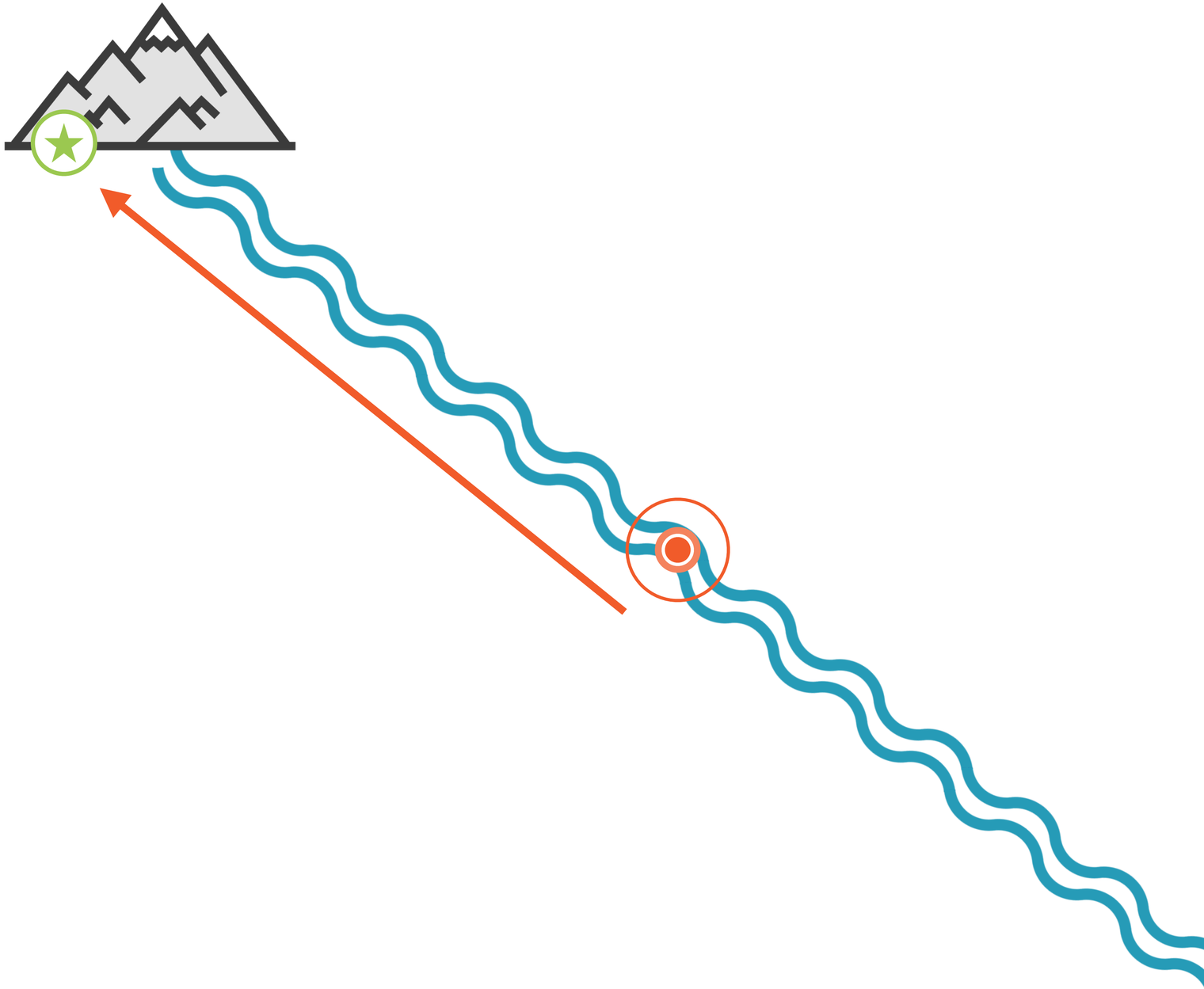
iOS Getting Started

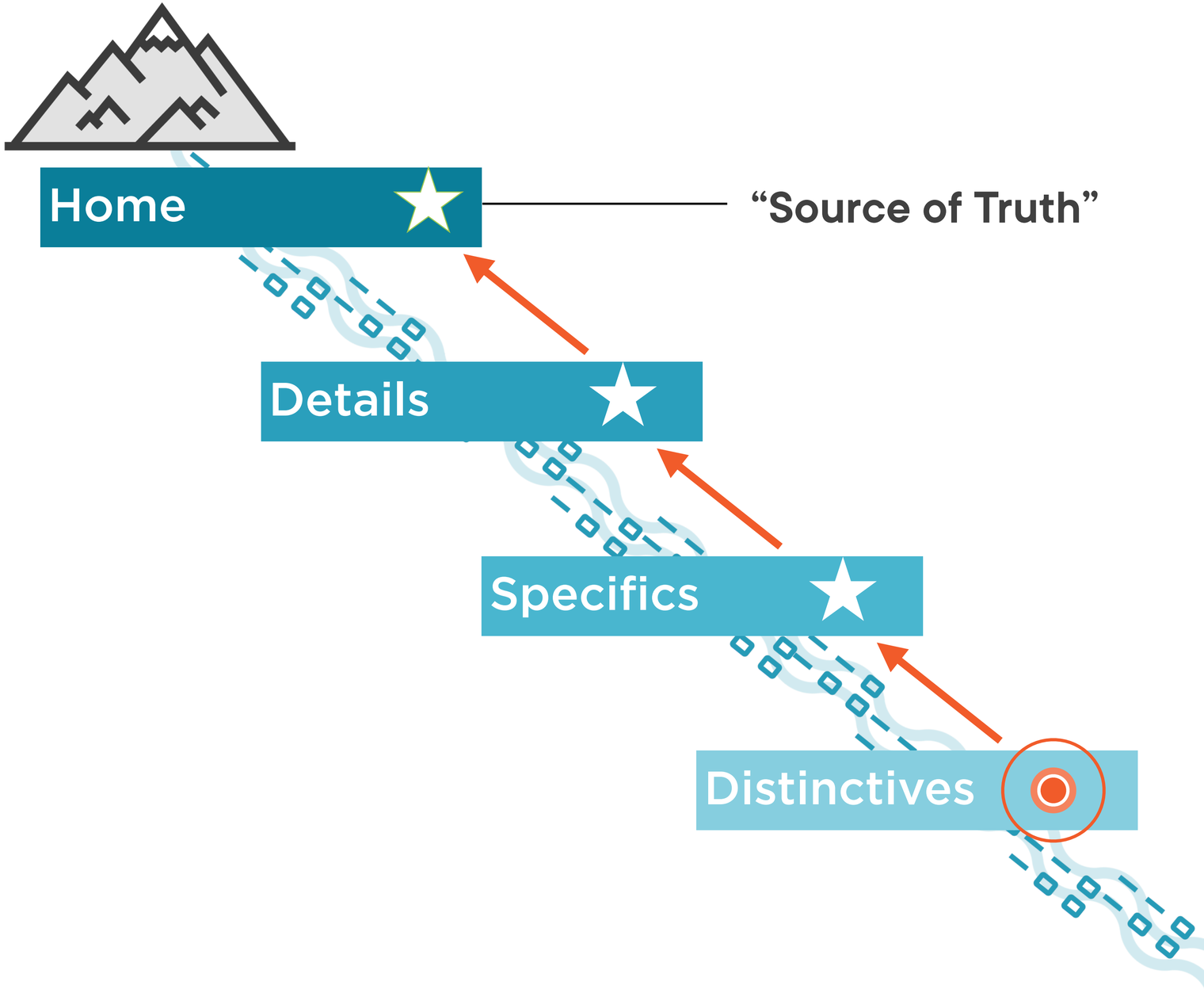
iOS Data Persistence: The Big Picture


INPUT

How do we initialize the data for users to interact with and establish an app's "data flow"?

Establishing an App’s Data Flow




Home
“Source of Truth”
Details
Specifics
Distinctives

Which View(s) need data?

Where are these Views in relation to one another
in the View hierarchy?

Where is the data going to come from?

- Initialize and own the data as a source of truth?

- Refer to a source of truth by letting the data be initialized elsewhere?

Which View(s) need data?

The EditView...

Where is the EditView in the View hierarchy?

App Scene WindowGroup

RenovationProjectsView

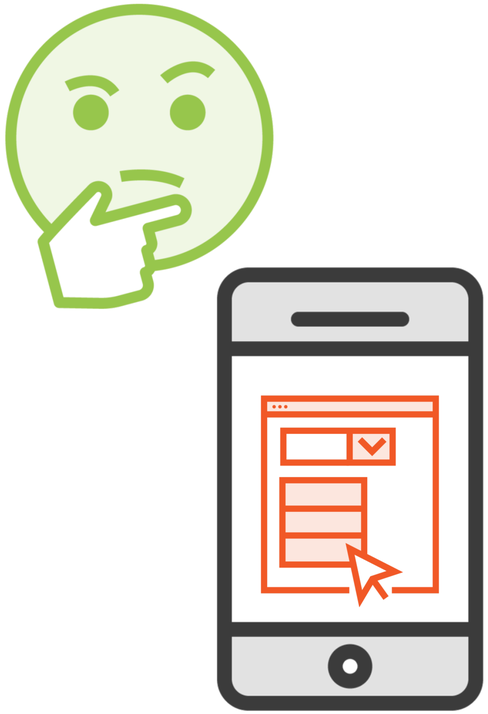
DetailView

EditView

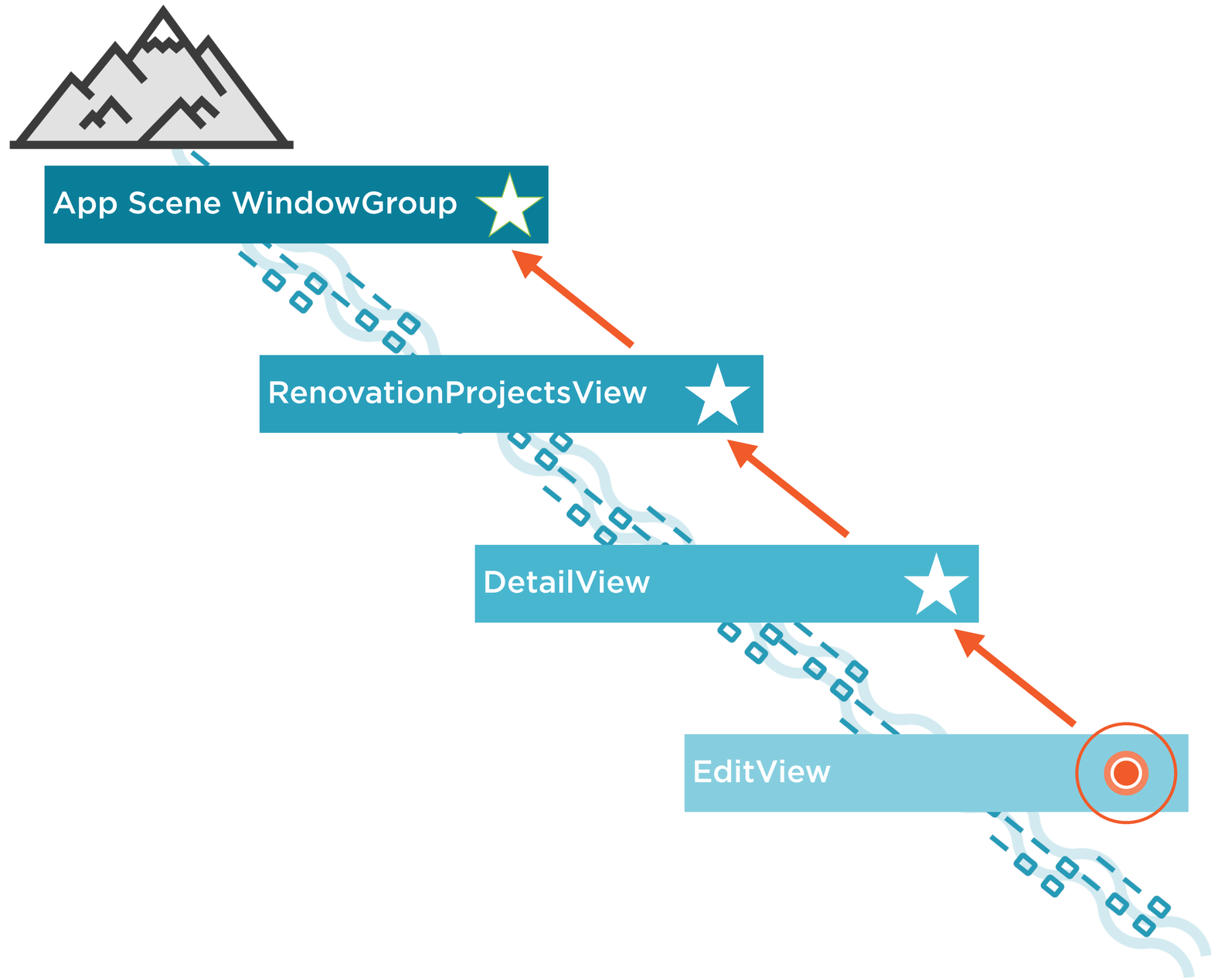
Where is the data going to come from?

- Initialize and own the data as a source of truth?

- Refer to a source of truth by letting the data be initialized elsewhere?



The purpose of an edit screen is to take data that **already exists** and **change it**...


App Scene WindowGroup
RenovationProjectsView
DetailView
EditView

iOS App Development Learning Path Resources

iOS Getting Started — Adding Behavior and Working with Data

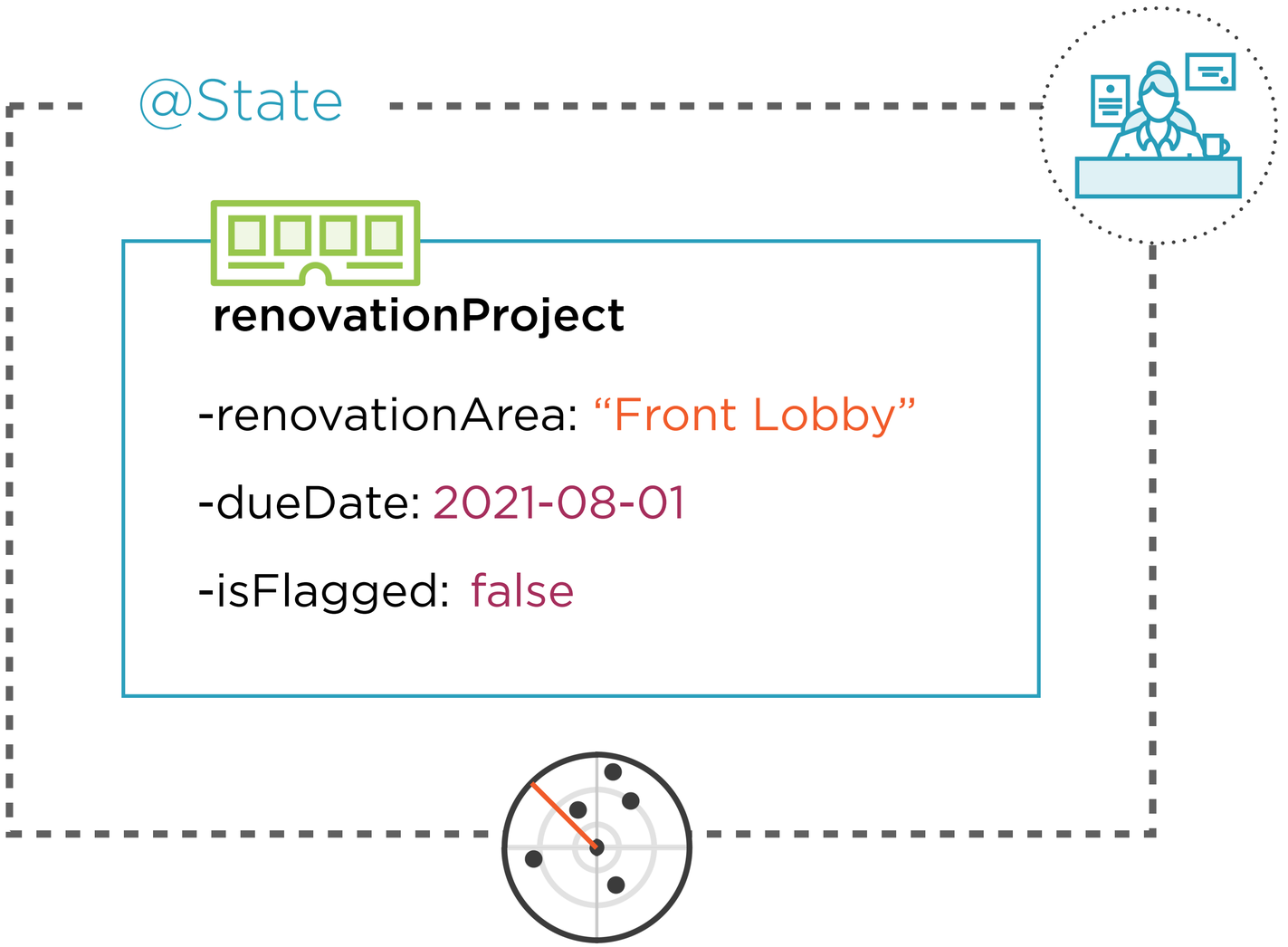
Data Management Types

@State

@StateObject

Value Types (Structs)

Reference Types (Classes)


@State
renovationProject
-renovationArea: “Front Lobby”
-dueDate: 2021-08-01
-isFlagged: false

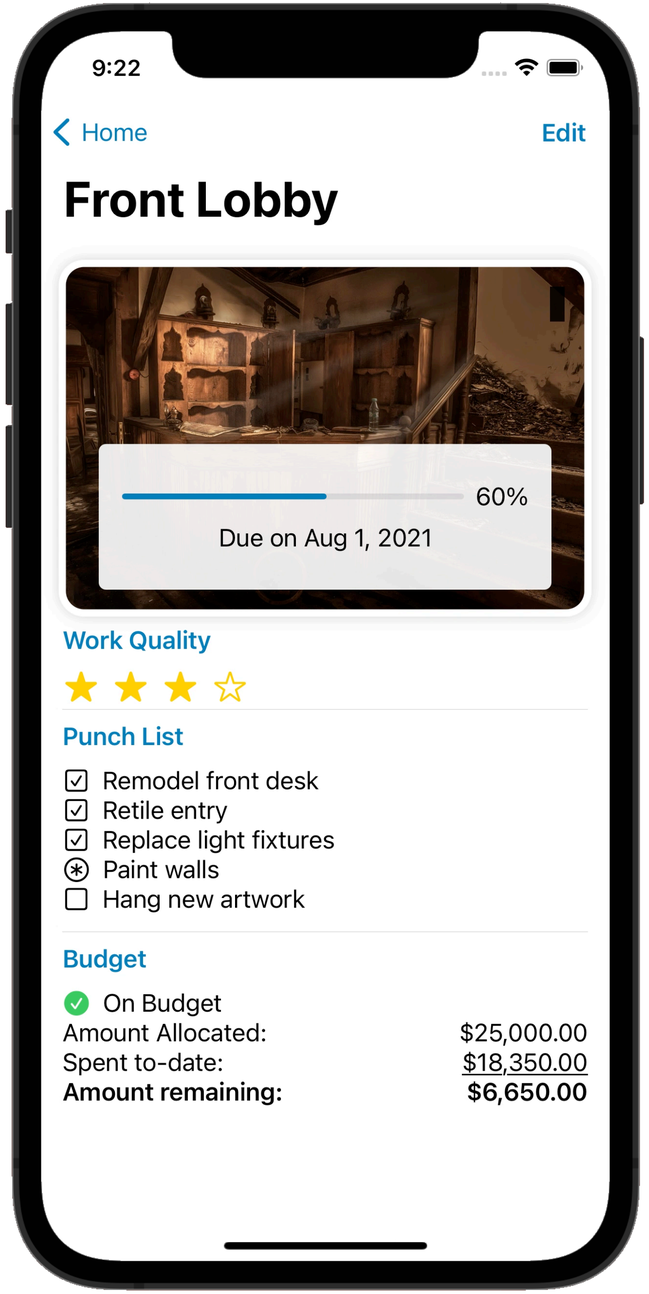
@State

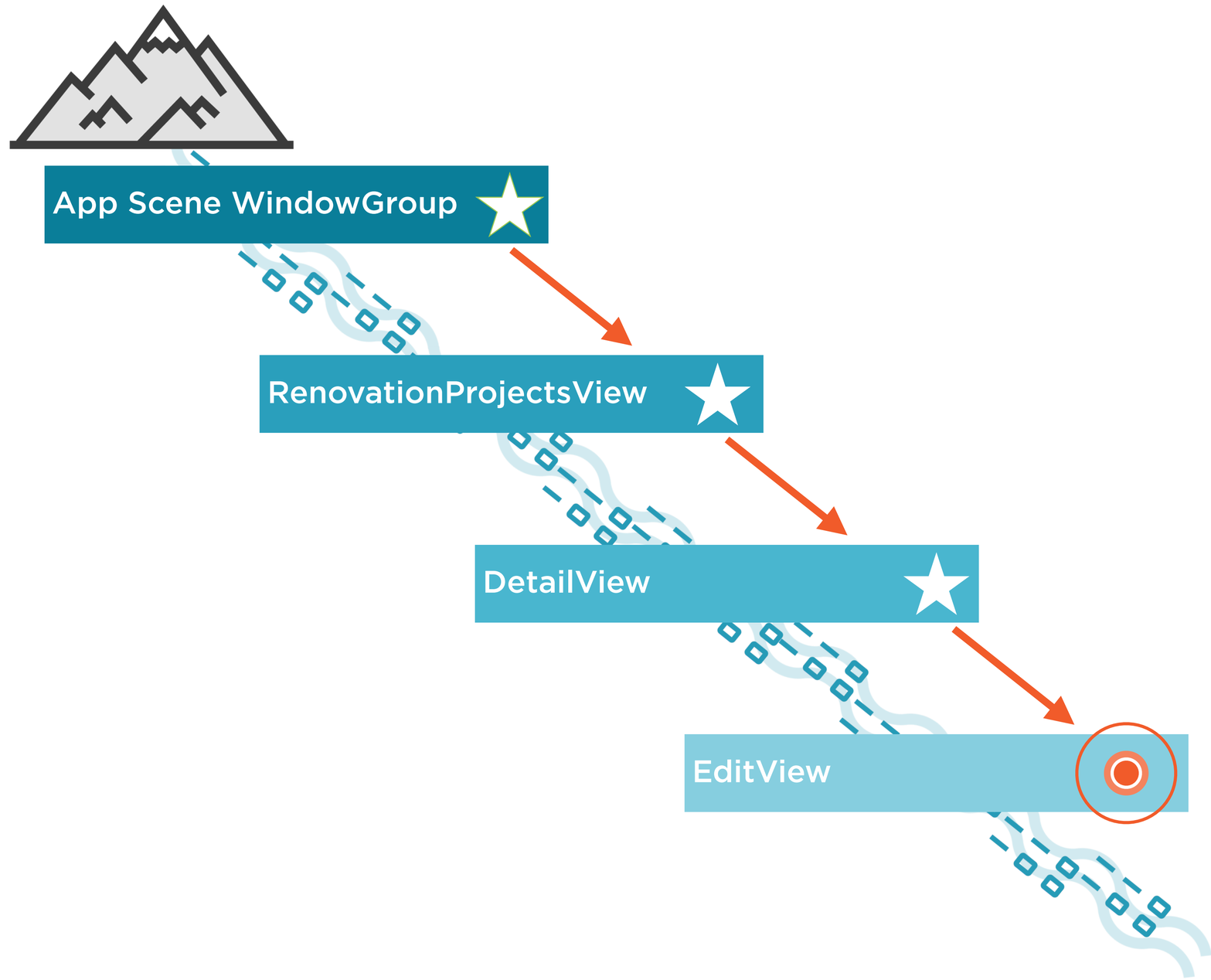
renovationProject

-renovationArea: “Front Lobby”

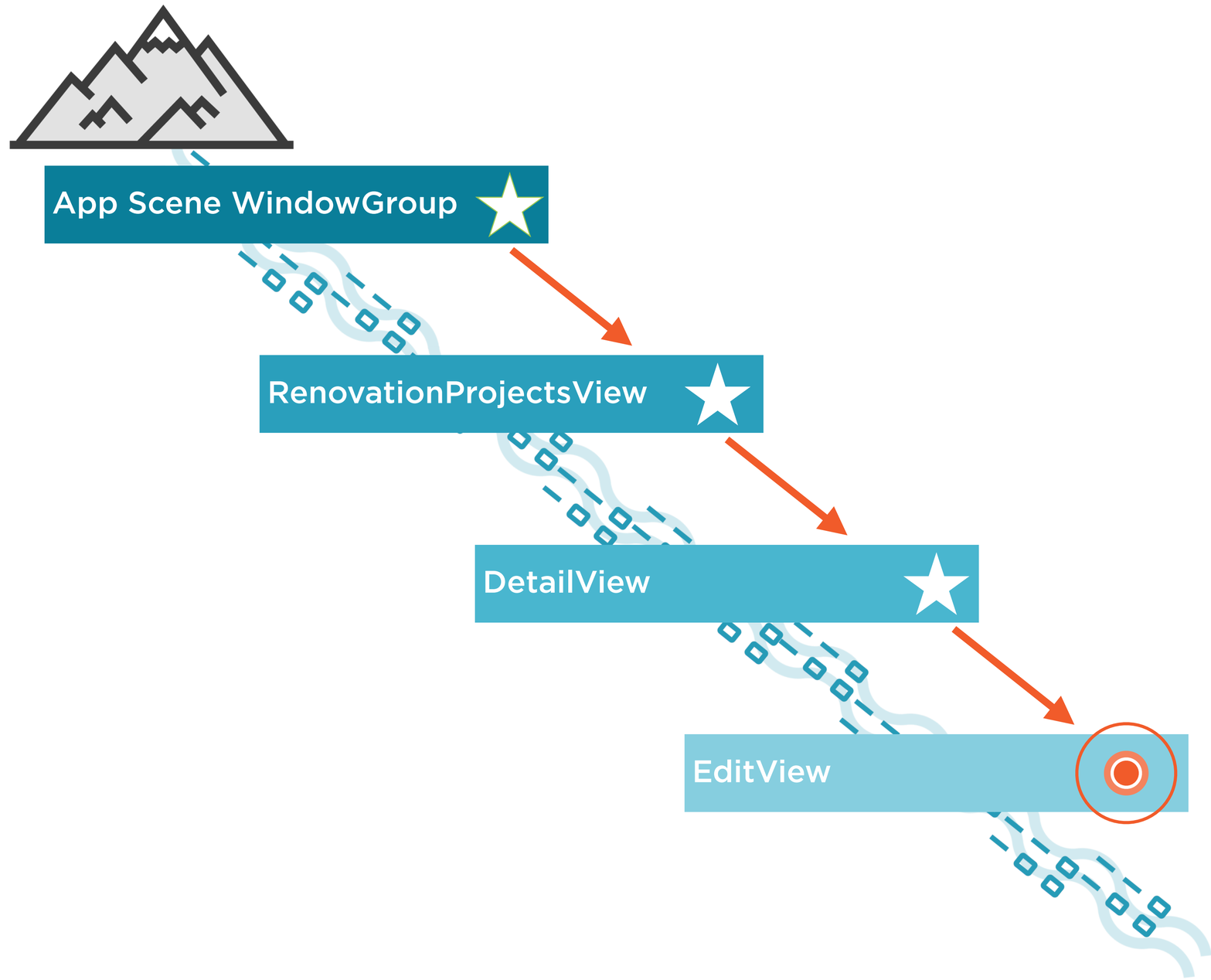
-dueDate: 2021-08-01

-isFlagged: true




App Scene WindowGroup
RenovationProjectsView
DetailView
EditView

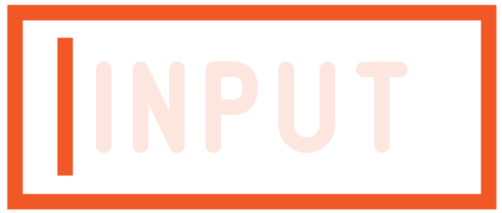
Loading and Displaying Data


App Scene WindowGroup
RenovationProjectsView
DetailView
EditView

Working with JSON in Swift

Search

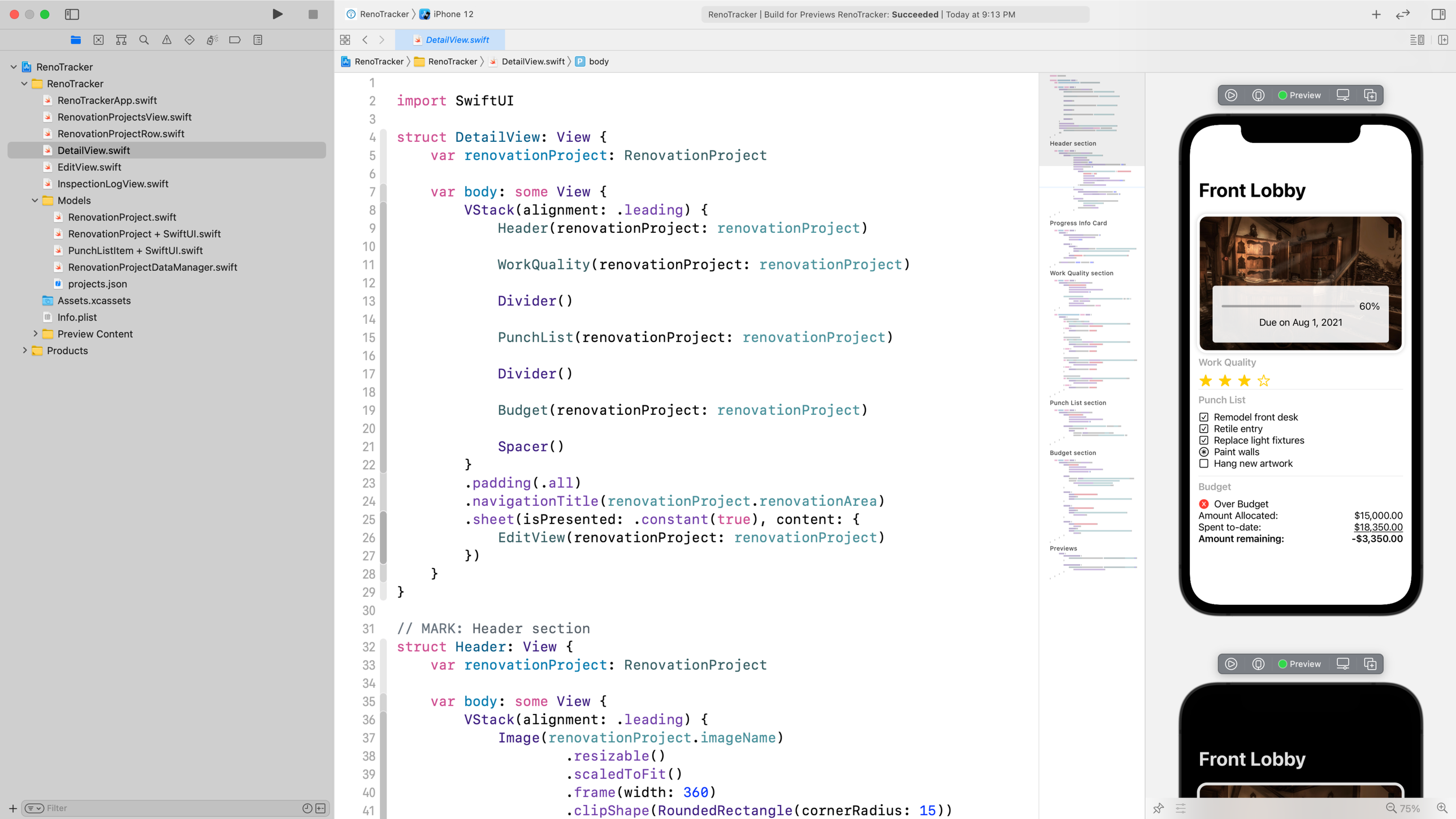
Try not to block the main thread by performing potentially long-running tasks inside an onAppear closure.

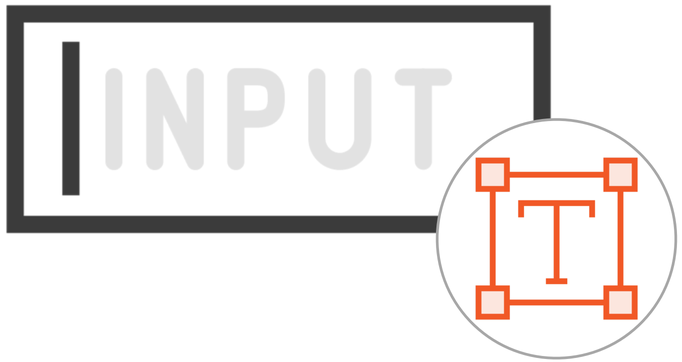


Handling user input implies entering or changing data in some way.

How do we edit text data with Text Fields?

Editing Text Data with Text Fields


RenoTracker
iPhone 12
RenoTracker | Build for Previews RenoTracker: Succeeded | Today at 9:13 PM
DetailView.swift
RenoTracker
RenoTracker
RenoTracker
DetailView.swift
body
RenoTracker
RenoTrackerApp.swift
RenovationProjectsView.swift
RenovationProjectRow.swift
DetailView.swift
EditView.swift
InspectionLogView.swift
Models
RenovationProject.swift
RenovationProject + SwiftUI.swift
PunchListItem + SwiftUI.swift
RenovationProjectDataManager.swift
projects.json
Assets.xcassets
Info.plist
Preview Content
Products
Filter
1 import SwiftUI
2
3 struct DetailView: View {
4 var renovationProject: RenovationProject
5
6 var body: some View {
7 VStack(alignment: .leading) {
8 Header(renovationProject: renovationProject)
9
10 WorkQuality(renovationProject: renovationProject)
11
12 Divider()
13
14 PunchList(renovationProject: renovationProject)
15
16 Divider()
17
18 Budget(renovationProject: renovationProject)
19
20 Spacer()
21 }
22 .padding(.all)
23 .navigationTitle(renovationProject.renovationArea)
24 .sheet(isPresented: .constant(true), content: {
25 EditView(renovationProject: renovationProject)
26 })
27 }
28 }
29
30 // MARK: Header section
31 struct Header: View {
32 var renovationProject: RenovationProject
33
34 var body: some View {
35 VStack(alignment: .leading) {
36 Image(renovationProject.imageName)
37 .resizable()
38 .scaledToFit()
39 .frame(width: 360)
40 .clipShape(RoundedRectangle(cornerRadius: 15))
41
Header section
Progress Info Card
Work Quality section
Punch List section
Budget section
Previews
Preview
Front Lobby
60%
Due on Aug 1, 2021
Work Quality
Punch List
Remodel front desk
Retile entry
Replace light fixtures
Paint walls
Hang new artwork
Budget
Over Budget
Amount Allocated: $15,000.00
Spent to-date: $18,350.00
Amount remaining: -$3,350.00
Preview
Front Lobby
75%



TextField

What pieces of data from the data model should users be allowed to change?

renovationArea

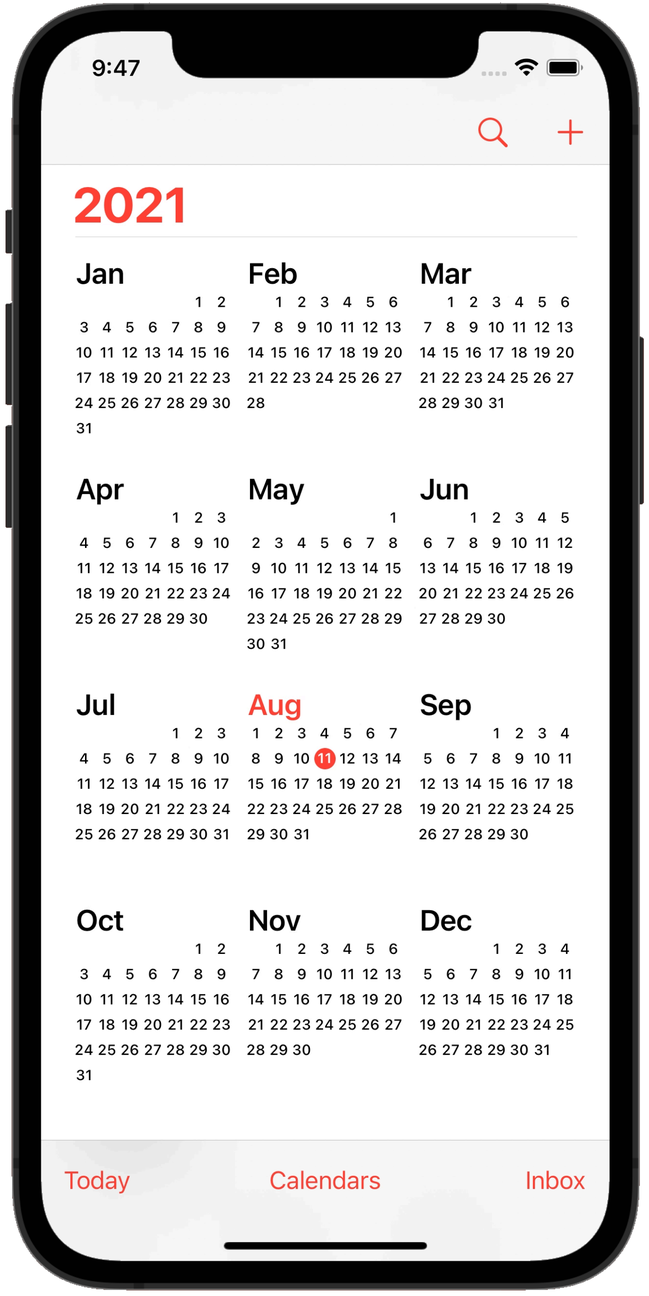
dueDate

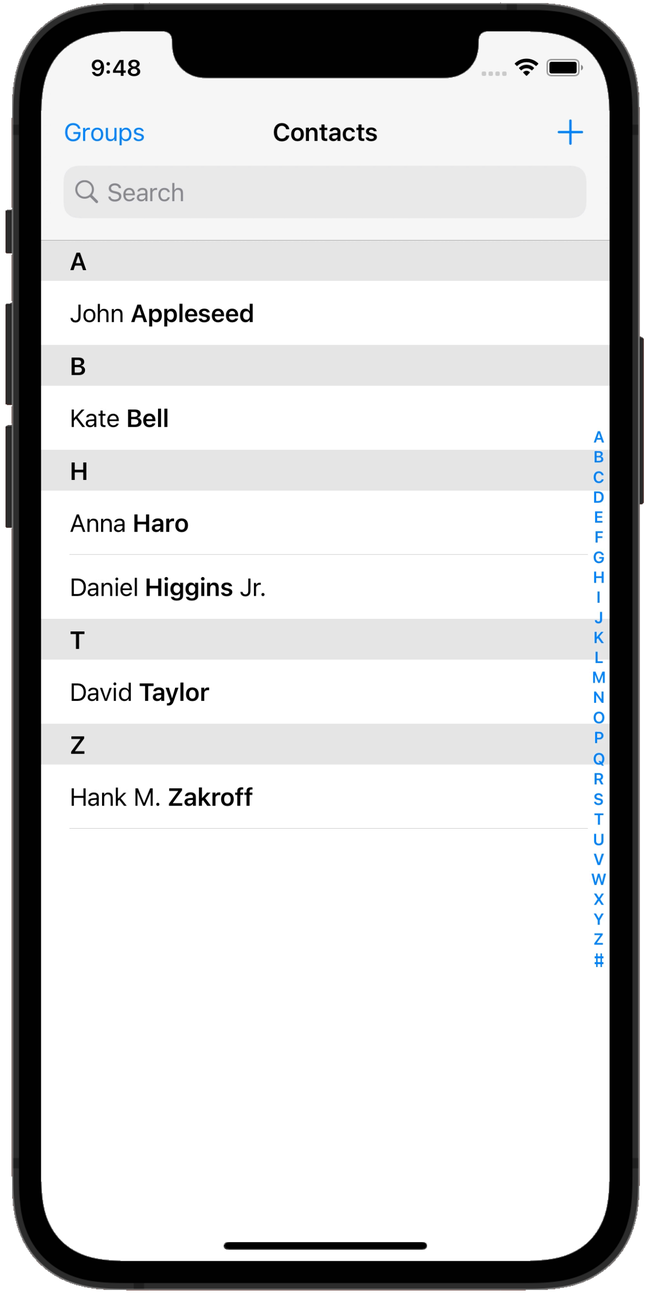
workQualityRating

isFlagged

punchList

budgetSpentToDate


9:47
2021
Jan
1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
Feb
1 2 3 4 5 6
7 8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28
Mar
1 2 3 4 5 6
7 8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30 31
Apr
1 2 3
4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30
May
1
2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31
Jun
1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30
Jul
1 2 3
4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 31
Aug
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31
Sep
1 2 3 4
5 6 7 8 9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30
Oct
1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
Nov
1 2 3 4 5 6
7 8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30
Dec
1 2 3 4
5 6 7 8 9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31
Today
Calendars
Inbox


9:48
Groups
Contacts
Search
A
John Appleseed
B
Kate Bell
H
Anna Haro
Daniel Higgins Jr.
T
David Taylor
Z
Hank M. Zakroff
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z #

How do we persist (or cancel) data changes?

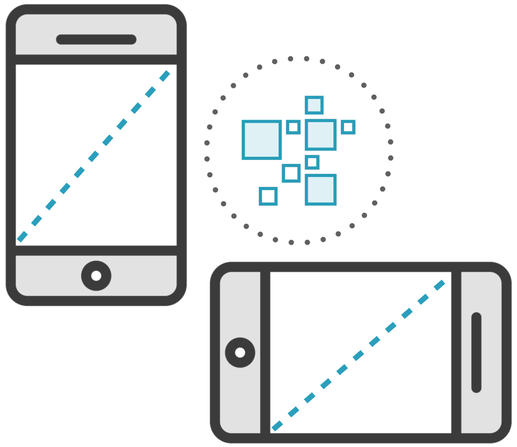
Persisting (or Canceling) Data Changes

-No way to back out and cancel changes that are made to the data

-Intentional changes that should be kept are wiped out after every relaunch of the app

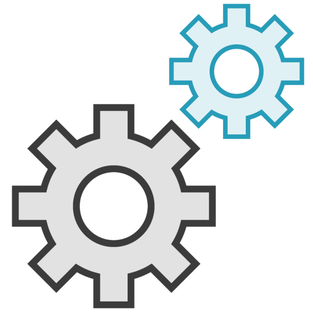
-There needs to actually be a cancel button and a done button on the EditView’s navigation bar

SwiftUI Environment



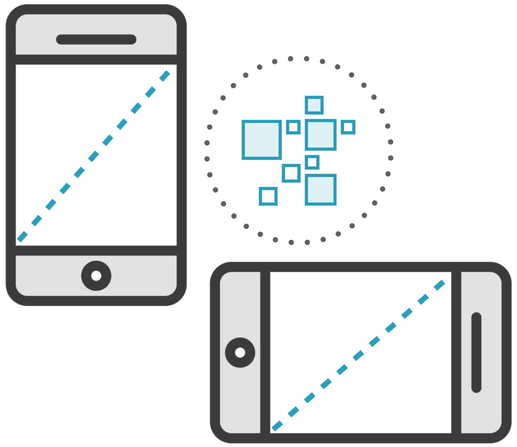
Device characteristics

Operating system states

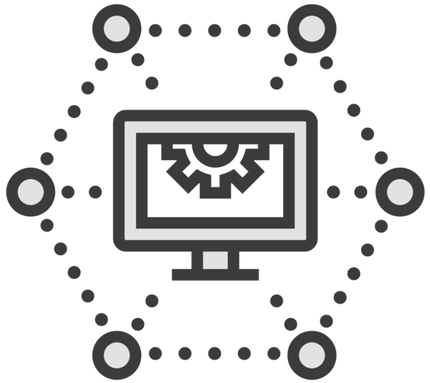


User settings

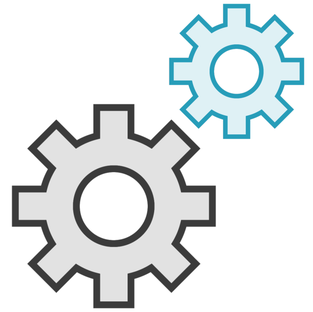
SwiftUI Environment



Device characteristics

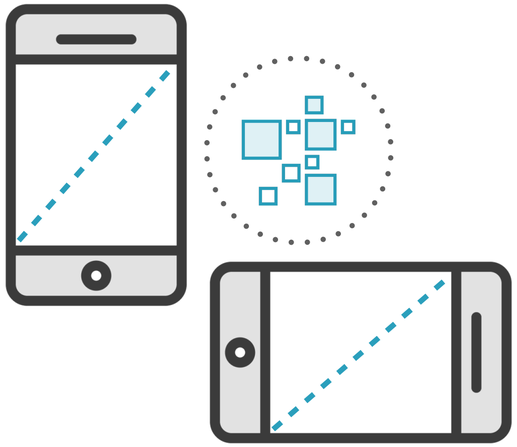


Operating system states

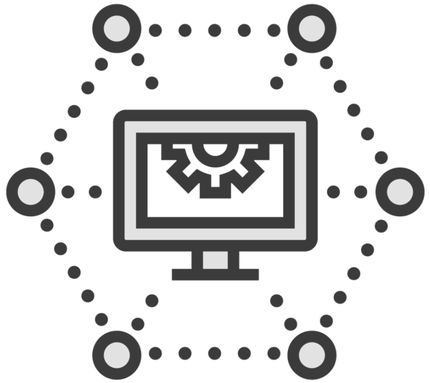


User settings

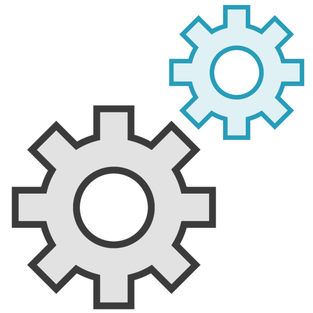
SwiftUI Environment



Device characteristics



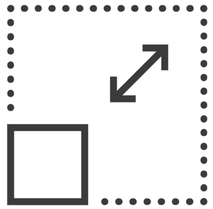
Operating system states



User settings

Data Lifecycle

Load



Change

Cancel

Persist

renovationArea

dueDate

workQualityRating

isFlagged

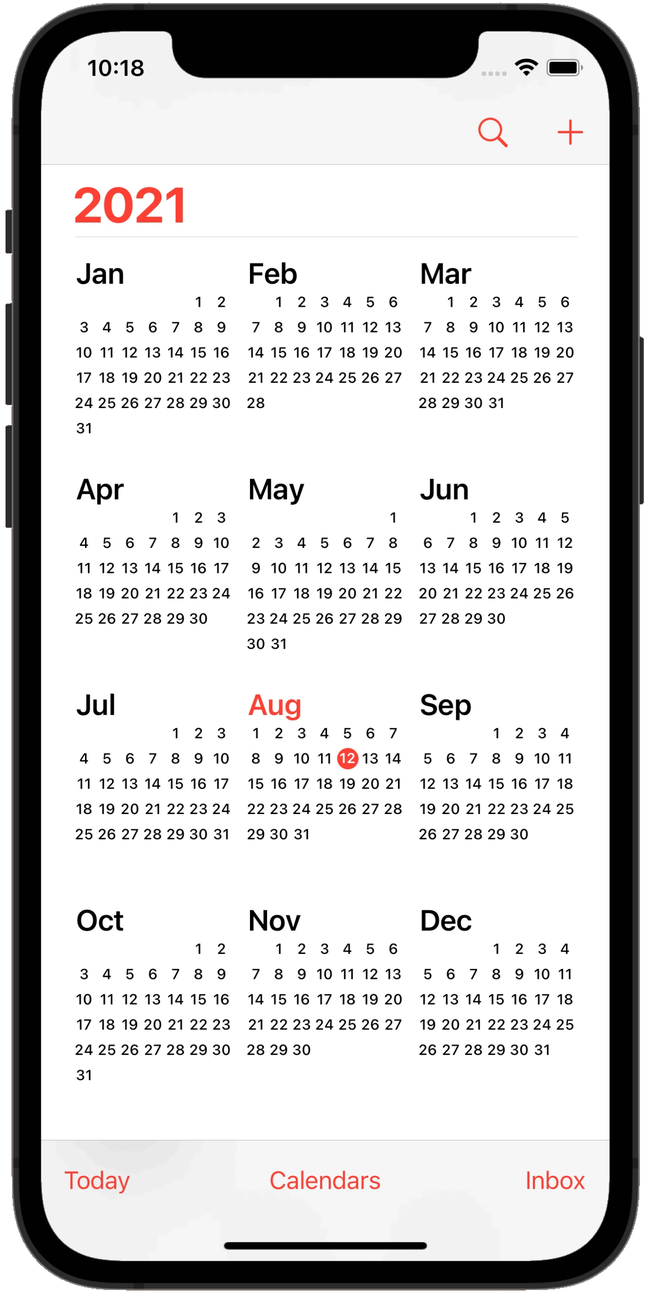
punchList

budgetSpentToDate

- ✓ renovationArea
- dueDate
- workQualityRating
- isFlagged
- punchList
- budgetSpentToDate

How do we implement an input control for choosing dates, displaying pop-over menus, and switching between two or more mutually exclusive options?

Working with Picker Views


10:18
2021
Jan
1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
Feb
1 2 3 4 5 6
7 8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28
Mar
1 2 3 4 5 6
7 8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30 31
Apr
1 2 3
4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30
May
1
2 3 4 5 6 7 8
9 10 11 12 13 14 15
16 17 18 19 20 21 22
23 24 25 26 27 28 29
30 31
Jun
1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30
Jul
1 2 3
4 5 6 7 8 9 10
11 12 13 14 15 16 17
18 19 20 21 22 23 24
25 26 27 28 29 30 31
Aug
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31
Sep
1 2 3 4
5 6 7 8 9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30
Oct
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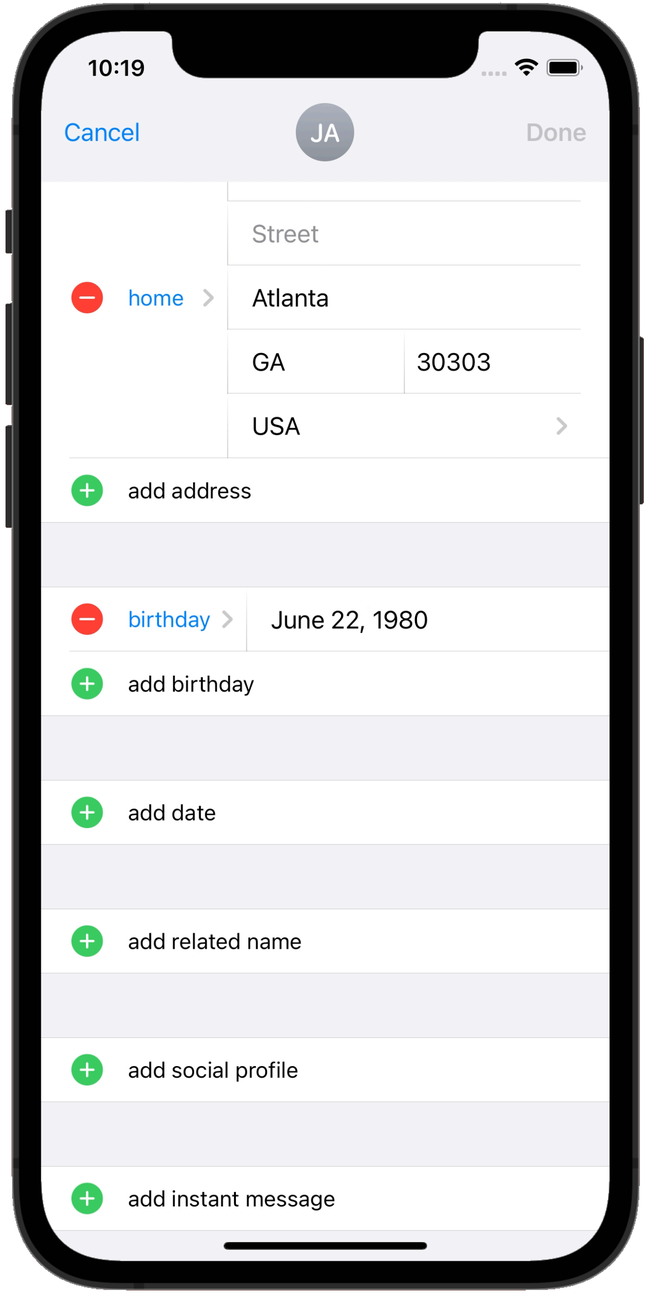
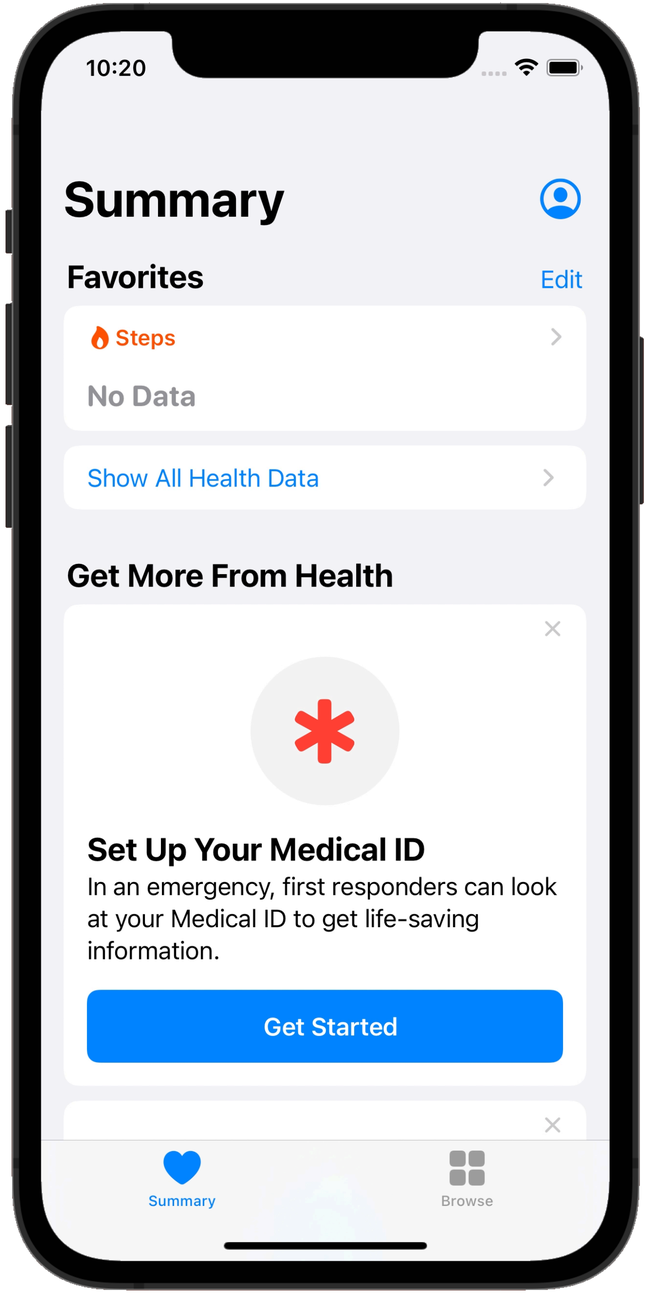
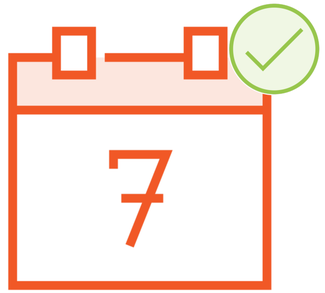
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
Nov
1 2 3 4 5 6
7 8 9 10 11 12 13
14 15 16 17 18 19 20
21 22 23 24 25 26 27
28 29 30
Dec
1 2 3 4
5 6 7 8 9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31
Today
Calendars
Inbox


10:19
Cancel
JA
Done
Street
home
Atlanta
GA
30303
USA
add address
birthday
June 22, 1980
add birthday
add date
add related name
add social profile
add instant message

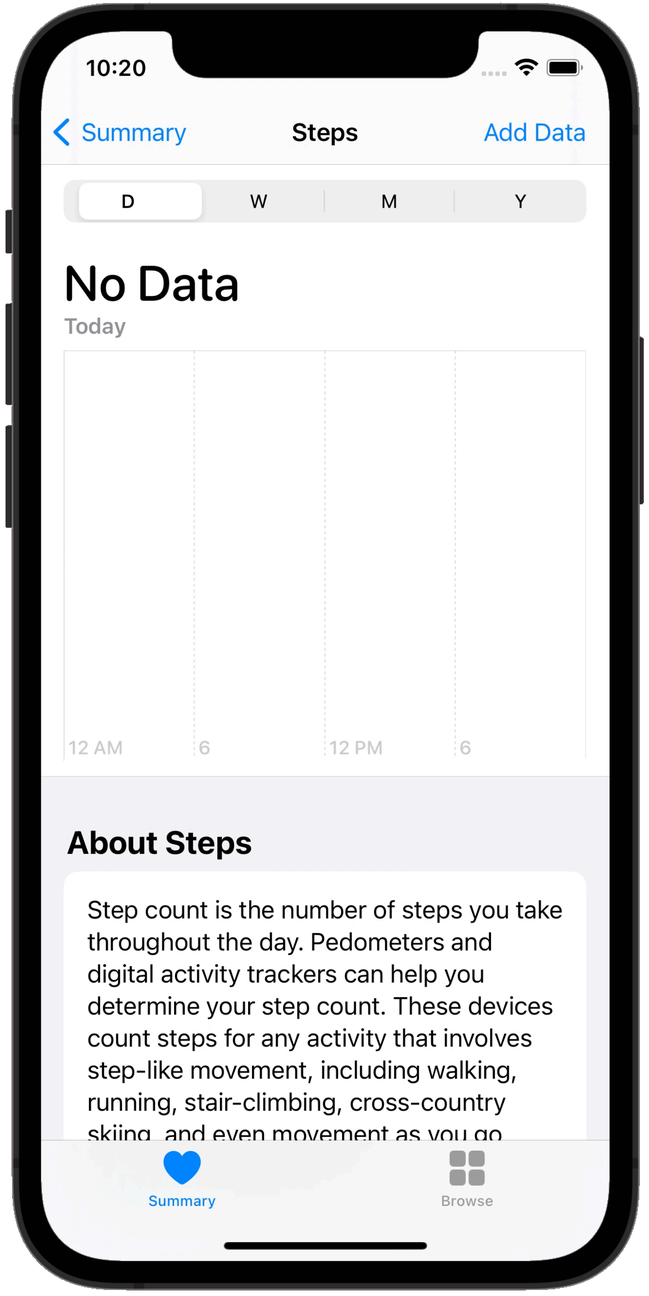

10:20
Summary
Favorites
Edit
Steps
No Data
Show All Health Data
Get More From Health
Set Up Your Medical ID
In an emergency, first responders can look at your Medical ID to get life-saving information.
Get Started
Summary
Browse

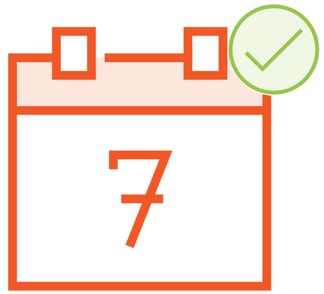
What about the other picker styles that we saw (like the wheel-style date picker)?



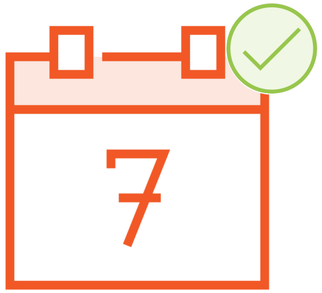
DatePicker

How do I create something like the segmented control that we saw in the Health app?


10:20
Summary
Steps
Add Data
D
W
M
Y
No Data
Today
12 AM
6
12 PM
6
About Steps
Step count is the number of steps you take throughout the day. Pedometers and digital activity trackers can help you determine your step count. These devices count steps for any activity that involves step-like movement, including walking, running, stair-climbing, cross-country skiing, and even movement as you go
Summary
Browse



DatePicker



DatePicker

Picker

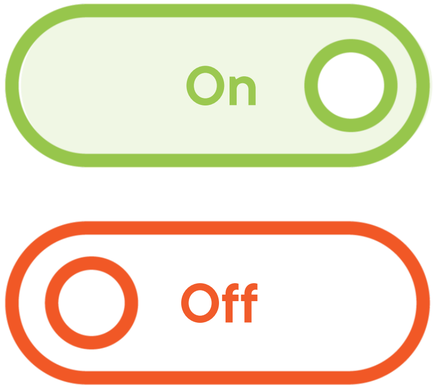
What kind of editing control should we use if the piece of data can only have one of two possible values?

True

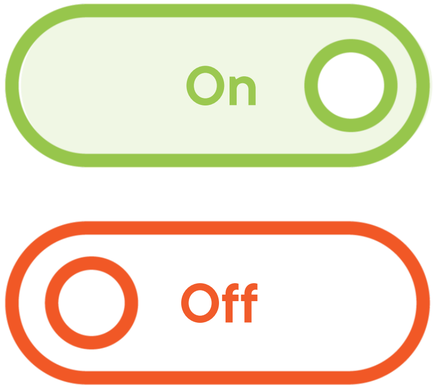
False

Yes

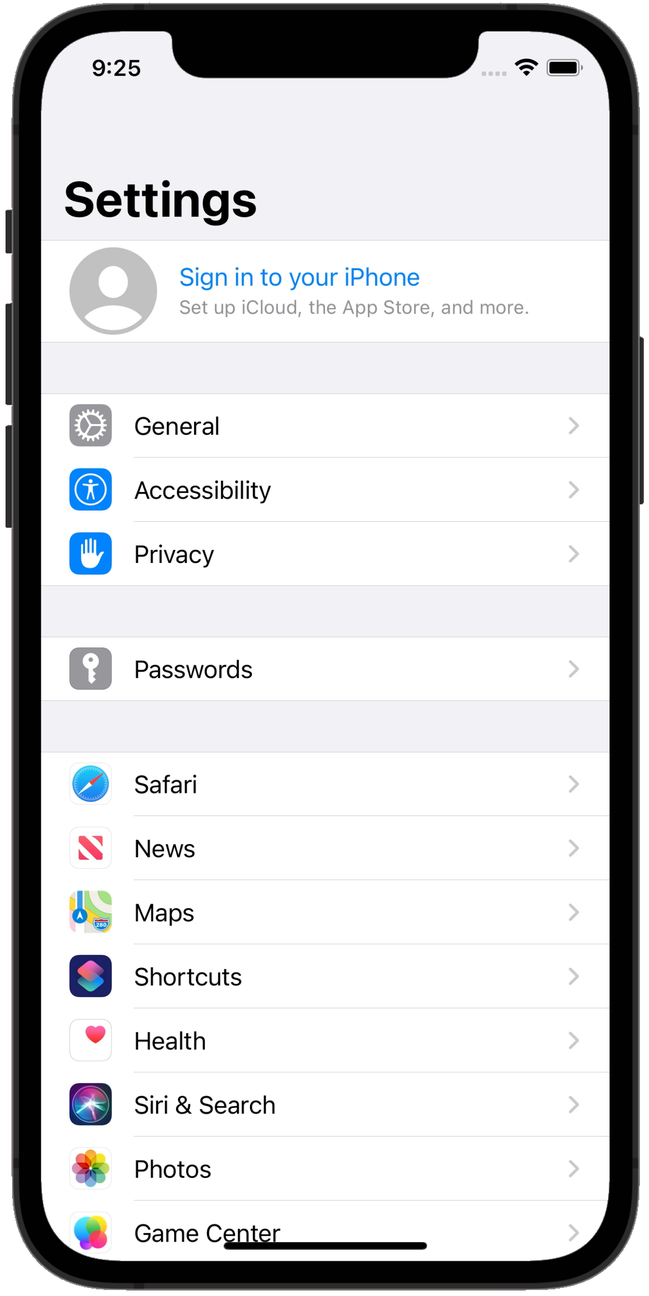
No

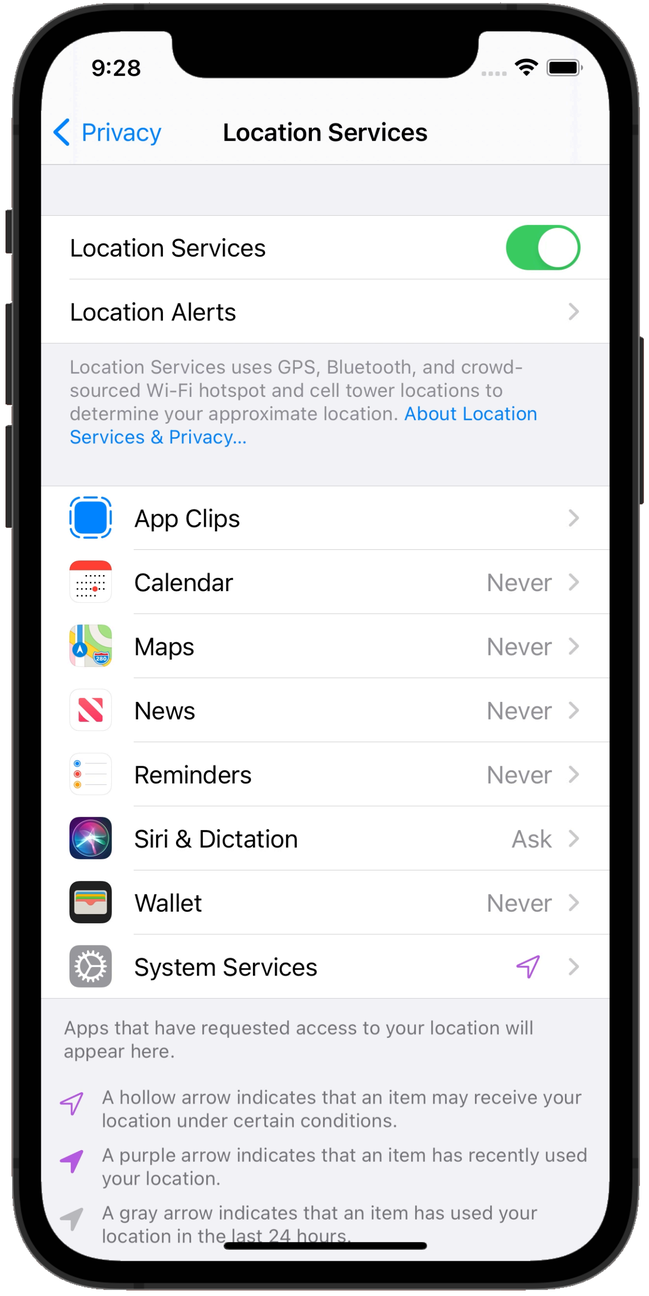

On
Off

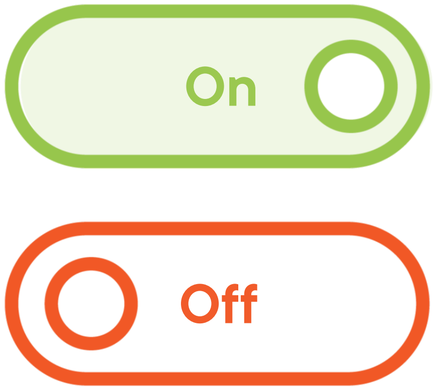
Switching Between Binary Options with Toggles



Toggle


9:25
Settings
Sign in to your iPhone
Set up iCloud, the App Store, and more.
General
Accessibility
Privacy
Passwords
Safari
News
Maps
Shortcuts
Health
Siri & Search
Photos
Game Center


9:28
Privacy
Location Services
Location Services
Location Alerts
Location Services uses GPS, Bluetooth, and crowd-sourced Wi-Fi hotspot and cell tower locations to determine your approximate location. About Location Services & Privacy...
App Clips
Calendar
Never
Maps
Never
News
Never
Reminders
Never
Siri & Dictation
Ask
Wallet
Never
System Services
Apps that have requested access to your location will appear here.
A hollow arrow indicates that an item may receive your location under certain conditions.
A purple arrow indicates that an item has recently used your location.
A gray arrow indicates that an item has used your location in the last 24 hours.

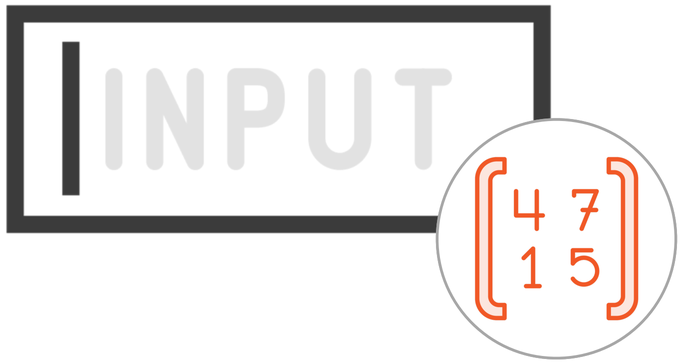


Toggle

Use when you want to allow users to edit a piece of data that can only be one of two possible values.

- ✓ renovationArea
- ✓ dueDate
- ✓ workQualityRating
- ✓ punchList
- isFlagged
- budgetSpentToDate

- ✓ renovationArea
- ✓ dueDate
- ✓ workQualityRating
- ✓ punchList
- ✓ isFlagged
- budgetSpentToDate



TextField

Editing Numeric Data with Text Fields

Can we use a TextField to edit numeric data?

Displaying Editing Controls in a Form

Summary

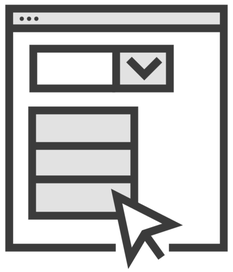
Build a data model

Establish a data flow

Bind data to SwiftUI's data editing controls

TextField

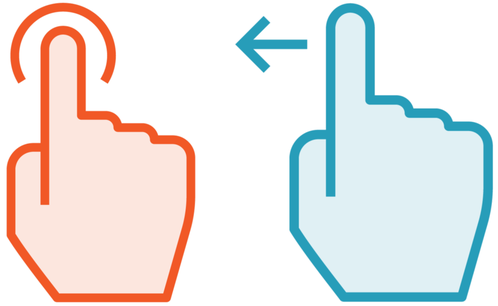
DatePicker



Picker

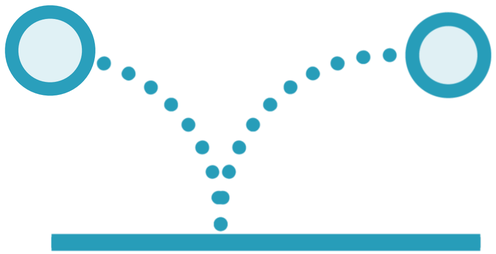
Toggle

Up Next



Gestures

Drawing



Animation