UI Testing in Xcode

Session 406

Wil Turner Developer Tools
Brooke Callahan Developer Tools

Overview

Overview

UI testing

Overview

UI testing

- Find and interact with UI elements

Overview

UI testing

- Find and interact with UI elements
- Validate UI properties and state

Overview

UI testing

- Find and interact with UI elements
- Validate UI properties and state

UI recording

Overview

UI testing

- Find and interact with UI elements
- Validate UI properties and state

UI recording

Test reports

Core Technologies

Core Technologies

XCTest

Core Technologies

XCTest + Accessibility

XCTest

Xcode’s testing framework

XCTest

Xcode’s testing framework

Test case subclasses

XCTest

Xcode’s testing framework

Test case subclasses

Test methods

XCTest

Xcode’s testing framework

Test case subclasses

Test methods

Assertions

XCTest

Xcode's testing framework

Test case subclasses

Test methods

Assertions

Integrated with Xcode

XCTest

Xcode's testing framework

Test case subclasses

Test methods

Assertions

Integrated with Xcode

CI via Xcode Server and xcodebuild

XCTest

Xcode's testing framework

Test case subclasses

Test methods

Assertions

Integrated with Xcode

CI via Xcode Server and xcodebuild

Swift and Objective-C

Testing Matrix

	Unit	UI
Correctness	✓	
Performance		

Testing Matrix

	Unit	UI
Correctness	✓	
Performance	✓	

Testing Matrix

NEW

	Unit	UI
Correctness	✓	✓
Performance	✓	✓

Core Technologies

XCTest + Accessibility

Accessibility

Accessibility

Rich semantic data about UI

Accessibility

Rich semantic data about UI

UIKit and AppKit integration

Accessibility

Rich semantic data about UI

UIKit and AppKit integration

APIs for fine tuning

Accessibility

Rich semantic data about UI

UIKit and AppKit integration

APIs for fine tuning

UI tests interact with the app the way a user does

Requirements

Requirements

UI testing depends on new OS features

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- iOS 9

Requirements

UI testing depends on new OS features

- iOS 9
- OS X 10.11

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Privacy protection

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- iOS devices

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Privacy protection

- iOS devices
  - Enabled for development

Requirements

UI testing depends on new OS features

- iOS 9
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Privacy protection

- iOS devices
  - Enabled for development
  - Connected to a trusted host running Xcode

Requirements

UI testing depends on new OS features

- iOS 9
- OS X 10.11

Privacy protection

- iOS devices
  - Enabled for development
  - Connected to a trusted host running Xcode
- OS X must grant permission to Xcode Helper

Requirements

UI testing depends on new OS features

- iOS 9
- OS X 10.11

Privacy protection

- iOS devices
  - Enabled for development
  - Connected to a trusted host running Xcode
- OS X must grant permission to Xcode Helper
  - Prompted on first run

Getting Started

Getting Started

Xcode target type

Getting Started

Xcode target type

Getting Started

Xcode target type

APIs

Getting Started

Xcode target type

APIs

UI recording

UI Testing Xcode Targets

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UI tests have special requirements

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- Execute in a separate process

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- Execute in a separate process
- Permission to use Accessibility

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New Xcode target templates

UI Testing Xcode Targets

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- Execute in a separate process
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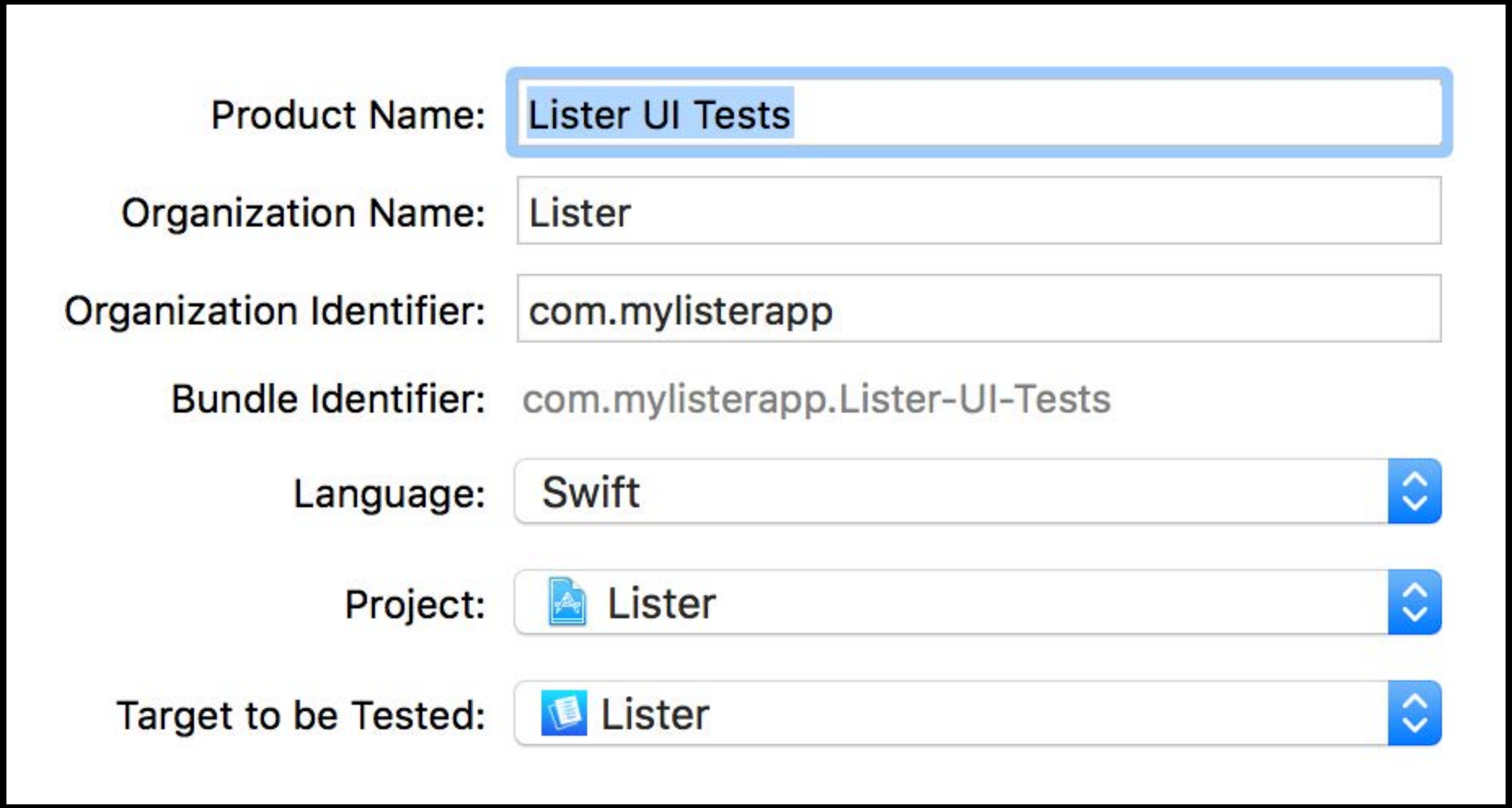
New Xcode target templates

- Cocoa Touch UI Testing Bundle (iOS)
- Cocoa UI Testing Bundle (OS X)



Product Name:	Lister UI Tests
Organization Name:	Lister
Organization Identifier:	com.mylisterapp
Bundle Identifier:	com.mylisterapp.Lister-UI-Tests
Language:	Swift
Project:	Lister
Target to be Tested:	Lister

UI Testing Xcode Targets

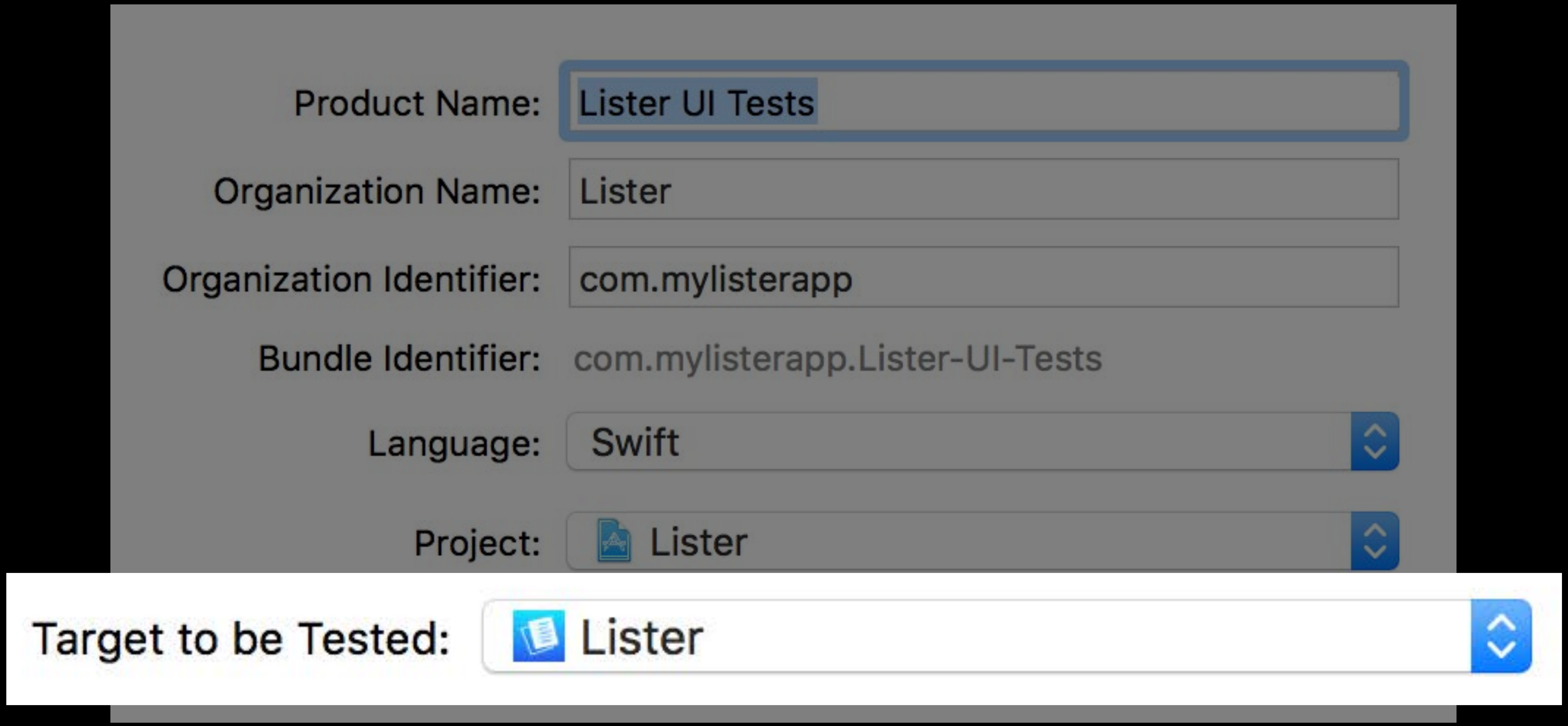
UI tests have special requirements

- Execute in a separate process
- Permission to use Accessibility

New Xcode target templates

- Cocoa Touch UI Testing Bundle (iOS)
- Cocoa UI Testing Bundle (OS X)

"Target to be Tested" setting



Product Name: Lister UI Tests
Organization Name: Lister
Organization Identifier: com.mylisterapp
Bundle Identifier: com.mylisterapp.Lister-UI-Tests
Language: Swift
Project: Lister
Target to be Tested: Lister

APIs

APIs

Three new classes

APIs

Three new classes

- XCUIApplication

APIs

Three new classes

- XCUIApplication
- XCUIElement

APIs

Three new classes

- XCUIApplication
- XCUIElement
- XCUIElementQuery

UI Recording

UI Recording

Interact with your app

UI Recording

Interact with your app

Recording generates the code

UI Recording

Interact with your app

Recording generates the code

- Create new tests

UI Recording

Interact with your app

Recording generates the code

- Create new tests
- Expand existing tests

Demo

Getting started with UI testing

What Did You See?

What Did You See?

Adding a UI testing target

What Did You See?

Adding a UI testing target

Using recording

What Did You See?

Adding a UI testing target

Using recording

- Finding UI elements

What Did You See?

Adding a UI testing target

Using recording

- Finding UI elements
- Synthesizing user events

What Did You See?

Adding a UI testing target

Using recording

- Finding UI elements
- Synthesizing user events

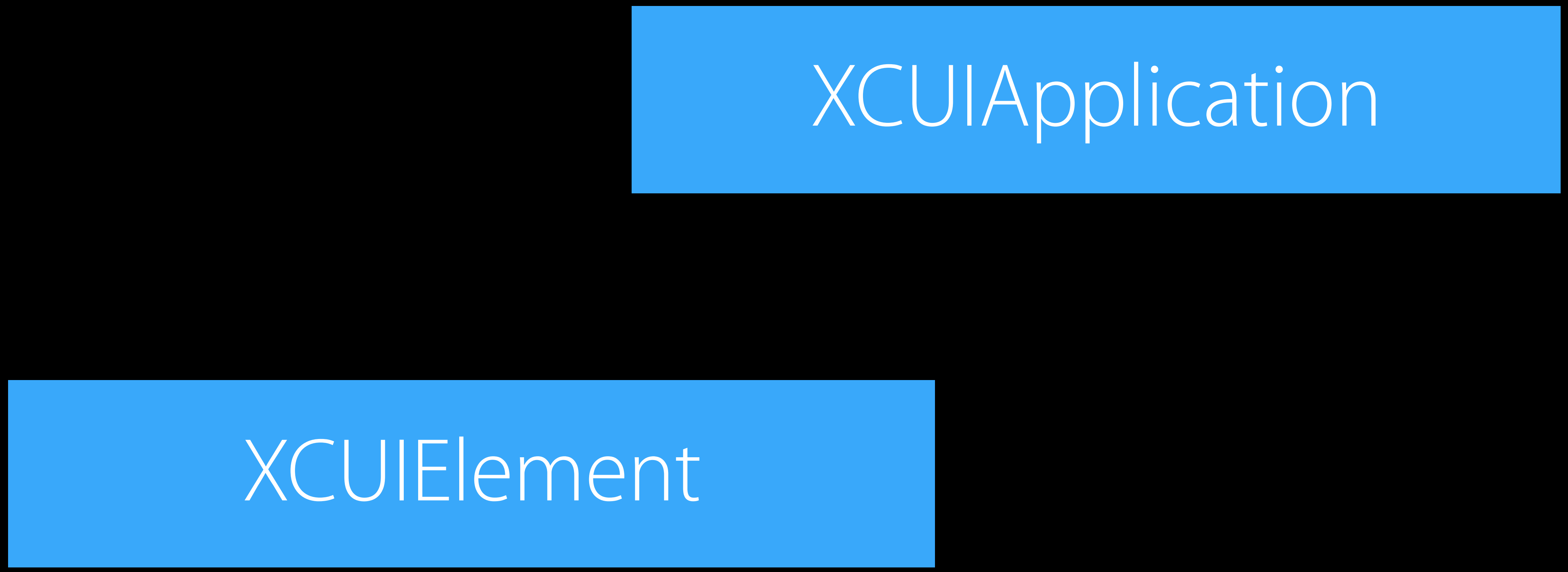
Adding validation with XCTAssert

UI Testing API

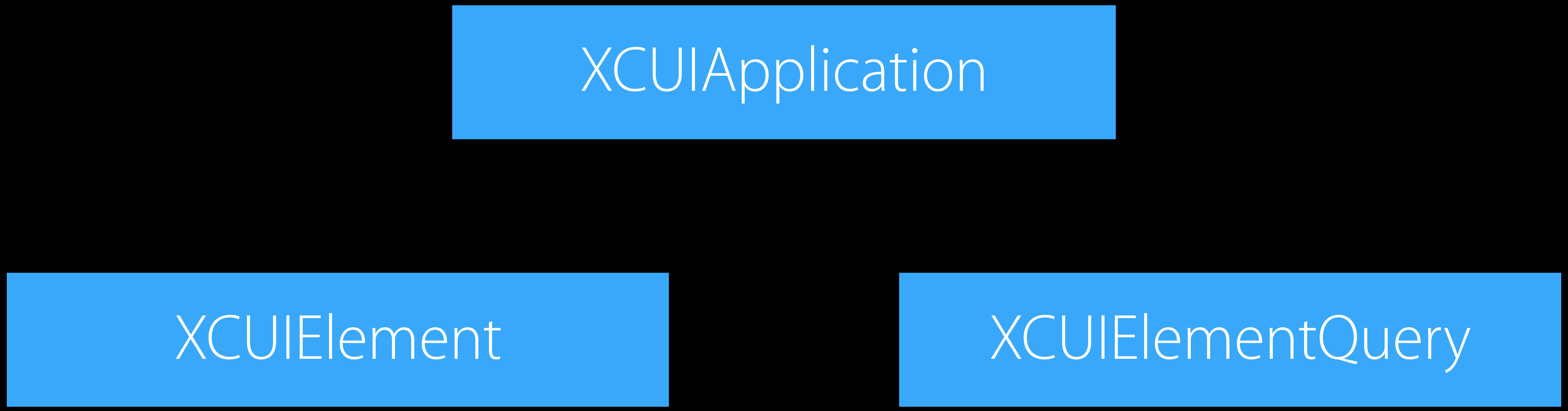
UI Testing API

UI Testing API

UI Testing API



UI Testing API



Example

Testing the Add button

```
// application:
let app = XCUIApplication()
app.launch()

// element and query:
let addButton = app.buttons[“Add”]
addButton.tap()

// assertion:
XCTAssertEqual(app.tables.cells.count, 1)
```

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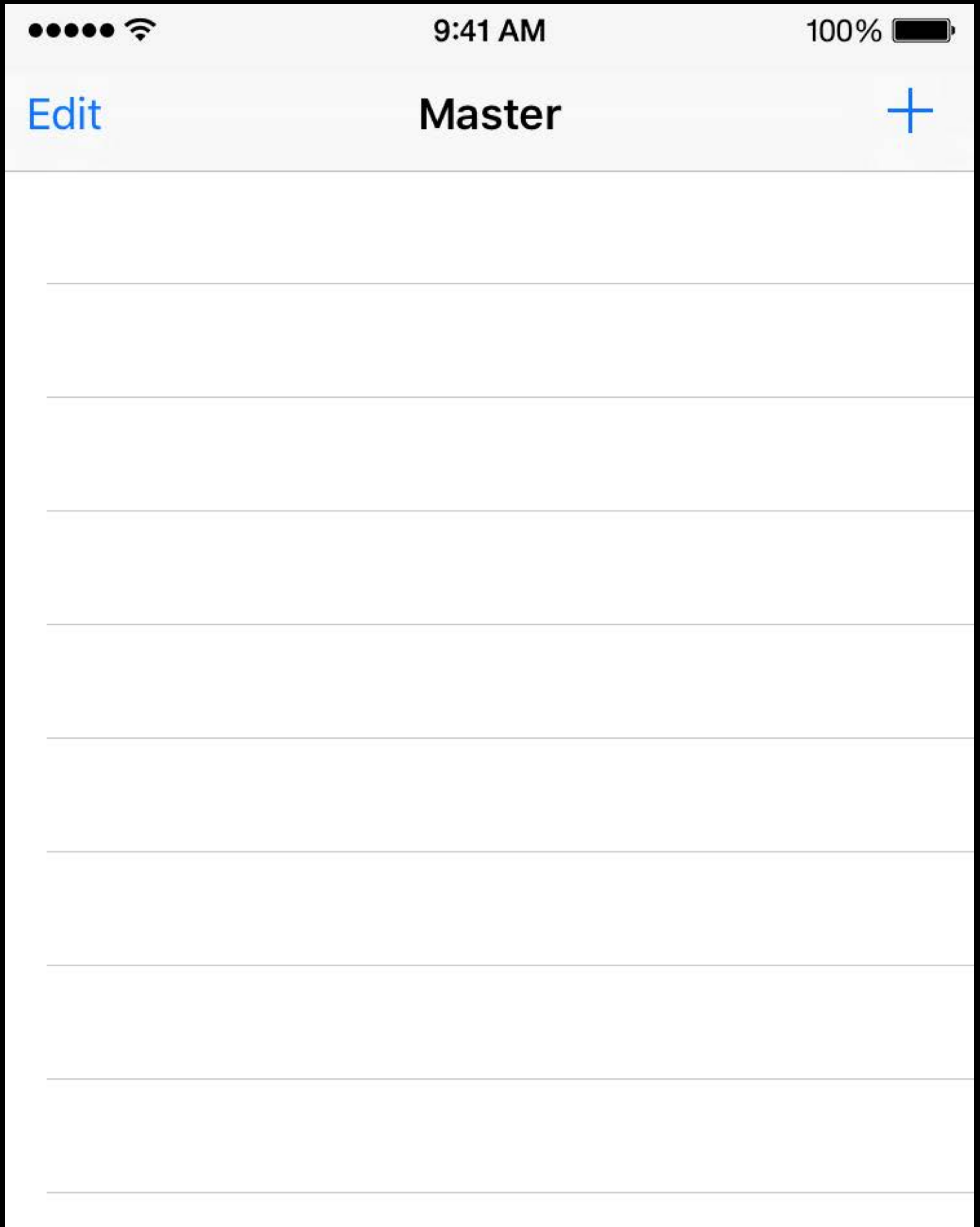

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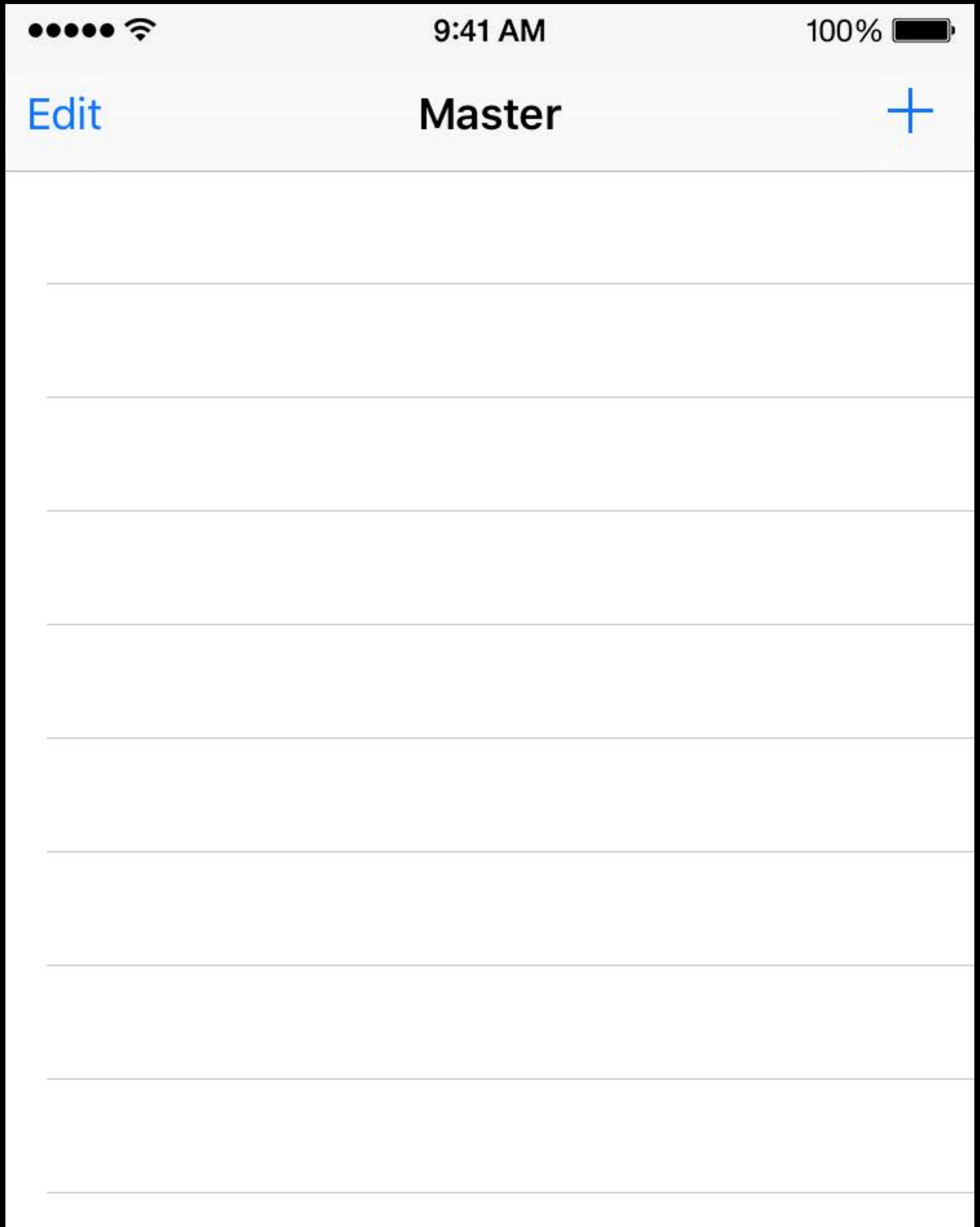

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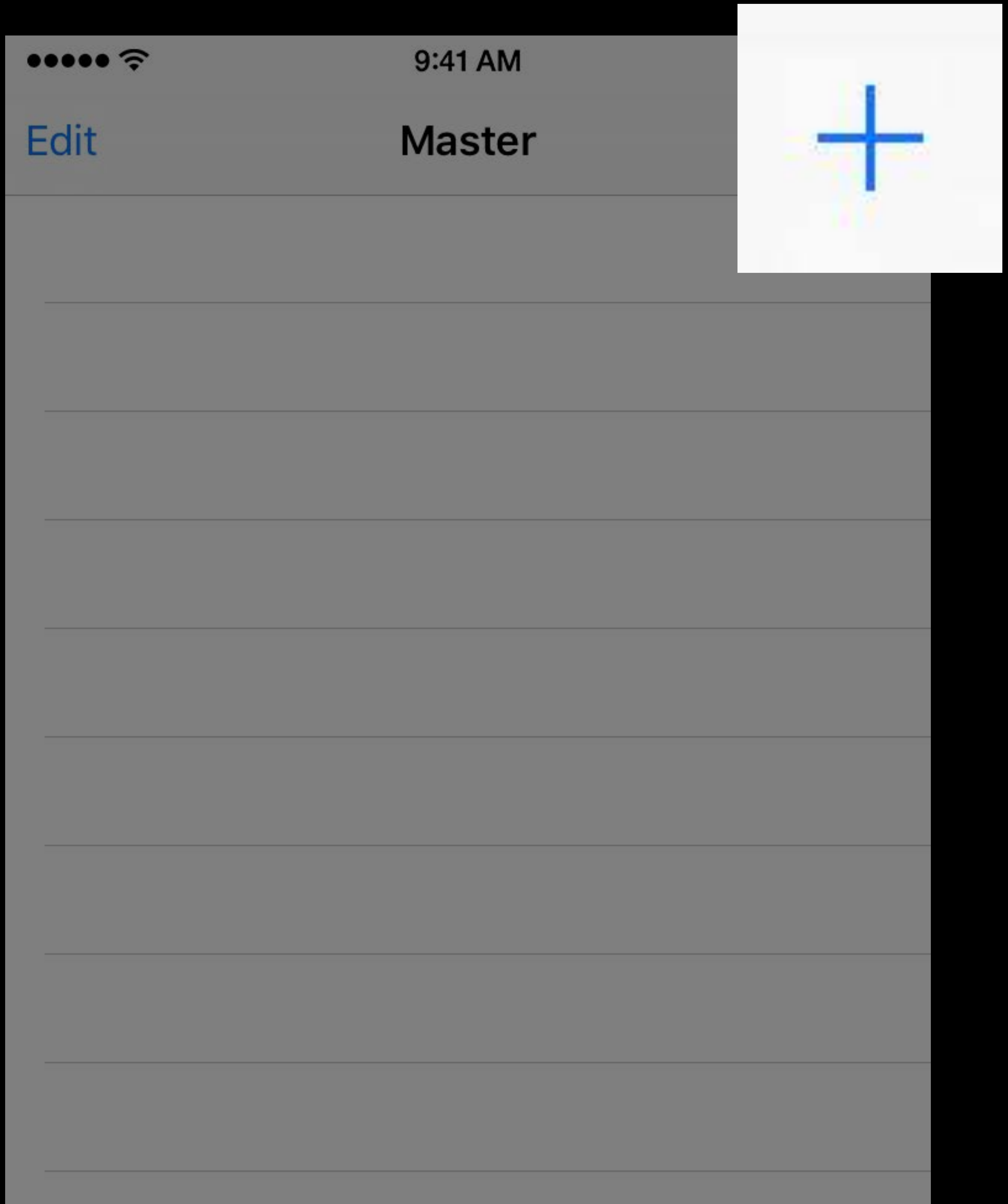

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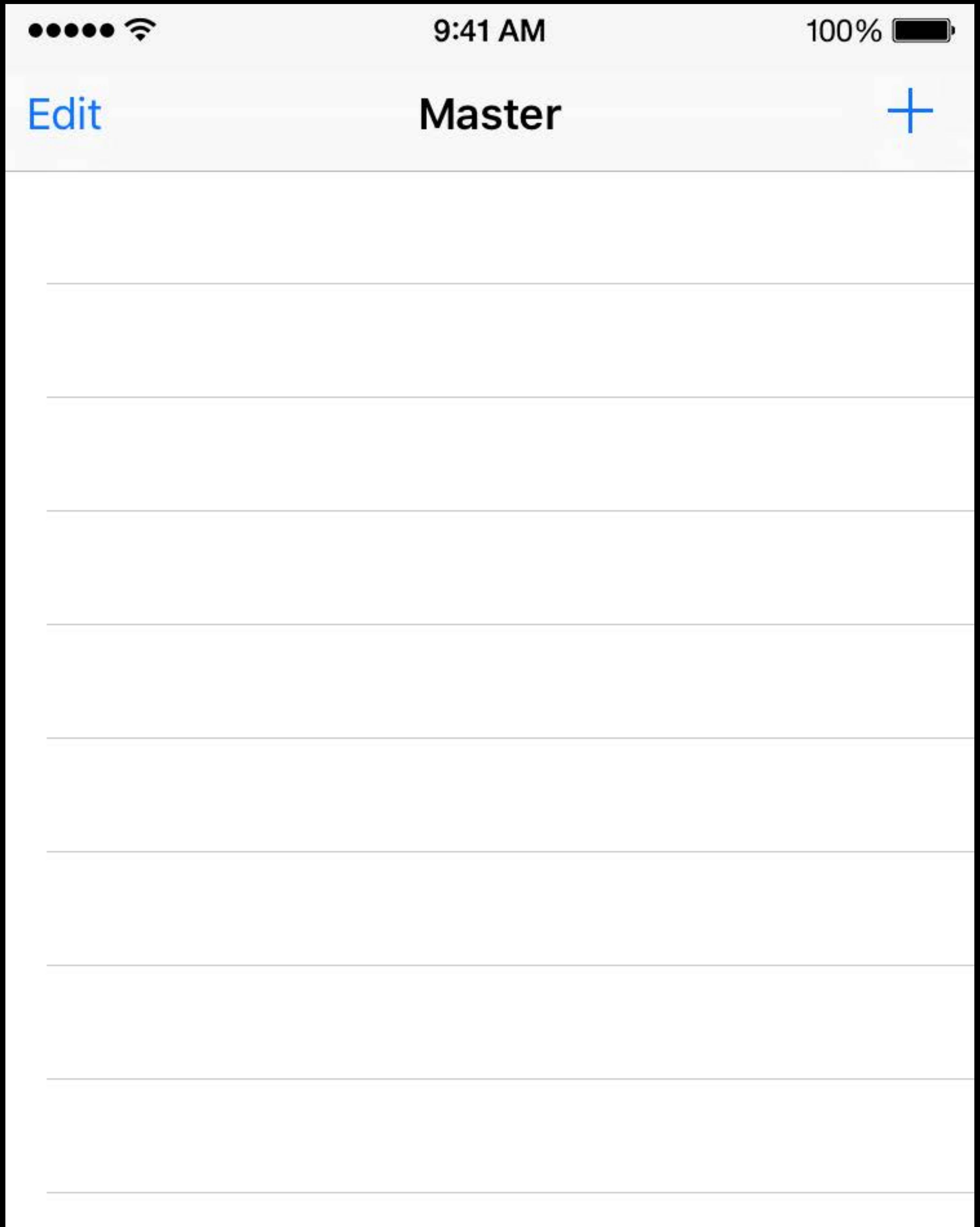

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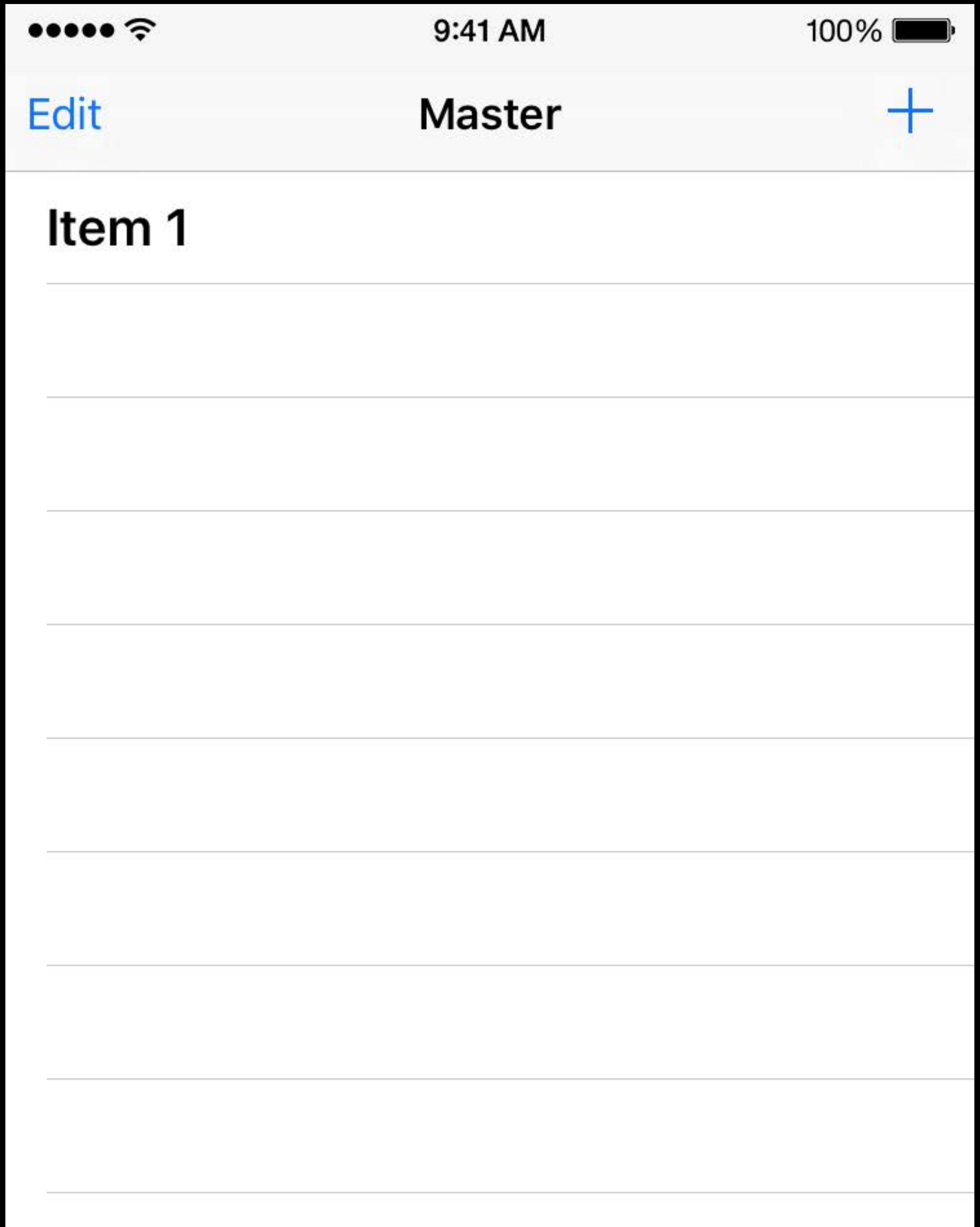

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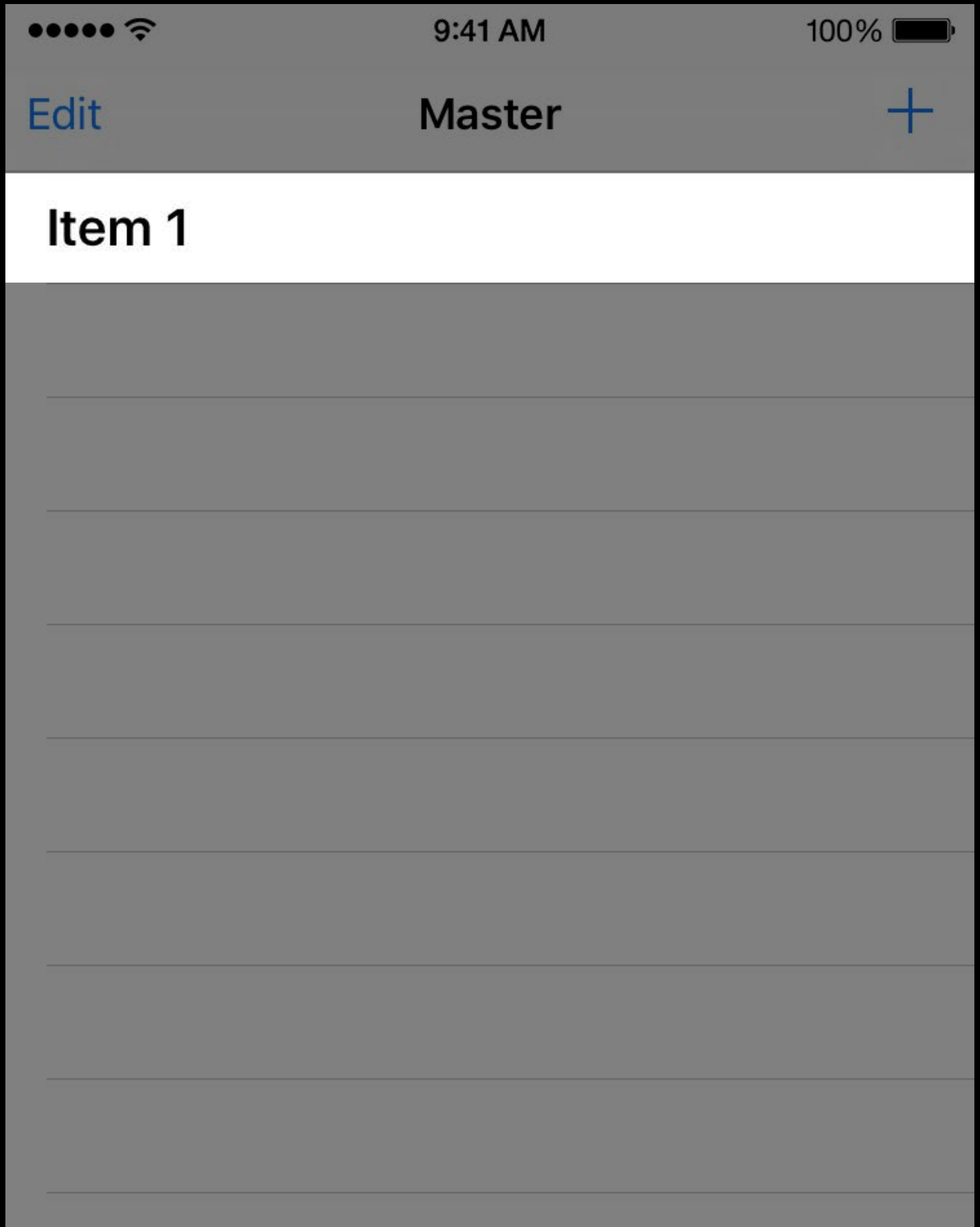

XCUIApplication

XCUIApplication

Proxy for the tested application

XCUIApplication

Proxy for the tested application

- Tests run in a separate process

XCUIApplication

Proxy for the tested application

- Tests run in a separate process

Launch

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Proxy for the tested application

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- Always spawns a new process

XCUIApplication

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- Always spawns a new process
- Implicitly terminates any preexisting instance

XCUIApplication

Proxy for the tested application

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Starting point for finding elements

XCUIElement

XCUIElement

Proxy for elements in application

XCUIElement

Proxy for elements in application

Types

XCUIElement

Proxy for elements in application

Types

- Button, Cell, Window, etc.

XCUIElement

Proxy for elements in application

Types

- Button, Cell, Window, etc.

Identifiers

XCUIElement

Proxy for elements in application

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- Accessibility identifier, label, title, etc.

XCUIElement

Proxy for elements in application

Types

- Button, Cell, Window, etc.

Identifiers

- Accessibility identifier, label, title, etc.

Most elements are found by combining type and identifier

Element Hierarchy

Element Hierarchy

Application is the root of a tree of elements

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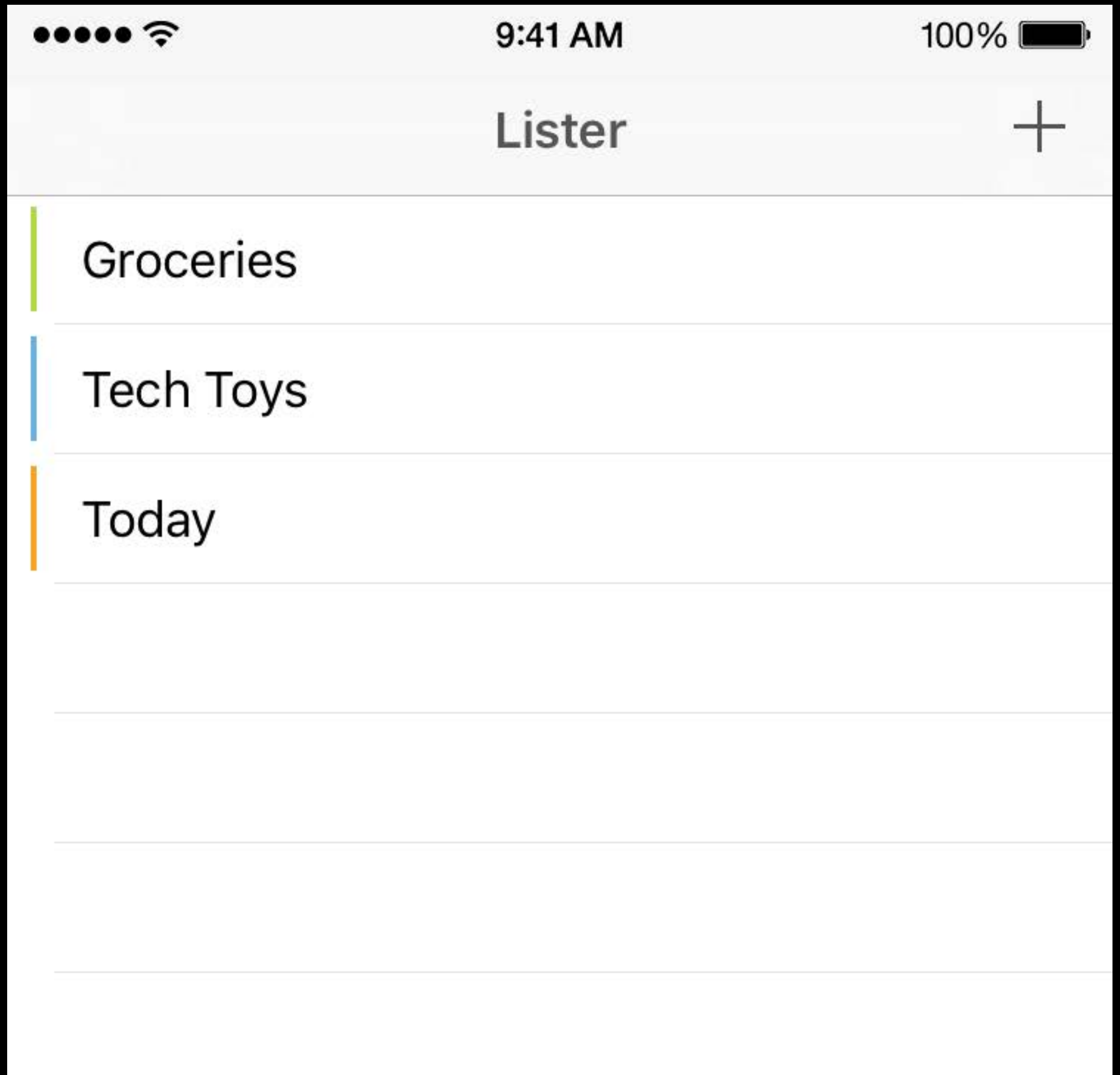
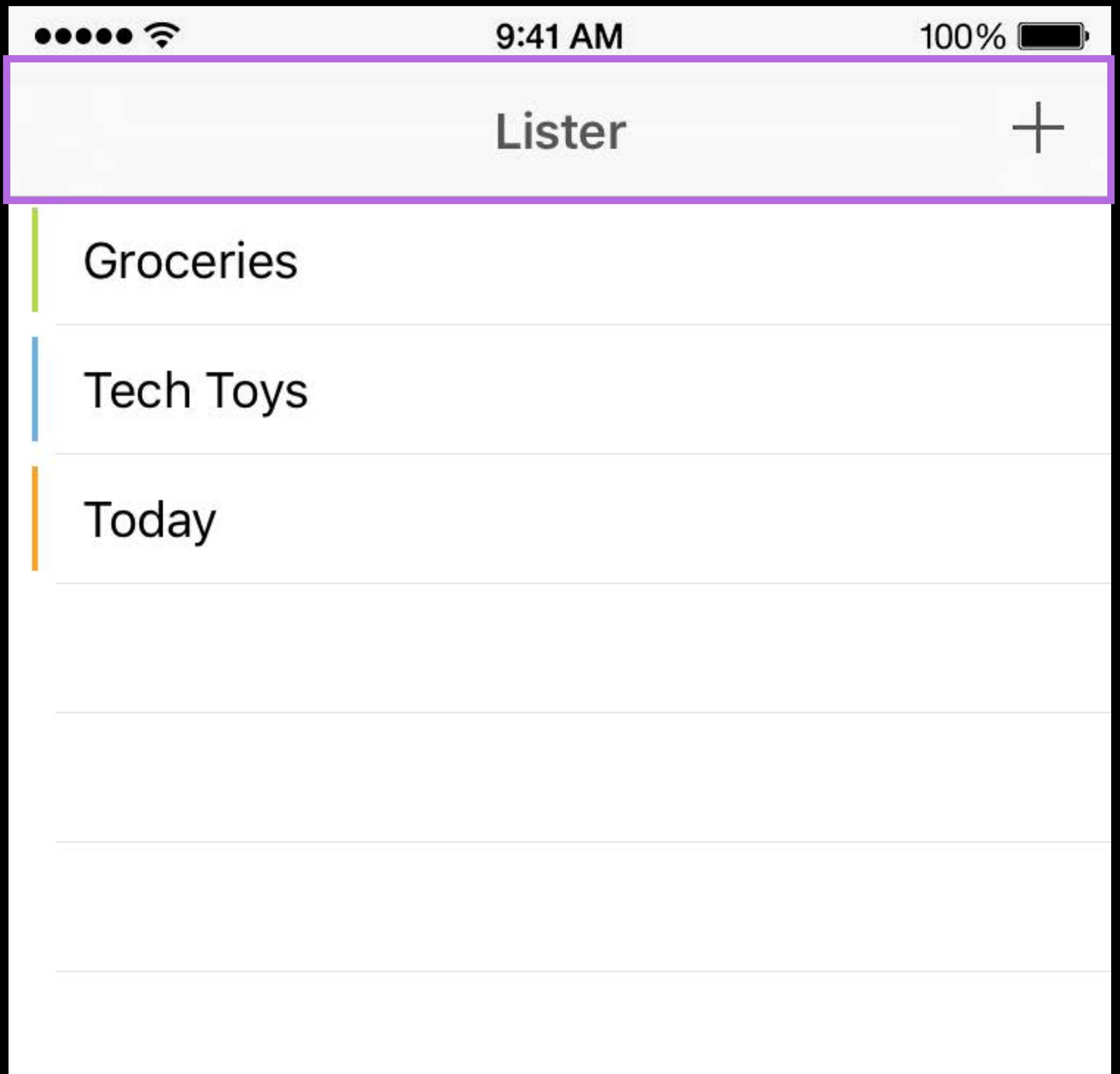


- Application
  - Navigation Bar
    - Title Label
    - "Add" Button
  - View
    - Table
      - Cell
        - "Groceries" Label
      - Cell
        - "Tech Toys" Label
      - Cell
        - "Today" Label

Element Hierarchy

Application is the root of a tree of elements



```
Application
├─ Navigation Bar
│  ├─ Title Label
│  └─ "Add" Button
└─ View
   └─ Table
      ├─ Cell
      │  └─ "Groceries" Label
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```

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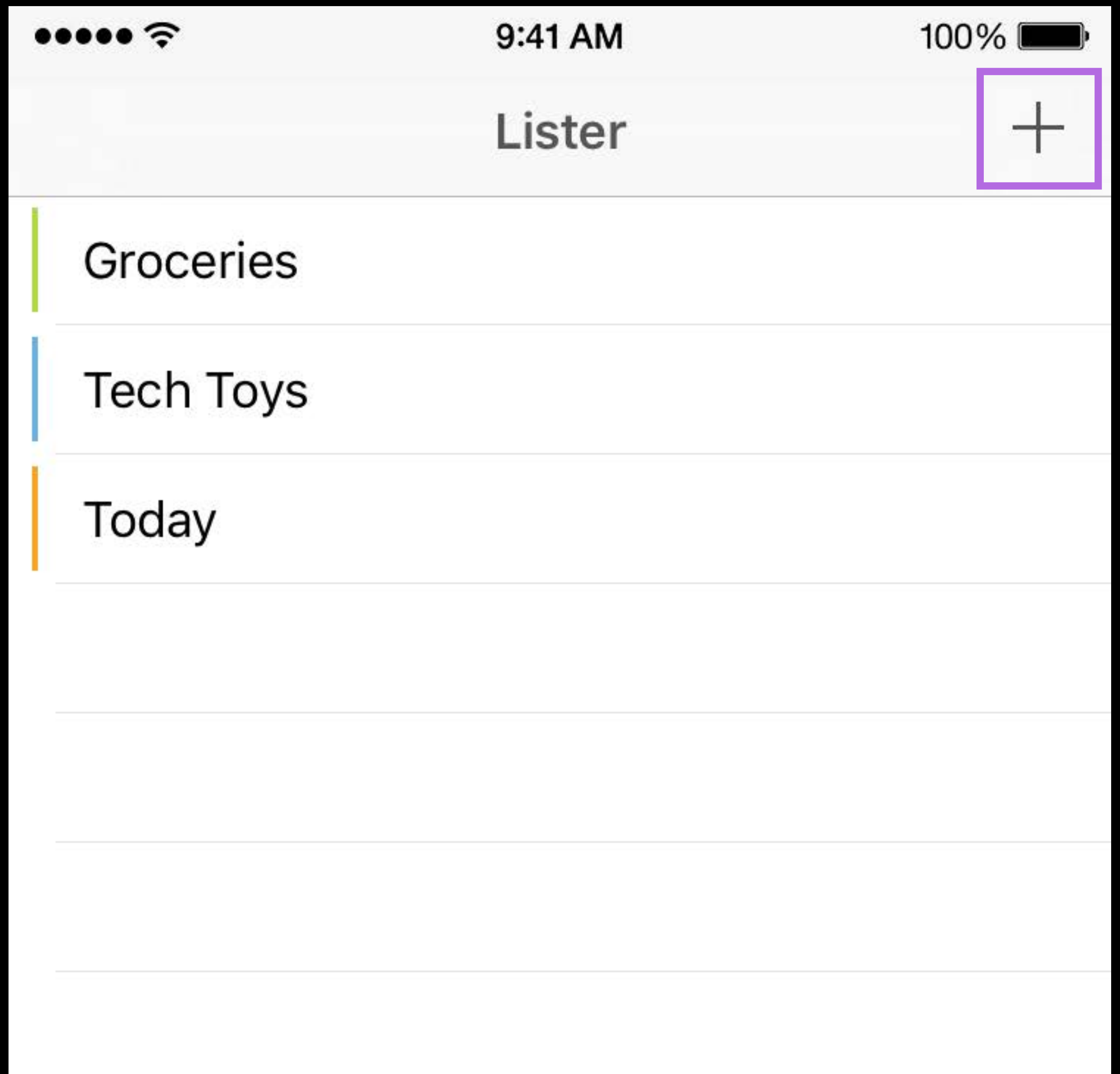

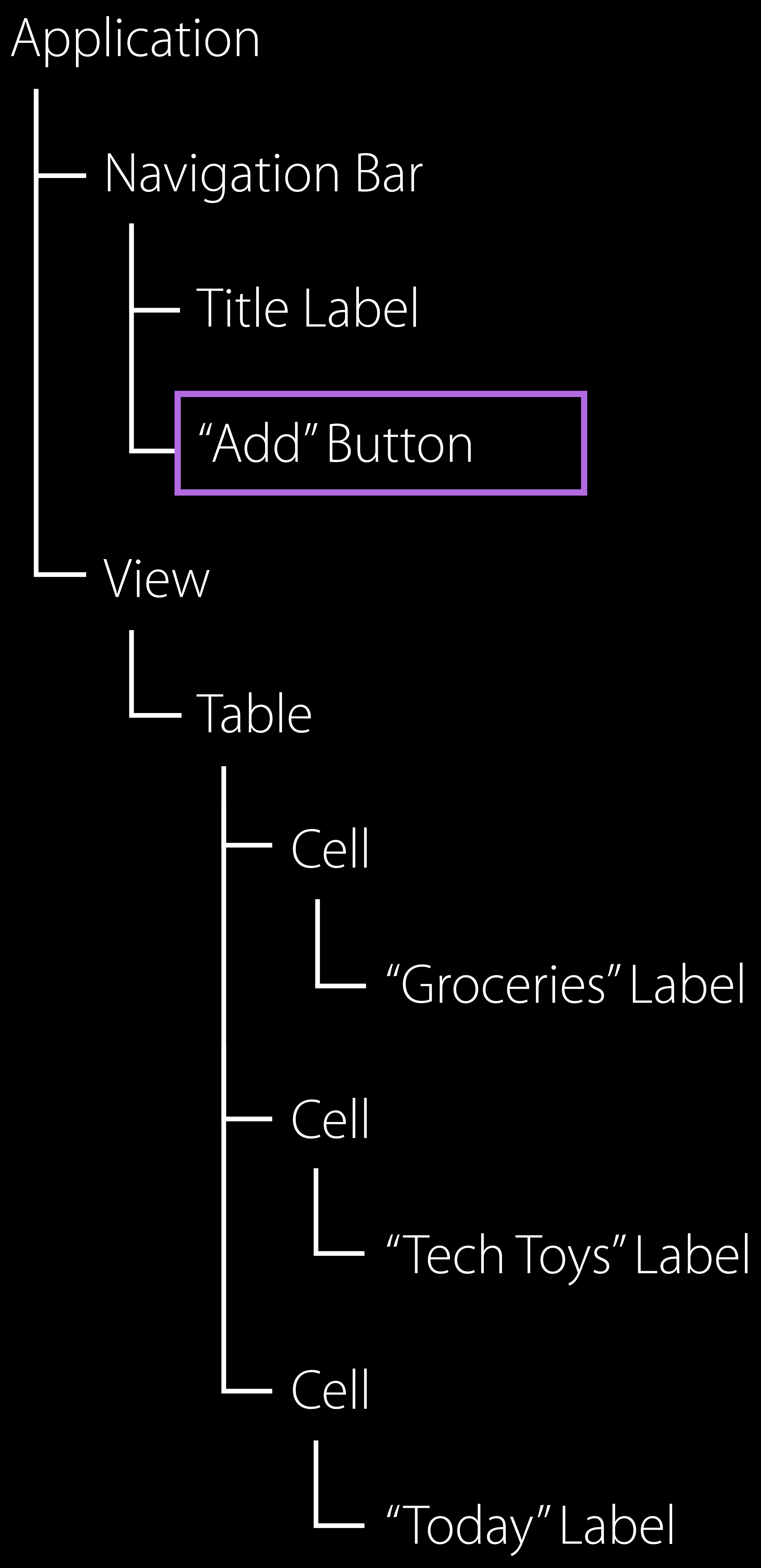

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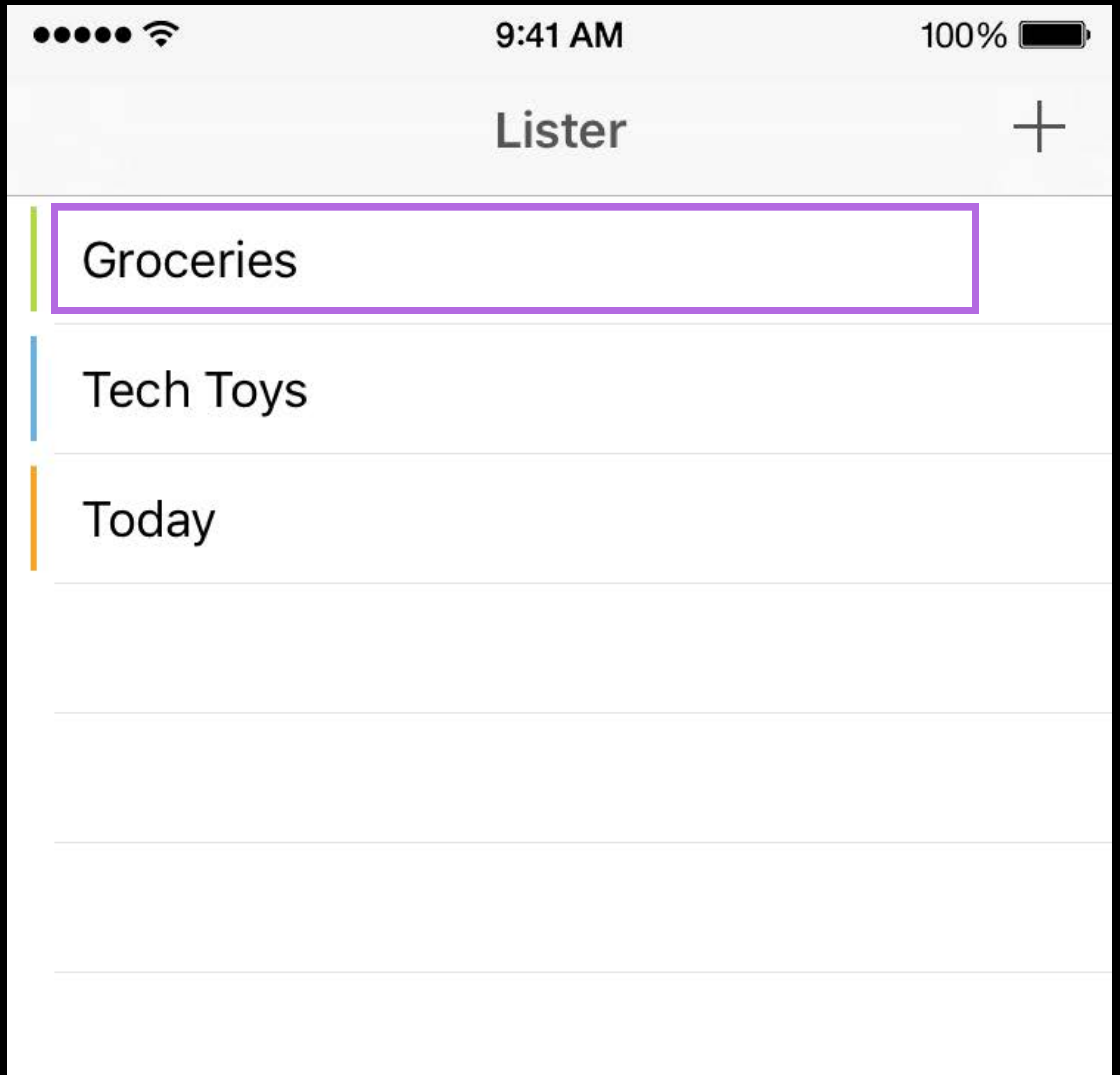
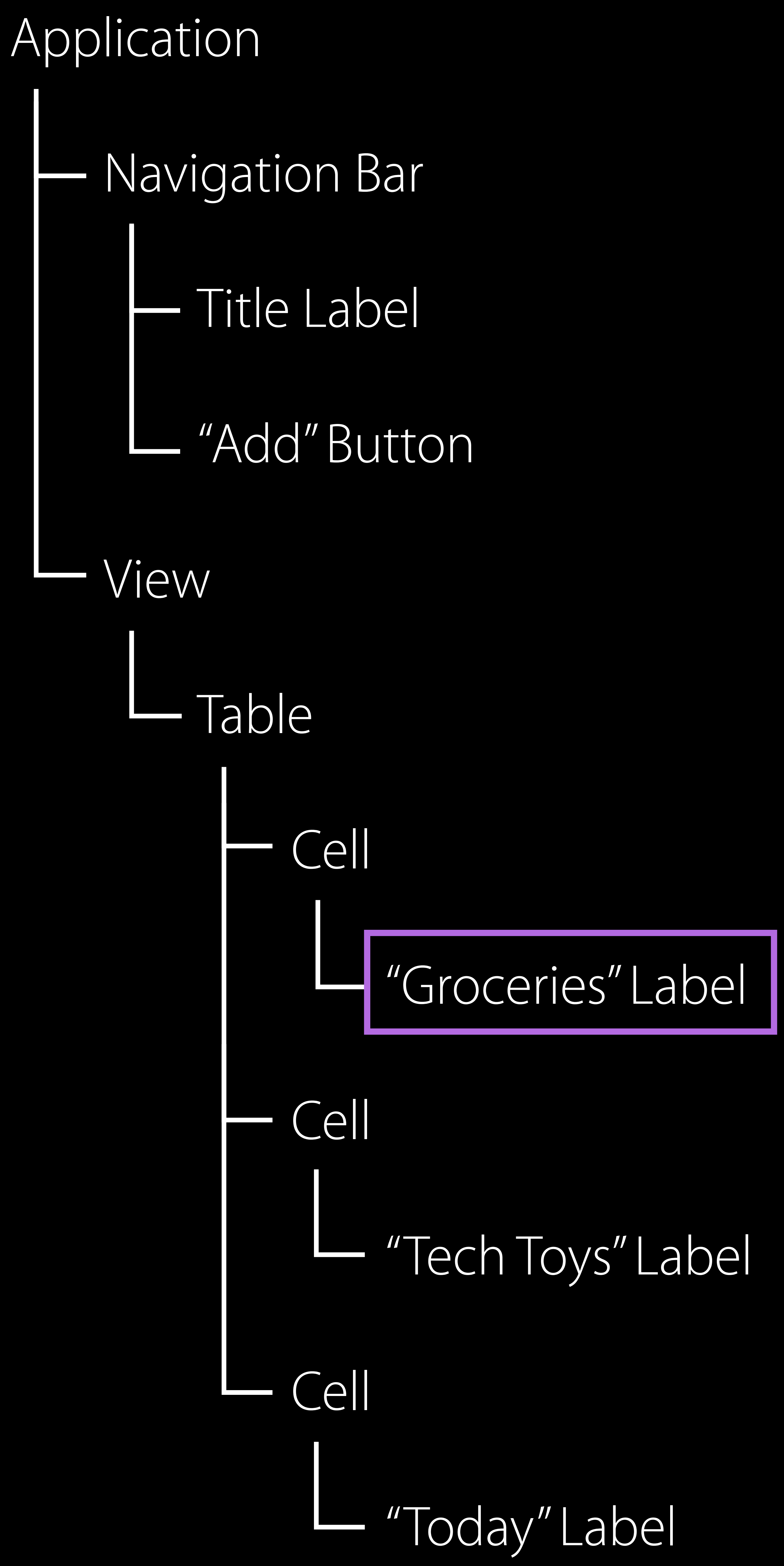
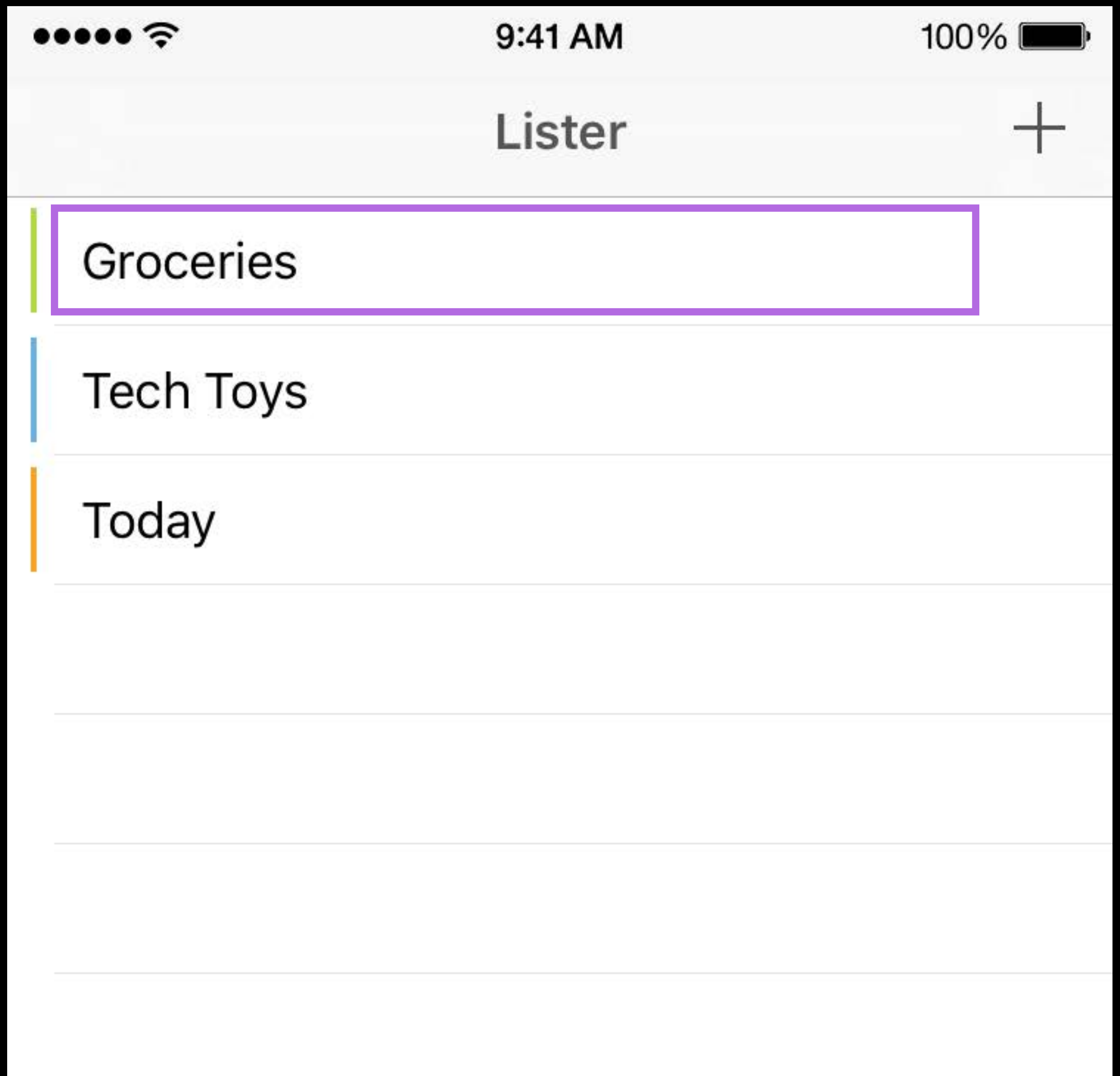


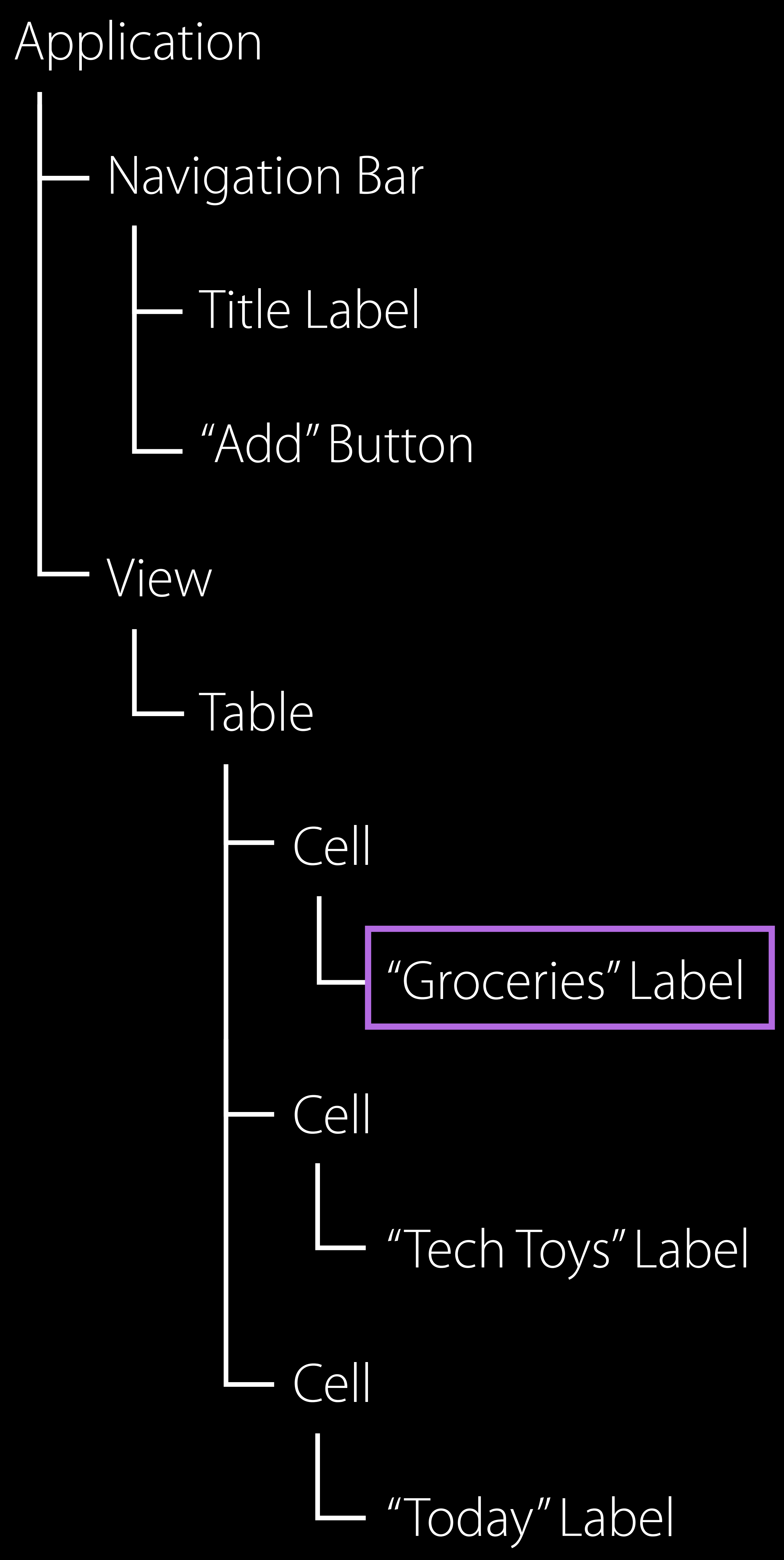


Element Hierarchy

Application is the root of a tree of elements

Used by queries with type and identifiers





Element Uniqueness

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Every XCUIElement is backed by a query

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Query must resolve to exactly one match

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Element Uniqueness

Every XCUIElement is backed by a query

Query must resolve to exactly one match

- No matches or multiple matches cause test failure
- Failure raised when element resolves query

Element Uniqueness

Every XCUIElement is backed by a query

Query must resolve to exactly one match

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Exception

Element Uniqueness

Every XCUIElement is backed by a query

Query must resolve to exactly one match

- No matches or multiple matches cause test failure
- Failure raised when element resolves query

Exception

- `exists` property

Event Synthesis

Event Synthesis

Simulate user interaction on elements

Event Synthesis

Simulate user interaction on elements

APIs are platform-specific

Event Synthesis

Simulate user interaction on elements

APIs are platform-specific

```
button.click() // OS X
```

Event Synthesis

Simulate user interaction on elements

APIs are platform-specific

```
button.click() // OS X
button.tap() // iOS
```

Event Synthesis

Simulate user interaction on elements

APIs are platform-specific

```
button.click() // OS X
button.tap() // iOS
textField.typeText(“Hello, World!”) // iOS & OS X
```

XCUIElementQuery

API for specifying elements

XCUIElementQuery

API for specifying elements

Queries resolve to collections of accessible elements

XCUIElementQuery

API for specifying elements

Queries resolve to collections of accessible elements

- Number of matches: `count`

XCUIElementQuery

API for specifying elements

Queries resolve to collections of accessible elements

- Number of matches: `count`
- Specify by identifier: subscripting

XCUIElementQuery

API for specifying elements

Queries resolve to collections of accessible elements

- Number of matches: `count`
- Specify by identifier: subscripting
- Specify by index: `elementAtIndex()`

XCUIElementQuery

How do queries work?

XCUIElementQuery

How do queries work?

Relationships

XCUIElementQuery

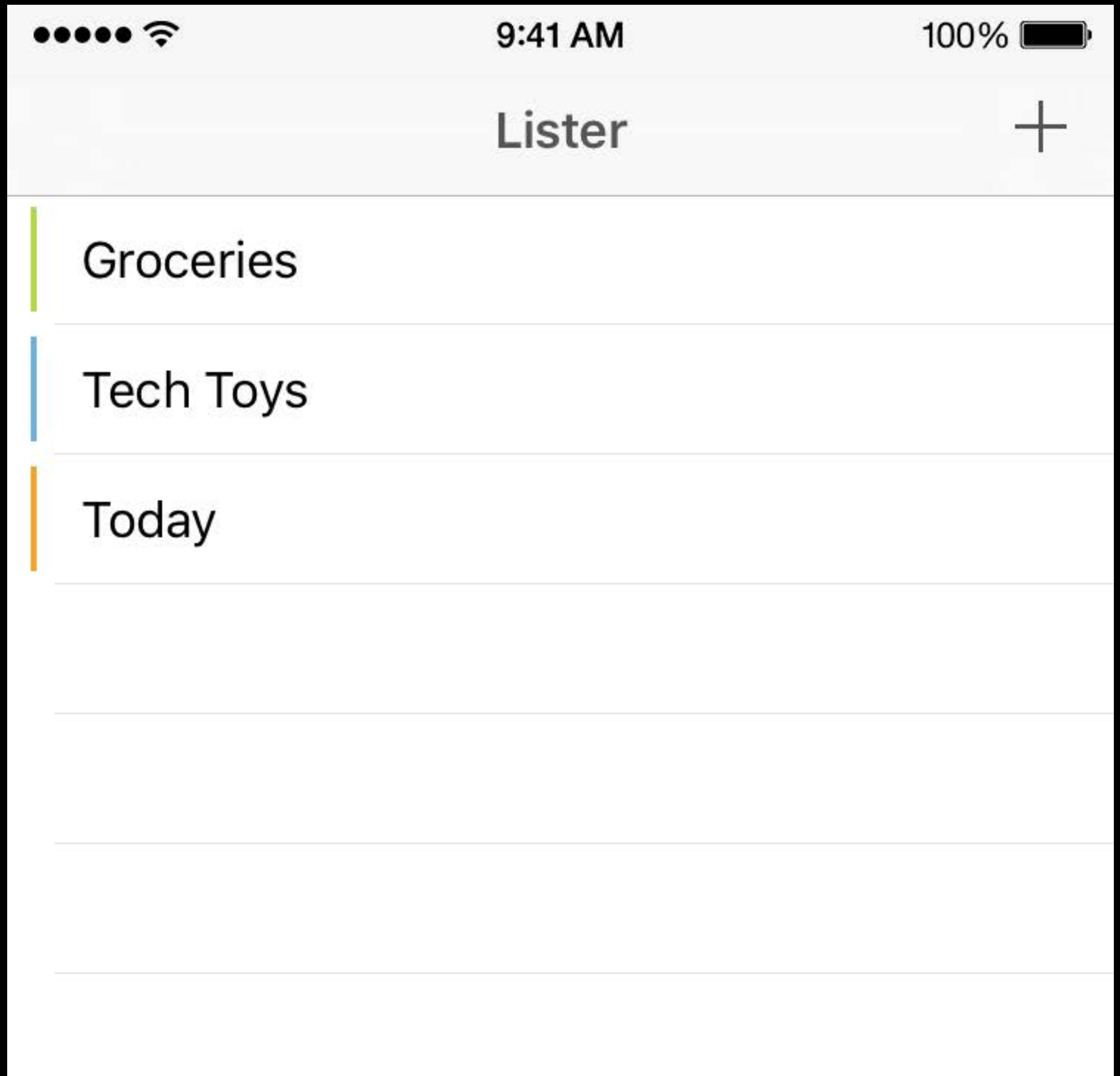
How do queries work?

Relationships

Filtering

XCUIElementQuery

Expressing relationships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Lister +

Groceries

Tech Toys

Today

```
Application
├─ Navigation Bar
│  ├─ Title Label
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      │  └─ "Tech Toys" Label
      └─ Cell
         └─ "Today" Label
```
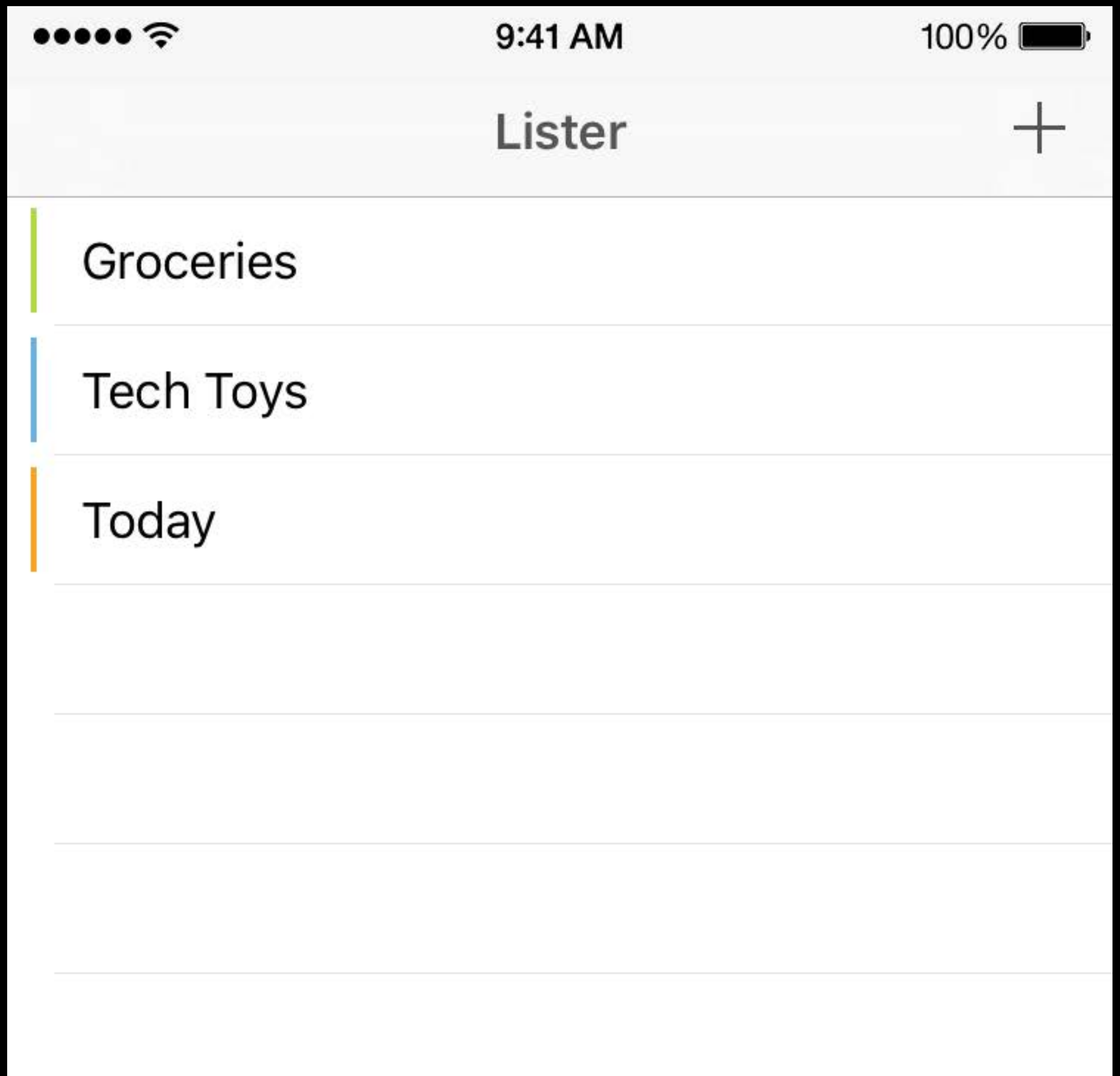
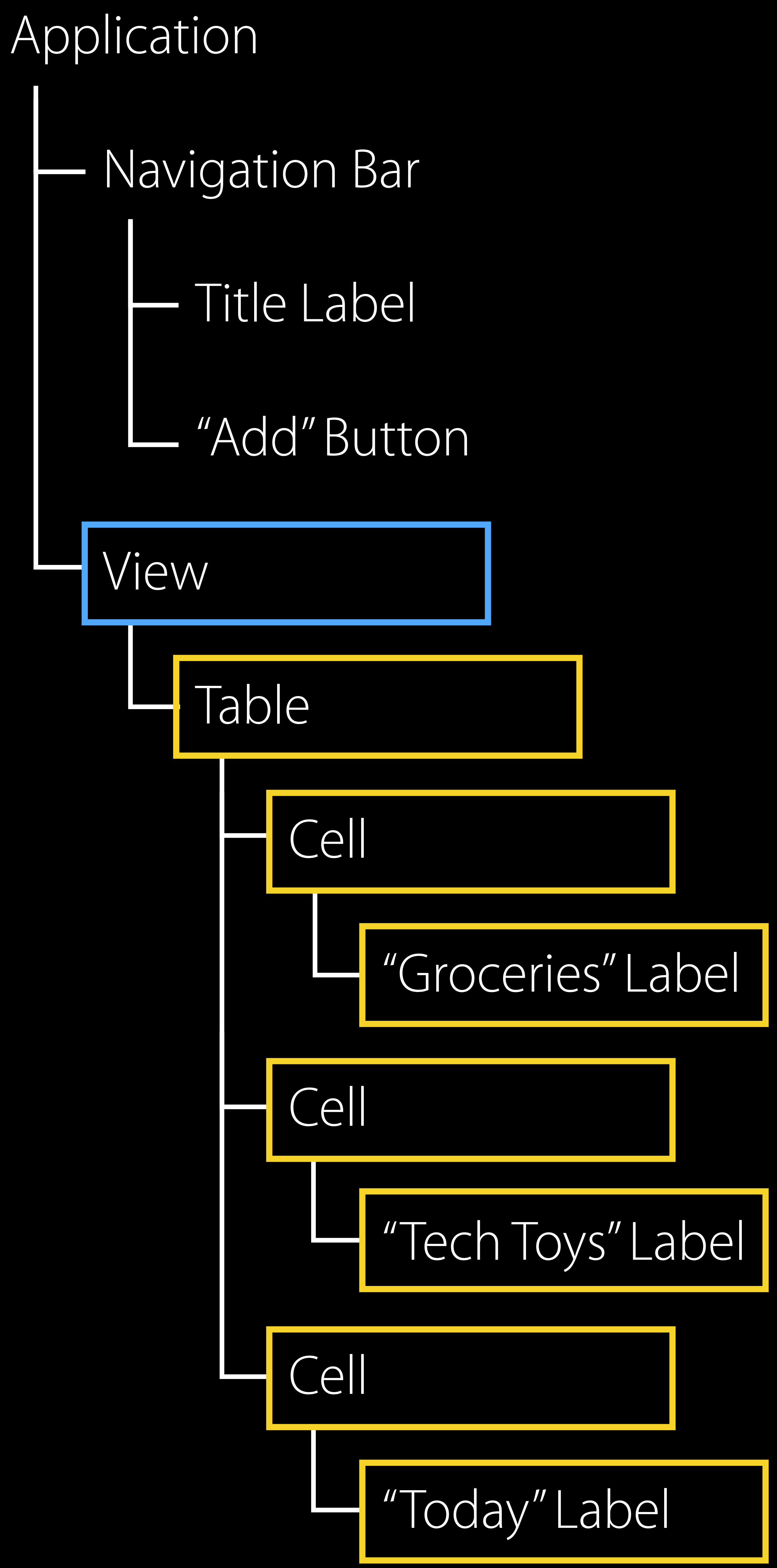

XCUIElementQuery

Expressing relationships

Descendants



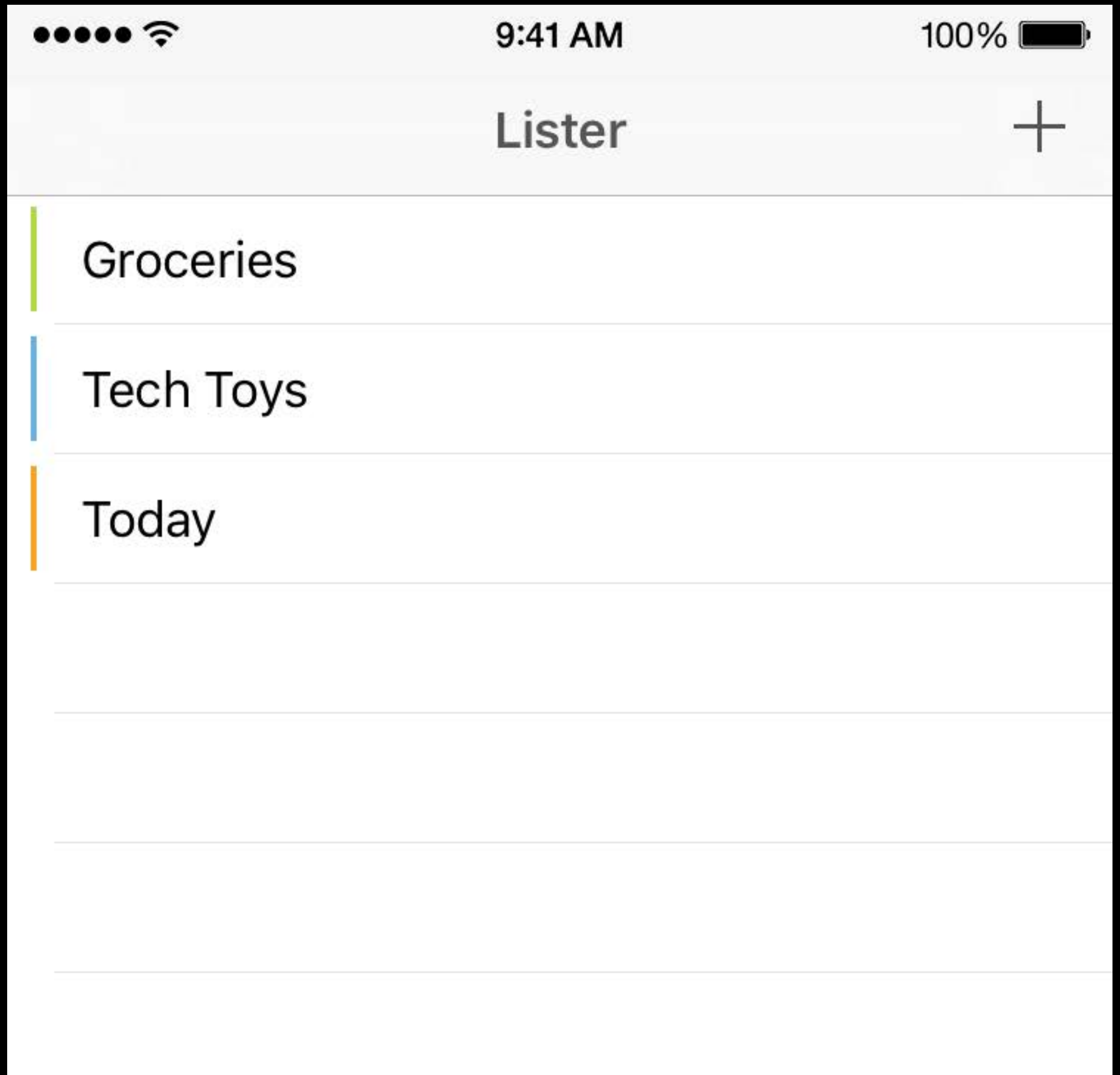


XCUIElementQuery

Expressing relationships

Descendants

Children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Lister +

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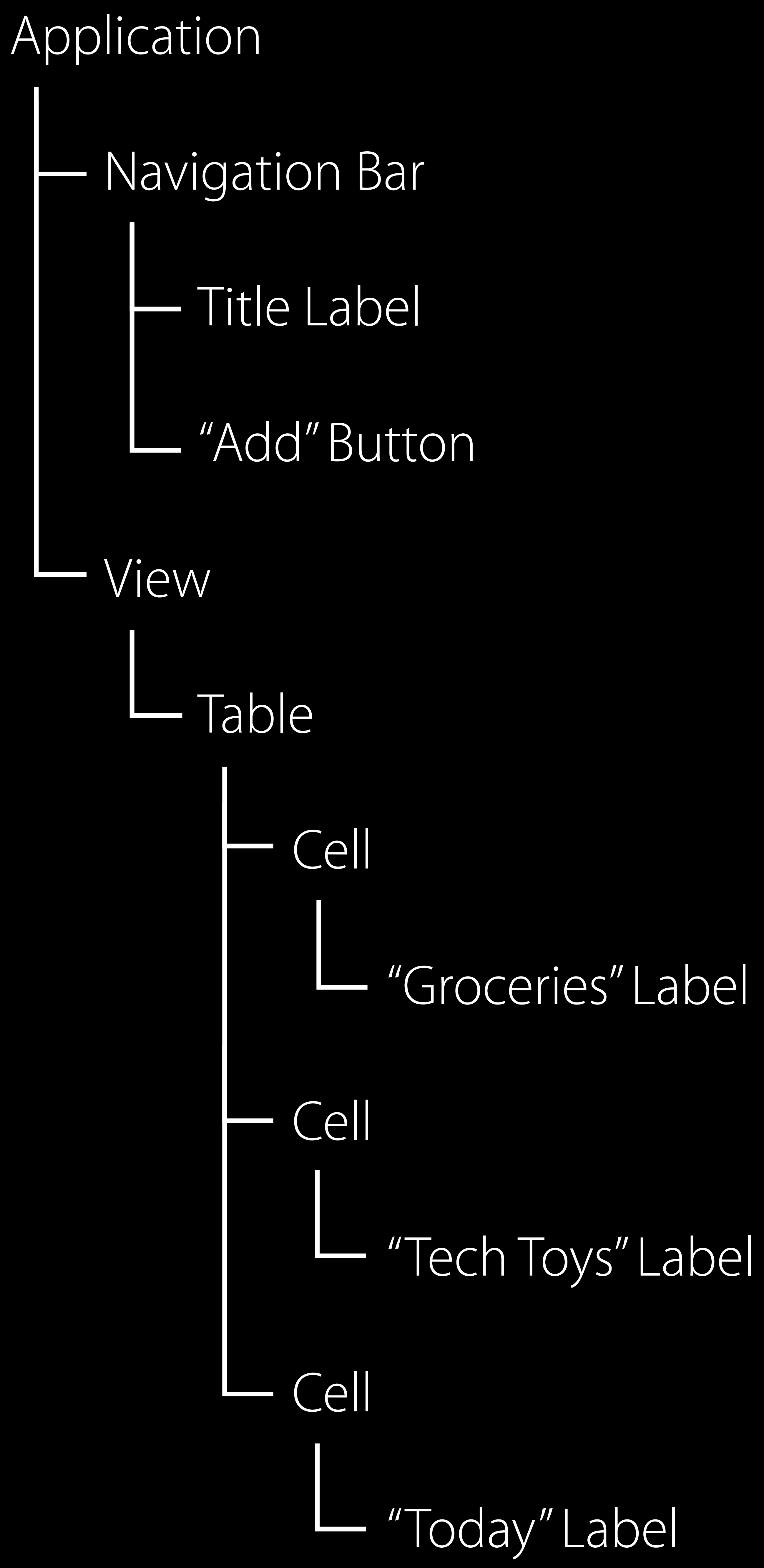

XCUIElementQuery

Expressing relationships

Descendants

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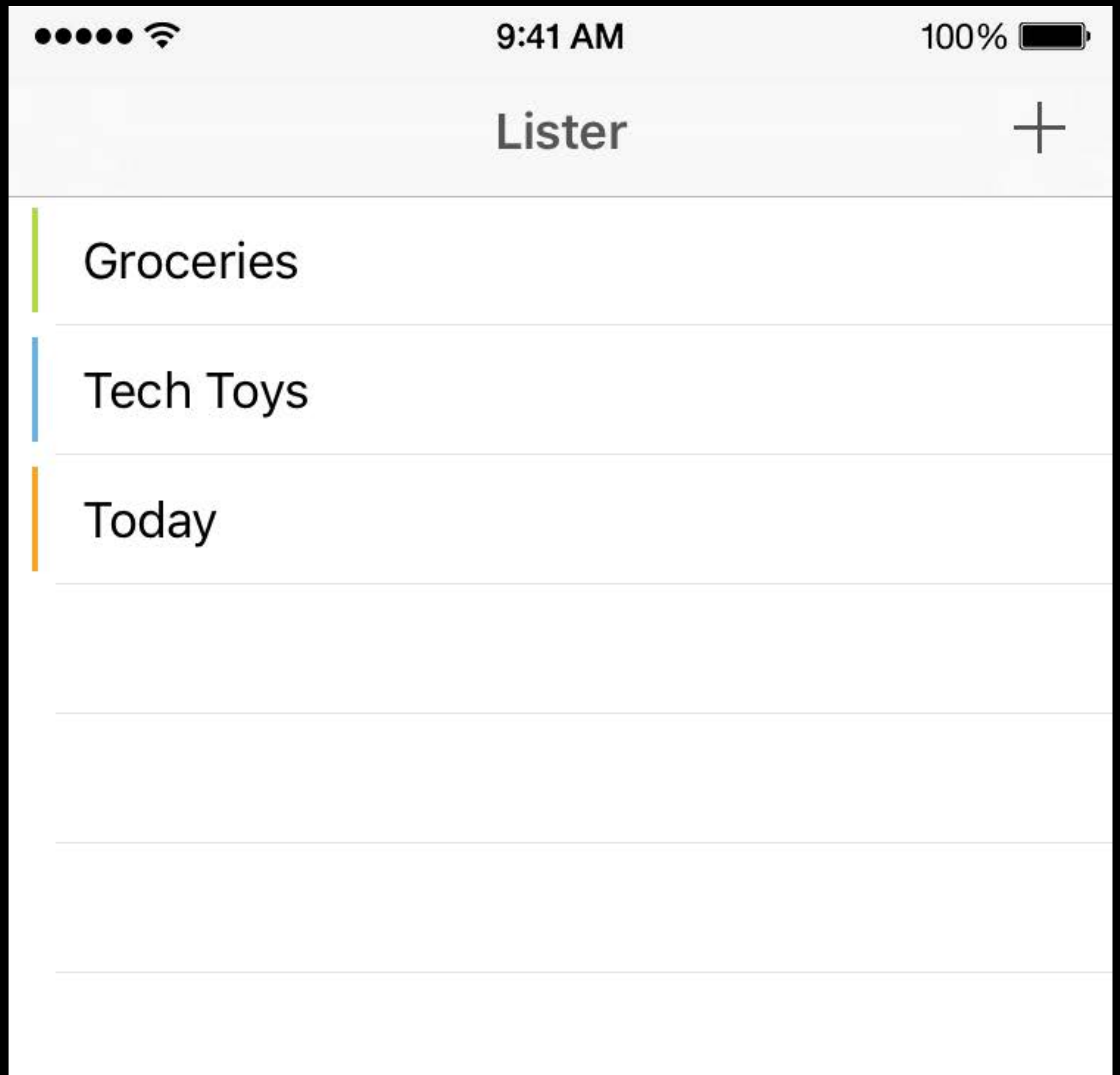
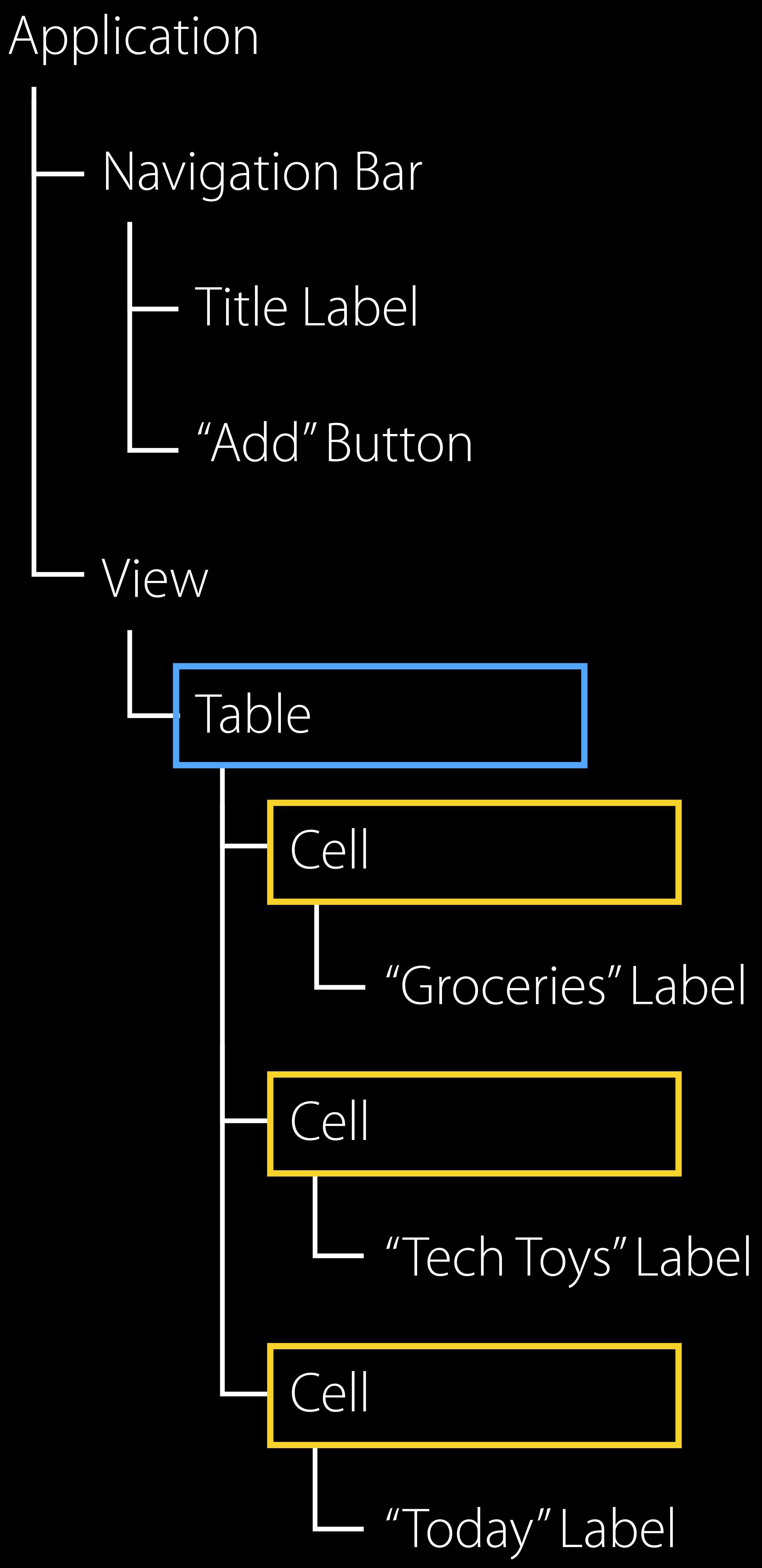




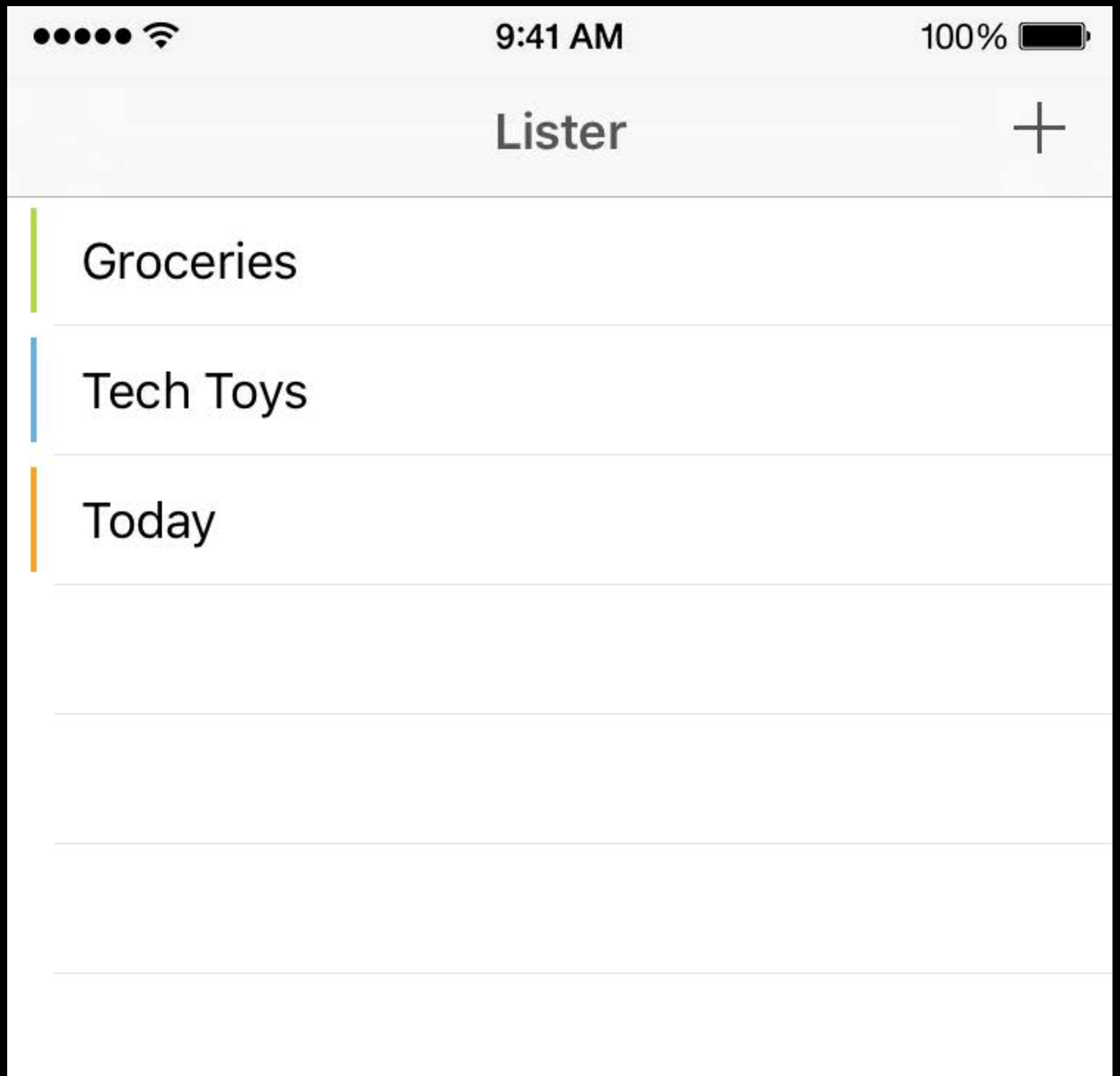
XCUIElementQuery

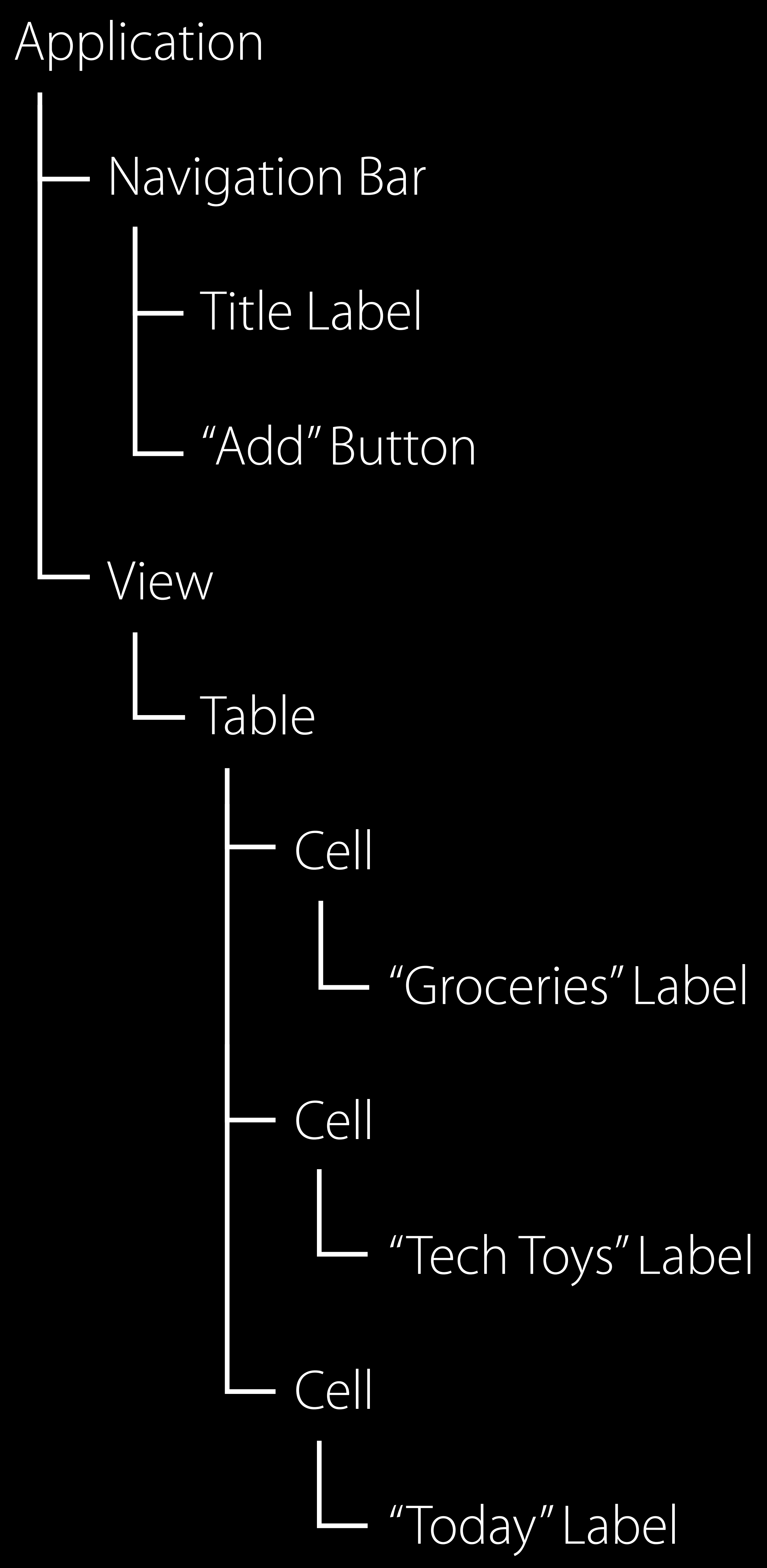
Expressing relationships

Descendants

Children

Containment





XCUIElementQuery

Expressing relationships

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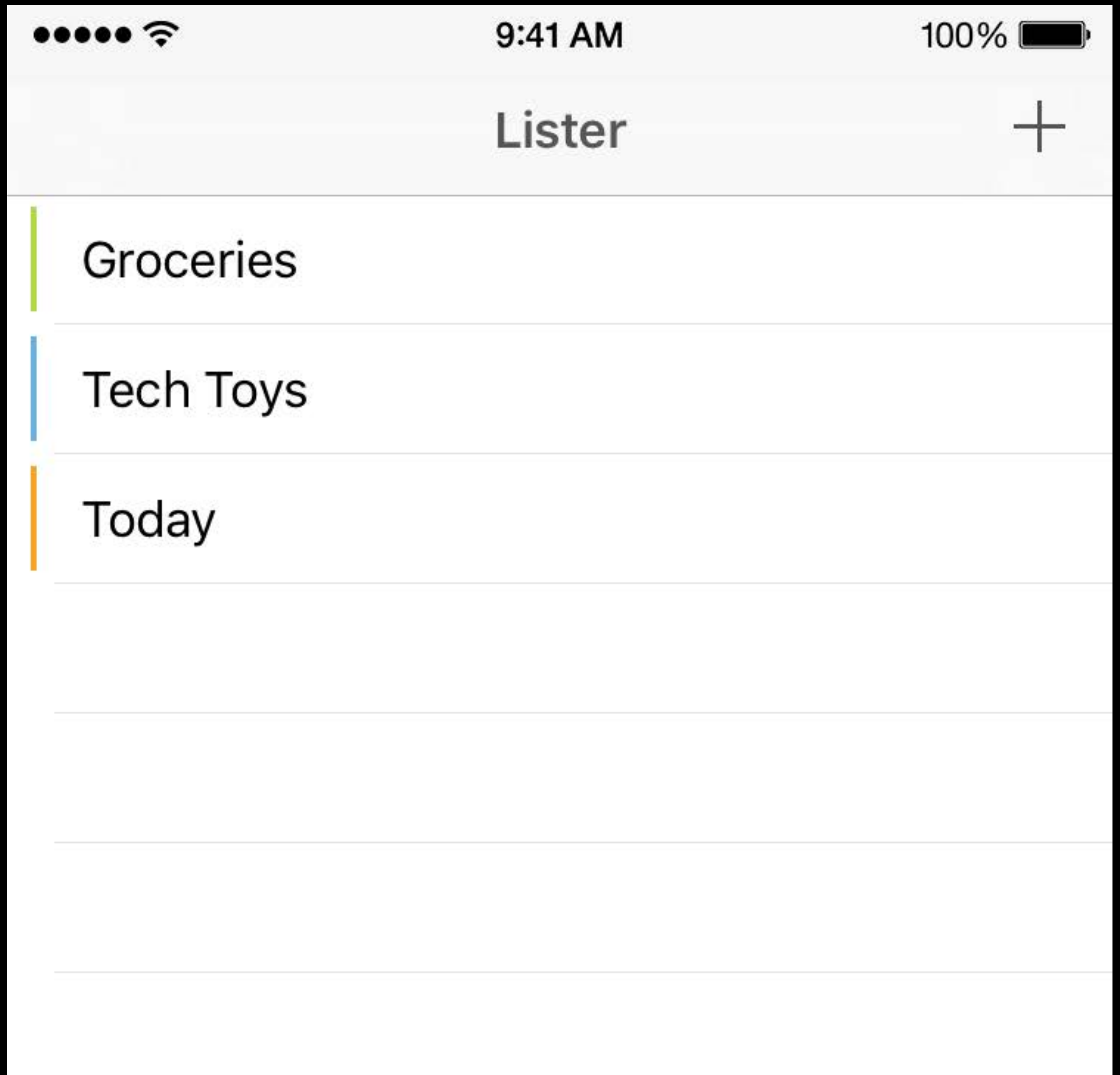

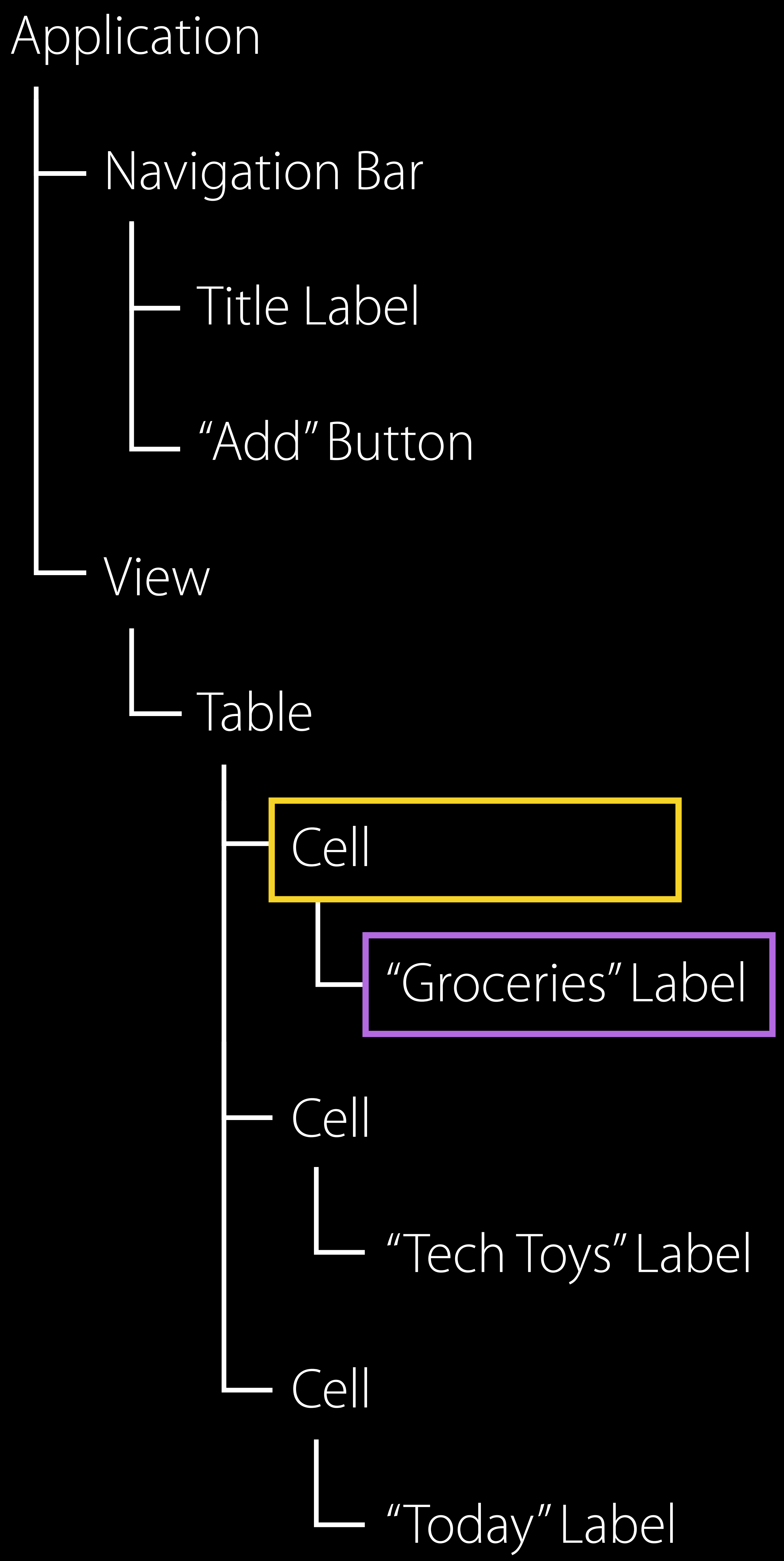

XCUIElementQuery

Filtering

XCUIElementQuery

Filtering

Element type

- Button, table, menu, etc.

XCUIElementQuery

Filtering

Element type

- Button, table, menu, etc.

Identifiers

- Accessibility identifier, label, title, etc.

XCUIElementQuery

Filtering

Element type

- Button, table, menu, etc.

Identifiers

- Accessibility identifier, label, title, etc.

Predicates

- Value, partial matching, etc.

Combining Relationships and Filtering

descendantsMatchingType()

Combining Relationships and Filtering

descendantsMatchingType()

Most common query

Combining Relationships and Filtering

descendantsMatchingType()

Most common query

```
let allButtons = app.descendantsMatchingType(.Button)
```

Combining Relationships and Filtering

descendantsMatchingType()

Most common query

```
let allButtons = app.descendantsMatchingType(.Button)

let allCellsInTable = table.descendantsMatchingType(.Cell)
```

Combining Relationships and Filtering

descendantsMatchingType()

Most common query

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let allButtons = app.descendantsMatchingType(.Button)

let allCellsInTable = table.descendantsMatchingType(.Cell)

let allMenuItemsInMenu = menu.descendantsMatchingType(.MenuItem)
```

Combining Relationships and Filtering

descendantsMatchingType()

So common, we provide convenience API for each type

```
let allButtons = app.descendantsMatchingType(.Button)

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Combining Relationships and Filtering

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Combining Relationships and Filtering

descendantsMatchingType()

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let allCellsInTable = table.descendantsMatchingType(.Cell)

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Combining Relationships and Filtering

descendantsMatchingType()

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Combining Relationships and Filtering

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Combining Relationships and Filtering

descendantsMatchingType()

So common, we provide convenience API for each type

```
let allButtons = app.buttons

let allCellsInTable = table.cells

let allMenuItemsInMenu = menu.menuItems
```

Combining Relationships and Filtering

childrenMatchingType()

Combining Relationships and Filtering

childrenMatchingType()

Differentiates between any descendant and a direct child relationship

Combining Relationships and Filtering

childrenMatchingType()

Differentiates between any descendant and a direct child relationship

```
let allButtons = app.buttons // descendantsMatchingType(.Button)
```

Combining Relationships and Filtering

childrenMatchingType()

Differentiates between any descendant and a direct child relationship

```
let allButtons = app.buttons // descendantsMatchingType(.Button)

let childButtons = navBar.childrenMatchingType(.Button)
```

Combining Relationships and Filtering

containingType()

Combining Relationships and Filtering

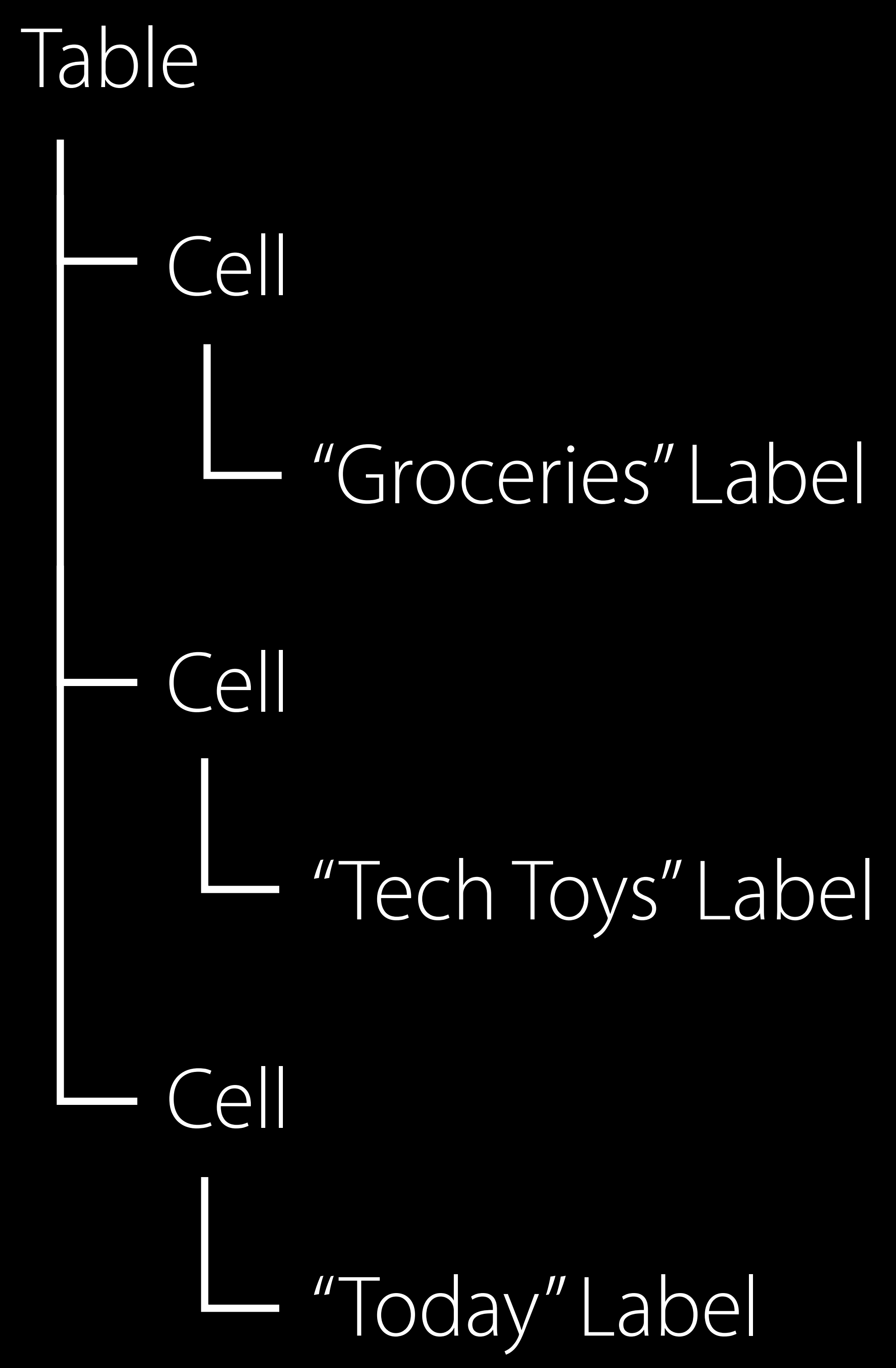
containingType()

Find elements by describing their descendants

Combining Relationships and Filtering

containingType()

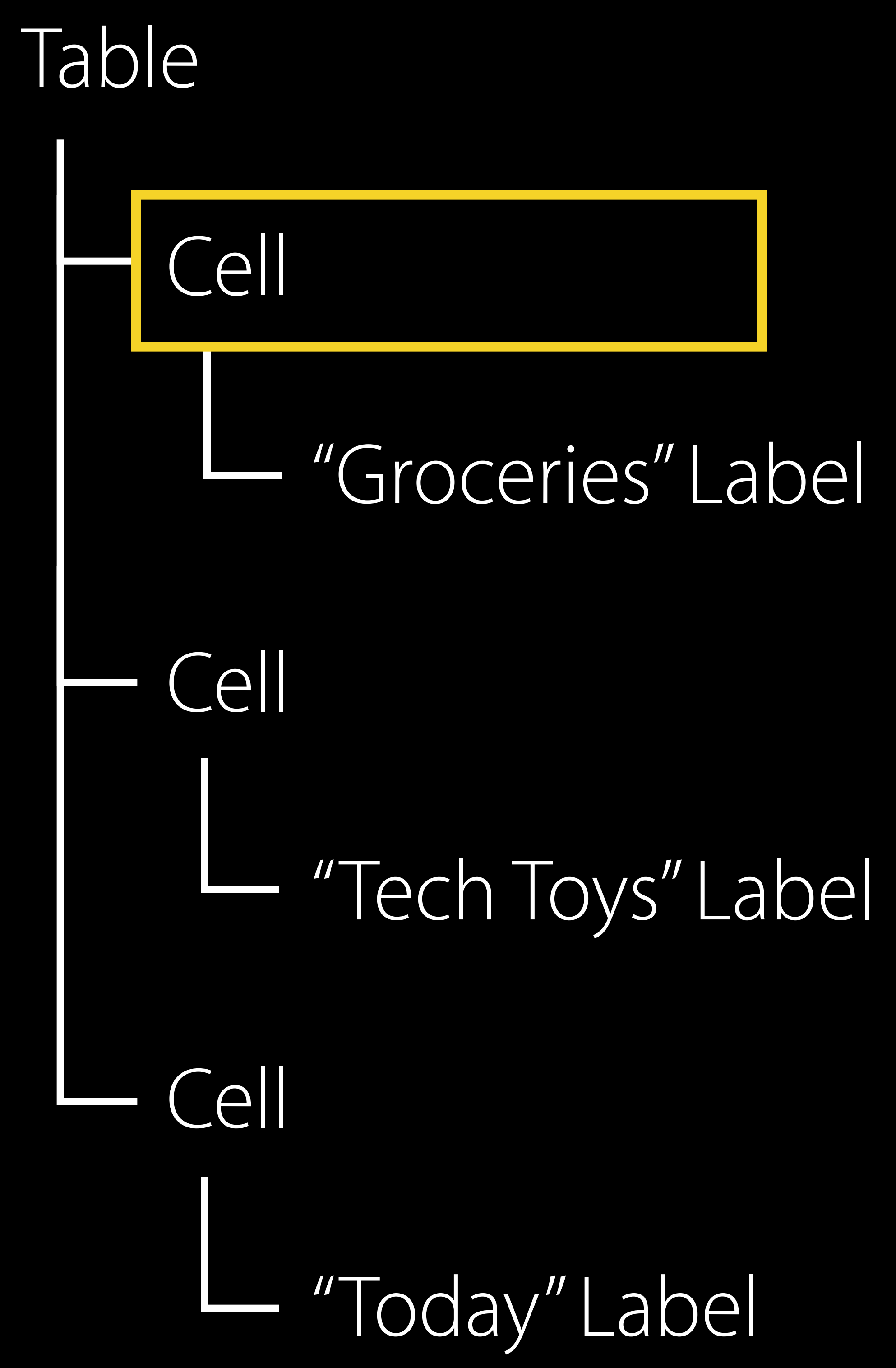
Find elements by describing their descendants



Combining Relationships and Filtering

containingType()

Find elements by describing their descendants

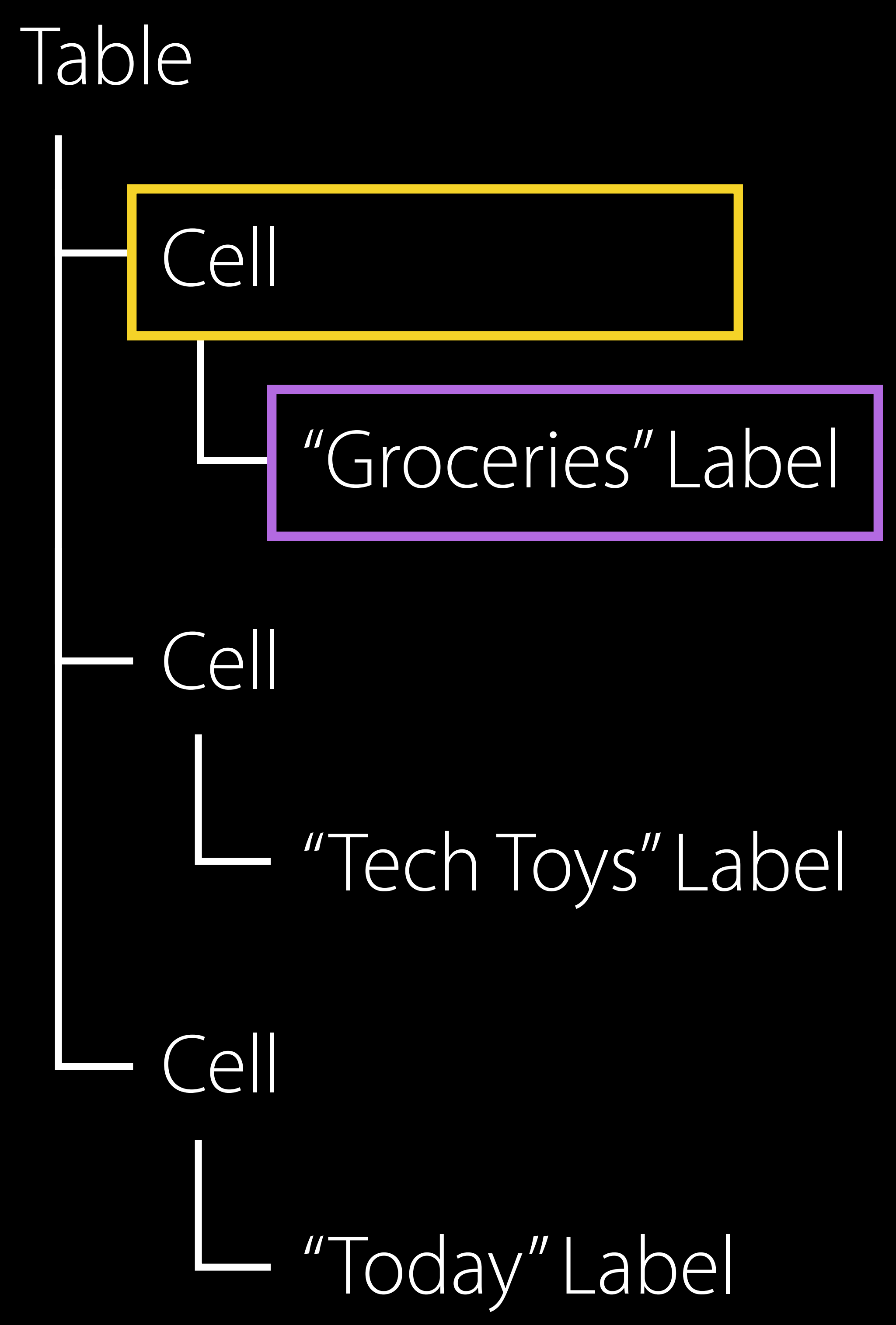


Combining Relationships and Filtering

containingType()

Find elements by describing their descendants

```
let cellQuery = cells.containingType(.StaticText,
                                     identifier:"Groceries")
```



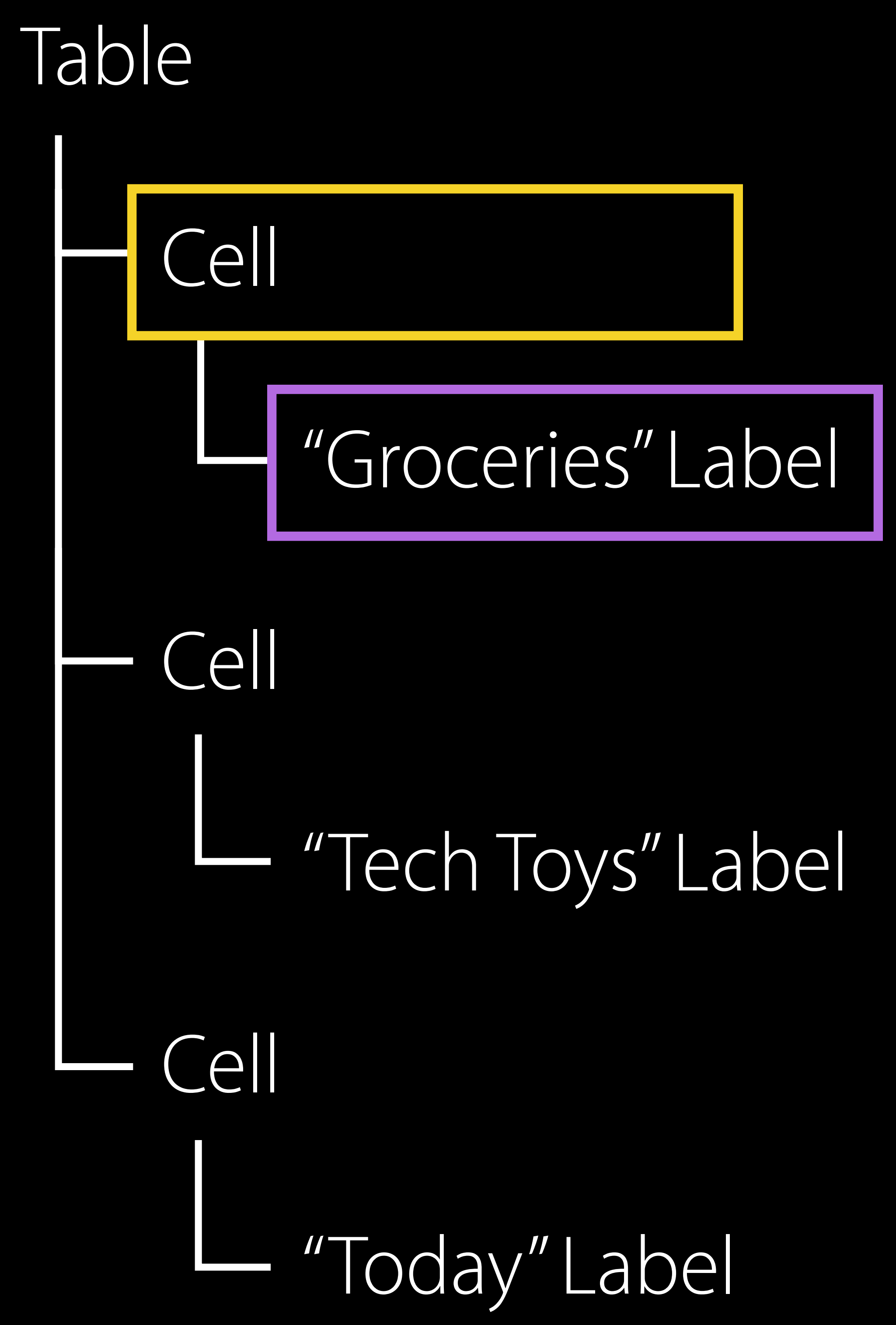
Combining Relationships and Filtering

containingType()

Find elements by describing their descendants

```
let cellQuery = cells.containingType(.StaticText,
                                     identifier:"Groceries")
```

Predicate variant also available



XCUIElementQuery

Combining relationships and filtering

```
descendantsMatchingType()
childrenMatchingType()
containingType()
```

Combining Queries

Combining Queries

Queries can be “chained” together

Combining Queries

Queries can be “chained” together

Output of each query is the input of the next query

Combining Queries

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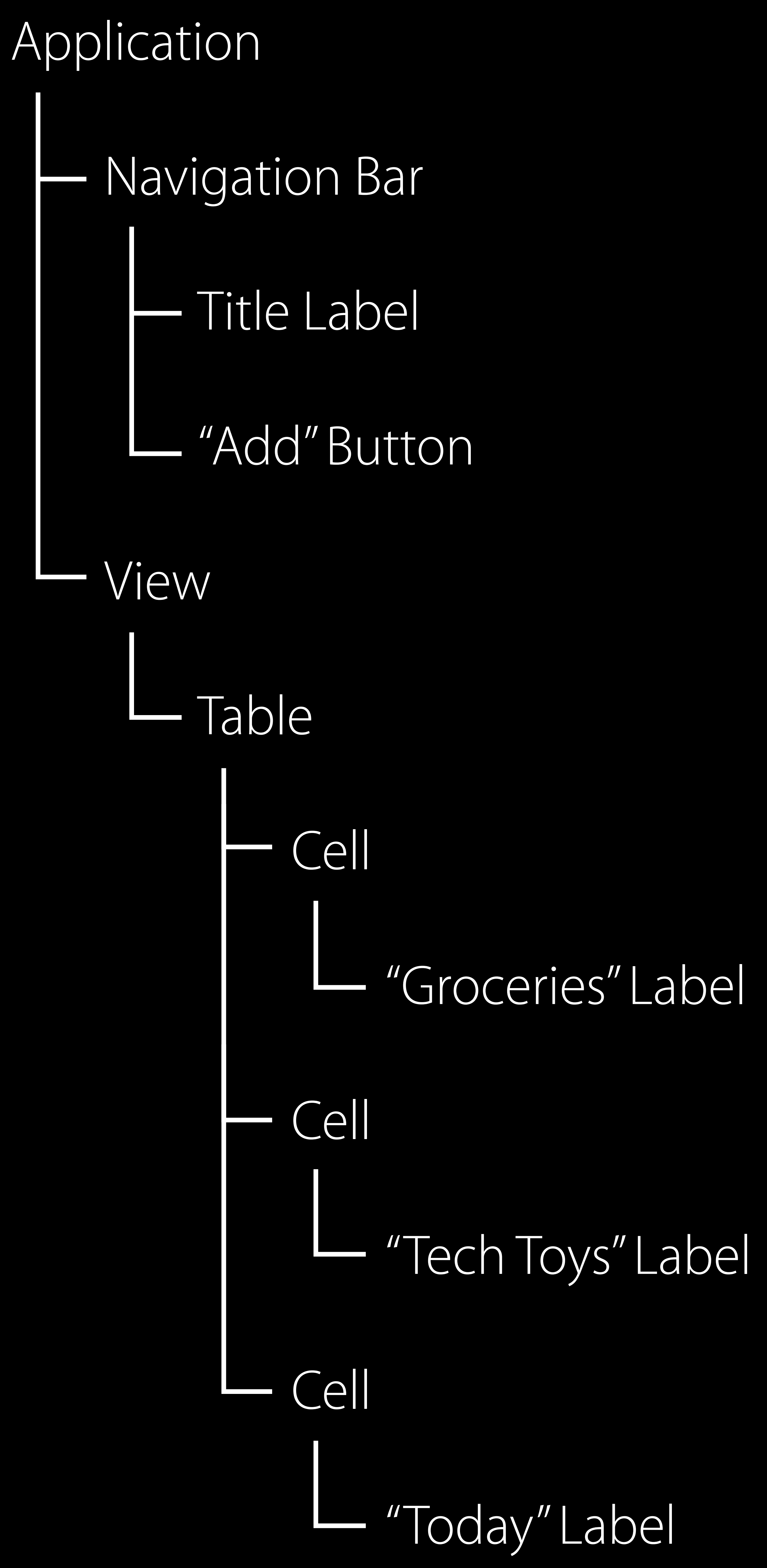
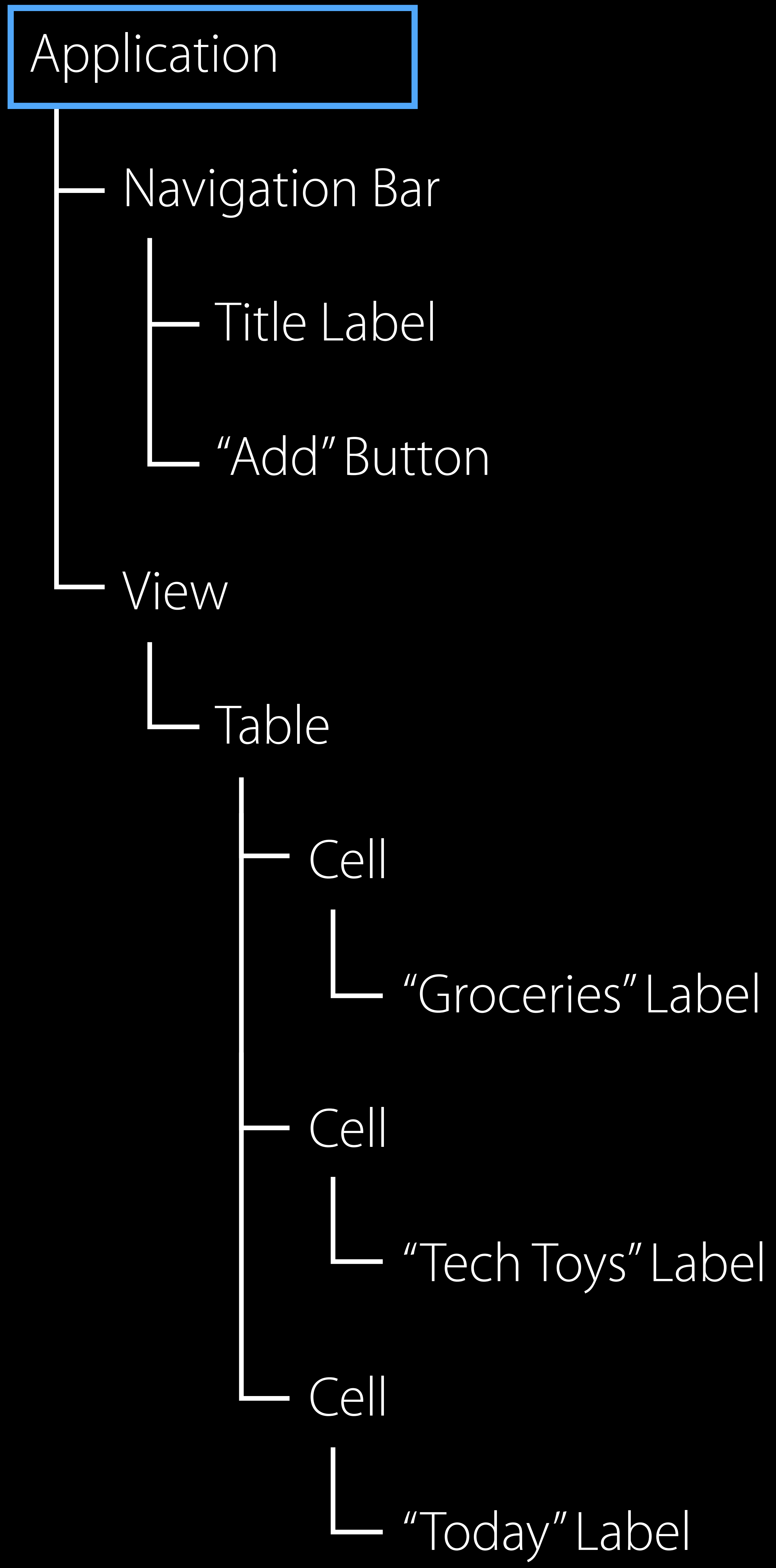


Combining Queries

Queries can be "chained" together

Output of each query is the input of the next query

```
let labelsInTable = app
```

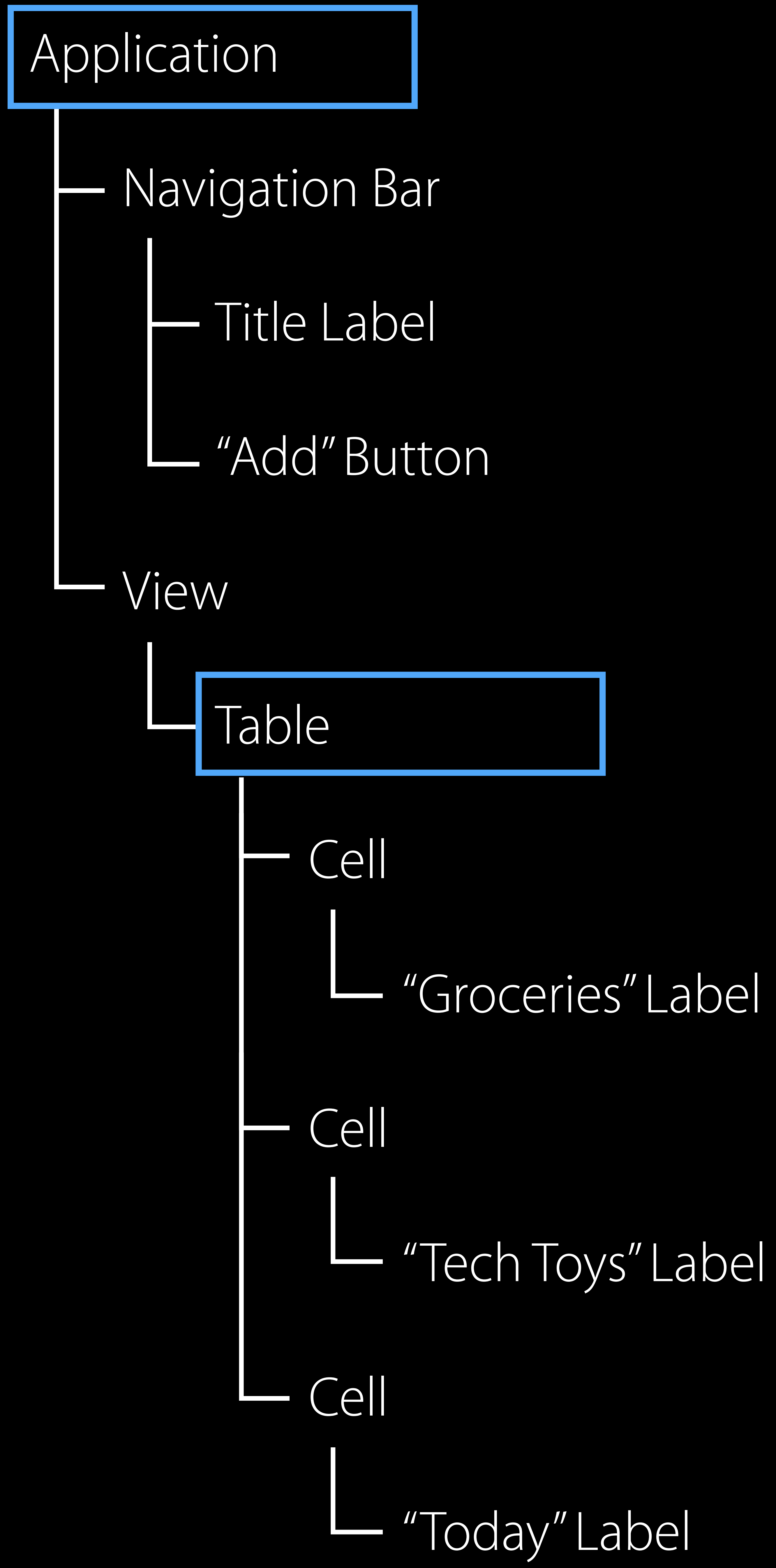


Combining Queries

Queries can be "chained" together

Output of each query is the input of the next query

```
let labelsInTable = app.tables
```

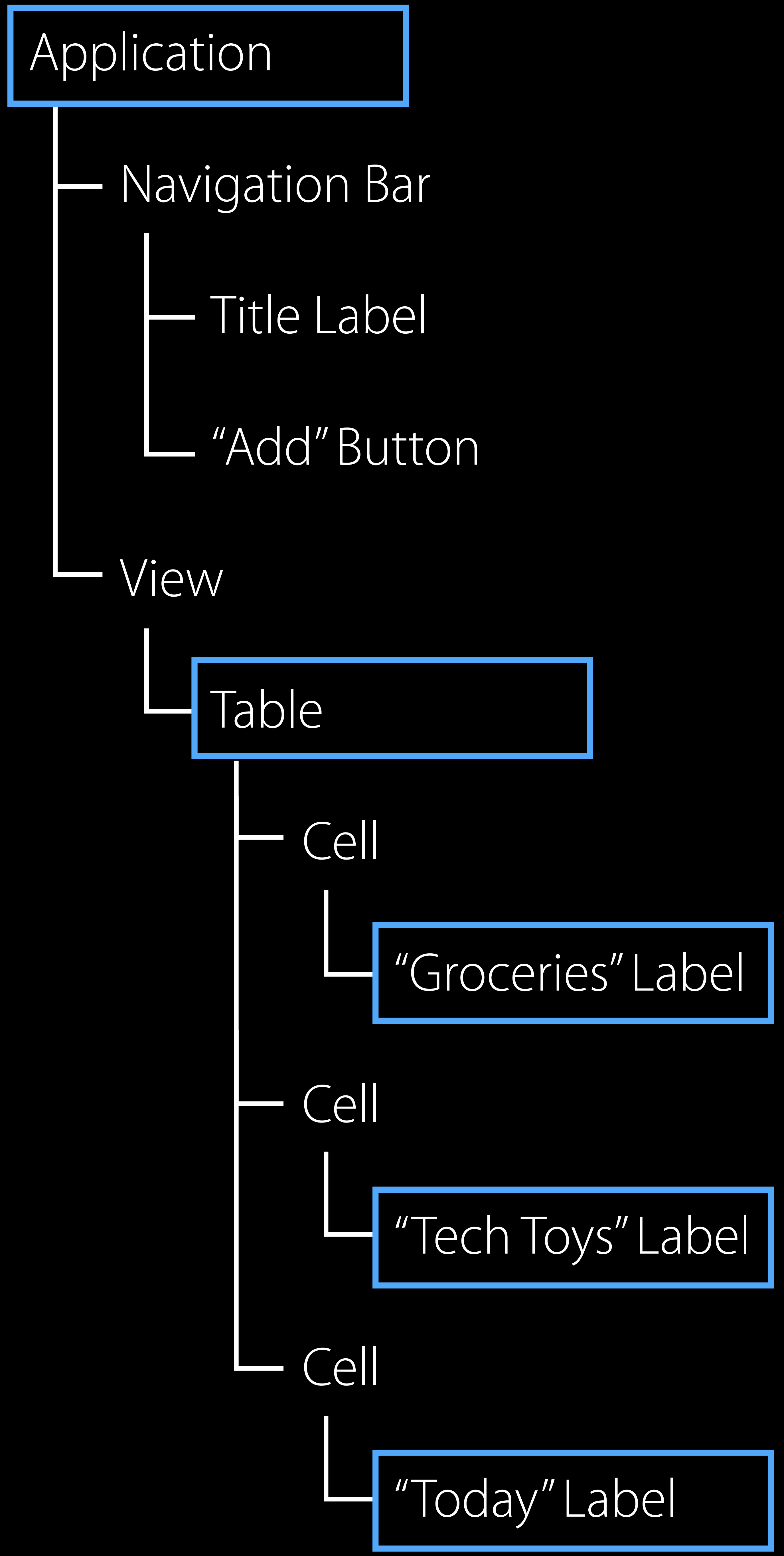


Combining Queries

Queries can be "chained" together

Output of each query is the input of the next query

```
let labelsInTable = app.tables.staticTexts
```



Getting Elements from Queries

Getting Elements from Queries

Subscripting	`table.staticTexts[“Groceries”]`

Getting Elements from Queries

Subscripting	`table.staticTexts[“Groceries”]`
Index	`table.staticTexts.elementAtIndex(0)`

Getting Elements from Queries

Subscripting	`table.staticTexts[“Groceries”]`
Index	`table.staticTexts.elementAtIndex(0)`
Unique	`app.navigationBars.element`

Evaluating Queries

Evaluating Queries

Queries are evaluated on demand

Evaluating Queries

Queries are evaluated on demand

XCUIElement

- Synthesizing events
- Reading property values

Evaluating Queries

Queries are evaluated on demand

XCUIElement

- Synthesizing events
- Reading property values

XCUIElementQuery

- Getting number of matches (`.count`)
- Getting all matches (`.allElementsBoundByAccessibilityElement`)

Evaluating Queries

Queries are evaluated on demand

XCUIElement

- Synthesizing events
- Reading property values

XCUIElementQuery

- Getting number of matches (`.count`)
- Getting all matches (`.allElementsBoundByAccessibilityElement`)

Re-evaluated when UI changes

Queries and Elements

Similar to URLs

Queries and Elements

Similar to URLs

Creating a URL does not fetch a resource

Queries and Elements

Similar to URLs

Creating a URL does not fetch a resource

- URL could be invalid, error raised when requested

Queries and Elements

Similar to URLs

Creating a URL does not fetch a resource

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Queries and elements

Queries and Elements

Similar to URLs

Creating a URL does not fetch a resource

- URL could be invalid, error raised when requested

Queries and elements

- Just a specification for accessible elements in the tested application

Queries and Elements

Similar to URLs

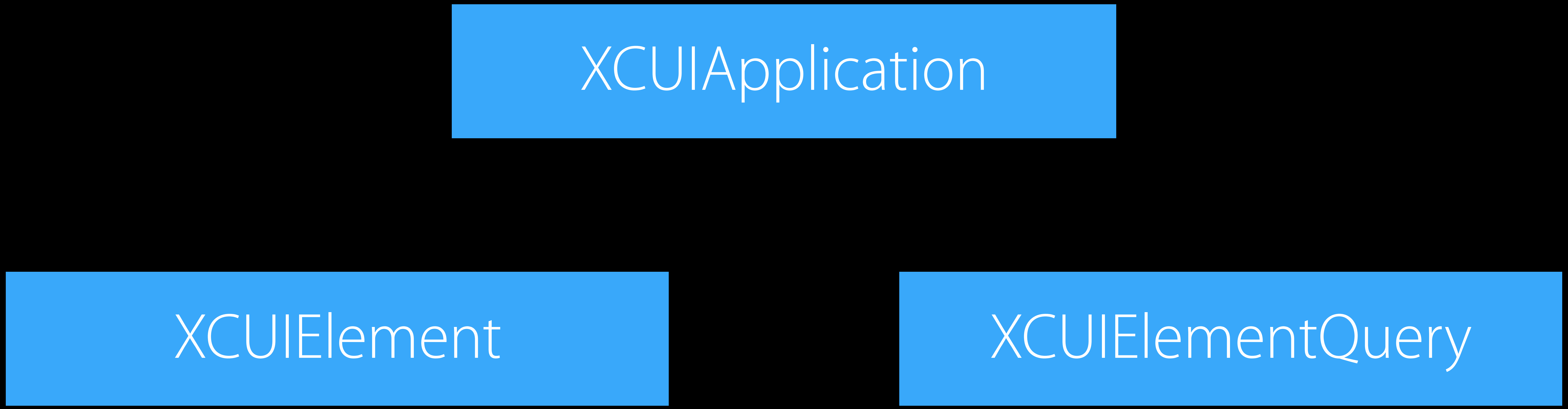
Creating a URL does not fetch a resource

- URL could be invalid, error raised when requested

Queries and elements

- Just a specification for accessible elements in the tested application
- Not resolved until needed

API Recap



Accessibility and UI Testing

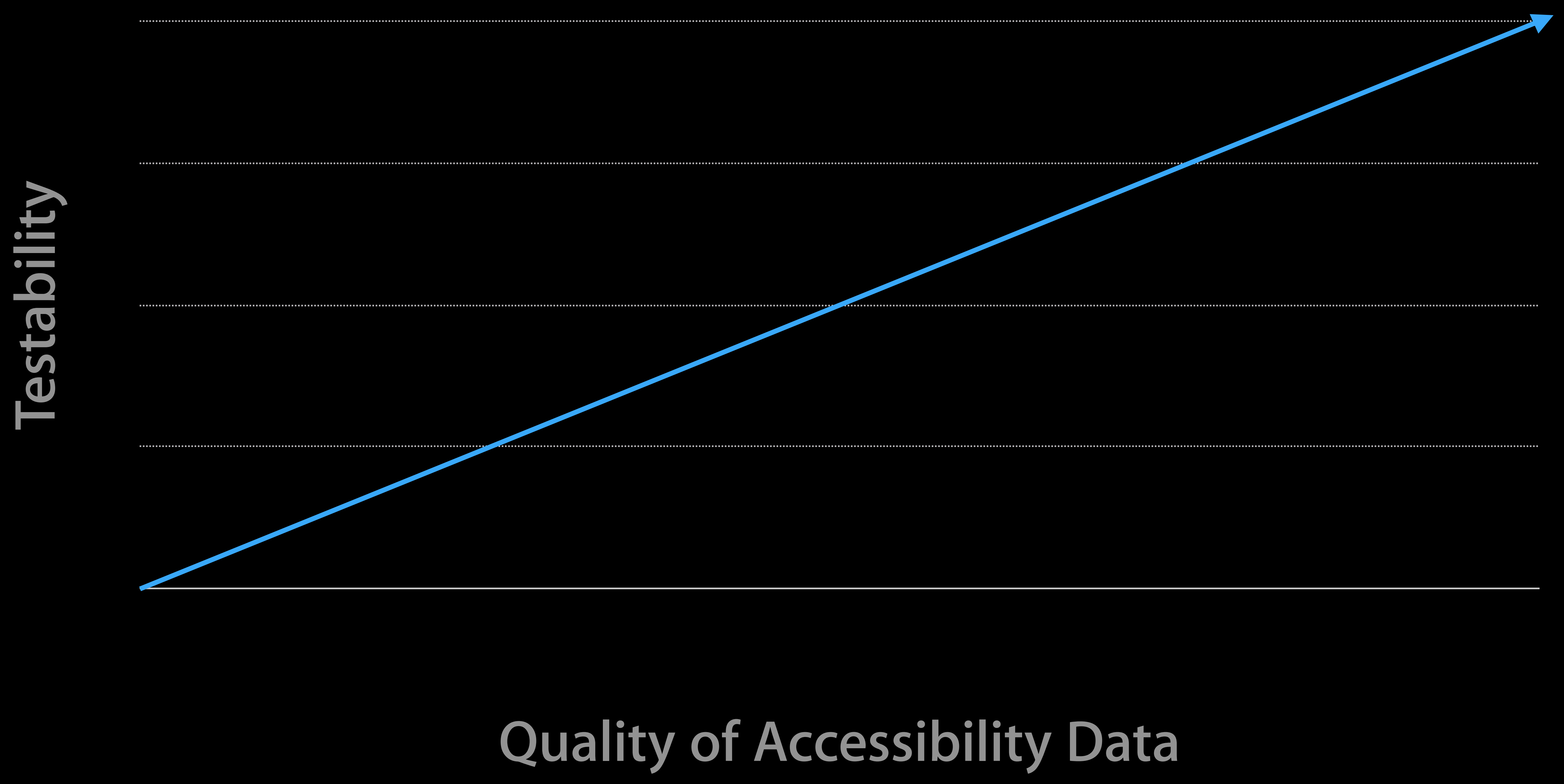
Accessibility and UI Testing

Accessibility and UI Testing

Accessibility data makes UI testing possible

Accessibility and UI Testing

Accessibility data makes UI testing possible



Accessibility and UI Testing

Debugging tips

Accessibility and UI Testing

Debugging tips

Not accessible

Accessibility and UI Testing

Debugging tips

Not accessible

- Custom view subclasses

Accessibility and UI Testing

Debugging tips

Not accessible

- Custom view subclasses
- Layers, sprites, and other graphics objects

Accessibility and UI Testing

Debugging tips

Not accessible

- Custom view subclasses
- Layers, sprites, and other graphics objects

Poor accessibility data

Accessibility and UI Testing

Debugging tips

Not accessible

- Custom view subclasses
- Layers, sprites, and other graphics objects

Poor accessibility data

Tools

Accessibility and UI Testing

Debugging tips

Not accessible

- Custom view subclasses
- Layers, sprites, and other graphics objects

Poor accessibility data

Tools

- UI recording

Accessibility and UI Testing

Debugging tips

Not accessible

- Custom view subclasses
- Layers, sprites, and other graphics objects

Poor accessibility data

Tools

- UI recording
- Accessibility inspectors

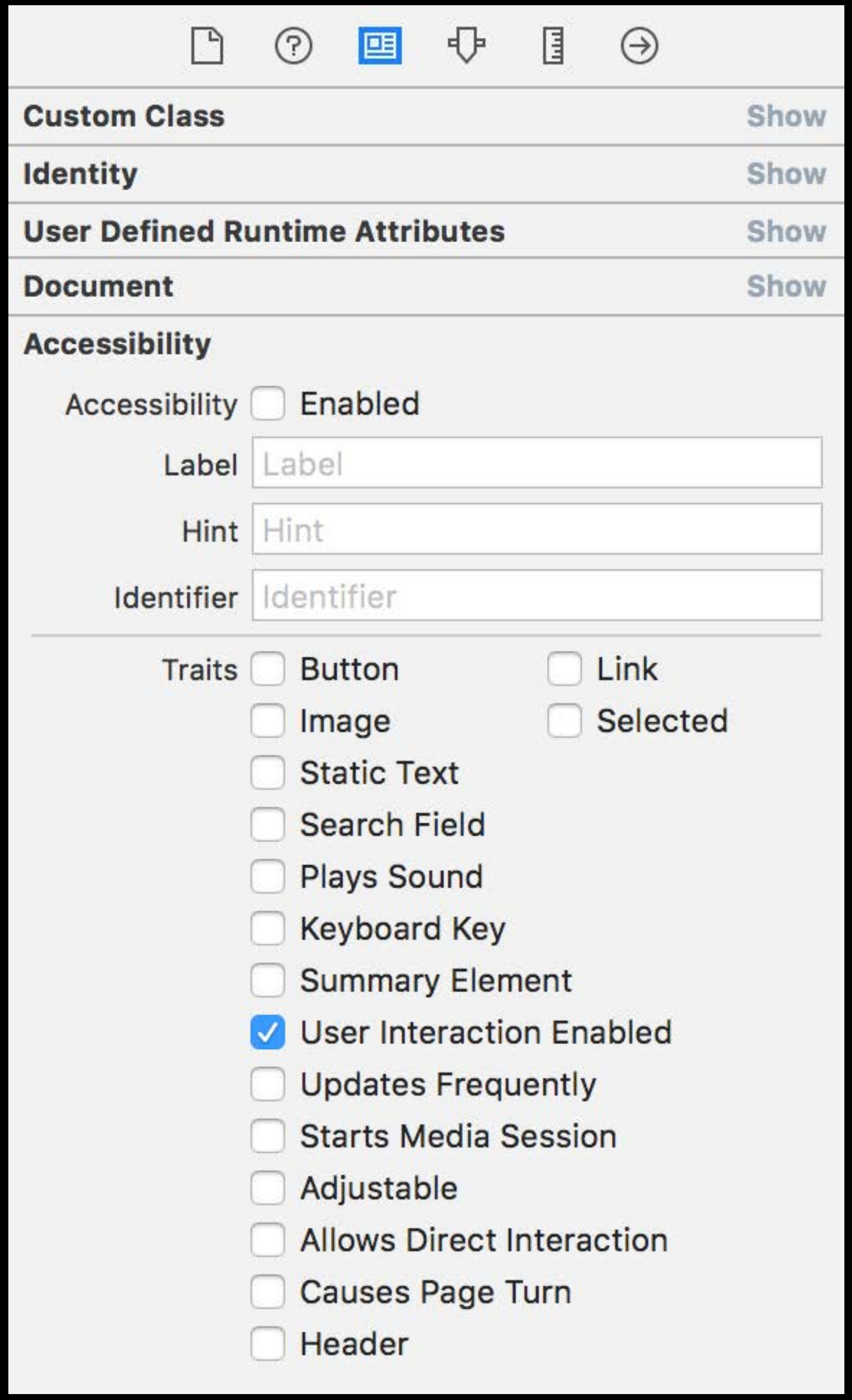
Accessibility and UI Testing

Improving data

Accessibility and UI Testing

Improving data

Interface Builder inspector



Custom Class Show

Identity Show

User Defined Runtime Attributes Show

Document Show

Accessibility

Accessibility [ ] Enabled

Label: Label

Hint: Hint

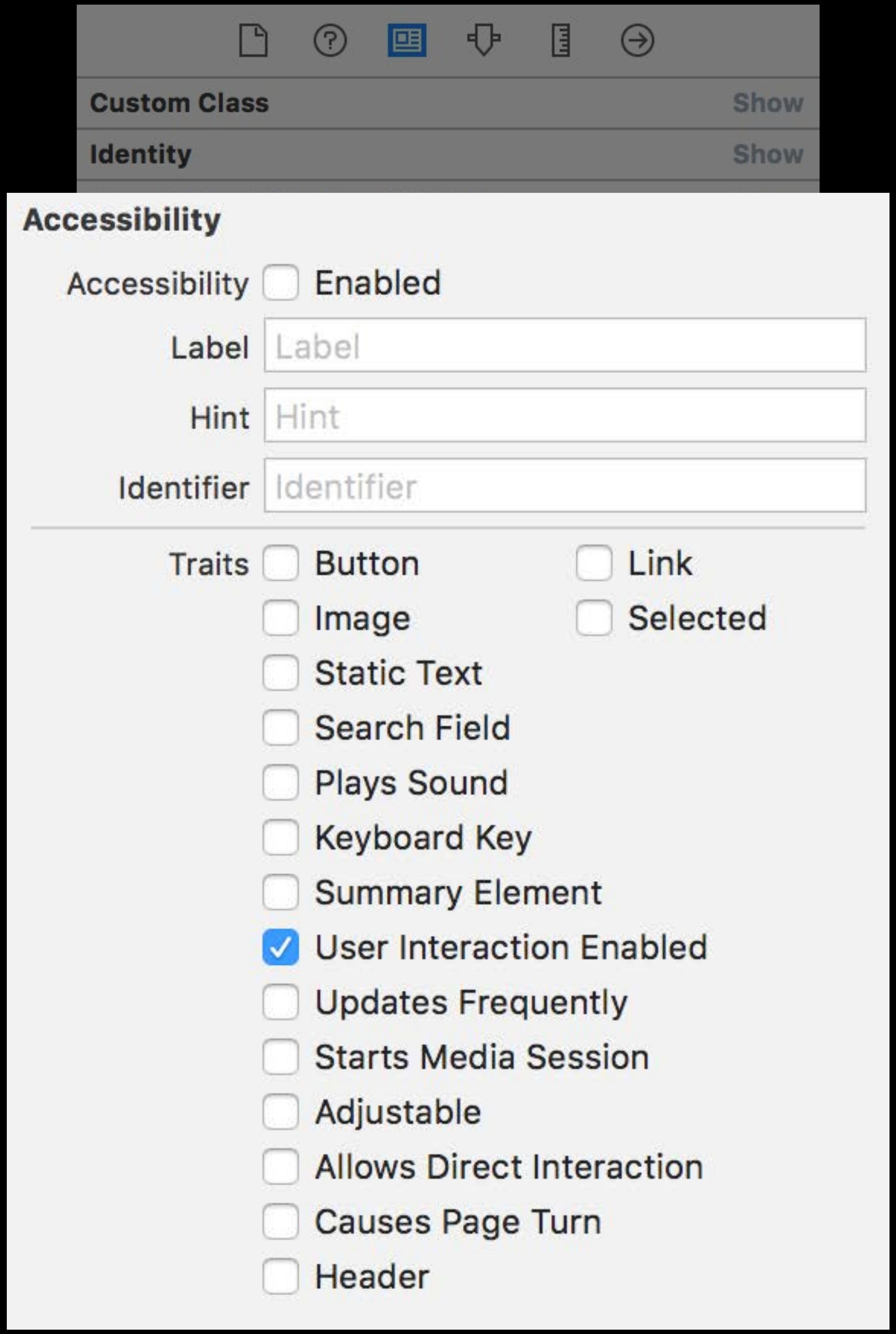
Identifier: Identifier

Traits:
- [ ] Button
- [ ] Link
- [ ] Image
- [ ] Selected
- [ ] Static Text
- [ ] Search Field
- [ ] Plays Sound
- [ ] Keyboard Key
- [ ] Summary Element
- [✓] User Interaction Enabled
- [ ] Updates Frequently
- [ ] Starts Media Session
- [ ] Adjustable
- [ ] Allows Direct Interaction
- [ ] Causes Page Turn
- [ ] Header

Accessibility and UI Testing

Improving data

Interface Builder inspector



Custom Class Show

Identity Show

Accessibility

Accessibility [ ] Enabled

Label: Label

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Traits
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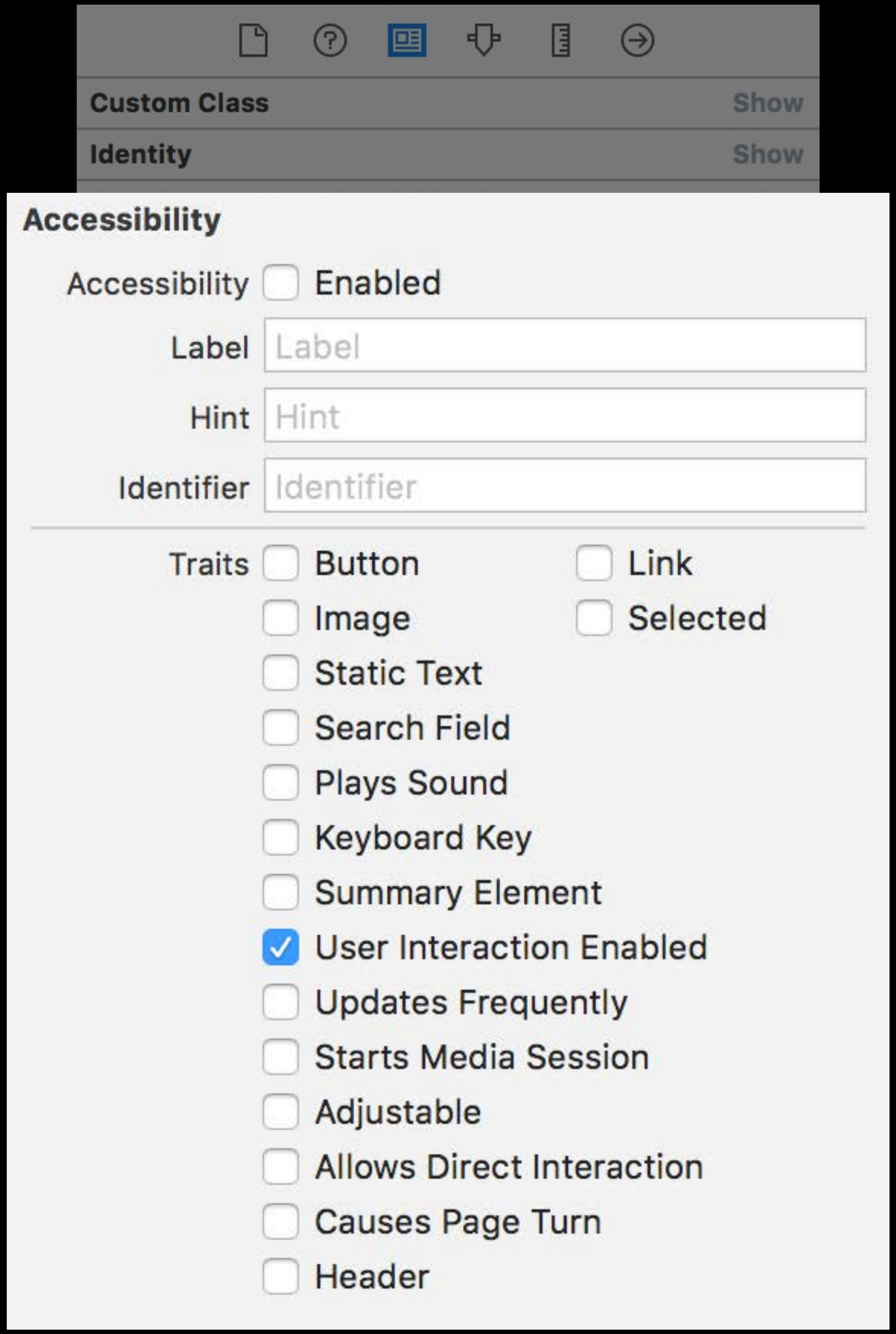
Accessibility and UI Testing

Improving data

Interface Builder inspector

API


Custom Class Show

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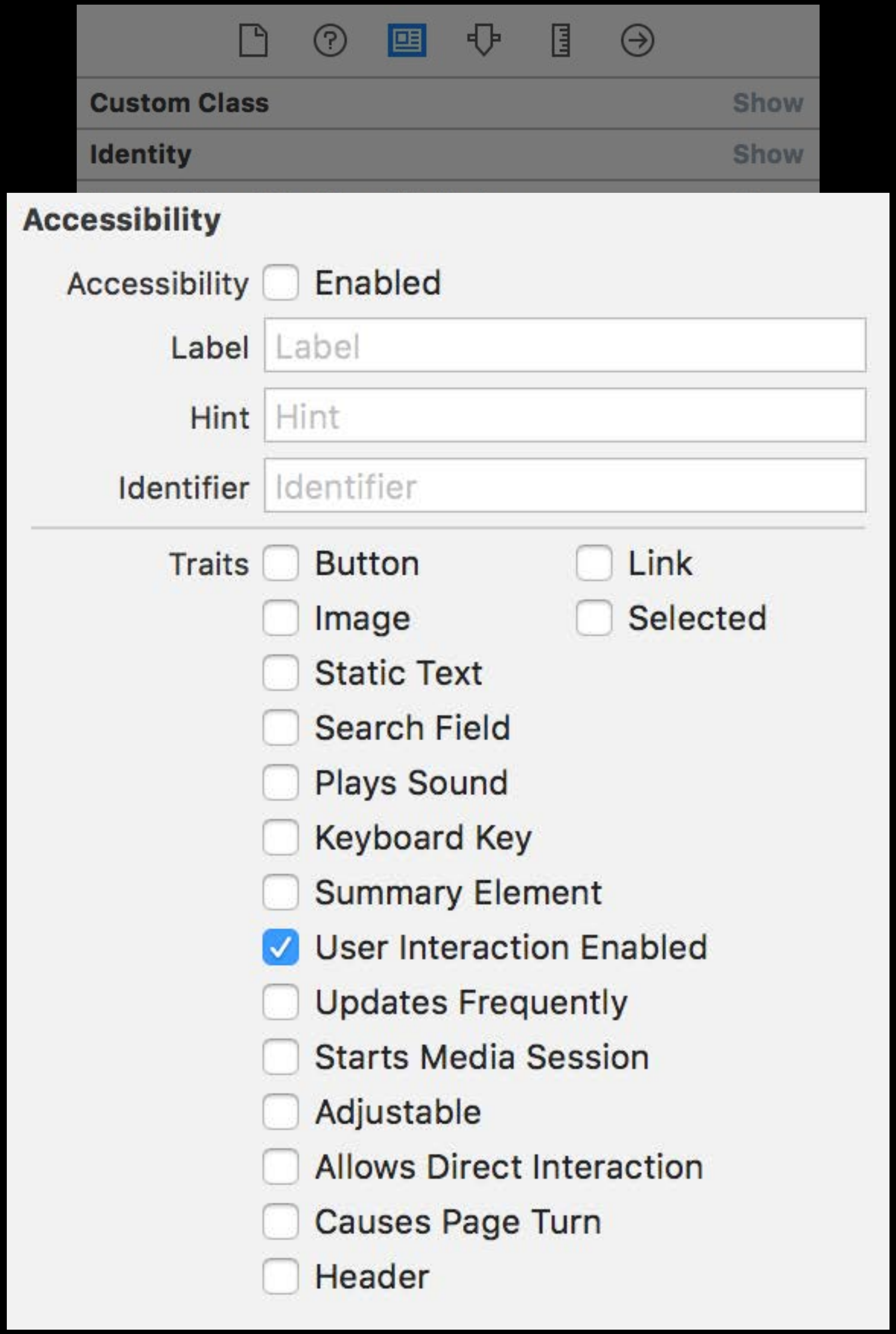
Accessibility and UI Testing

Improving data

Interface Builder inspector

API

- UIAccessibility (iOS)
- NSAccessibility (OS X)



Custom Class Show

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Demo

What Did You See?

What Did You See?

Advanced UI testing

What Did You See?

Advanced UI testing

Correcting queries

What Did You See?

- Advanced UI testing
- Correcting queries
- Looping over elements

What Did You See?

Advanced UI testing

Correcting queries

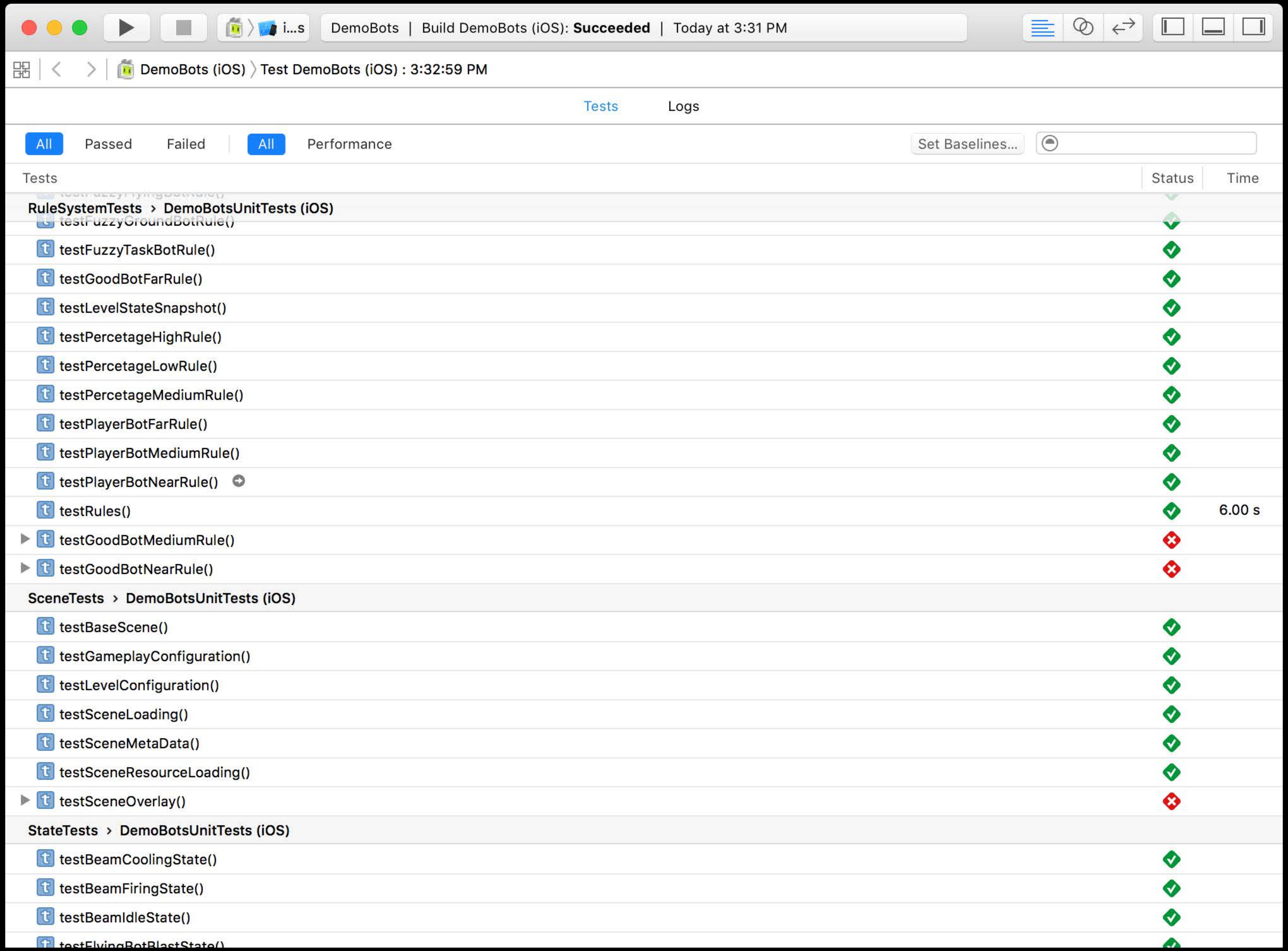
Looping over elements

Improving accessibility

Test Reports

UI Refresh

Test Reports



DemoBots | Build DemoBots (iOS): **Succeeded** | Today at 3:31 PM

DemoBots (iOS) 〉 Test DemoBots (iOS) : 3:32:59 PM

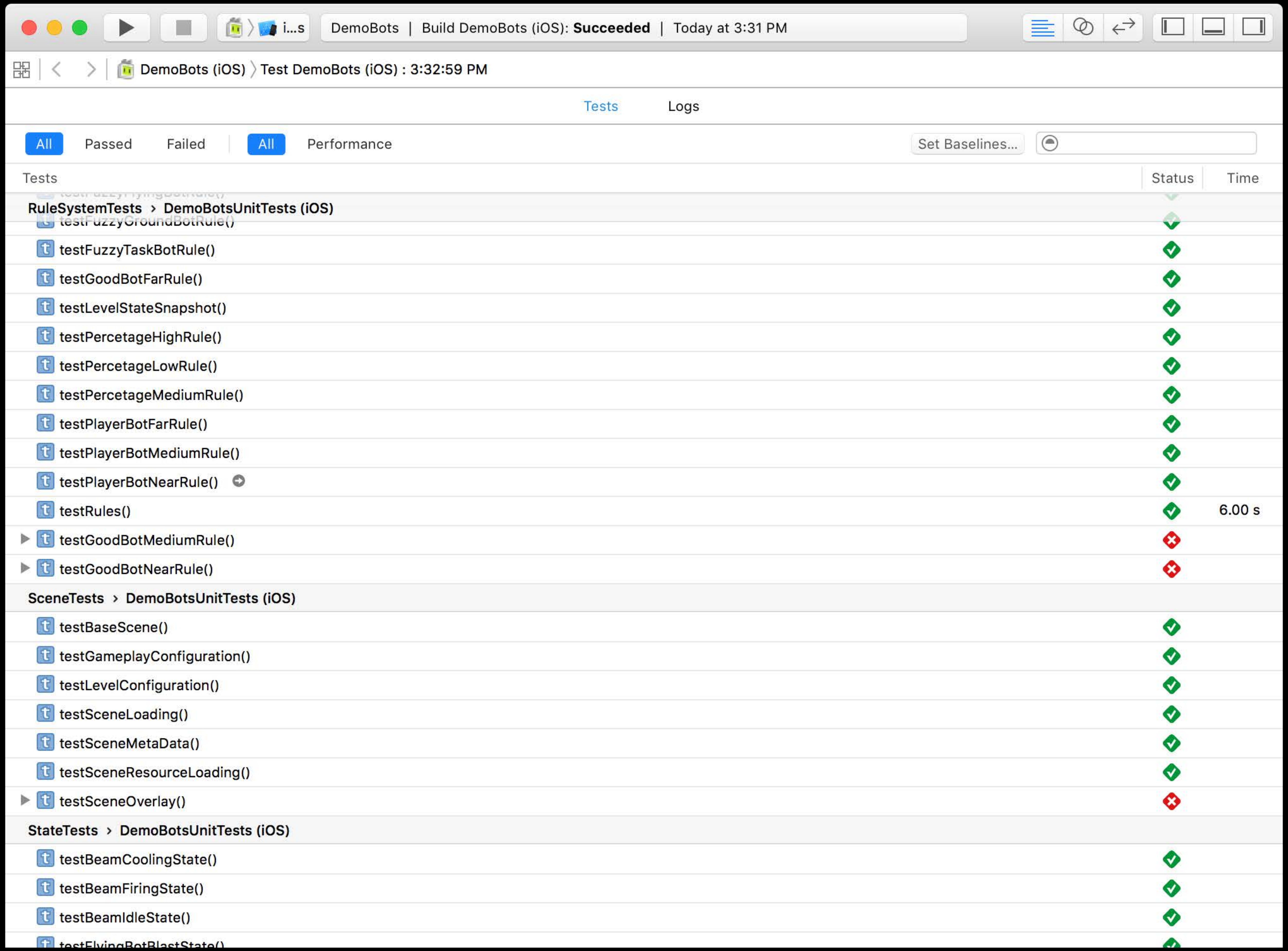
Tests Logs

All Passed Failed All Performance Set Baselines...

Tests	Status	Time
testFuzzyFlyingBotRule()	✓	
RuleSystemTests › DemoBotsUnitTests (iOS)		
testFuzzyGroundBotRule()	✓	
testFuzzyTaskBotRule()	✓	
testGoodBotFarRule()	✓	
testLevelStateSnapshot()	✓	
testPercetageHighRule()	✓	
testPercetageLowRule()	✓	
testPercetageMediumRule()	✓	
testPlayerBotFarRule()	✓	
testPlayerBotMediumRule()	✓	
testPlayerBotNearRule()	✓	
testRules()	✓	6.00 s
▶ testGoodBotMediumRule()	✗	
▶ testGoodBotNearRule()	✗	
SceneTests › DemoBotsUnitTests (iOS)		
testBaseScene()	✓	
testGameplayConfiguration()	✓	
testLevelConfiguration()	✓	
testSceneLoading()	✓	
testSceneMetaData()	✓	
testSceneResourceLoading()	✓	
▶ testSceneOverlay()	✗	
StateTests › DemoBotsUnitTests (iOS)		
testBeamCoolingState()	✓	
testBeamFiringState()	✓	
testBeamIdleState()	✓	
testFlyingBotBlastState()	✓	

Test Reports

Show results for all tests



DemoBots | Build DemoBots (iOS): **Succeeded** | Today at 3:31 PM

DemoBots (iOS) 〉 Test DemoBots (iOS) : 3:32:59 PM

Tests   Logs

All   Passed   Failed   All   Performance   Set Baselines...

Tests	Status	Time
RuleSystemTests › DemoBotsUnitTests (iOS)		
testFuzzyGroundBotRule()	✓	
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testPercetageMediumRule()	✓	
testPlayerBotFarRule()	✓	
testPlayerBotMediumRule()	✓	
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testRules()	✓	6.00 s
testGoodBotMediumRule()	✗	
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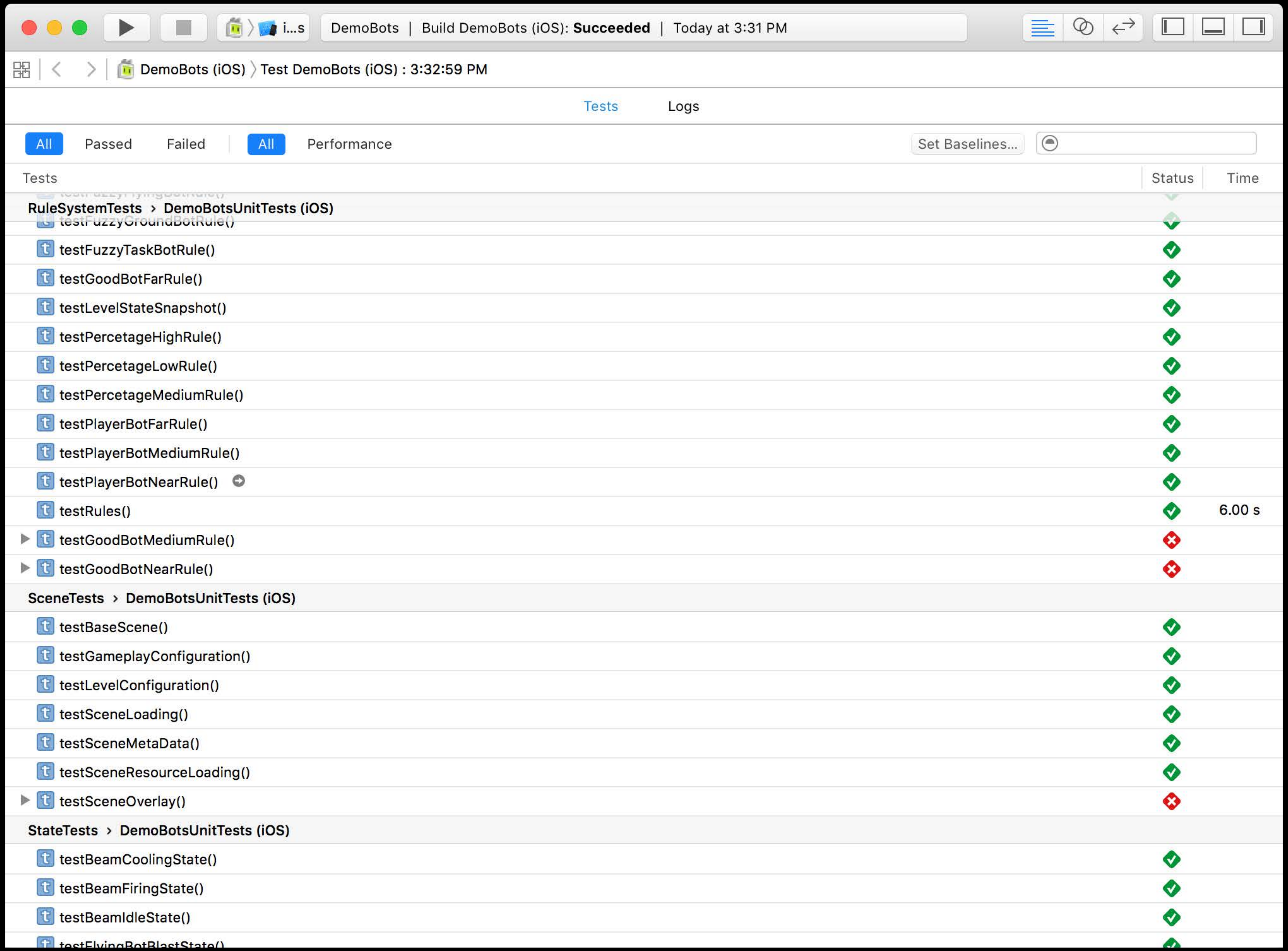
SceneTests › DemoBotsUnitTests (iOS)		
testBaseScene()	✓	
testGameplayConfiguration()	✓	
testLevelConfiguration()	✓	
testSceneLoading()	✓	
testSceneMetaData()	✓	
testSceneResourceLoading()	✓	
testSceneOverlay()	✗	
StateTests › DemoBotsUnitTests (iOS)		
testBeamCoolingState()	✓	
testBeamFiringState()	✓	
testBeamIdleState()	✓	

Test Reports

Show results for all tests

- Pass/fail



DemoBots | Build DemoBots (iOS): **Succeeded** | Today at 3:31 PM

DemoBots (iOS) 〉 Test DemoBots (iOS) : 3:32:59 PM

Tests Logs

All Passed Failed All Performance Set Baselines...

Tests	Status	Time
testFuzzyGroundBotRule()	✓	
RuleSystemTests › DemoBotsUnitTests (iOS)		
testFuzzyTaskBotRule()	✓	
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testPercetageMediumRule()	✓	
testPlayerBotFarRule()	✓	
testPlayerBotMediumRule()	✓	
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testRules()	✓	6.00 s
testGoodBotMediumRule()	✗	
testGoodBotNearRule()	✗	
SceneTests › DemoBotsUnitTests (iOS)		
testBaseScene()	✓	
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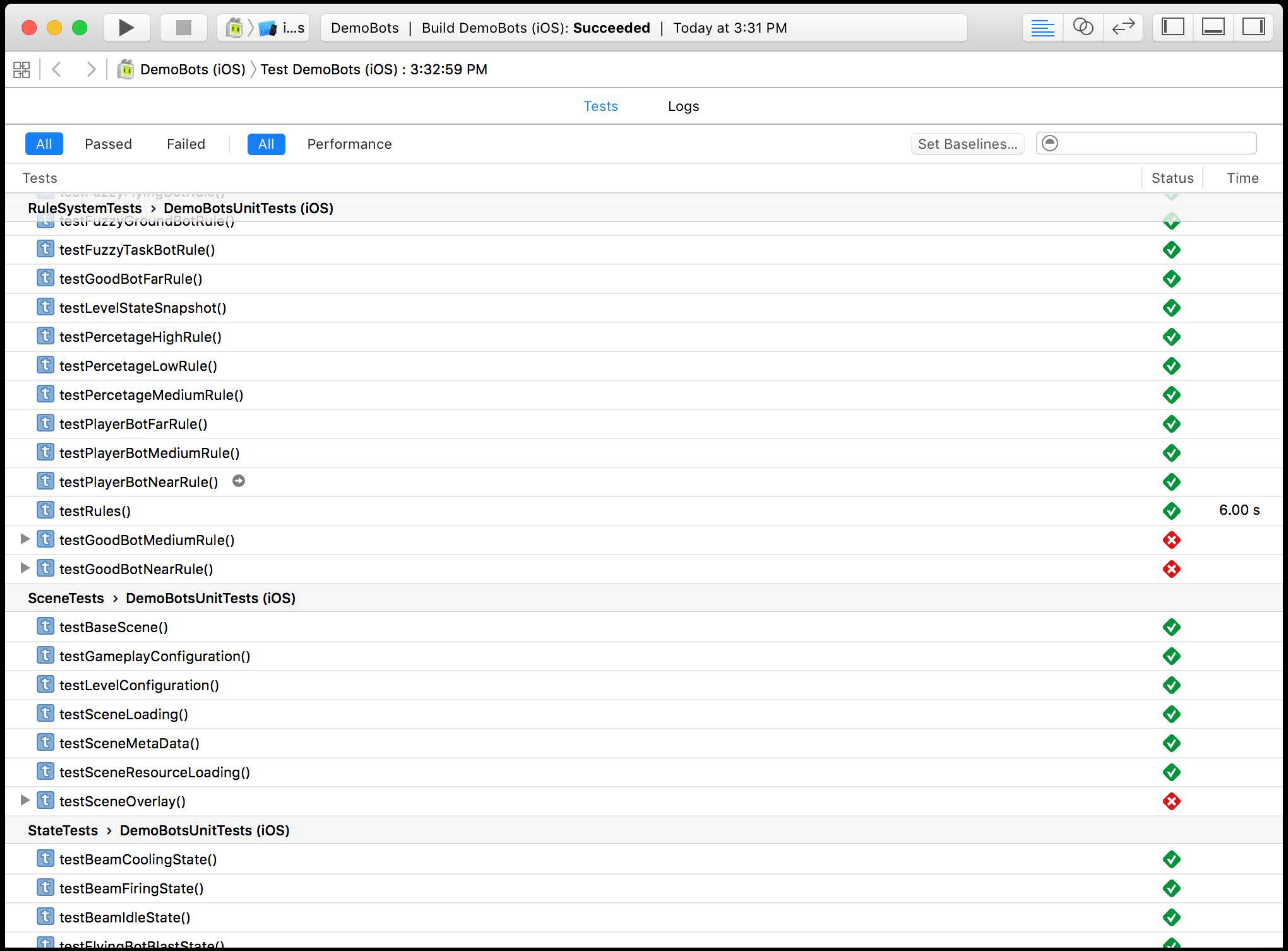
testLevelConfiguration()	✓	
testSceneLoading()	✓	
testSceneMetaData()	✓	
testSceneResourceLoading()	✓	
testSceneOverlay()	✗	
StateTests › DemoBotsUnitTests (iOS)		
testBeamCoolingState()	✓	
testBeamFiringState()	✓	
testBeamIdleState()	✓	
testFlyingBotBlastState()	✓	

Test Reports

Show results for all tests

- Pass/fail
- Failure reason


DemoBots | Build DemoBots (iOS): **Succeeded** | Today at 3:31 PM
DemoBots (iOS) 〉 Test DemoBots (iOS) : 3:32:59 PM
Tests
Logs
All
Passed
Failed
All
Performance
Set Baselines...

Tests	Status	Time
RuleSystemTests › DemoBotsUnitTests (iOS)		
testFuzzyTaskBotRule()	✓	
testGoodBotFarRule()	✓	
testLevelStateSnapshot()	✓	
testPercetageHighRule()	✓	
testPercetageLowRule()	✓	
testPercetageMediumRule()	✓	
testPlayerBotFarRule()	✓	
testPlayerBotMediumRule()	✓	
testPlayerBotNearRule()	✓	
testRules()	✓	6.00 s
testGoodBotMediumRule()	✗	
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SceneTests › DemoBotsUnitTests (iOS)		
testBaseScene()	✓	
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testLevelConfiguration()	✓	
testSceneLoading()	✓	
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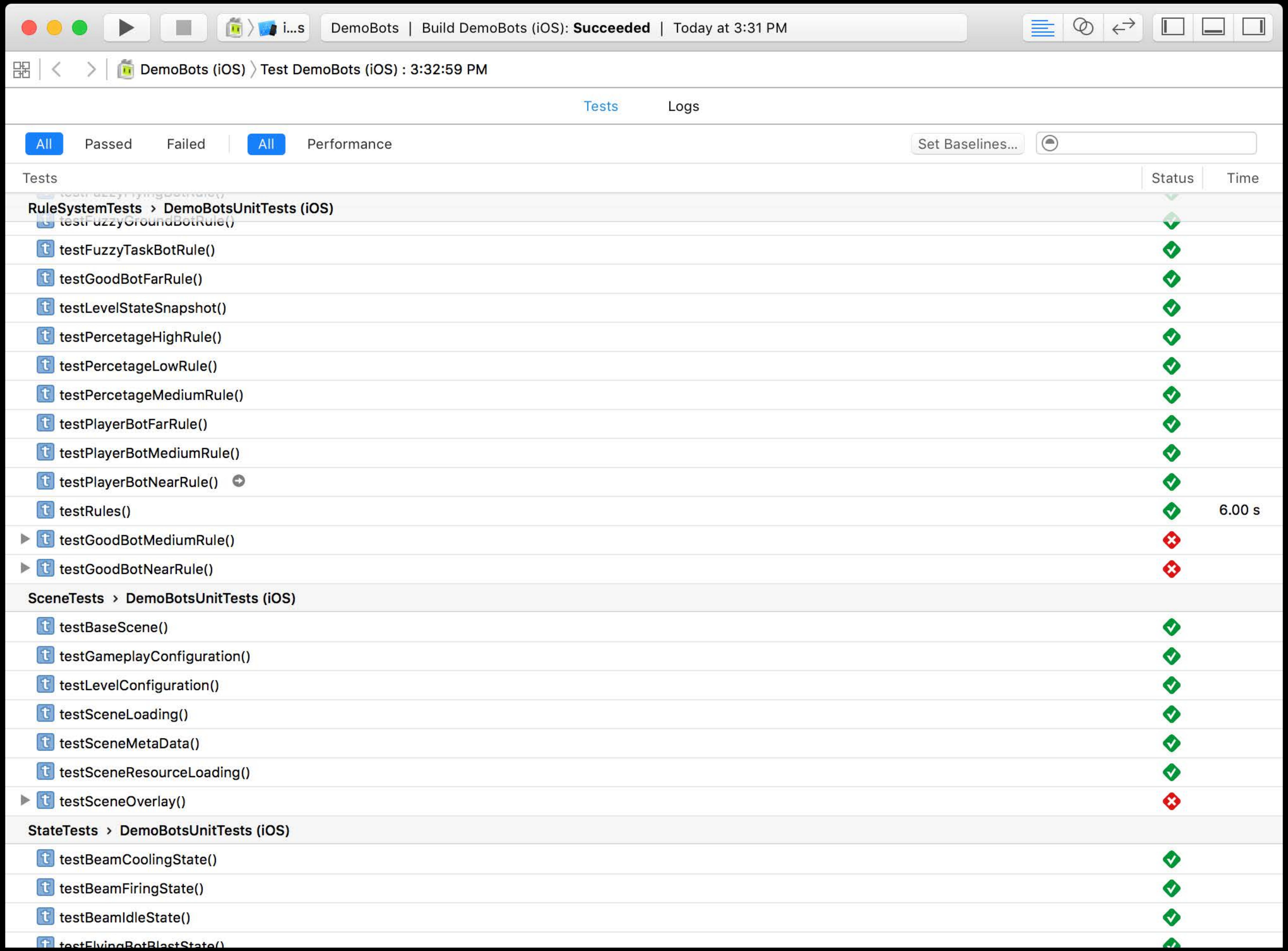
testSceneOverlay()	✗	
StateTests › DemoBotsUnitTests (iOS)		
testBeamCoolingState()	✓	
testBeamFiringState()	✓	
testBeamIdleState()	✓	

Test Reports

Show results for all tests

- Pass/fail
- Failure reason
- Performance metrics



DemoBots | Build DemoBots (iOS): **Succeeded** | Today at 3:31 PM

DemoBots (iOS) 〉 Test DemoBots (iOS) : 3:32:59 PM

Tests	Status	Time
testFuzzyFlyingBotRule()	✓	
RuleSystemTests › DemoBotsUnitTests (iOS)		
testFuzzyGroundBotRule()	✓	
testFuzzyTaskBotRule()	✓	
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testLevelStateSnapshot()	✓	
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StateTests › DemoBotsUnitTests (iOS)		
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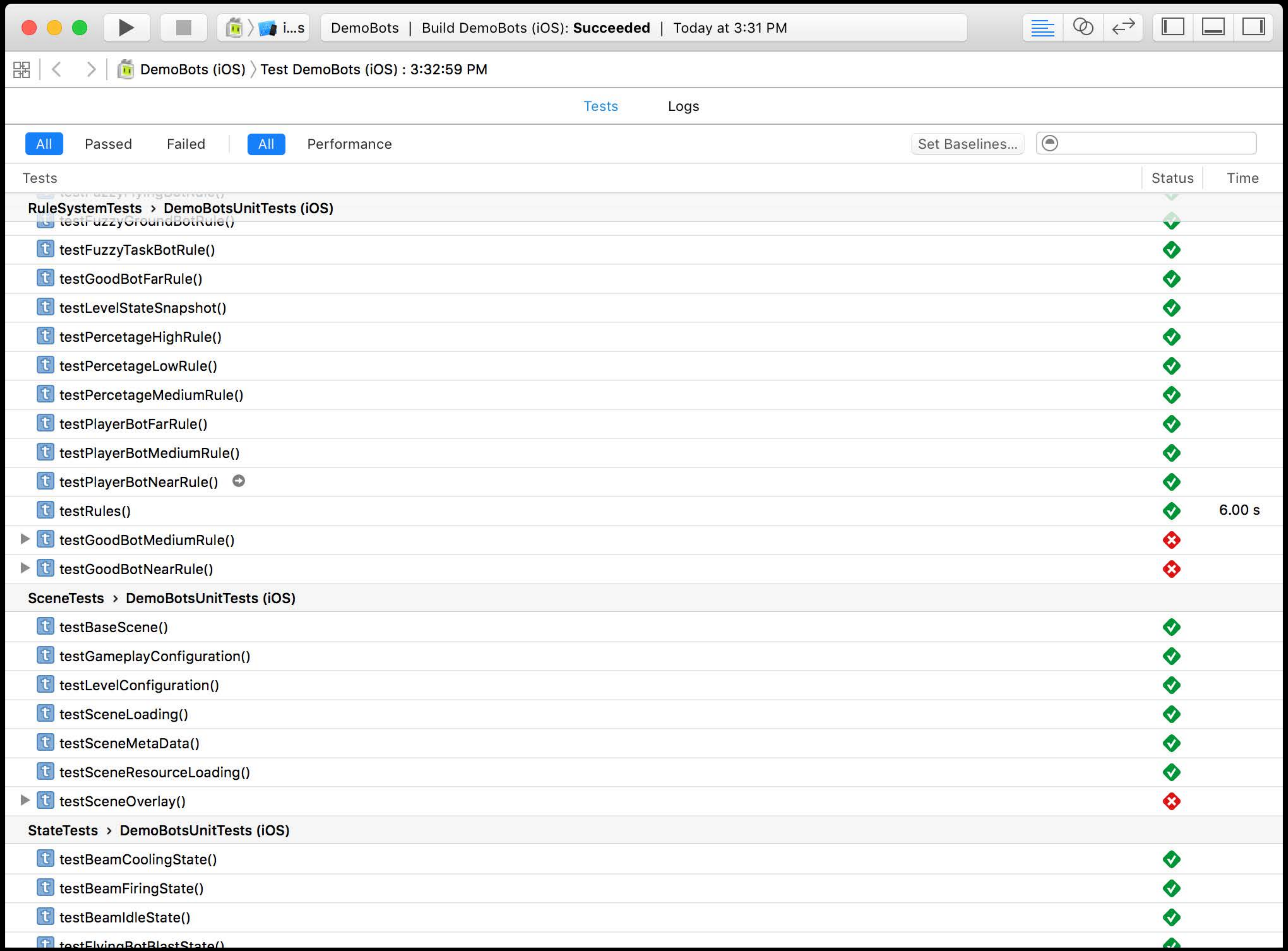
testBeamFiringState()	✓	
testBeamIdleState()	✓	
testFlyingBotBlastState()	✓	

Test Reports

Show results for all tests

- Pass/fail
- Failure reason
- Performance metrics

Same UI in Xcode and in Xcode Server



DemoBots | Build DemoBots (iOS): **Succeeded** | Today at 3:31 PM

DemoBots (iOS) 〉 Test DemoBots (iOS) : 3:32:59 PM

Tests Logs

All Passed Failed | All Performance Set Baselines...

Tests	Status	Time
RuleSystemTests › DemoBotsUnitTests (iOS)		
testFuzzyGroundBotRule()	✓	
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testLevelStateSnapshot()	✓	
testPercetageHighRule()	✓	
testPercetageLowRule()	✓	
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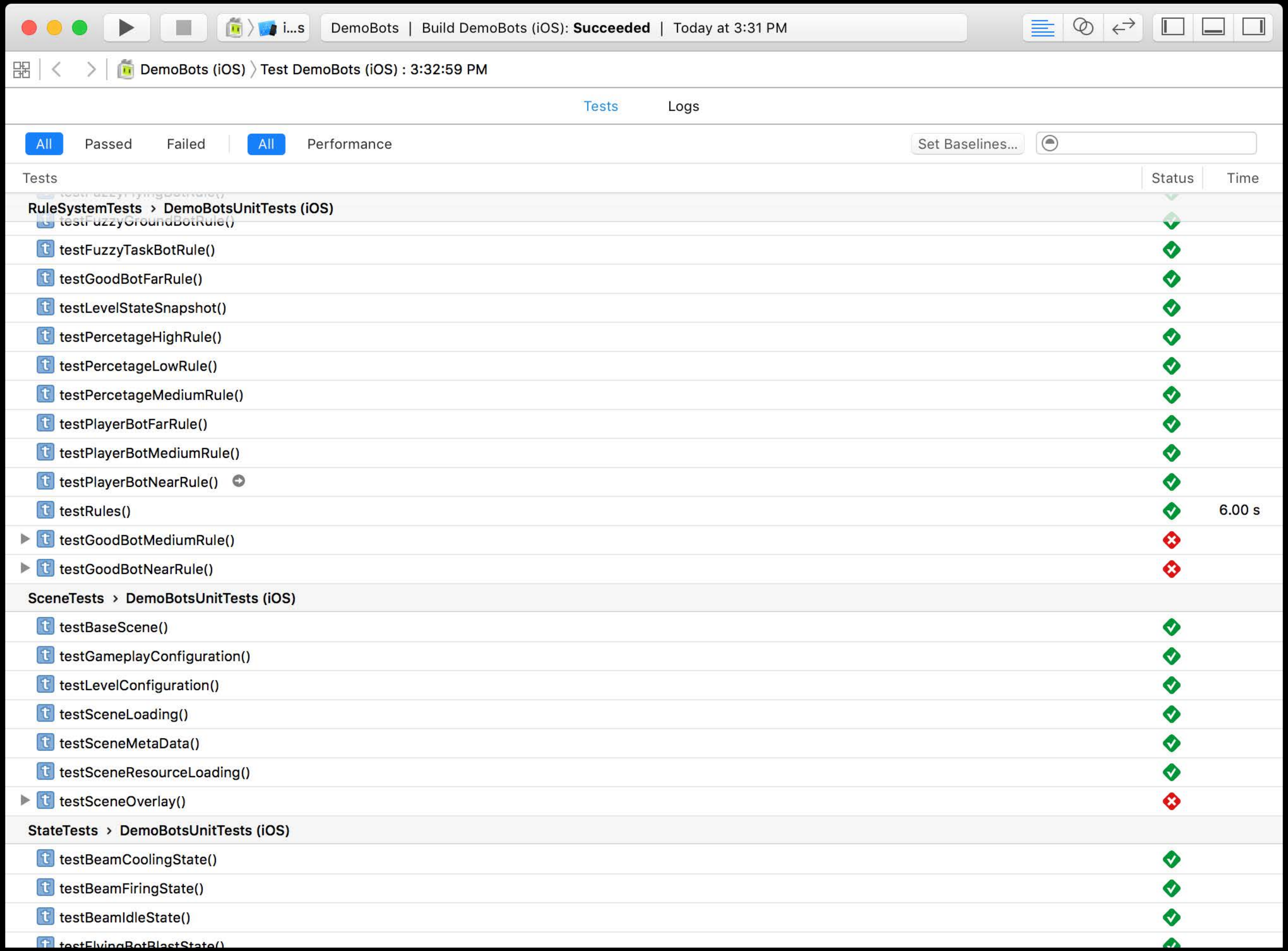
Test Reports

Show results for all tests

- Pass/fail
- Failure reason
- Performance metrics

Same UI in Xcode and in Xcode Server

Per-device results for Xcode Server


i...s
DemoBots | Build DemoBots (iOS): **Succeeded** | Today at 3:31 PM
DemoBots (iOS) 〉Test DemoBots (iOS) : 3:32:59 PM
Tests
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testBeamCoolingState()	✓	
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testBeamIdleState()	✓	
testFlyingBotBlastState()	✓	

Test Reports

UI testing additions

Test Reports

UI testing additions

New data

Test Reports

UI testing additions

New data

Screenshots

Test Reports

UI testing additions

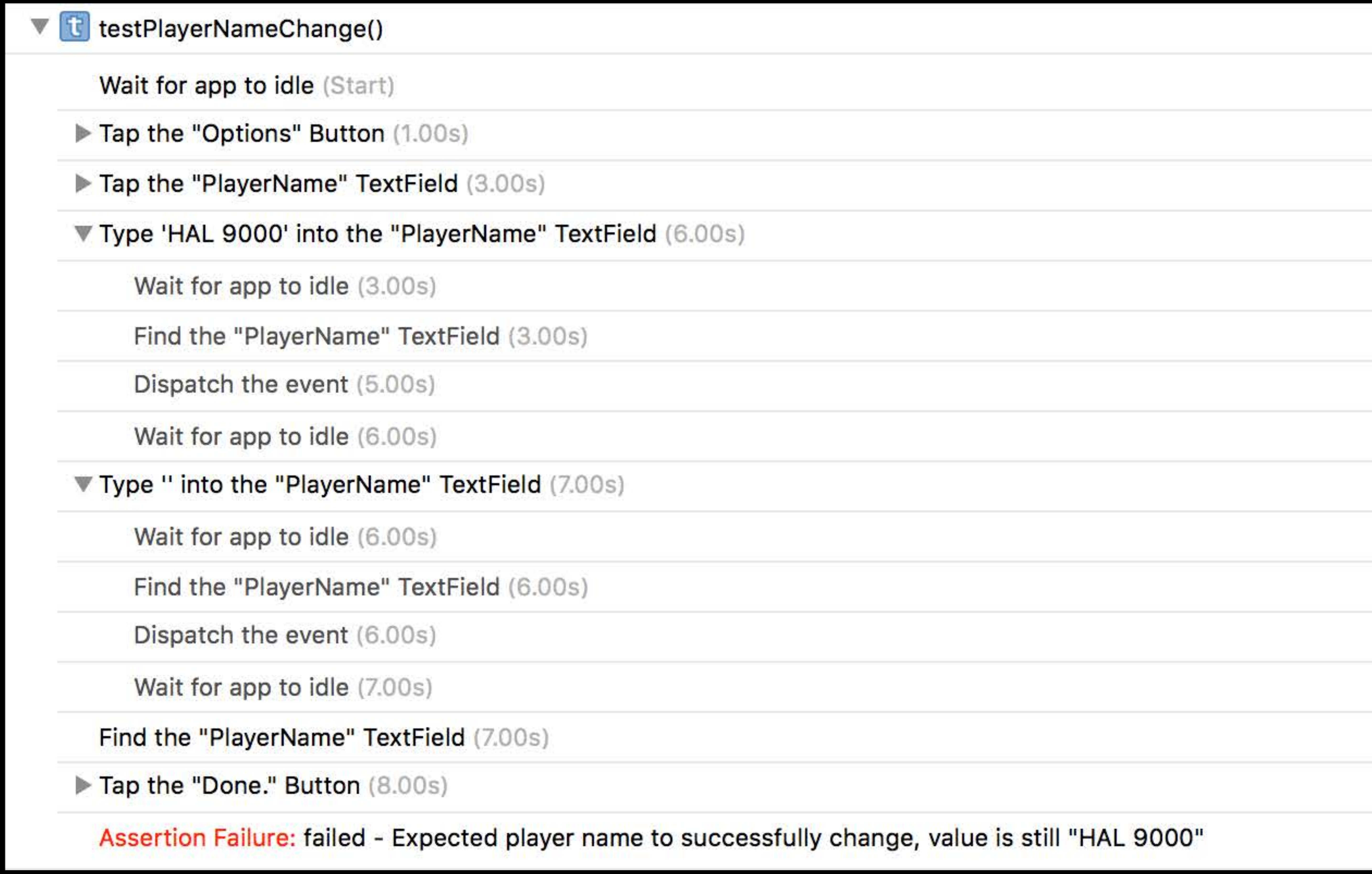
New data

Screenshots

Nested activities

Test Reports

Nested activities



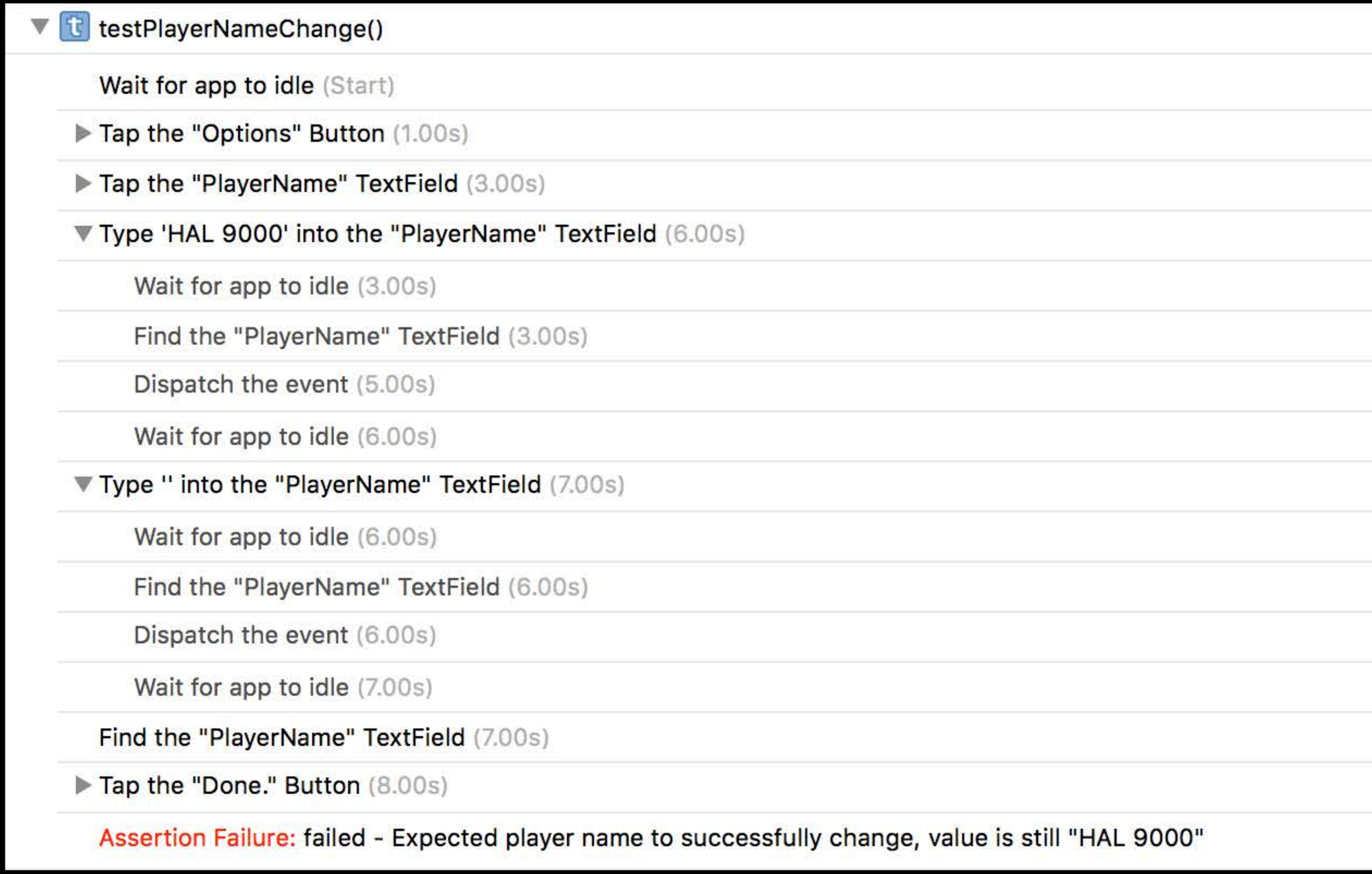
▼ testPlayerNameChange()

- Wait for app to idle (Start)
- ▶ Tap the "Options" Button (1.00s)
- ▶ Tap the "PlayerName" TextField (3.00s)
- ▼ Type 'HAL 9000' into the "PlayerName" TextField (6.00s)
  - Wait for app to idle (3.00s)
  - Find the "PlayerName" TextField (3.00s)
  - Dispatch the event (5.00s)
  - Wait for app to idle (6.00s)
- ▼ Type '' into the "PlayerName" TextField (7.00s)
  - Wait for app to idle (6.00s)
  - Find the "PlayerName" TextField (6.00s)
  - Dispatch the event (6.00s)
  - Wait for app to idle (7.00s)
- Find the "PlayerName" TextField (7.00s)
- ▶ Tap the "Done." Button (8.00s)
- Assertion Failure: failed - Expected player name to successfully change, value is still "HAL 9000"

Test Reports

Nested activities

UI testing APIs have several steps



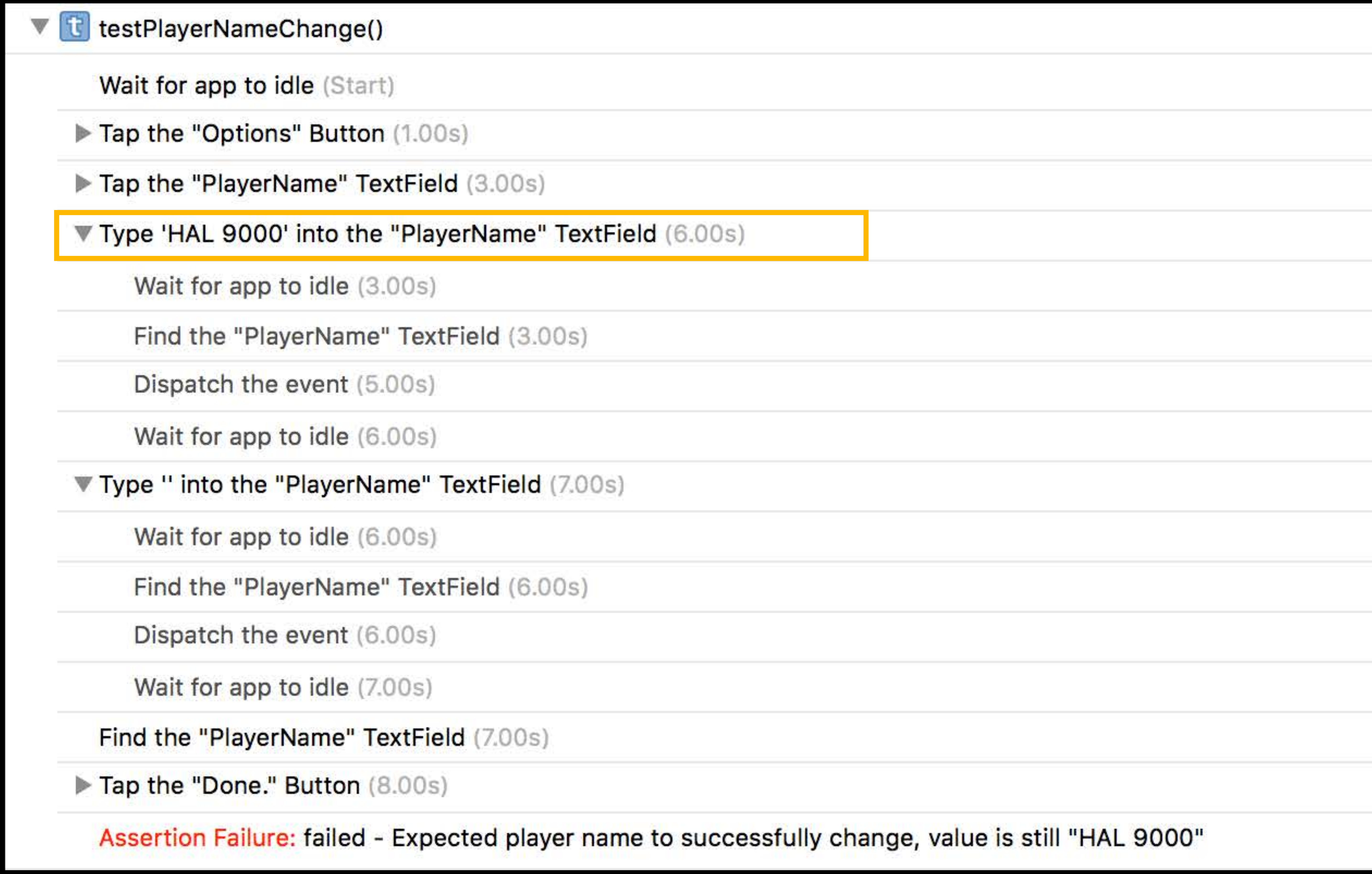
```
▼ testPlayerNameChange()
    Wait for app to idle (Start)
  ▶ Tap the "Options" Button (1.00s)
  ▶ Tap the "PlayerName" TextField (3.00s)
  ▼ Type 'HAL 9000' into the "PlayerName" TextField (6.00s)
        Wait for app to idle (3.00s)
        Find the "PlayerName" TextField (3.00s)
        Dispatch the event (5.00s)
        Wait for app to idle (6.00s)
  ▼ Type '' into the "PlayerName" TextField (7.00s)
        Wait for app to idle (6.00s)
        Find the "PlayerName" TextField (6.00s)
        Dispatch the event (6.00s)
        Wait for app to idle (7.00s)
    Find the "PlayerName" TextField (7.00s)
  ▶ Tap the "Done." Button (8.00s)
    Assertion Failure: failed - Expected player name to successfully change, value is still "HAL 9000"
```

Test Reports

Nested activities

UI testing APIs have several steps

Typing into a textfield



```
▼ testPlayerNameChange()
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Test Reports

Nested activities

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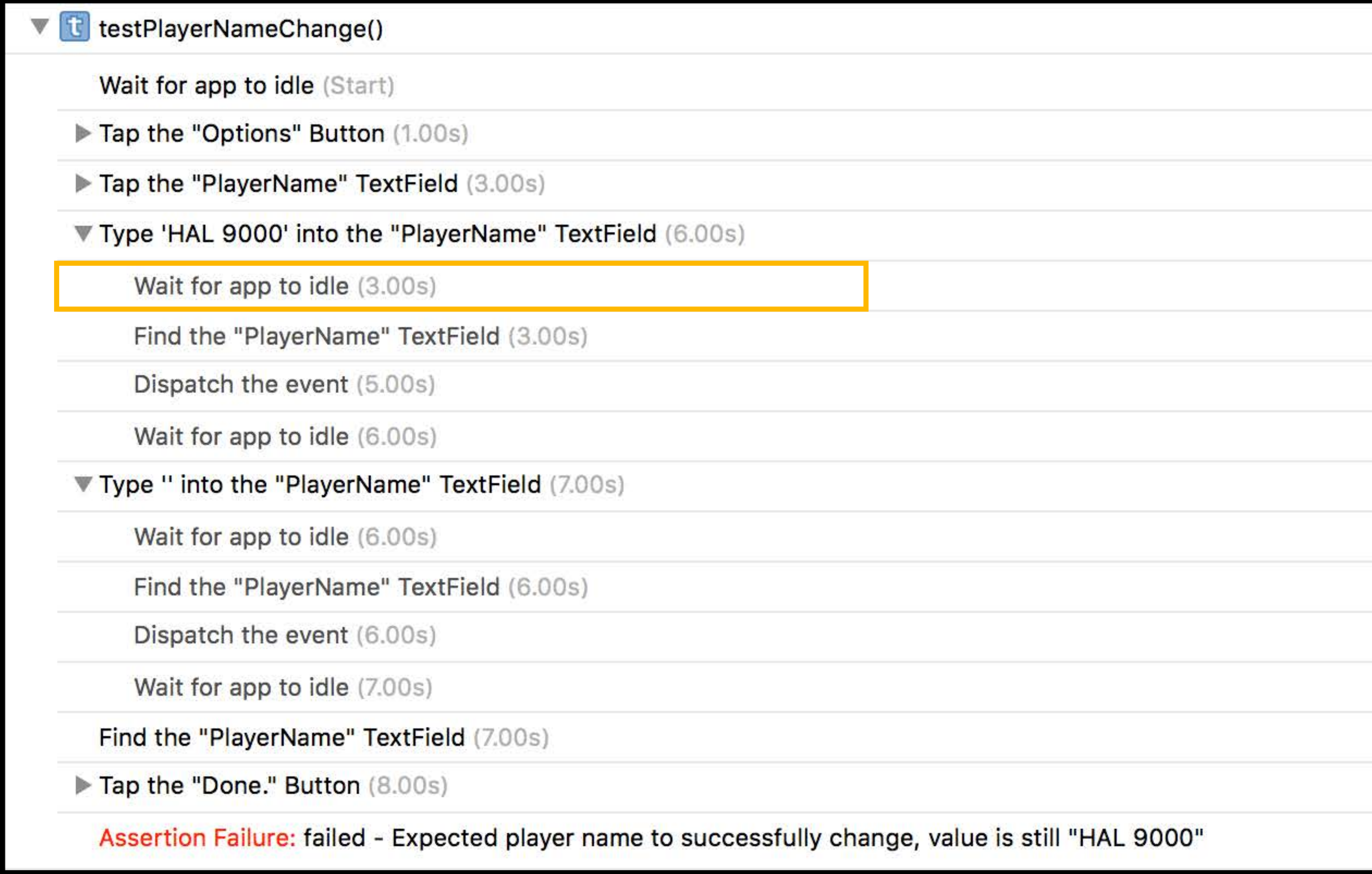

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      Dispatch the event (6.00s)
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    Find the "PlayerName" TextField (7.00s)
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    Assertion Failure: failed - Expected player name to successfully change, value is still "HAL 9000"
```

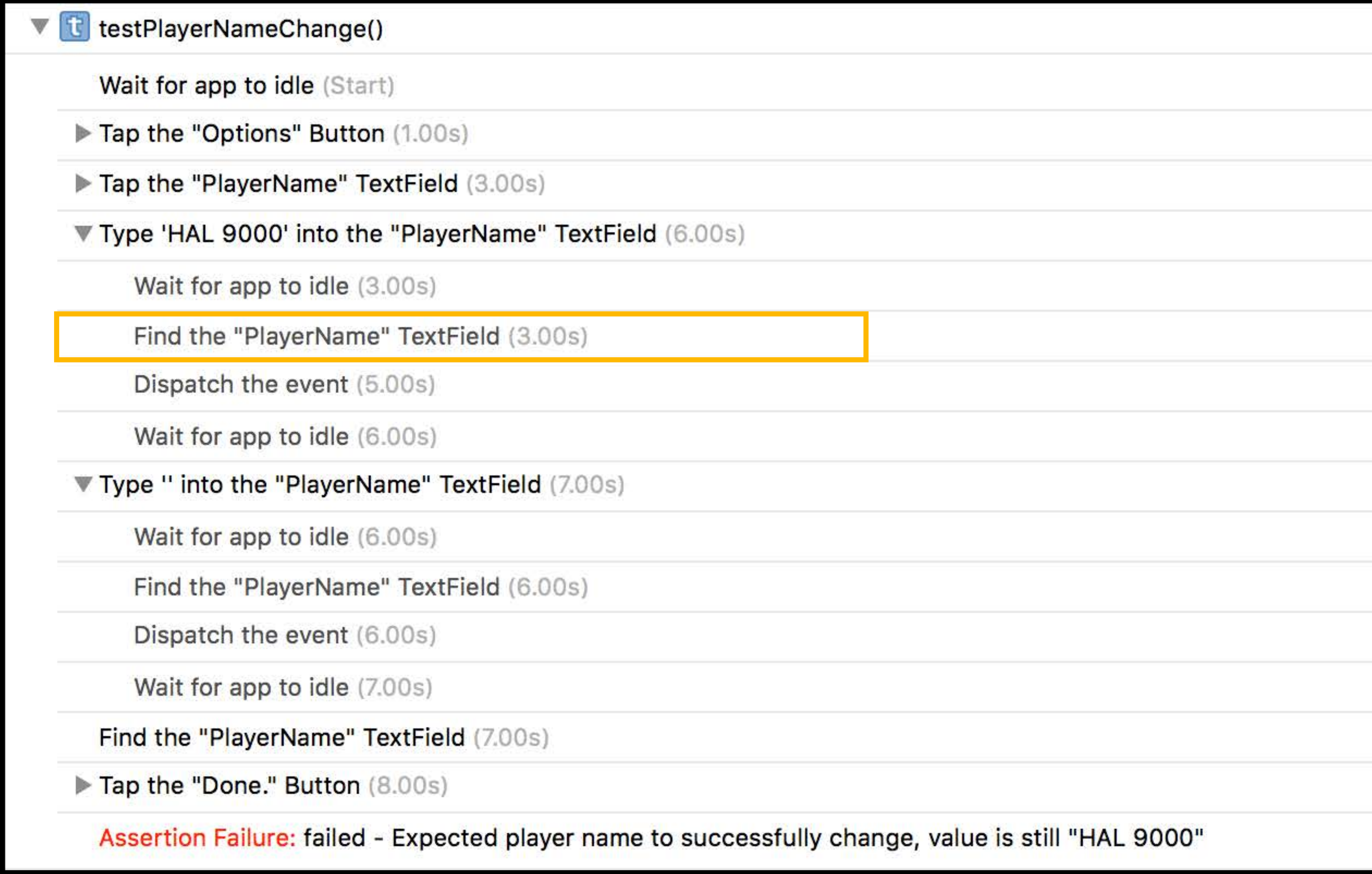
Test Reports

Nested activities

UI testing APIs have several steps

Typing into a textfield

- Wait for the app to idle
- Evaluate the textfield query



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▼ testPlayerNameChange()
    Wait for app to idle (Start)
  ▶ Tap the "Options" Button (1.00s)
  ▶ Tap the "PlayerName" TextField (3.00s)
  ▼ Type 'HAL 9000' into the "PlayerName" TextField (6.00s)
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      Find the "PlayerName" TextField (6.00s)
      Dispatch the event (6.00s)
      Wait for app to idle (7.00s)
    Find the "PlayerName" TextField (7.00s)
  ▶ Tap the "Done." Button (8.00s)
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```

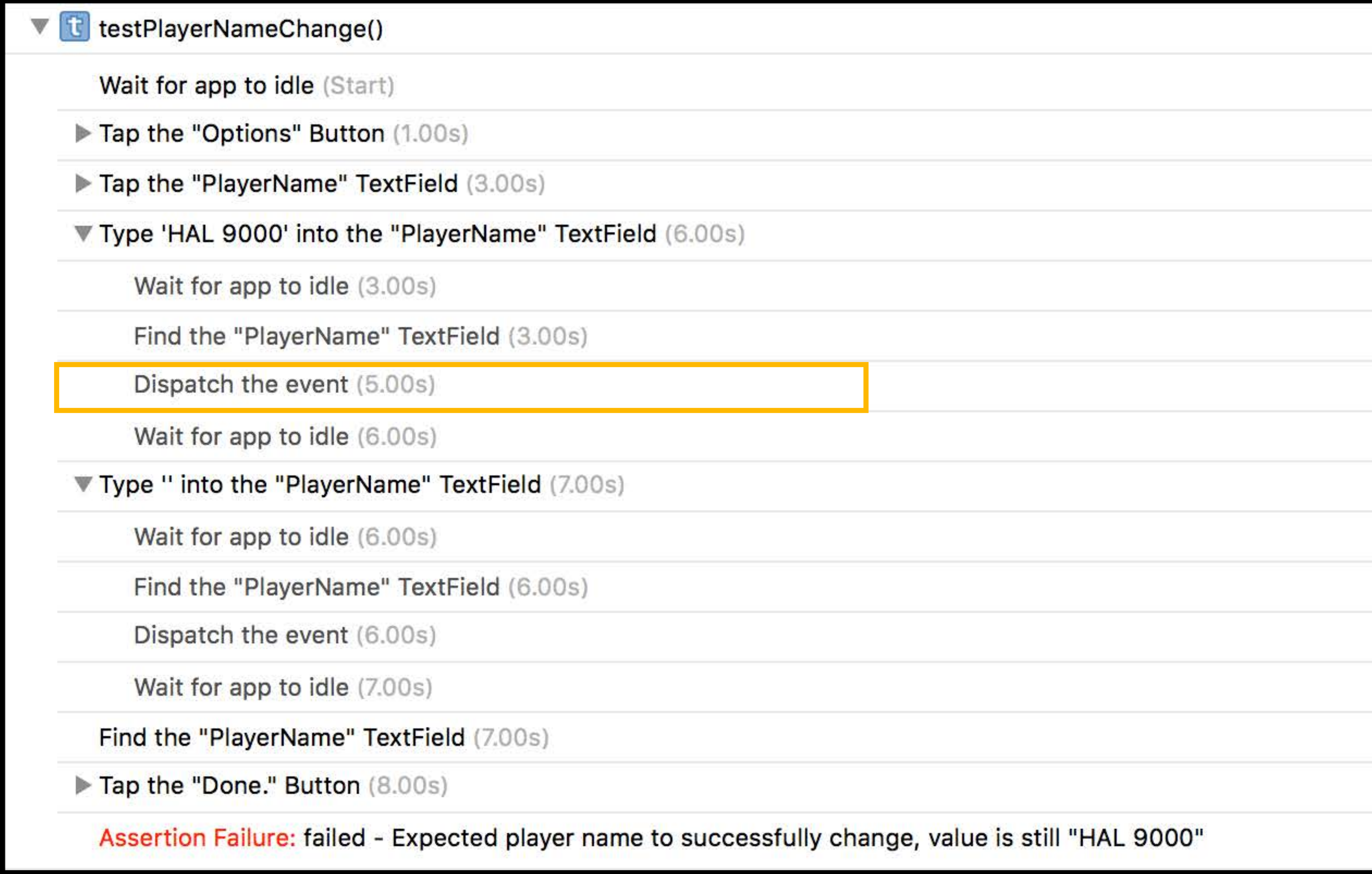
Test Reports

Nested activities

UI testing APIs have several steps

Typing into a textfield

- Wait for the app to idle
- Evaluate the textfield query
- Synthesize the text input



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  ▶ Tap the "Options" Button (1.00s)
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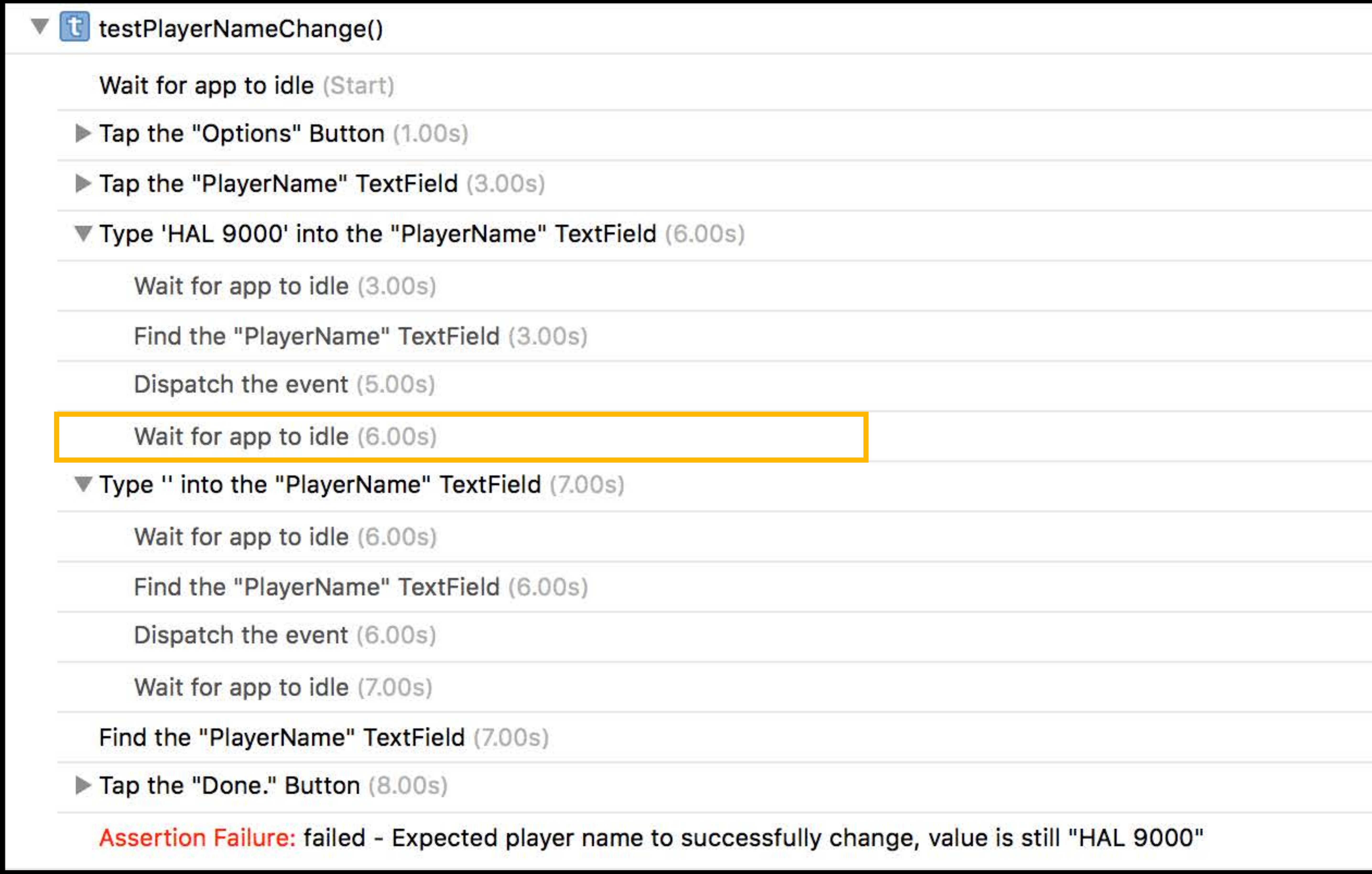
Test Reports

Nested activities

UI testing APIs have several steps

Typing into a textfield

- Wait for the app to idle
- Evaluate the textfield query
- Synthesize the text input
- Wait for the app to idle



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Test Reports

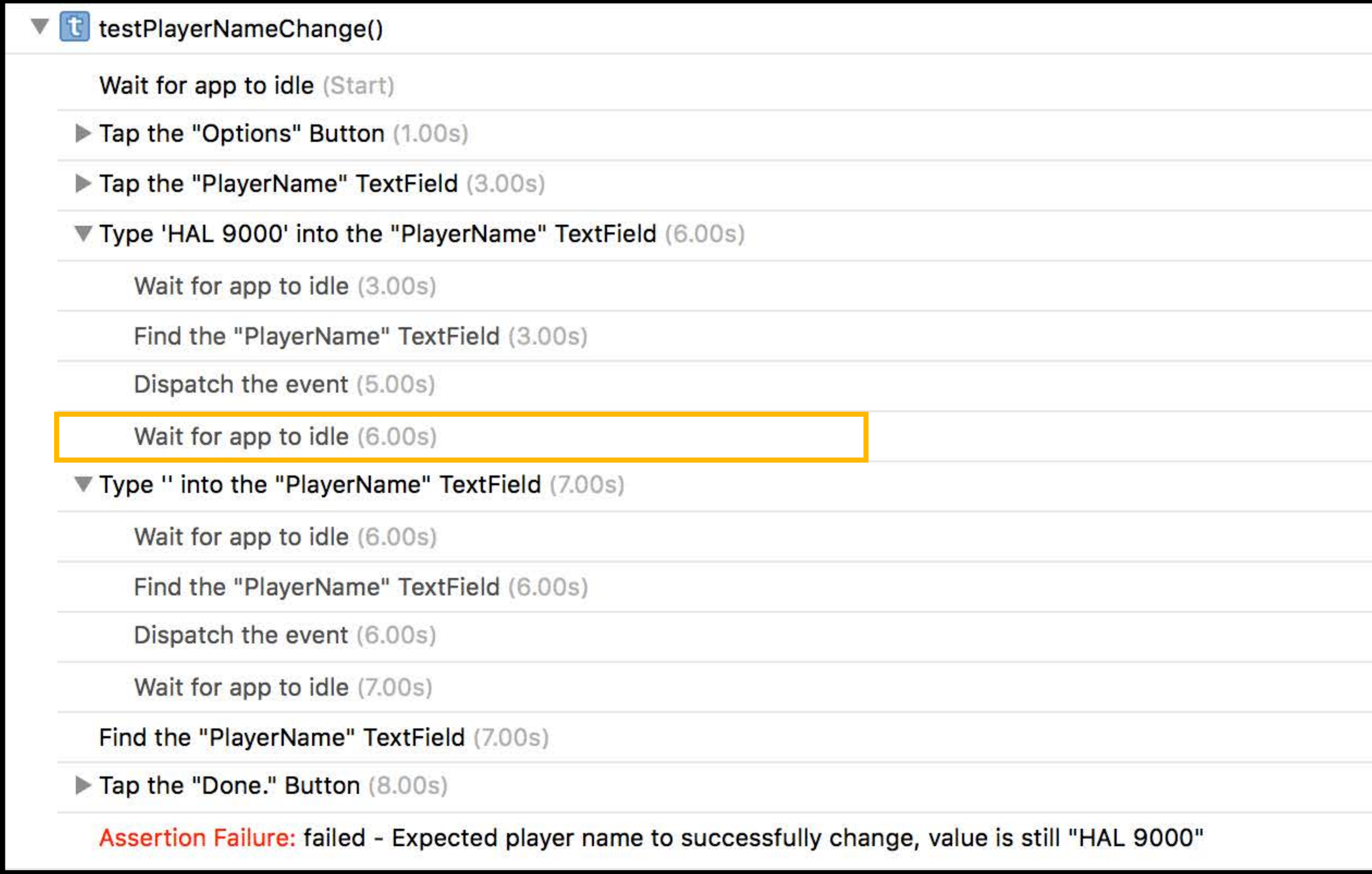
Nested activities

UI testing APIs have several steps

Typing into a textfield

- Wait for the app to idle
- Evaluate the textfield query
- Synthesize the text input
- Wait for the app to idle

QuickLook for screenshots



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▼ testPlayerNameChange()
    Wait for app to idle (Start)
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    Assertion Failure: failed - Expected player name to successfully change, value is still "HAL 9000"
```

Test Reports

Nested activities

UI testi

Typing

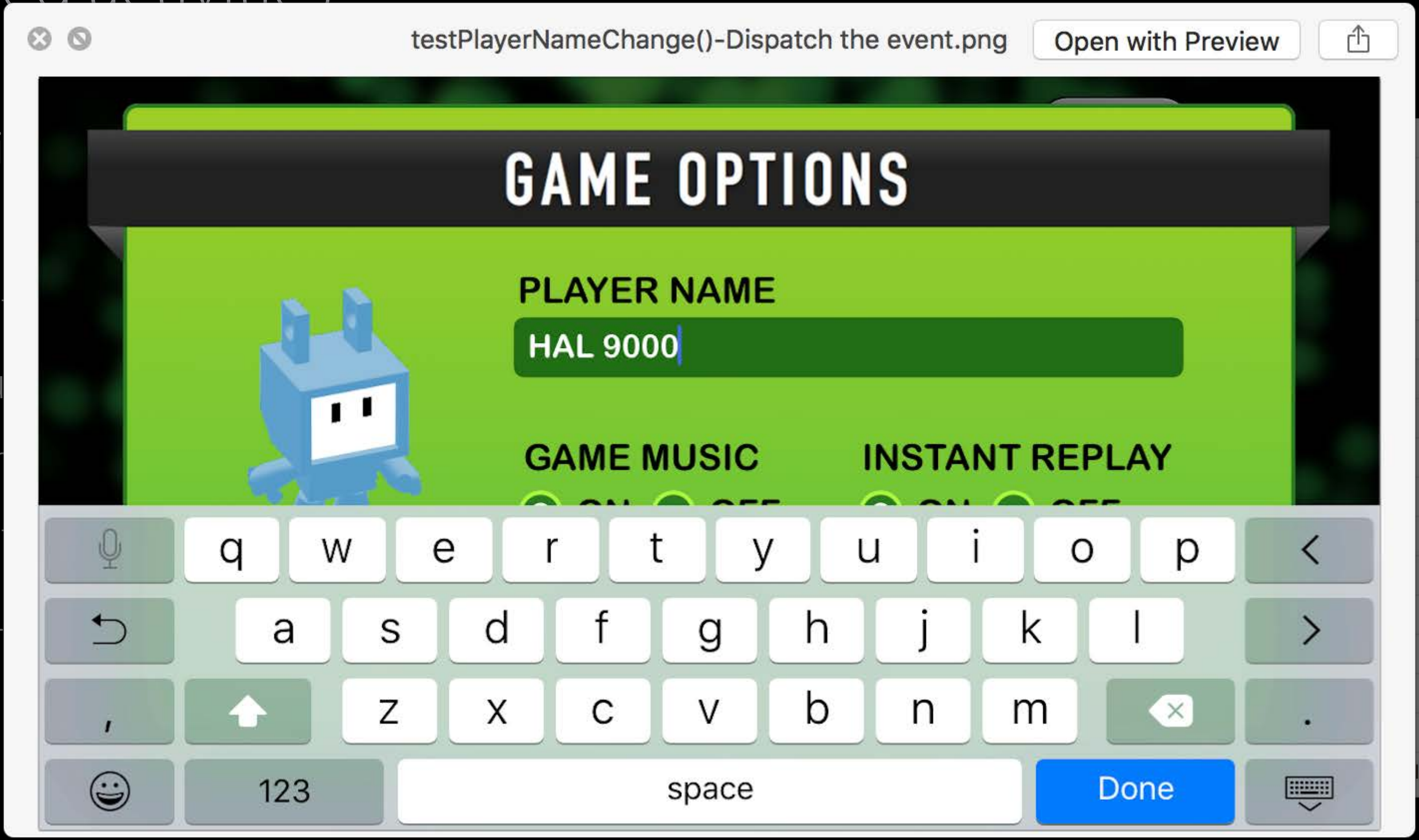
- Wait

- Evalu

- Synth

- Wait

QuickL



testPlayerNameChange()-Dispatch the event.png

l "HAL 9000"

When to Use UI Testing

Using UI Testing

Using UI Testing

Complements unit testing

Using UI Testing

Complements unit testing

Unit testing more precisely pinpoints failures

Using UI Testing

Complements unit testing

Unit testing more precisely pinpoints failures

UI testing covers broader aspects of functionality

Using UI Testing

Complements unit testing

Unit testing more precisely pinpoints failures

UI testing covers broader aspects of functionality

Find the right blend of UI tests and unit tests for your project

Candidates for UI Testing

Candidates for UI Testing

Demo sequences

Candidates for UI Testing

Demo sequences

Common workflows

Candidates for UI Testing

Demo sequences

Common workflows

Custom views

Candidates for UI Testing

Demo sequences

Common workflows

Custom views

Document creation, saving, and opening

Summary

Summary

UI testing

Summary

UI testing

- Find and interact with UI elements

Summary

UI testing

- Find and interact with UI elements
- Validate UI properties and state

Summary

UI testing

- Find and interact with UI elements
- Validate UI properties and state

UI recording

Summary

UI testing

- Find and interact with UI elements
- Validate UI properties and state

UI recording

Test reports

More Information

Testing in Xcode Documentation
http://developer.apple.com/testing

Accessibility for Developers Documentation
http://developer.apple.com/accessibility

Apple Developer Forums
http://developer.apple.com/forums

Stefan Lesser
Developer Tools Evangelist
slesser@apple.com

Related Sessions

iOS Accessibility	Pacific Heights	Tuesday 9:00 AM
Continuous Integration and Code Coverage in Xcode	Presidio	Thursday 10:00 AM

Labs

Testing and Continuous Integration	Developer Tools Lab B	Wednesday 1:30 PM
Testing and Continuous Integration	Developer Tools Lab B	Thursday 1:30 PM

WWDC15