Layout Testing

Raunak Talwar
Expedia

Who am I?

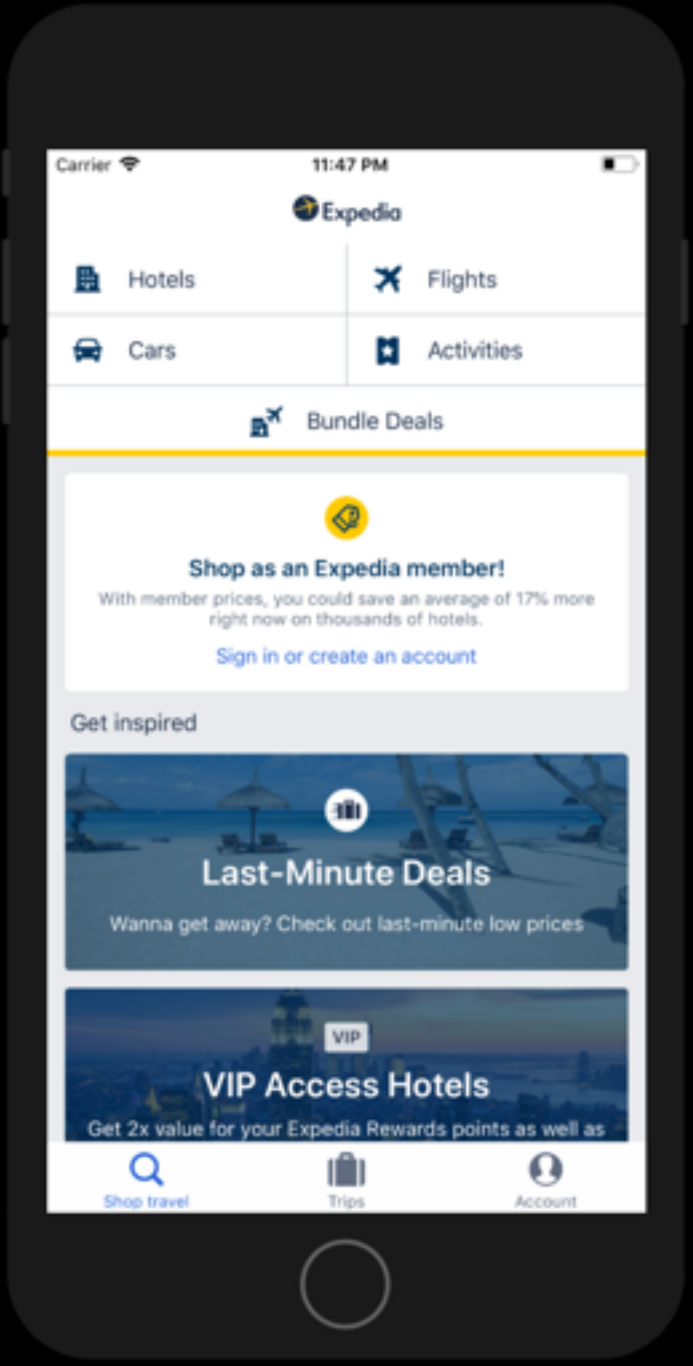
Raunak Talwar

Where I work?

Mobile Team
Expedia, Gurugram

Expedia Group

- One of the top OTA application on App Store with over **1.6 million** active users
- Available for **15 POS** with support for **19 languages**
- Supports **6 major LOBs** namely; Hotels, Flights, Bundles, Cars, Rails and Activities
- White labelled to be used for **9 other multi brands**



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Last-Minute Deals

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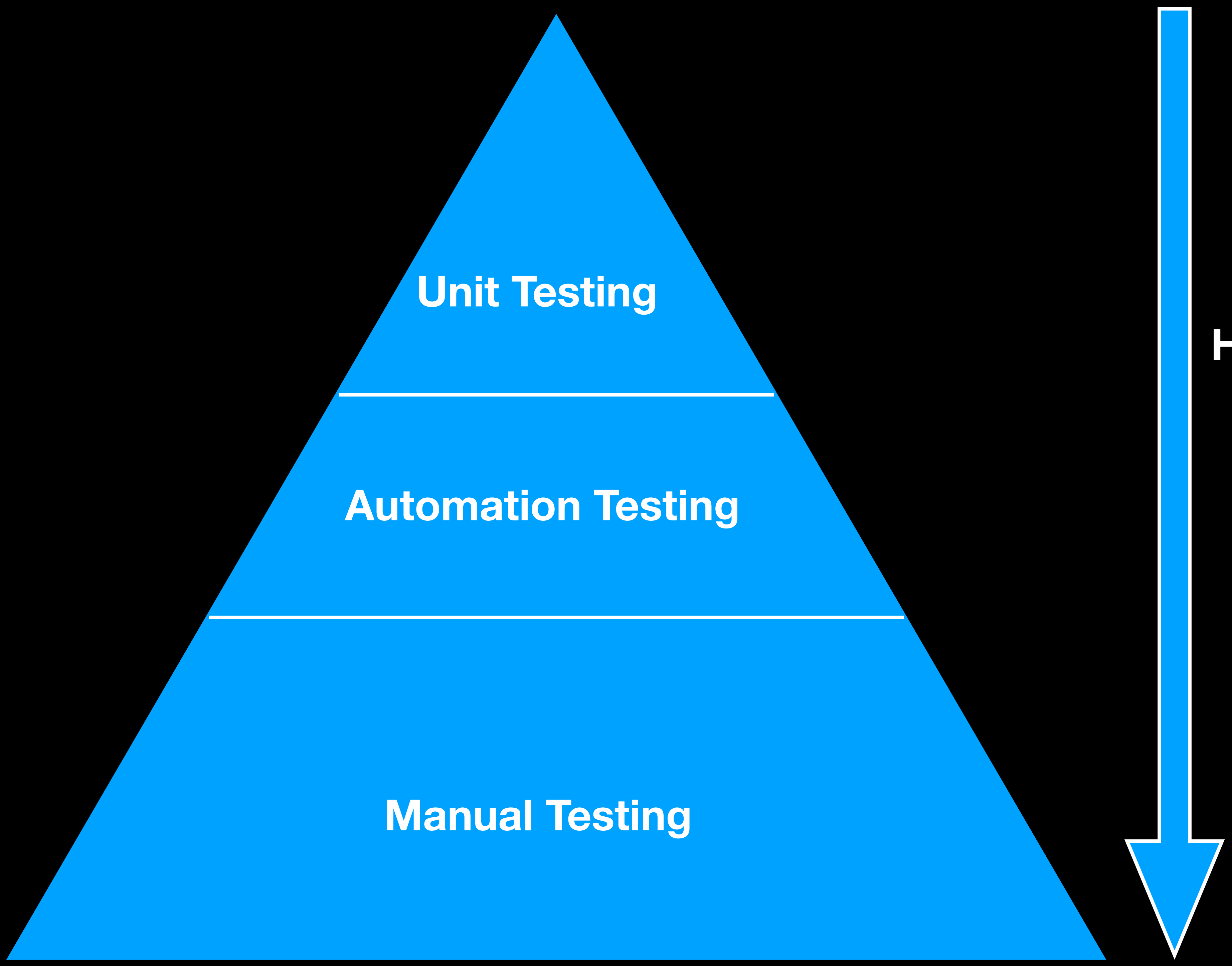
VIP Access Hotels

Get 2x value for your Expedia Rewards points as well as

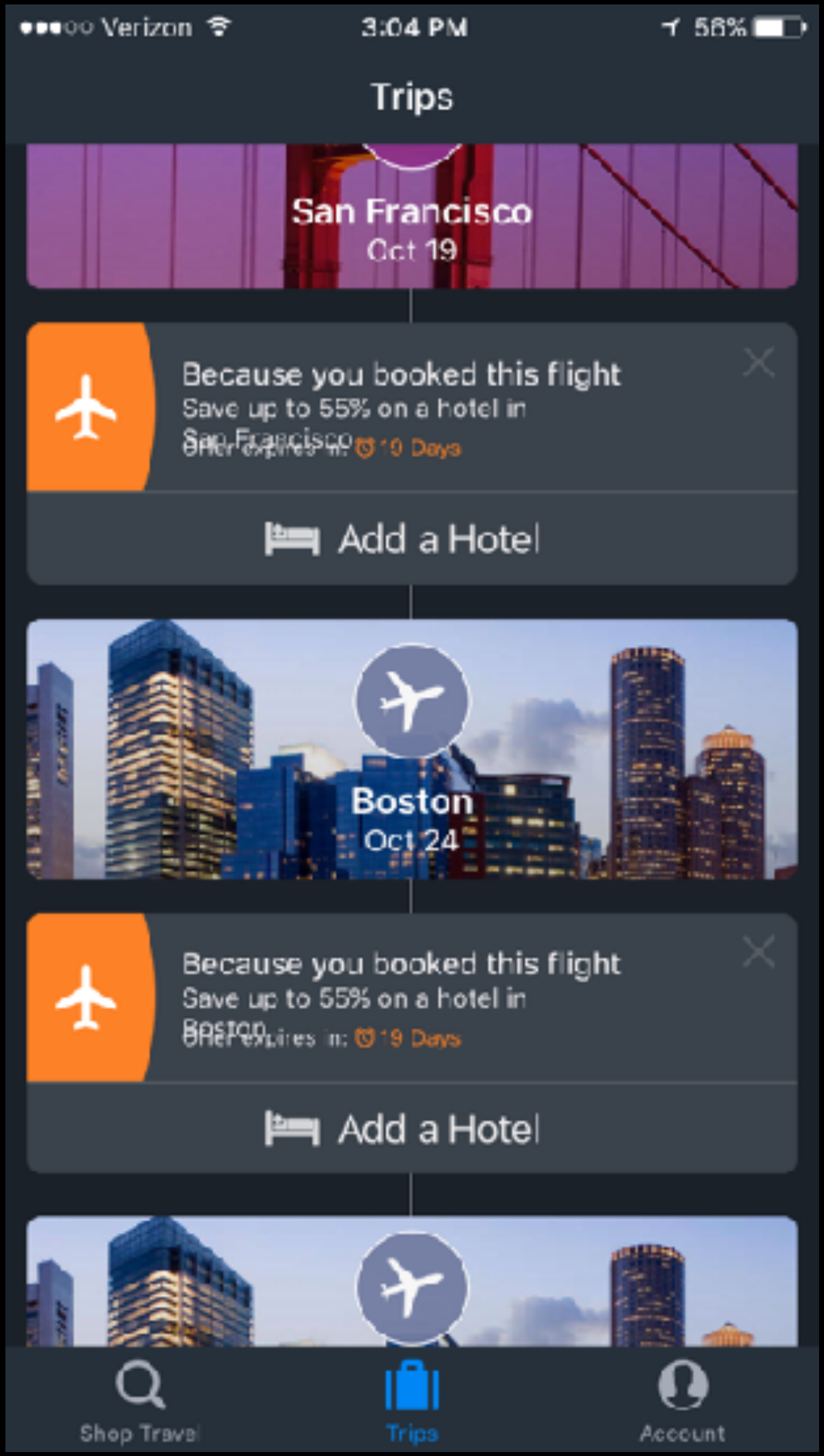
Why Tests?

- Reduce bugs in new/existing features
- Improve code quality
- Increase code confidence

Ways to test apps?



Problems with UI?



●●●○○ Verizon 3:04 PM 58%

Trips

San Francisco
Oct 19

Because you booked this flight
Save up to 55% on a hotel in
San Francisco
Offer expires in: 10 Days

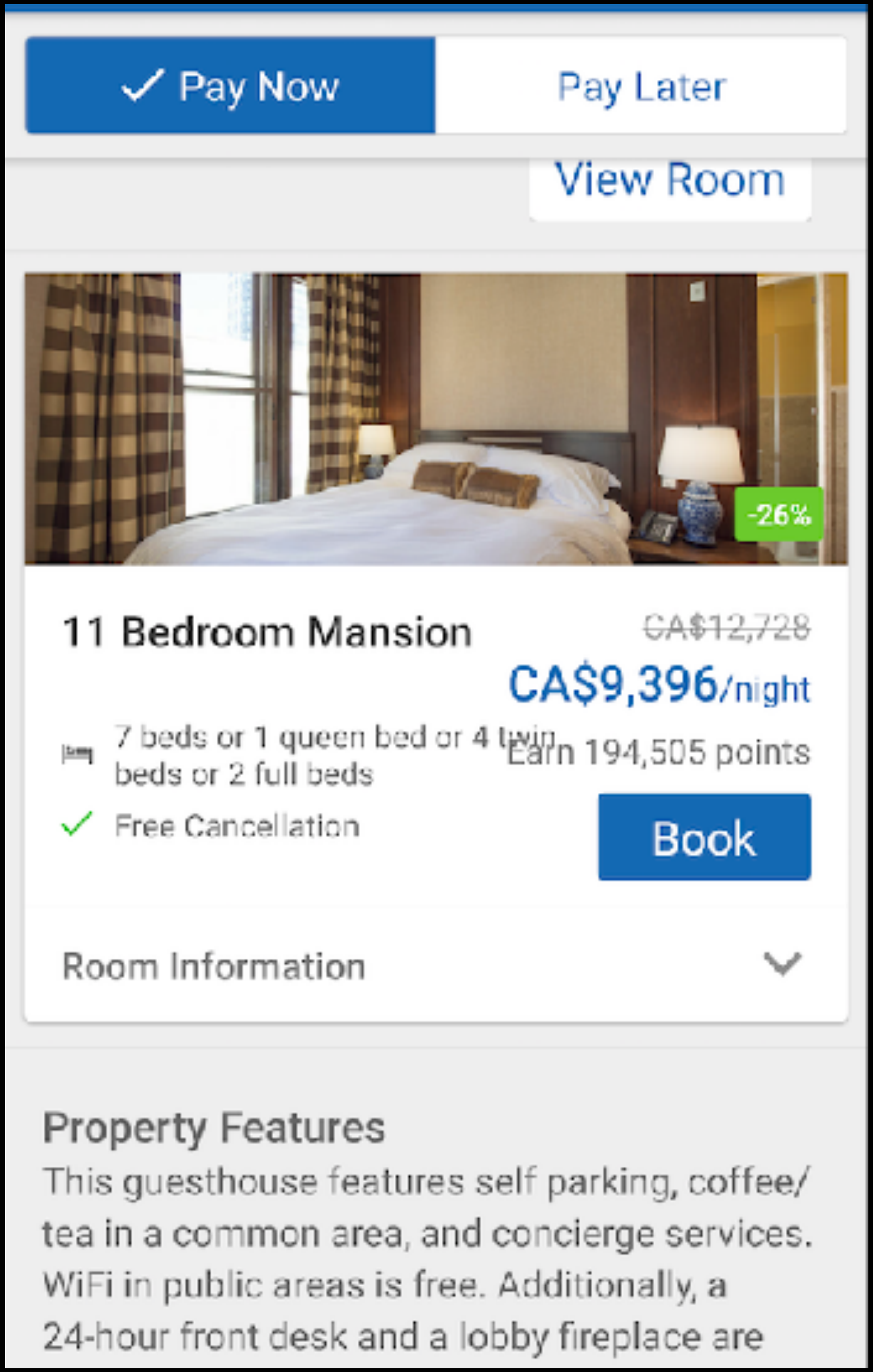
Add a Hotel

Boston
Oct 24

Because you booked this flight
Save up to 55% on a hotel in
Boston
Offer expires in: 19 Days

Add a Hotel

Shop Travel · Trips · Account



✓ Pay Now | Pay Later

View Room

-26%

11 Bedroom Mansion ~~CA$12,728~~
CA$9,396/night

7 beds or 1 queen bed or 4 twin beds or 2 full beds
Earn 194,505 points

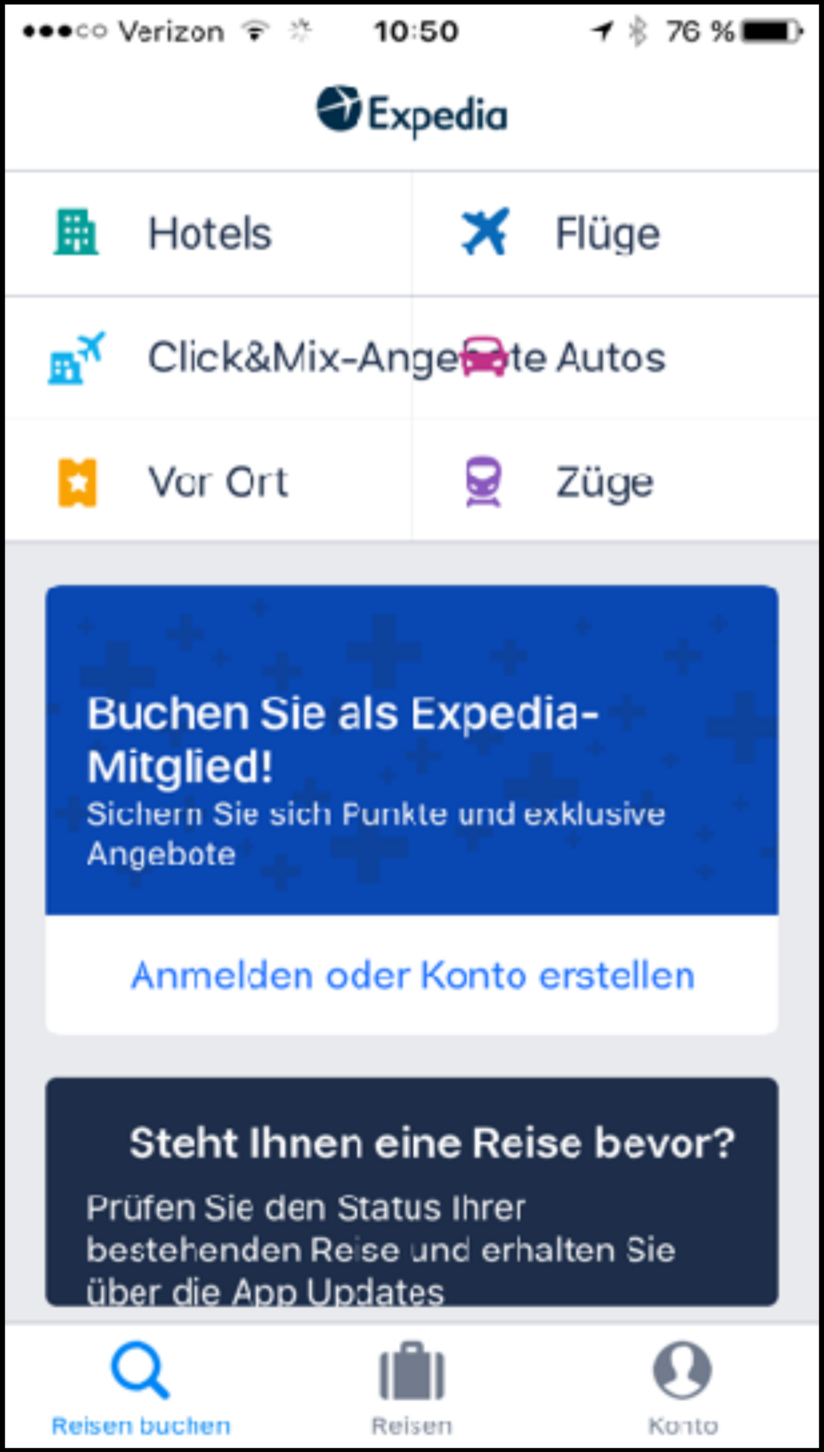
✓ Free Cancellation

Book

Room Information

Property Features

This guesthouse features self parking, coffee/tea in a common area, and concierge services. WiFi in public areas is free. Additionally, a 24-hour front desk and a lobby fireplace are



●●●○○ Verizon 10:50 76 %

Expedia

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Vor Ort · Züge

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Steht Ihnen eine Reise bevor?
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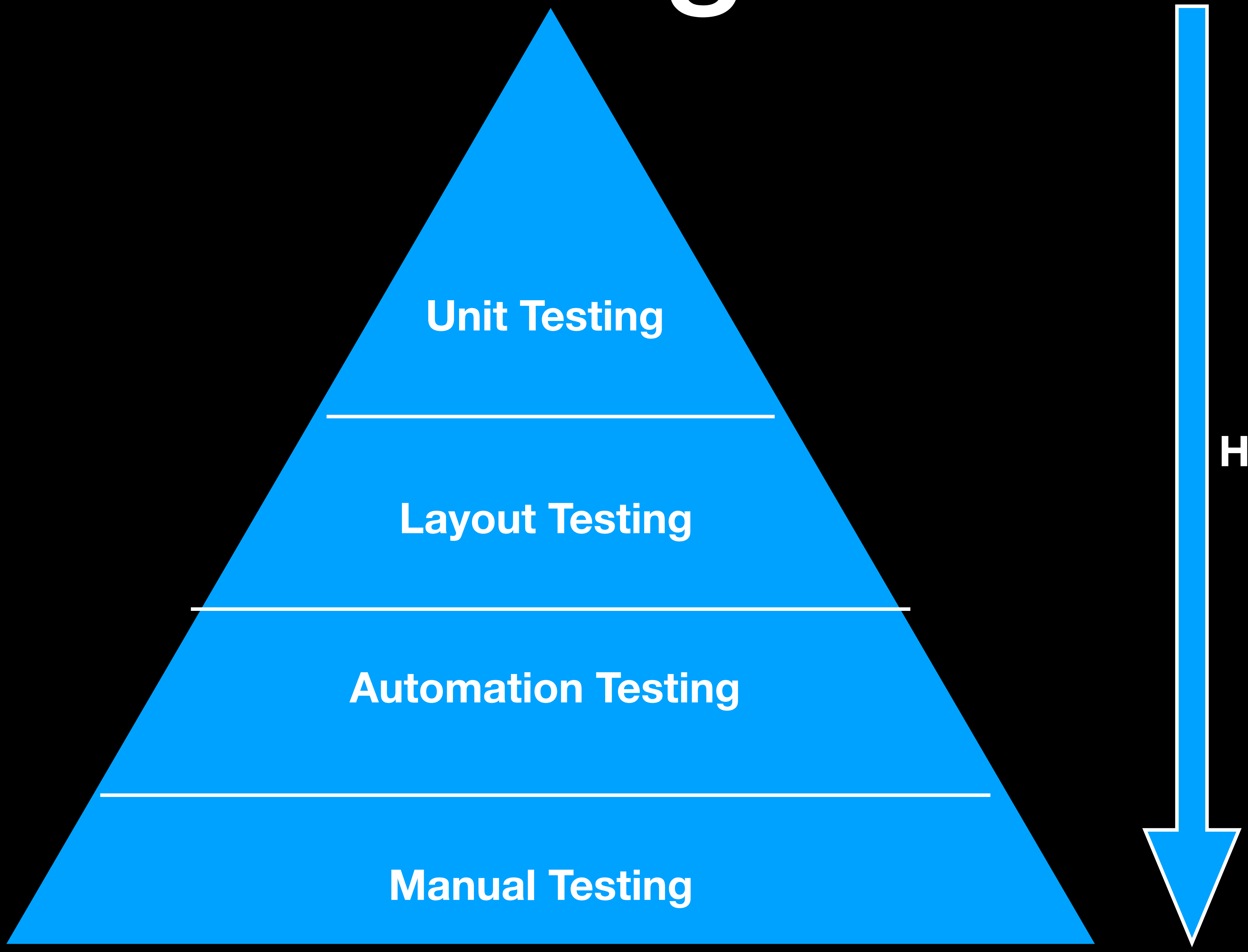
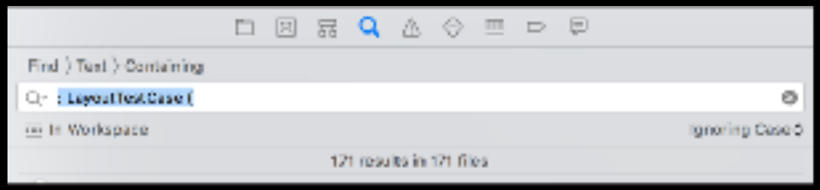
Reisen buchen · Reisen · Konto

What is a Layout Test?

- Run side by side with unit tests
- Validates the views layout with multiple combinations of data and edge cases
- Very fast to run
- Stable

Where it goes?





: LayoutTestCase (

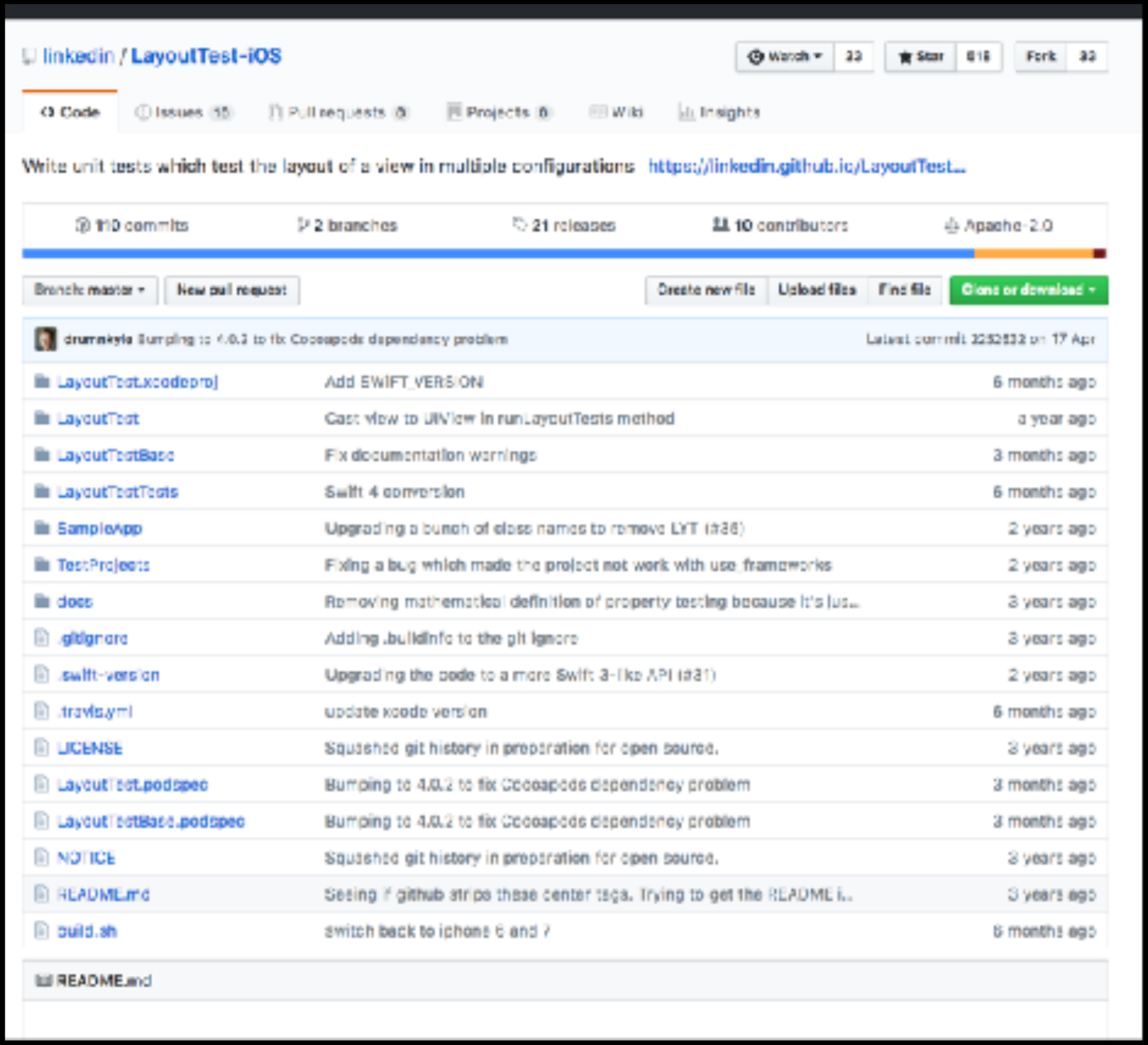
171 results in 171 files

Why should I write it?

- Easy to write - few lines of code!
- Automatically tests all kinds of edge cases of views
- Fast (they're just unit tests)
- Helps you stop regressions in your layout logic.

LayoutTest-iOS

- Open source library by Linkedin
- https://github.com/linkedin/LayoutTest-iOS
- Well documented and mature
- Similar android library on the way by **Expedia**!
-



Write unit tests which test the layout of a view in multiple configurations https://linkedin.github.io/LayoutTest...

110 commits | 2 branches | 21 releases | 10 contributors | Apache-2.0

drummkyle Bumping to 4.0.2 to fix Cocoapods dependency problem — Latest commit 2252532 on 17 Apr

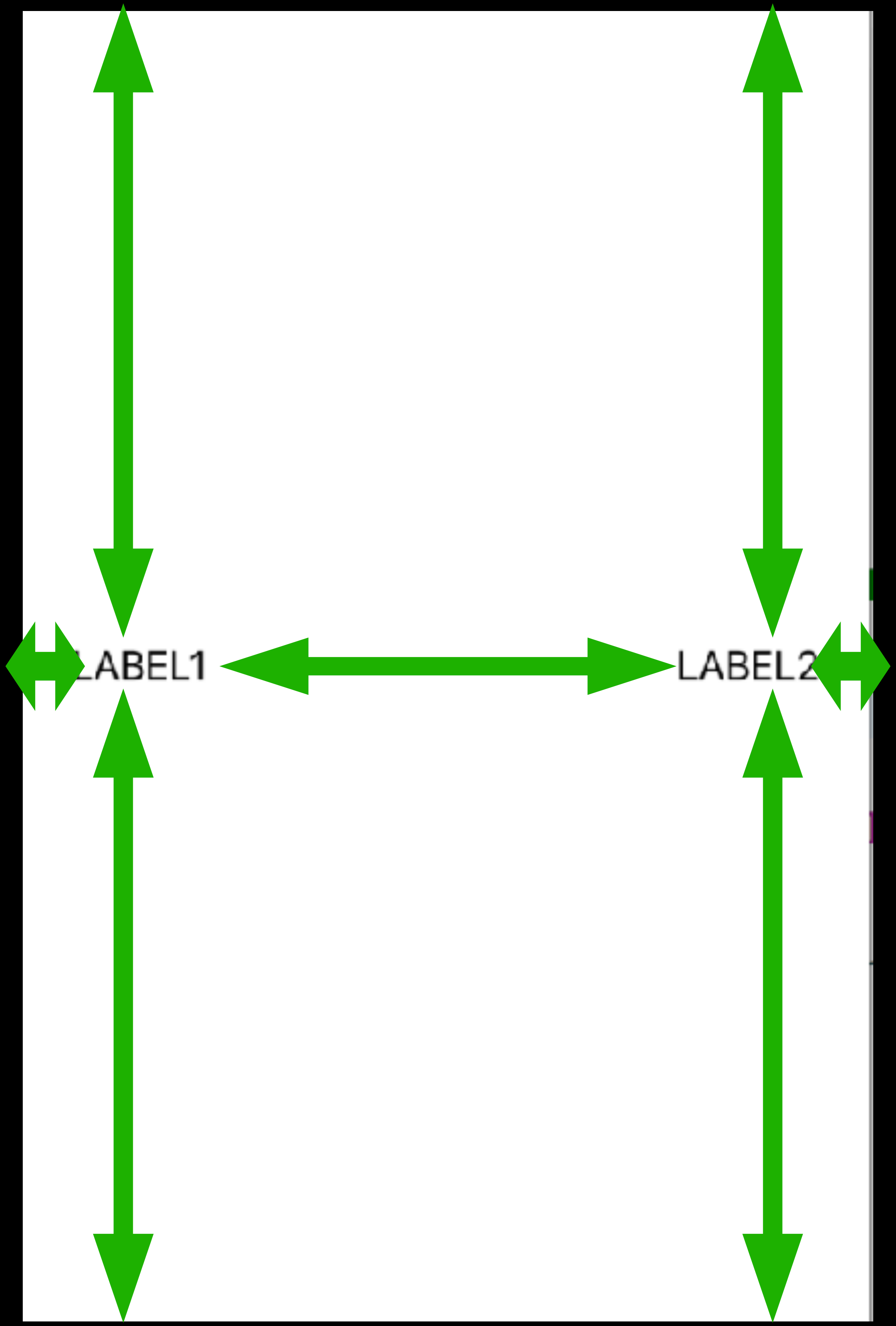
LayoutTest.xcodeproj	Add SWIFT_VERSION	6 months ago
LayoutTest	Cast view to UIView in runLayoutTests method	a year ago
LayoutTestBase	Fix documentation warnings	3 months ago
LayoutTestTests	Swift 4 conversion	6 months ago
SampleApp	Upgrading a bunch of class names to remove LYT (#36)	2 years ago
TestProjects	Fixing a bug which made the project not work with use_frameworks	2 years ago
docs	Removing mathematical definition of property testing because it's jus...	3 years ago
.gitignore	Adding .buildinfo to the git ignore	3 years ago
.swift-version	Upgrading the code to a more Swift 3-like API (#31)	2 years ago
.travis.yml	update xcode version	6 months ago
LICENSE	Squashed git history in preparation for open source.	3 years ago
LayoutTest.podspec	Bumping to 4.0.2 to fix Cocoapods dependency problem	3 months ago
LayoutTestBase.podspec	Bumping to 4.0.2 to fix Cocoapods dependency problem	3 months ago
NOTICE	Squashed git history in preparation for open source.	3 years ago
README.md	Seeing if github strips these center tags. Trying to get the README i...	3 years ago
build.sh	switch back to iphone 6 and 7	6 months ago

README.md

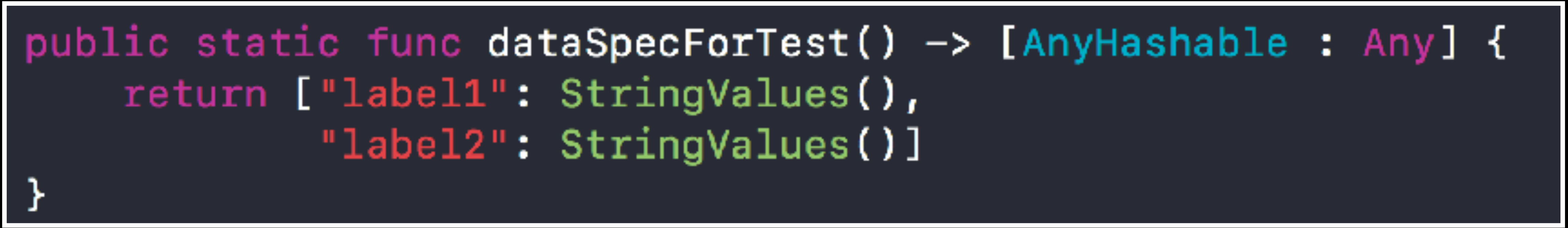
Demo

Steps to write a layout test

1. Write the data spec
2. Bind it with your view
3. Run all the layout pass on it.

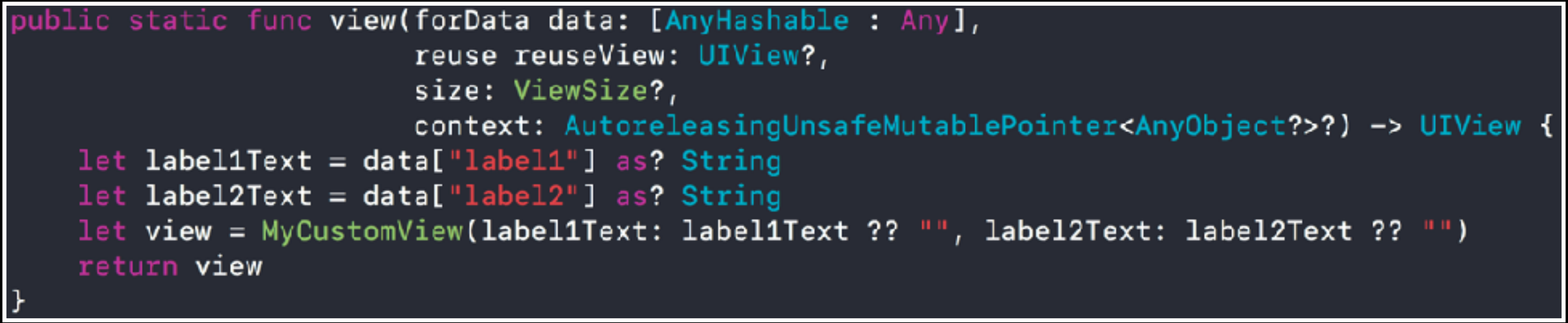

LABEL1
LABEL2

Step1: Write the data spec



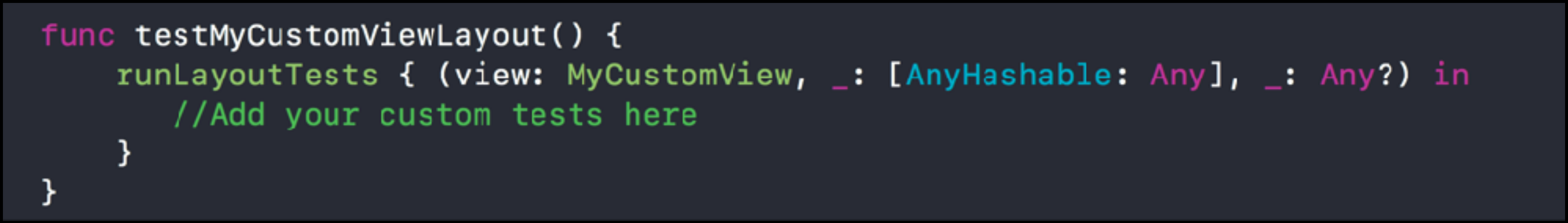
```swift
public static func dataSpecForTest() -> [AnyHashable : Any] {
    return ["label1": StringValues(),
            "label2": StringValues()]
}
```

Step2: Implement view bindings



```
public static func view(forData data: [AnyHashable : Any],
                        reuse reuseView: UIView?,
                        size: ViewSize?,
                        context: AutoreleasingUnsafeMutablePointer<AnyObject?>?) -> UIView {
    let label1Text = data["label1"] as? String
    let label2Text = data["label2"] as? String
    let view = MyCustomView(label1Text: label1Text ?? "", label2Text: label2Text ?? "")
    return view
}
```

Step3: Write the layout Test

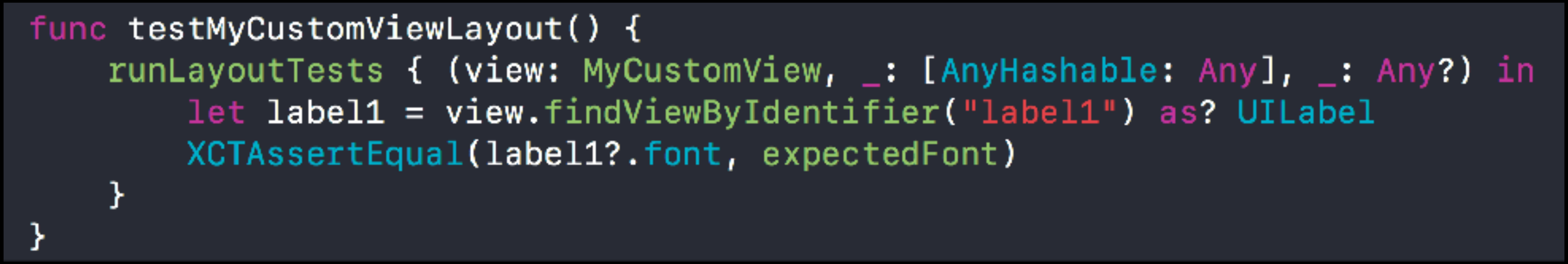


```
func testMyCustomViewLayout() {
    runLayoutTests { (view: MyCustomView, _: [AnyHashable: Any], _: Any?) in
       //Add your custom tests here
    }
}
```

🤖 Automatic Tests 🤖

- No subviews overlap
- All subviews contained within superview
- Auto layout is not ambiguous and doesn’t throw errors
- Accessibility sanity tests

Custom assertions



```swift
func testMyCustomViewLayout() {
    runLayoutTests { (view: MyCustomView, _: [AnyHashable: Any], _: Any?) in
        let label1 = view.findViewByIdentifier("label1") as? UILabel
        XCTAssertEqual(label1?.font, expectedFont)
    }
}
```

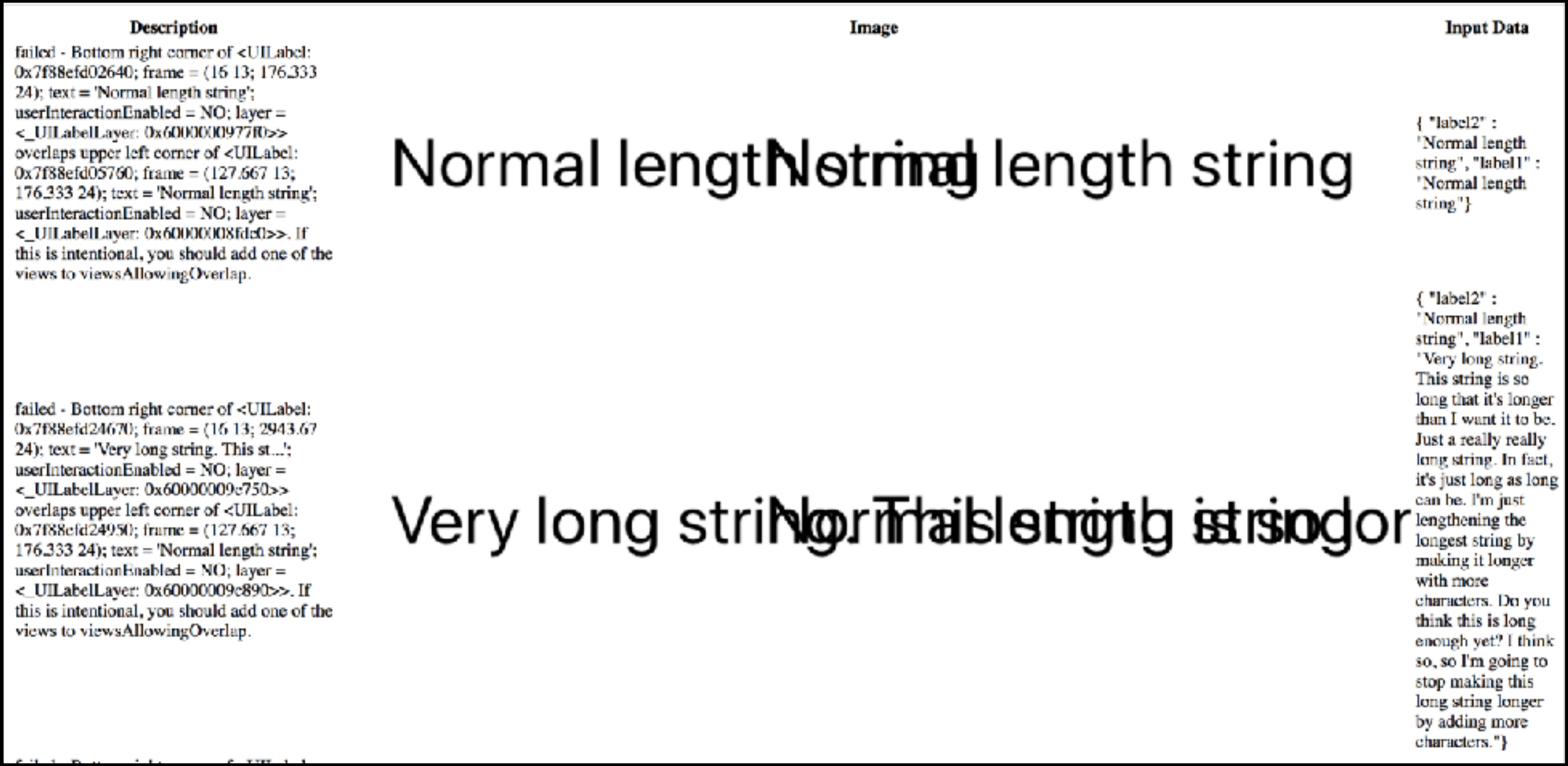
Different device sizes?

```swift
public static func sizesForView() -> [ViewSize] {
    return [ViewSize(width: LYTiPhone5Width, height: LYTiPhone5Height)]
}
```

All good?

What happens when things go wrong?

Failure report



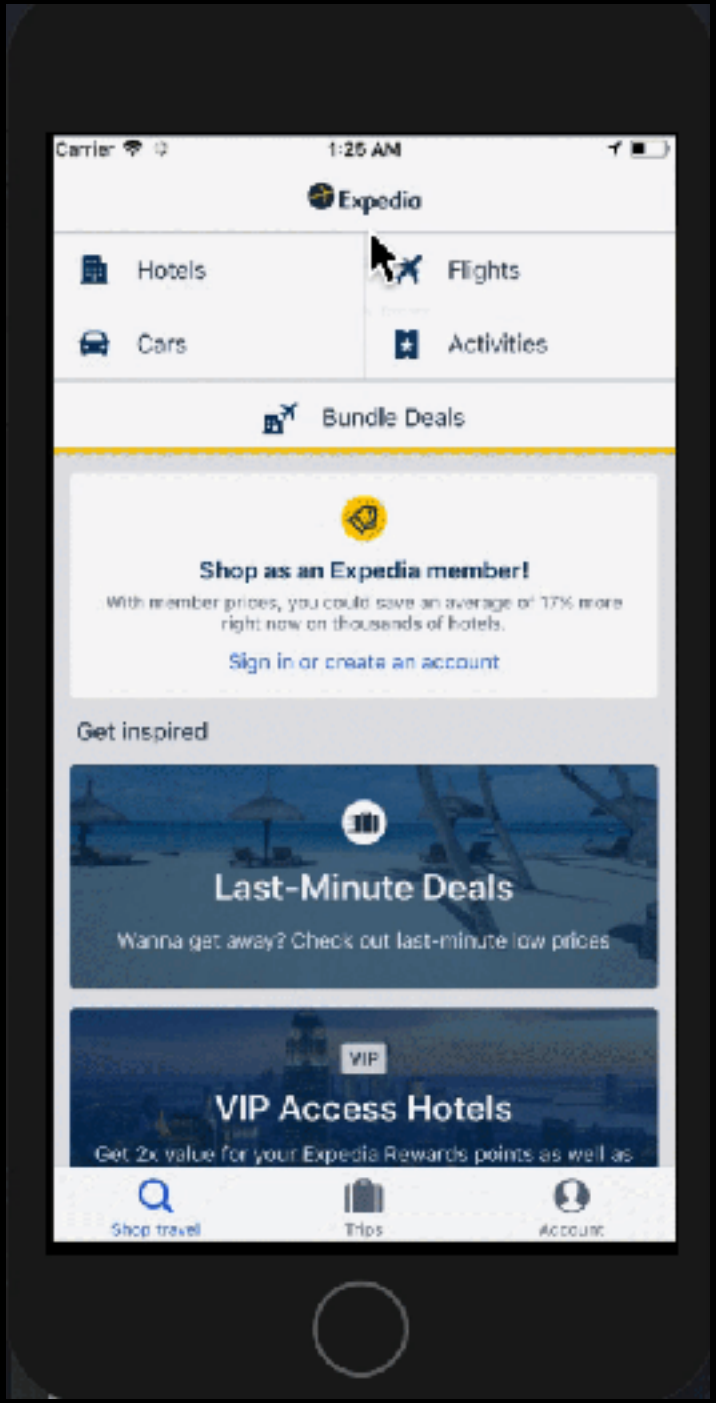
Description	Image	Input Data
failed - Bottom right corner of <UILabel: 0x7f88efd02640; frame = (16 13; 176.333 24); text = 'Normal length string'; userInteractionEnabled = NO; layer = <_UILabelLayer: 0x6000000977f0>> overlaps upper left corner of <UILabel: 0x7f88efd05760; frame = (127.667 13; 176.333 24); text = 'Normal length string'; userInteractionEnabled = NO; layer = <_UILabelLayer: 0x600000008fde0>>. If this is intentional, you should add one of the views to viewsAllowingOverlap.	Normal lengtNormal length string	{ "label2" : "Normal length string", "label1" : "Normal length string"}
failed - Bottom right corner of <UILabel: 0x7f88efd24670; frame = (16 13; 2943.67 24); text = 'Very long string. This st...'; userInteractionEnabled = NO; layer = <_UILabelLayer: 0x60000009e750>> overlaps upper left corner of <UILabel: 0x7f88efd24950; frame = (127.667 13; 176.333 24); text = 'Normal length string'; userInteractionEnabled = NO; layer = <_UILabelLayer: 0x60000009e890>>. If this is intentional, you should add one of the views to viewsAllowingOverlap.	Very long striNormal length string	{ "label2" : "Normal length string", "label1" : "Very long string. This string is so long that it's longer than I want it to be. Just a really really long string. In fact, it's just long as long can be. I'm just lengthening the longest string by making it longer with more characters. Do you think this is long enough yet? I think so, so I'm going to stop making this long string longer by adding more characters."}
failed - Bottom right corner of UILabel		

Testing other objects?

- We can test view of UIViewController subclass
- Use context parameter

What it doesn't test?

- Doesn't test flows. Taps, view transition.



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Performance?

- Number of test runs will be = (Number of combinations form data spec * number of sizes to test)

“Testing is an art, not a science”

Thank You!