สยามชำนาญกิจ
SIAM CHAMNAN KIT

Automated Testing with Appium

Automated Testing

http://appium.io/docs/en/about-appium/intro/

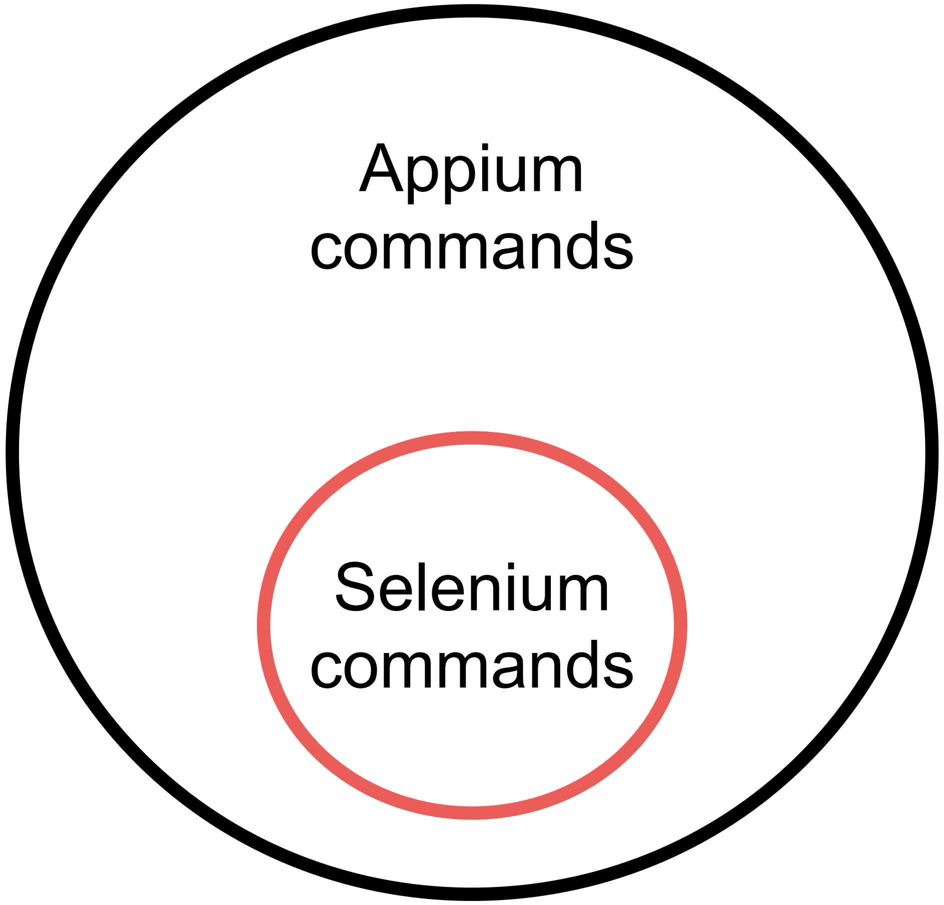
Automated Testing

appium™

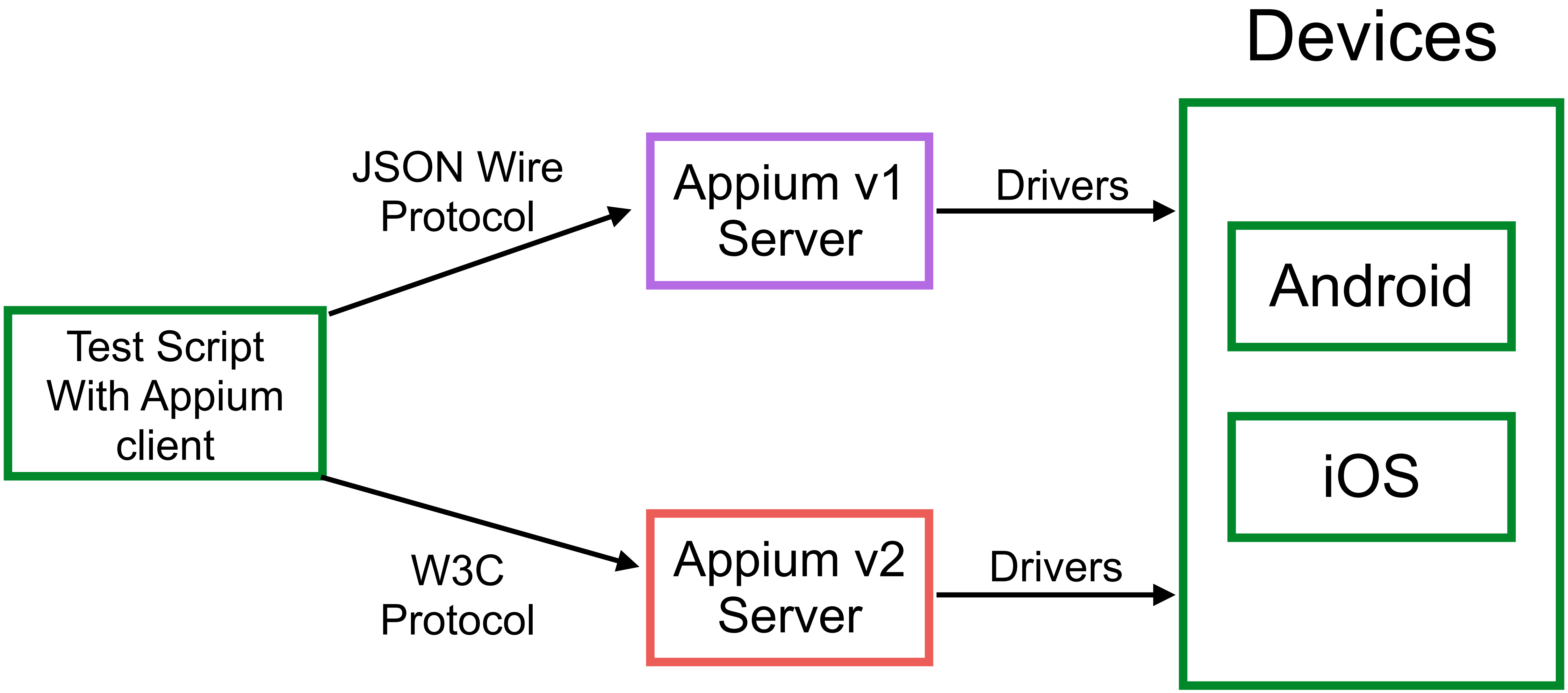
https://appium.github.io/appium/docs/en/2.0/

Appium

Automation tool for mobile app
Selenium for mobile
High compatibility with selenium



Architecture



Appium Tools

Appium Server via npm
Appium Server GUI/Desktop
Appium Inspector

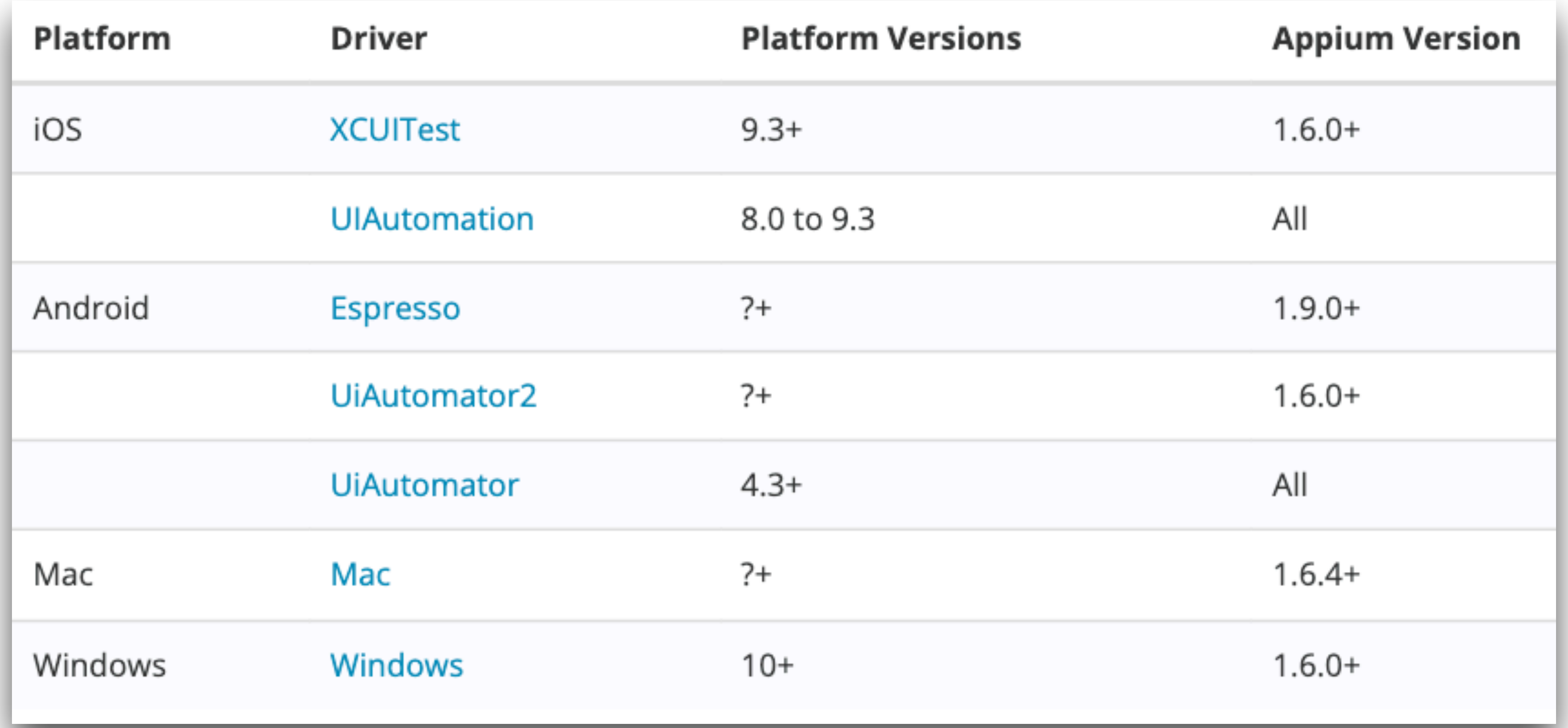
http://appium.io/docs/en/about-appium/getting-started/?lang=en#installing-appium

Appium Clients

Ruby
Python
Java
C#

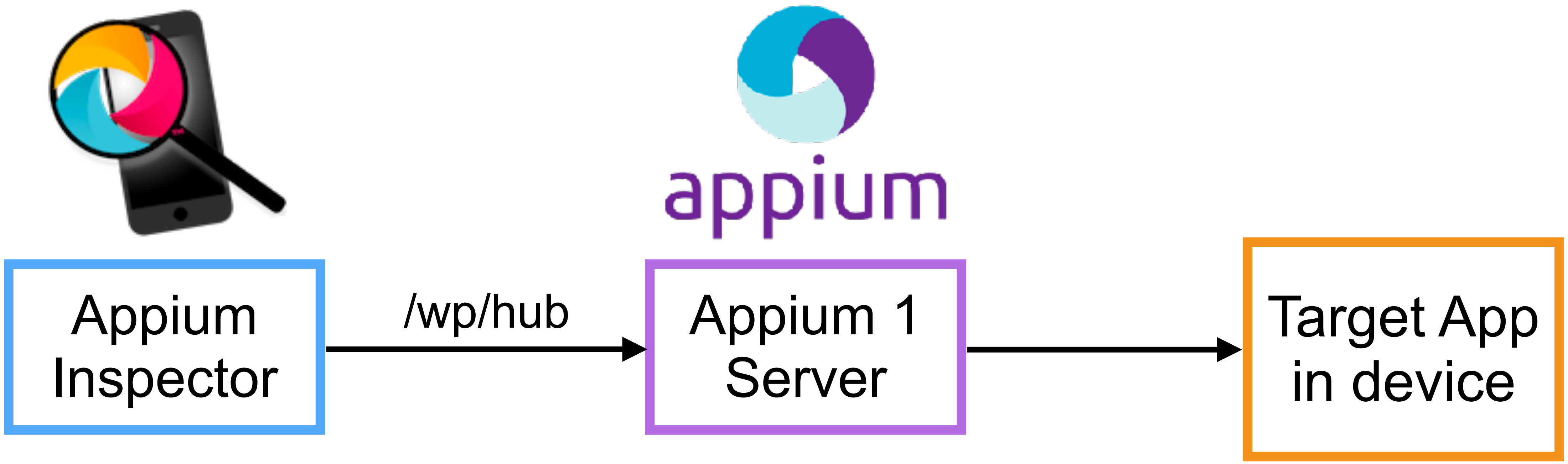
http://appium.io/docs/en/about-appium/appium-clients/index.html

Appium Drivers



Platform	Driver	Platform Versions	Appium Version
iOS	XCUITest	9.3+	1.6.0+
	UIAutomation	8.0 to 9.3	All
Android	Espresso	?+	1.9.0+
	UiAutomator2	?+	1.6.0+
	UiAutomator	4.3+	All
Mac	Mac	?+	1.6.4+
Windows	Windows	10+	1.6.0+

Let’s start with Appium



Appium Inspector

/wp/hub

Appium 1 Server

Target App in device

Steps to run

Appium doctor

Start server

Provide target apps (api, ipa/app)

Appium Inspector

Appium Docker

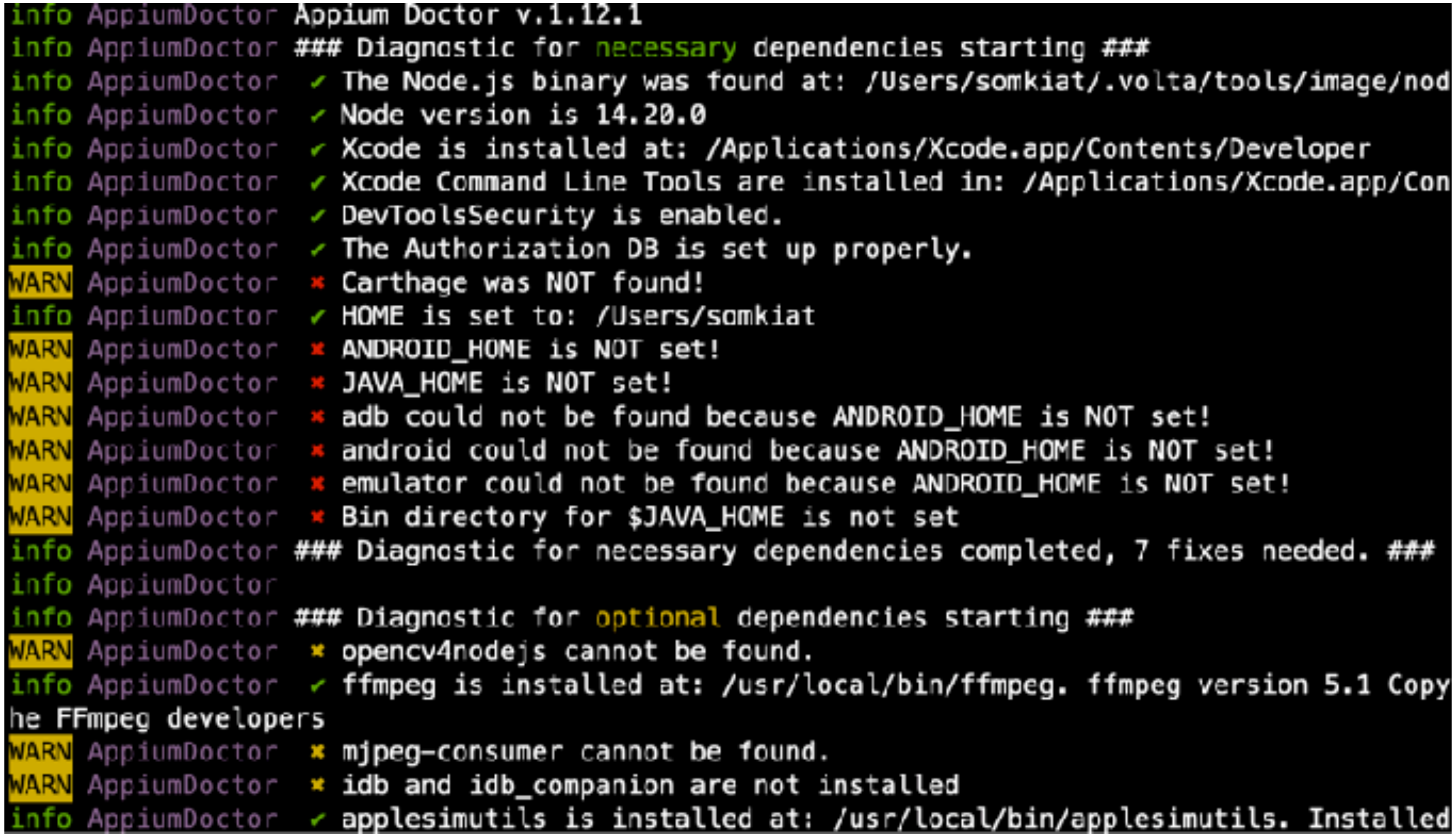
```
$npm install -g appium-doctor
$appium-doctor
```

```
$npm install -g @appium/doctor
```

https://github.com/appium/appium-doctor

Appium Docker

$appium-doctor



```
info AppiumDoctor Appium Doctor v.1.12.1
info AppiumDoctor ### Diagnostic for necessary dependencies starting ###
info AppiumDoctor  ✔ The Node.js binary was found at: /Users/somkiat/.volta/tools/image/nod
info AppiumDoctor  ✔ Node version is 14.20.0
info AppiumDoctor  ✔ Xcode is installed at: /Applications/Xcode.app/Contents/Developer
info AppiumDoctor  ✔ Xcode Command Line Tools are installed in: /Applications/Xcode.app/Con
info AppiumDoctor  ✔ DevToolsSecurity is enabled.
info AppiumDoctor  ✔ The Authorization DB is set up properly.
WARN AppiumDoctor  ✖ Carthage was NOT found!
info AppiumDoctor  ✔ HOME is set to: /Users/somkiat
WARN AppiumDoctor  ✖ ANDROID_HOME is NOT set!
WARN AppiumDoctor  ✖ JAVA_HOME is NOT set!
WARN AppiumDoctor  ✖ adb could not be found because ANDROID_HOME is NOT set!
WARN AppiumDoctor  ✖ android could not be found because ANDROID_HOME is NOT set!
WARN AppiumDoctor  ✖ emulator could not be found because ANDROID_HOME is NOT set!
WARN AppiumDoctor  ✖ Bin directory for $JAVA_HOME is not set
info AppiumDoctor ### Diagnostic for necessary dependencies completed, 7 fixes needed. ###
info AppiumDoctor
info AppiumDoctor ### Diagnostic for optional dependencies starting ###
WARN AppiumDoctor  ✖ opencv4nodejs cannot be found.
info AppiumDoctor  ✔ ffmpeg is installed at: /usr/local/bin/ffmpeg. ffmpeg version 5.1 Copy
he FFmpeg developers
WARN AppiumDoctor  ✖ mjpeg-consumer cannot be found.
WARN AppiumDoctor  ✖ idb and idb_companion are not installed
info AppiumDoctor  ✔ applesimutils is installed at: /usr/local/bin/applesimutils. Installed
```

Appium Server

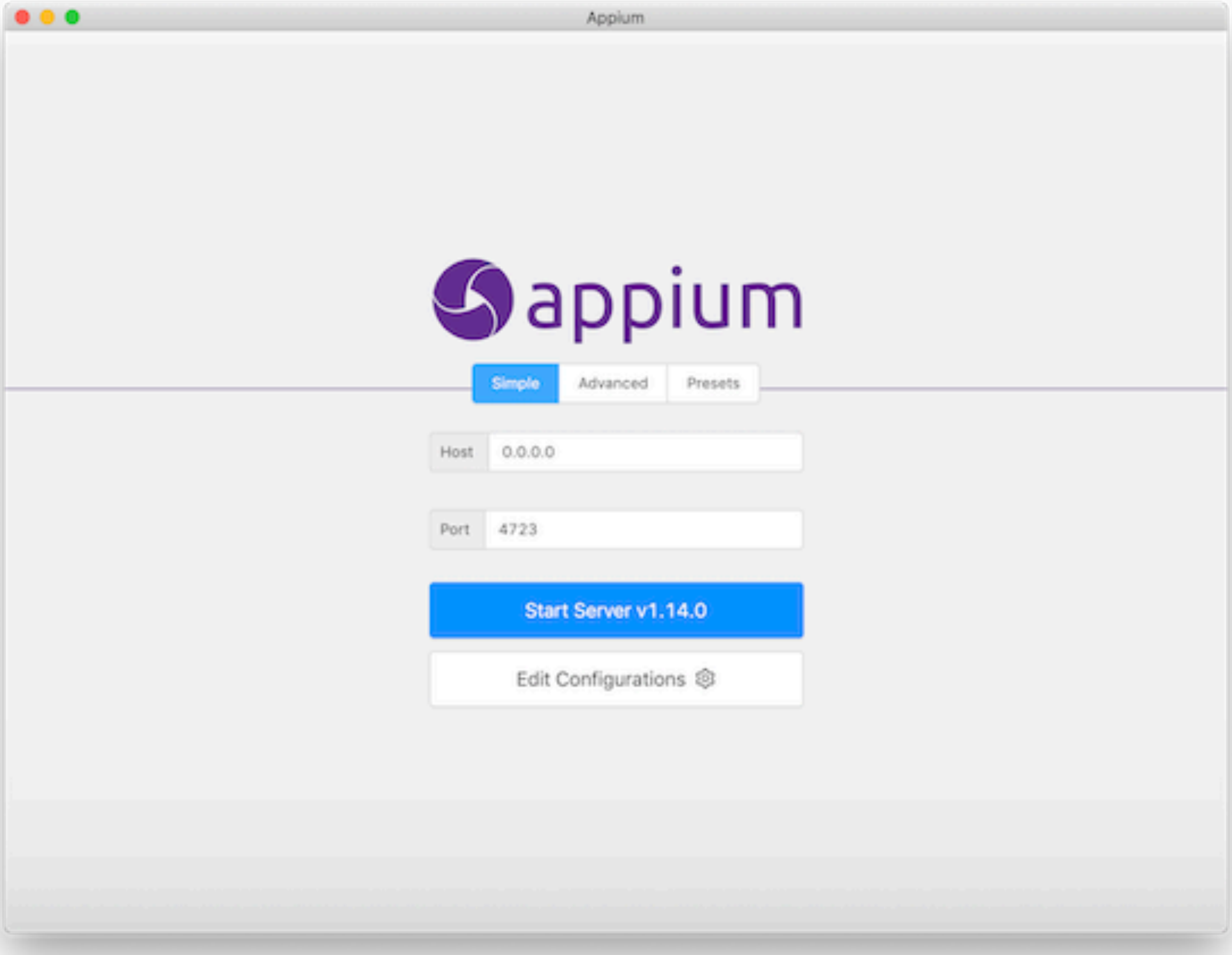
Install via npm

```
$npm install -g appium
$appium
```

https://github.com/appium/appium

Appium Server

Use GUI tool => Appium Desktop



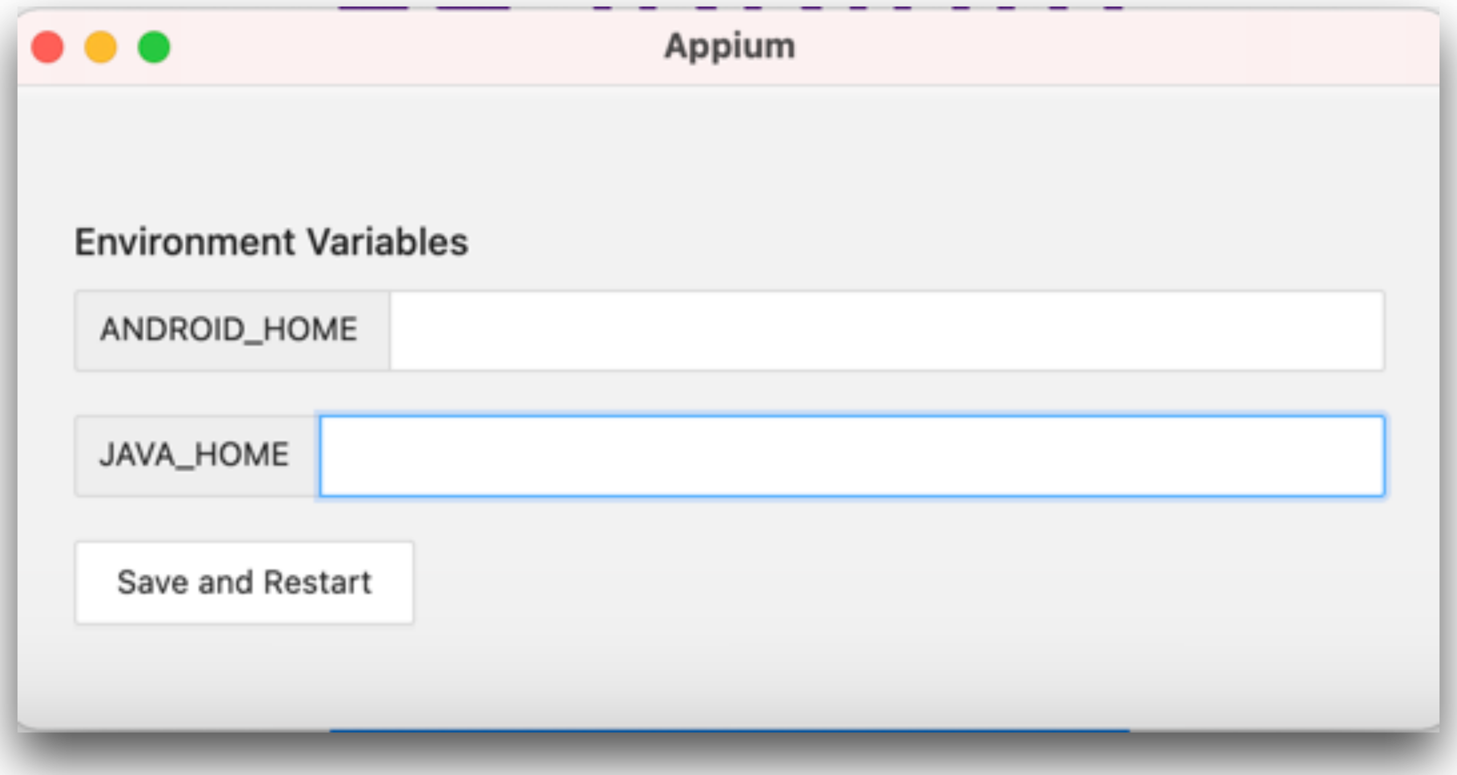
Host: 0.0.0.0

Port: 4723

https://github.com/appium/appium-desktop

Appium Server

Configurations of server



Appium

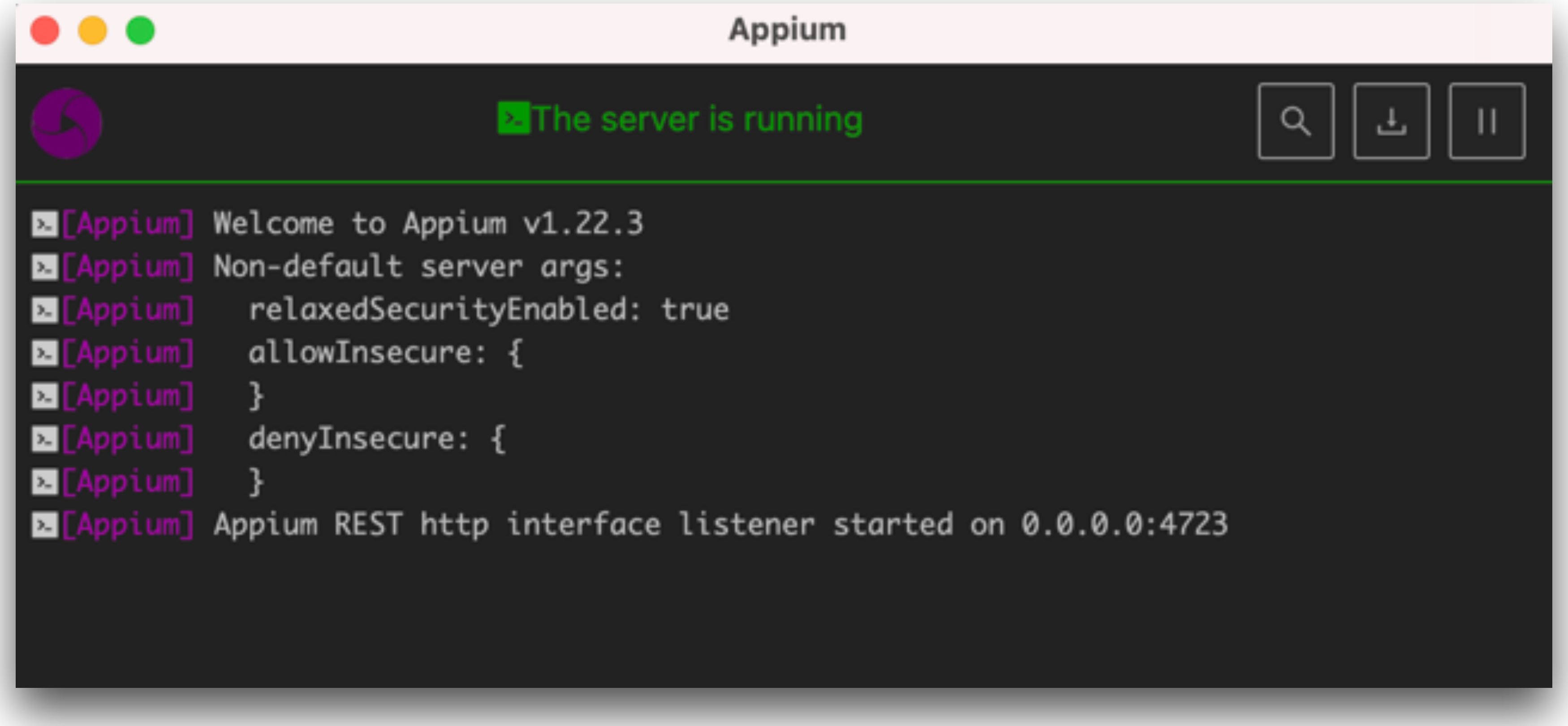
Environment Variables

ANDROID_HOME

JAVA_HOME

Appium Server

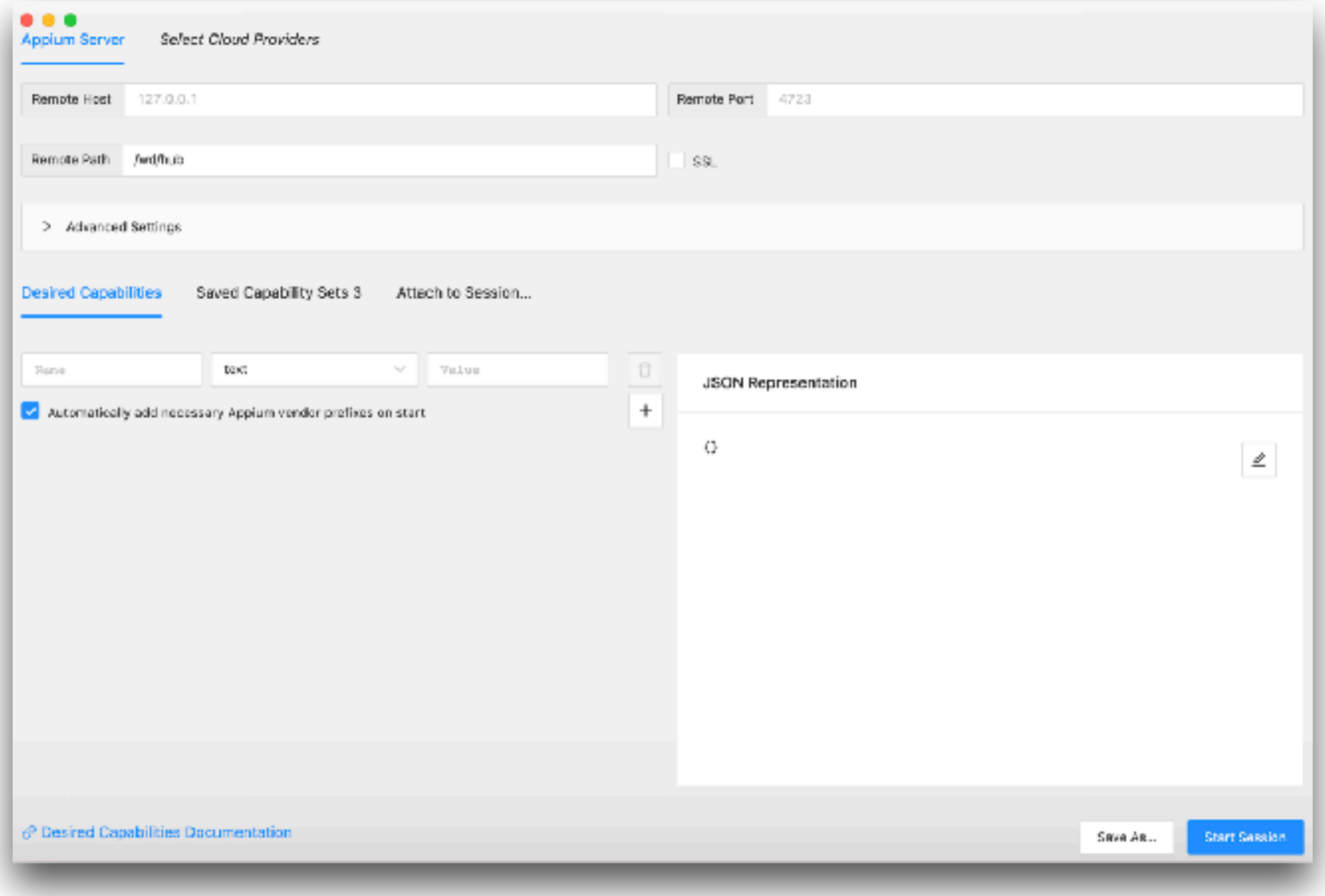
Start server



```
[Appium] Welcome to Appium v1.22.3
[Appium] Non-default server args:
[Appium]   relaxedSecurityEnabled: true
[Appium]   allowInsecure: {
[Appium]   }
[Appium]   denyInsecure: {
[Appium]   }
[Appium] Appium REST http interface listener started on 0.0.0.0:4723
```

Appium Inspector

GUI inspector for mobile apps



Remote Host 127.0.0.1

Remote Port 4723

Remote Path /wd/hub

□ SSL

☑ Automatically add necessary Appium vendor prefixes on start

JSON Representation

{}

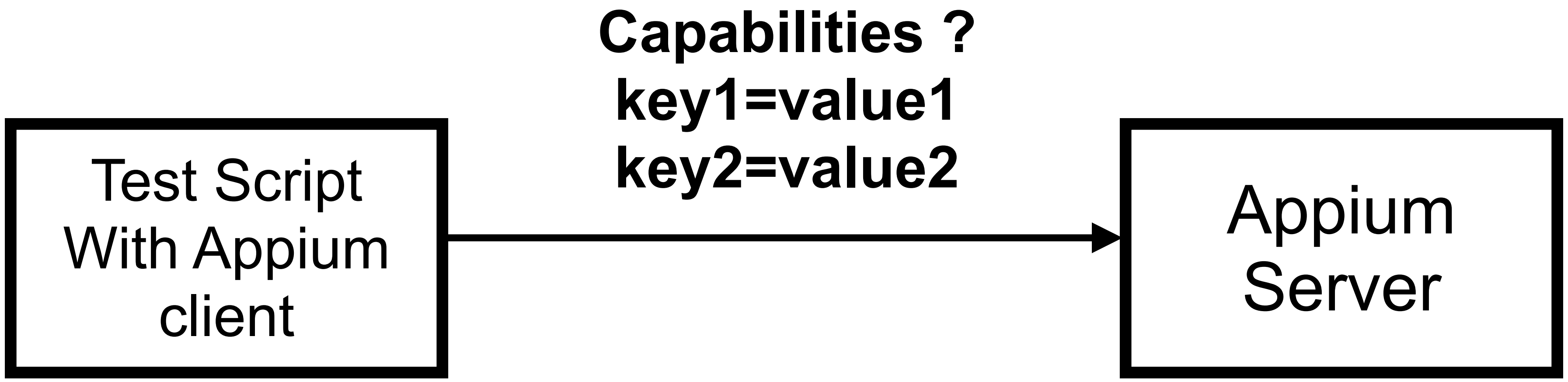
https://github.com/appium/appium-inspector

Create a session

HTTP Method	Route	Action
POST	/session	Start an session of test
POST	/session/:sessionId/element	Find an element
POST	/session/:sessionId/element/:elementId/click	Click/tab on selected element

http://appium.io/docs/en/commands/session/create/

Create a session with capabilities



http://appium.io/docs/en/writing-running-appium/caps/index.html

Required capabilities

Name	Description
platformName	Platform to automate (iOS, Android)
platformVersion	Version of platform
deviceName	Type of device to automate
app	Path to your app

Session capabilities for android

```
{
  "platformName": "Android",
  "automationName": "UiAutomator2",
  "app": "Path to APK file",

  "deviceName": "ID/Name of target device"

}
```

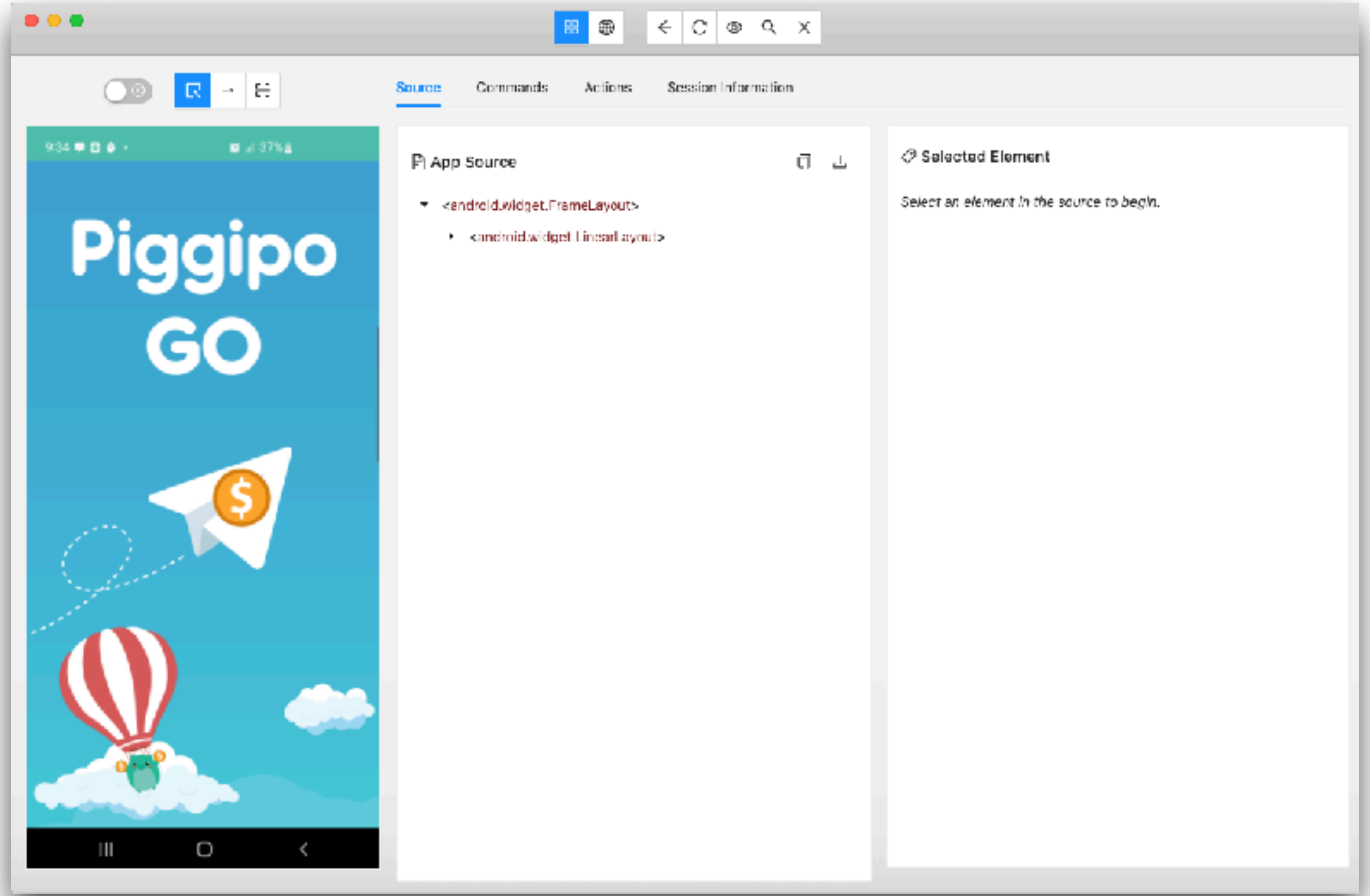
?

https://appium.io/docs/en/drivers/android-uiautomator2/

List of android’s devices

```
$adb devices
```

Appium Inspector



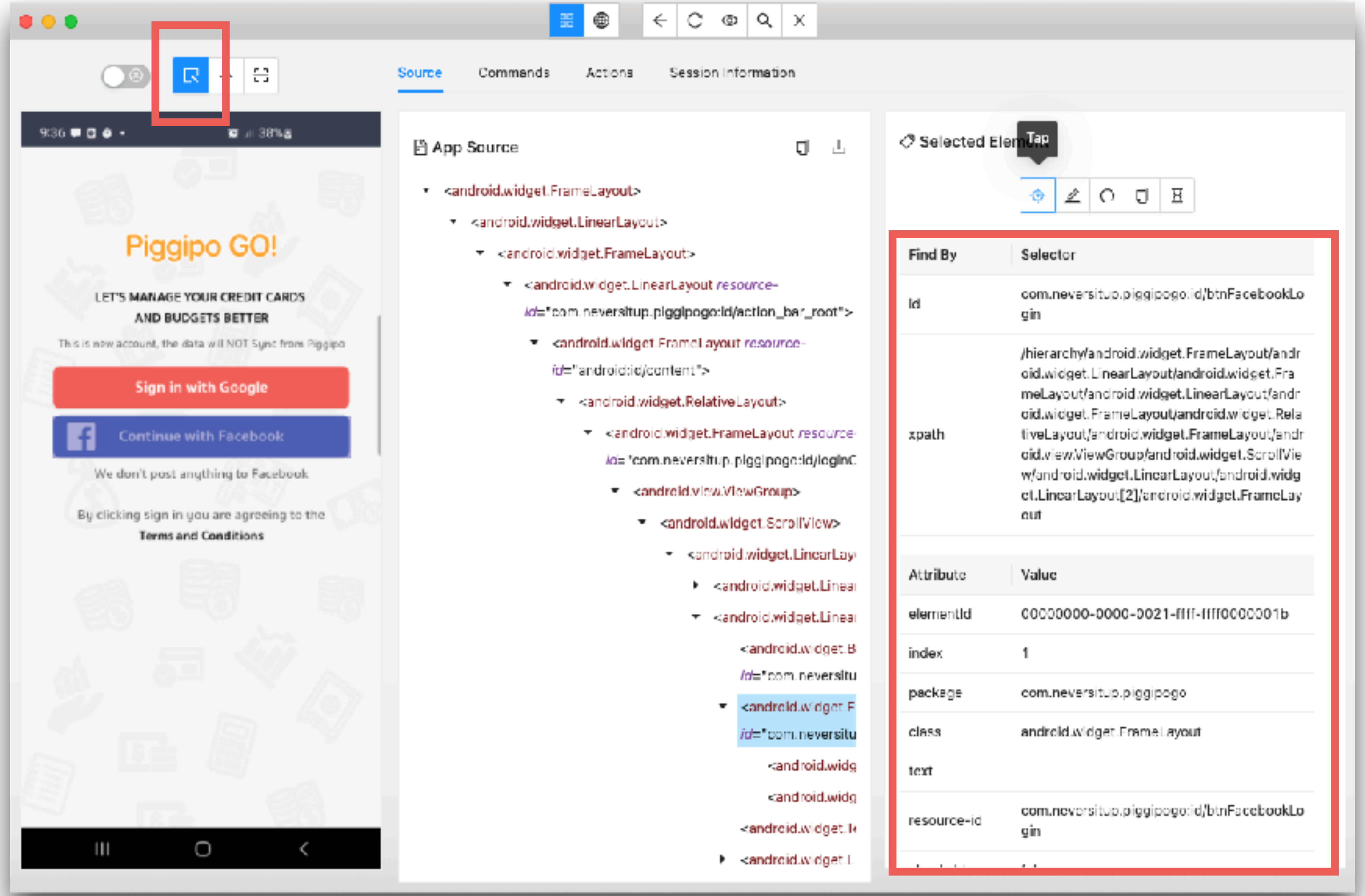
App Source

<android.widget.FrameLayout>
<android.widget.LinearLayout>

Selected Element

Select an element in the source to begin.

Inspect Element

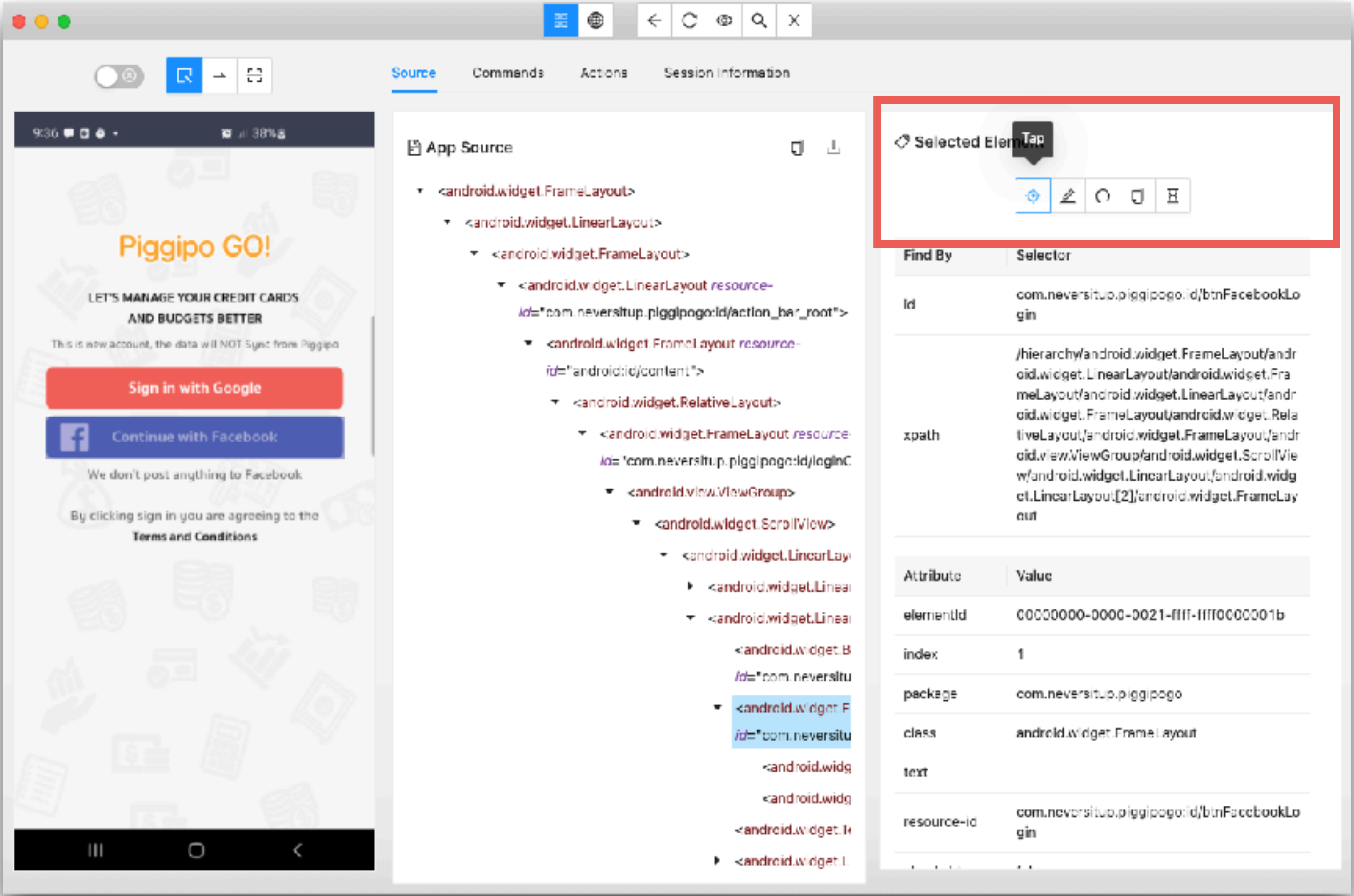

Piggipo GO!
LET'S MANAGE YOUR CREDIT CARDS AND BUDGETS BETTER
This is new account, the data will NOT Sync from Piggipo
Sign in with Google
Continue with Facebook
We don't post anything to Facebook
By clicking sign in you are agreeing to the
Terms and Conditions
Source
Commands
Actions
Session Information
App Source
Selected Element
Tap

```
▾ <android.widget.FrameLayout>
  ▾ <android.widget.LinearLayout>
    ▾ <android.widget.FrameLayout>
      ▾ <android.widget.LinearLayout resource-
        id="com.neversitup.piggipogo:id/action_bar_root">
        ▾ <android.widget.FrameLayout resource-
          id="android:id/content">
          ▾ <android.widget.RelativeLayout>
            ▾ <android.widget.FrameLayout resource-
              id="com.neversitup.piggipogo:id/loginC
              ▾ <android.view.ViewGroup>
                ▾ <android.widget.ScrollView>
                  ▾ <android.widget.LinearLay
                    ▸ <android.widget.Linear
                    ▾ <android.widget.Linear
                        <android.widget.B
                        id="com.neversitu
                      ▾ <android.widget.F
                        id="com.neversitu
                          <android.widg
                          <android.widg
                        <android.widget.I
                      ▸ <android.widget.I
```

Find By	Selector
id	com.neversitup.piggipogo:id/btnFacebookLogin
xpath	/hierarchy/android.widget.FrameLayout/android.widget.LinearLayout/android.widget.FrameLayout/android.widget.LinearLayout/android.widget.FrameLayout/android.widget.RelativeLayout/android.widget.FrameLayout/android.view.ViewGroup/android.widget.ScrollView/android.widget.LinearLayout/android.widget.LinearLayout[2]/android.widget.FrameLayout

Attribute	Value
elementId	00000000-0000-0021-ffff-ffff0000001b
index	1
package	com.neversitup.piggipogo
class	android.widget.FrameLayout
text	
resource-id	com.neversitup.piggipogo:id/btnFacebookLogin

Simulate actions on element

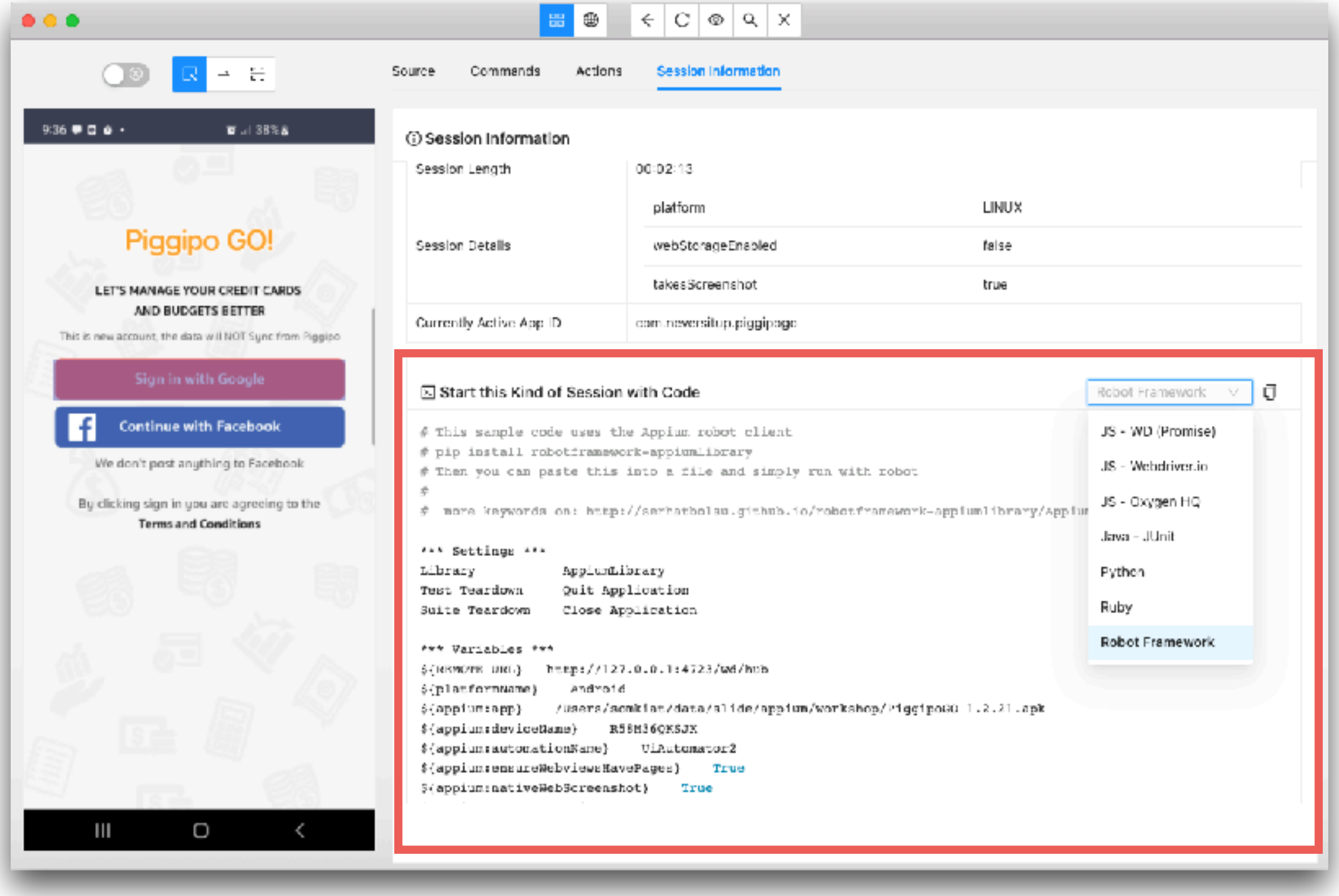


```
▾ <android.widget.FrameLayout>
  ▾ <android.widget.LinearLayout>
    ▾ <android.widget.FrameLayout>
      ▾ <android.widget.LinearLayout resource-
        id="com.neversitup.piggipogo:id/action_bar_root">
        ▾ <android.widget.FrameLayout resource-
          id="android:id/content">
          ▾ <android.widget.RelativeLayout>
            ▾ <android.widget.FrameLayout resource-
              id="com.neversitup.piggipogo:id/loginC
              ▾ <android.view.ViewGroup>
                ▾ <android.widget.ScrollView>
                  ▾ <android.widget.LinearLay
                    ▸ <android.widget.Linear
                    ▾ <android.widget.Linear
                        <android.widget.B
                        id="com.neversitu
                      ▾ <android.widget.F
                        id="com.neversitu
                          <android.widg
                          <android.widg
                        <android.widget.I
                      ▸ <android.widget.I
```

Find By	Selector
id	com.neversitup.piggipogo:id/btnFacebookLogin
xpath	/hierarchy/android.widget.FrameLayout/android.widget.LinearLayout/android.widget.FrameLayout/android.widget.LinearLayout/android.widget.FrameLayout/android.widget.RelativeLayout/android.widget.FrameLayout/android.view.ViewGroup/android.widget.ScrollView/android.widget.LinearLayout/android.widget.LinearLayout[2]/android.widget.FrameLayout

Attribute	Value
elementId	00000000-0000-0021-ffff-ffff0000001b
index	1
package	com.neversitup.piggipogo
class	android.widget.FrameLayout
text	
resource-id	com.neversitup.piggipogo:id/btnFacebookLogin

Code Example



Source
Commands
Actions
Session Information
9:36
38%
Piggipo GO!
LET'S MANAGE YOUR CREDIT CARDS
AND BUDGETS BETTER
This is new account, the data will NOT Sync from Piggipo
Sign in with Google
Continue with Facebook
We don't post anything to Facebook
By clicking sign in you are agreeing to the
Terms and Conditions

Session Information

Session Length	00:02:13	
Session Details	platform	LINUX
	webStorageEnabled	false
	takesScreenshot	true
Currently Active App ID	com.neversitup.piggipogo	

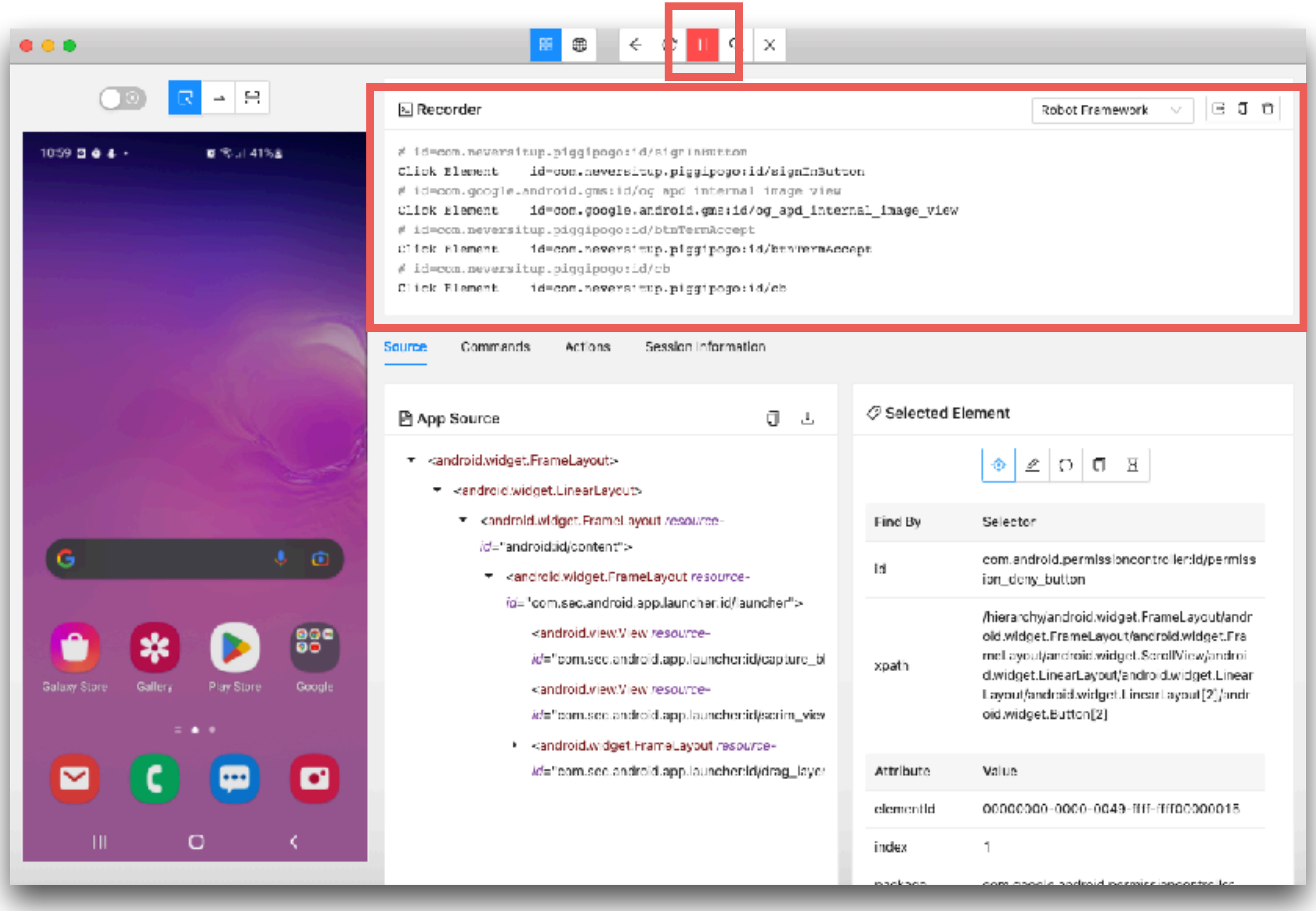
Start this Kind of Session with Code

```
# This sample code uses the Appium robot client
# pip install robotframework-appiumlibrary
# Then you can paste this into a file and simply run with robot
#
#  more keywords on: http://serhatbolsu.github.io/robotframework-appiumlibrary/AppiumLi

*** Settings ***
Library           AppiumLibrary
Test Teardown     Quit Application
Suite Teardown    Close Application

*** Variables ***
${REMOTE_URL}   http://127.0.0.1:4723/wd/hub
${platformName}    Android
${appium:app}    /Users/somkiat/data/slide/appium/workshop/PiggipoGO 1.2.21.apk
${appium:deviceName}    R58M36QKSJX
${appium:automationName}    UiAutomator2
${appium:ensureWebviewsHavePages}    True
${appium:nativeWebScreenshot}    True
```

Try to record test script



Recorder — Robot Framework

```
# id=com.neversitup.piggipogo:id/signInButton
Click Element    id=com.neversitup.piggipogo:id/signInButton
# id=com.google.android.gms:id/og_apd_internal_image_view
Click Element    id=com.google.android.gms:id/og_apd_internal_image_view
# id=com.neversitup.piggipogo:id/btnTermAccept
Click Element    id=com.neversitup.piggipogo:id/btnTermAccept
# id=com.neversitup.piggipogo:id/cb
Click Element    id=com.neversitup.piggipogo:id/cb
```

App Source

```
▾ <android.widget.FrameLayout>
    ▾ <android.widget.LinearLayout>
        ▾ <android.widget.FrameLayout resource-
          id="android:id/content">
            ▾ <android.widget.FrameLayout resource-
              id="com.sec.android.app.launcher:id/launcher">
                <android.view.View resource-
                id="com.sec.android.app.launcher:id/capture_bl
                <android.view.View resource-
                id="com.sec.android.app.launcher:id/scrim_view
              ▸ <android.widget.FrameLayout resource-
                id="com.sec.android.app.launcher:id/drag_layo
```

Selected Element

Find By	Selector
id	com.android.permissioncontroller:id/permission_deny_button
xpath	/hierarchy/android.widget.FrameLayout/android.widget.FrameLayout/android.widget.FrameLayout/android.widget.ScrollView/android.widget.LinearLayout/android.widget.LinearLayout/android.widget.LinearLayout[2]/android.widget.Button[2]

Attribute	Value
elementId	00000000-0000-0049-ffff-ffff00000015
index	1

Session capabilities for iOS

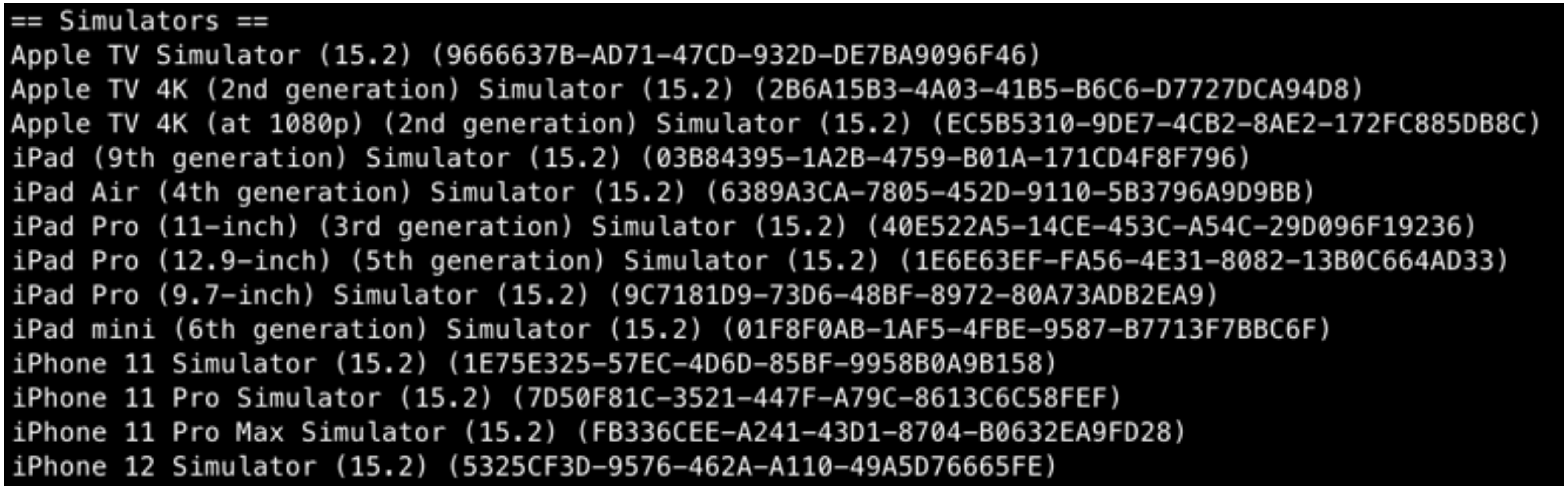
```
{
  "platformName": "Android",
  "automationName": “XCUITest",
  "app": "Path to IPA file",
  "platformVersion": "14.5"
  "deviceName": "ID/Name of target device"

}
```

https://appium.io/docs/en/drivers/ios-xcuitest/index.html

List of iOS's devices

$xcrun xctrace list devices

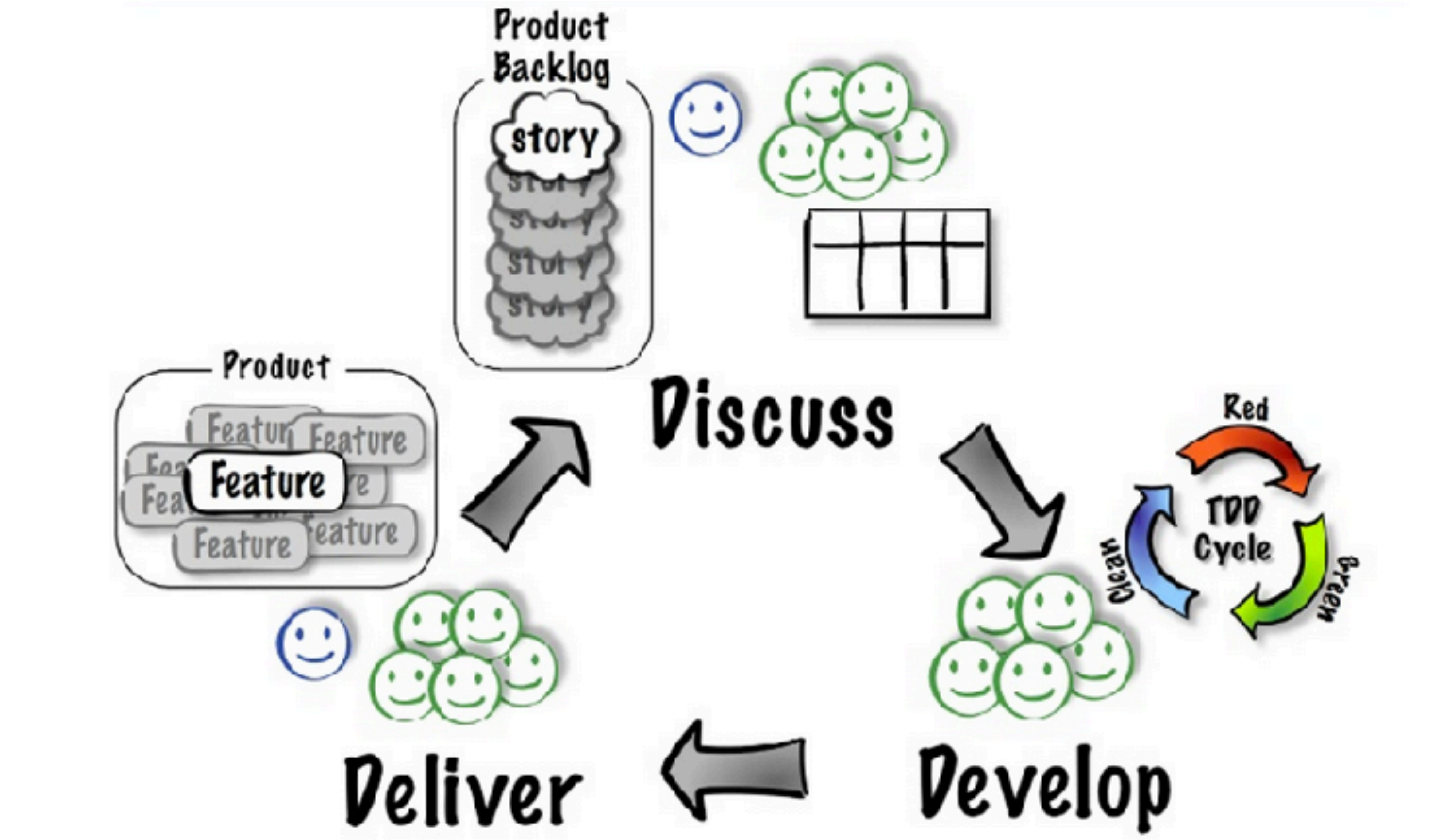


```
== Simulators ==
Apple TV Simulator (15.2) (9666637B-AD71-47CD-932D-DE7BA9096F46)
Apple TV 4K (2nd generation) Simulator (15.2) (2B6A15B3-4A03-41B5-B6C6-D7727DCA94D8)
Apple TV 4K (at 1080p) (2nd generation) Simulator (15.2) (EC5B5310-9DE7-4CB2-8AE2-172FC885DB8C)
iPad (9th generation) Simulator (15.2) (03B84395-1A2B-4759-B01A-171CD4F8F796)
iPad Air (4th generation) Simulator (15.2) (6389A3CA-7805-452D-9110-5B3796A9D9BB)
iPad Pro (11-inch) (3rd generation) Simulator (15.2) (40E522A5-14CE-453C-A54C-29D096F19236)
iPad Pro (12.9-inch) (5th generation) Simulator (15.2) (1E6E63EF-FA56-4E31-8082-13B0C664AD33)
iPad Pro (9.7-inch) Simulator (15.2) (9C7181D9-73D6-48BF-8972-80A73ADB2EA9)
iPad mini (6th generation) Simulator (15.2) (01F8F0AB-1AF5-4FBE-9587-B7713F7BBC6F)
iPhone 11 Simulator (15.2) (1E75E325-57EC-4D6D-85BF-9958B0A9B158)
iPhone 11 Pro Simulator (15.2) (7D50F81C-3521-447F-A79C-8613C6C58FEF)
iPhone 11 Pro Max Simulator (15.2) (FB336CEE-A241-43D1-8704-B0632EA9FD28)
iPhone 12 Simulator (15.2) (5325CF3D-9576-462A-A110-49A5D76665FE)
```

Write your tests

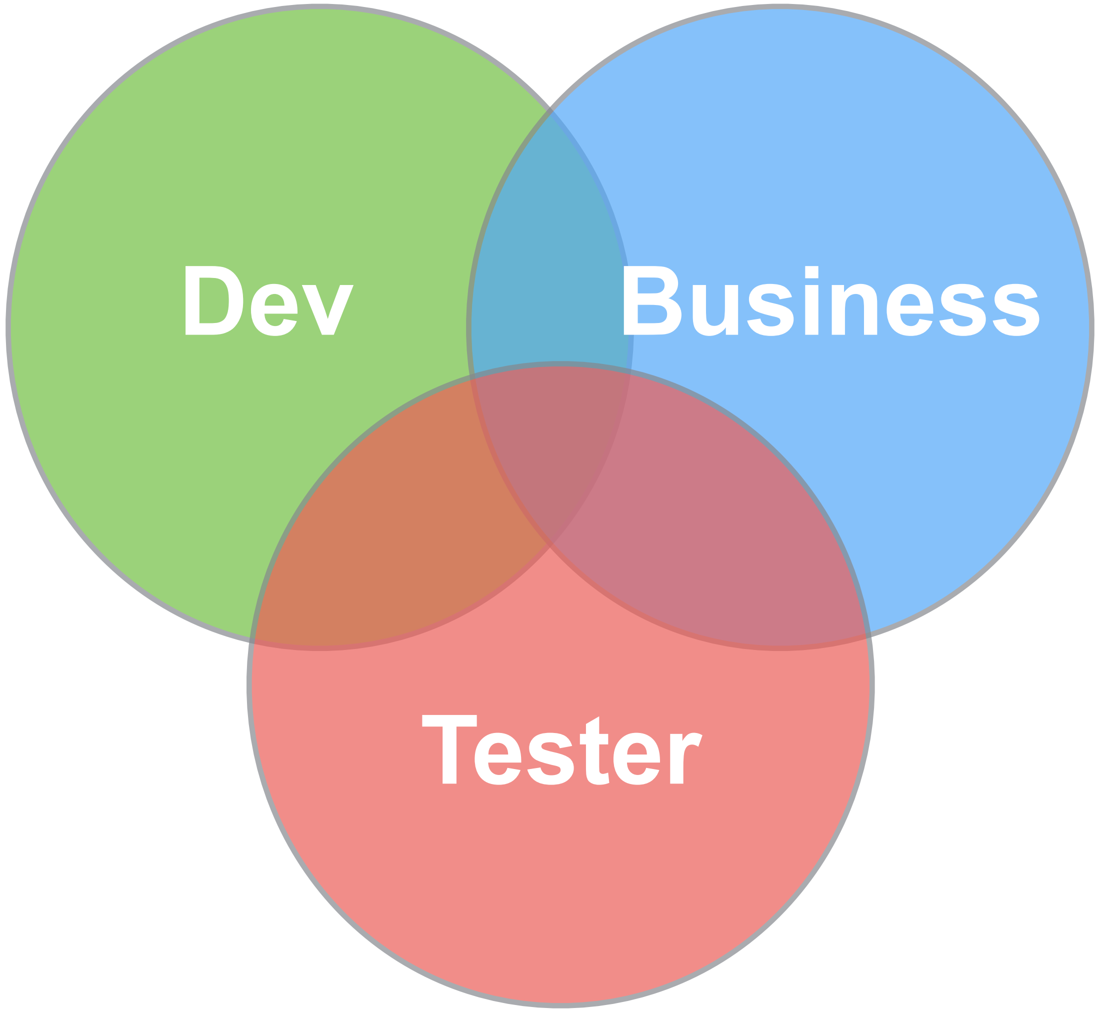
THINK before coding

Acceptance Test-Driven Development



(Model developed with Pekka Klärck, Bas Vodde, and Craig Larman.)

Acceptance Test-Driven Development



Acceptance Tests

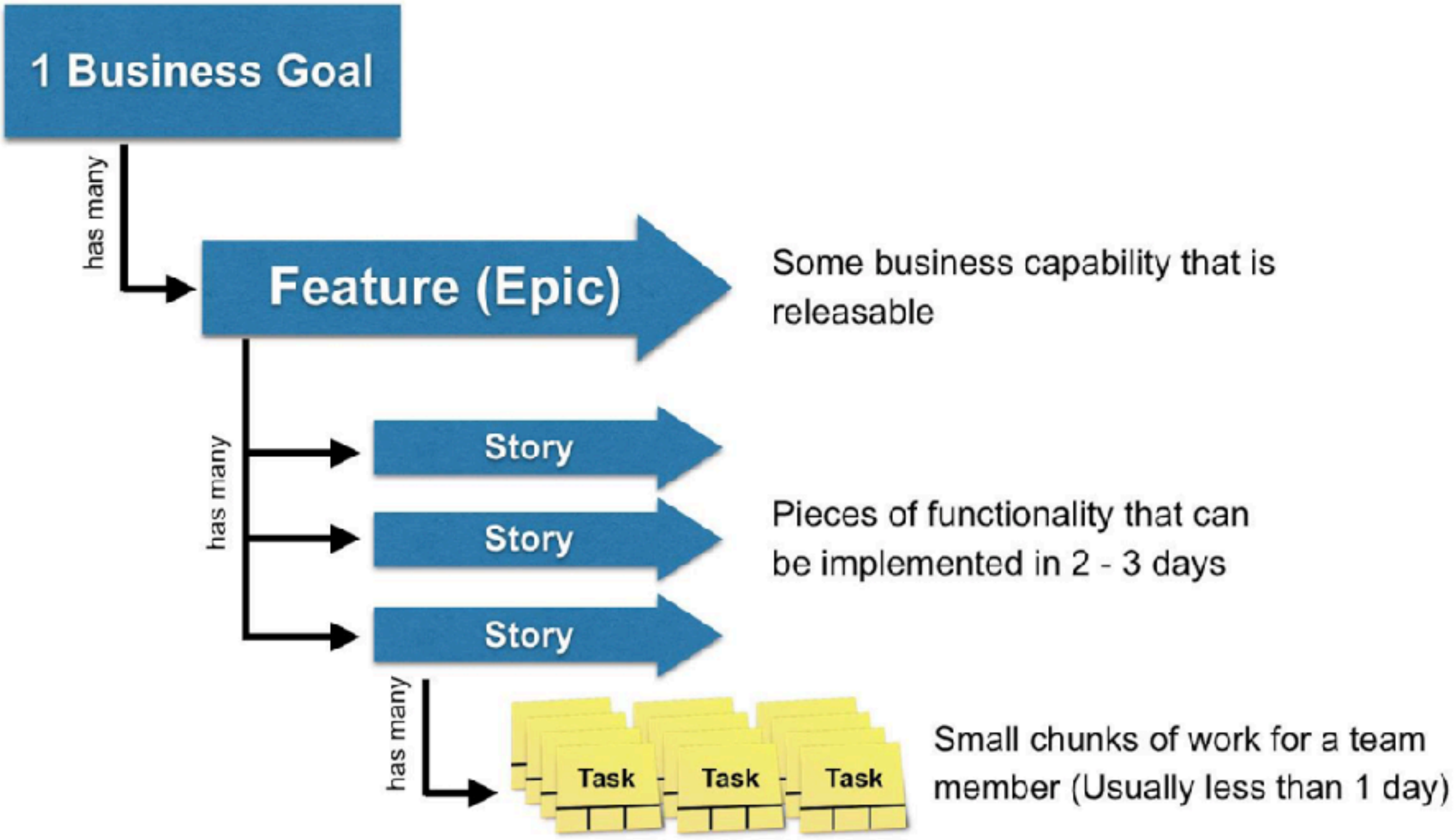
=

Business Criteria

+

Examples (data)

Work break down

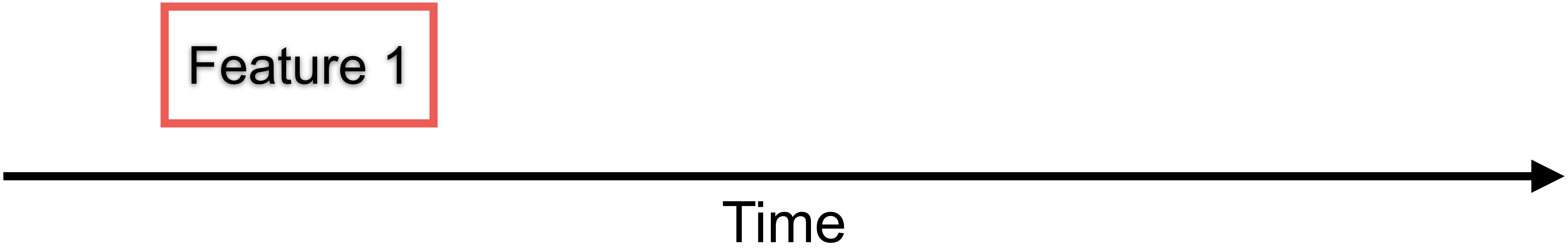


Some business capability that is releasable

Pieces of functionality that can be implemented in 2 - 3 days

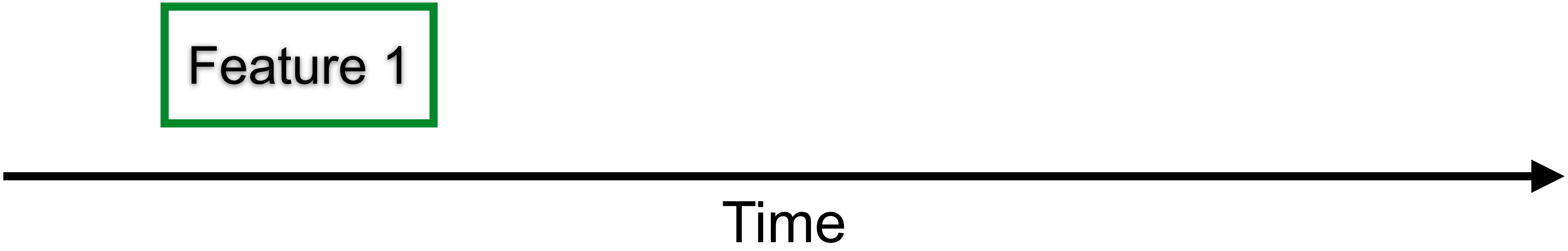
Small chunks of work for a team member (Usually less than 1 day)

Iterative and incremental process



Iterative and incremental process

Done = coded and tested

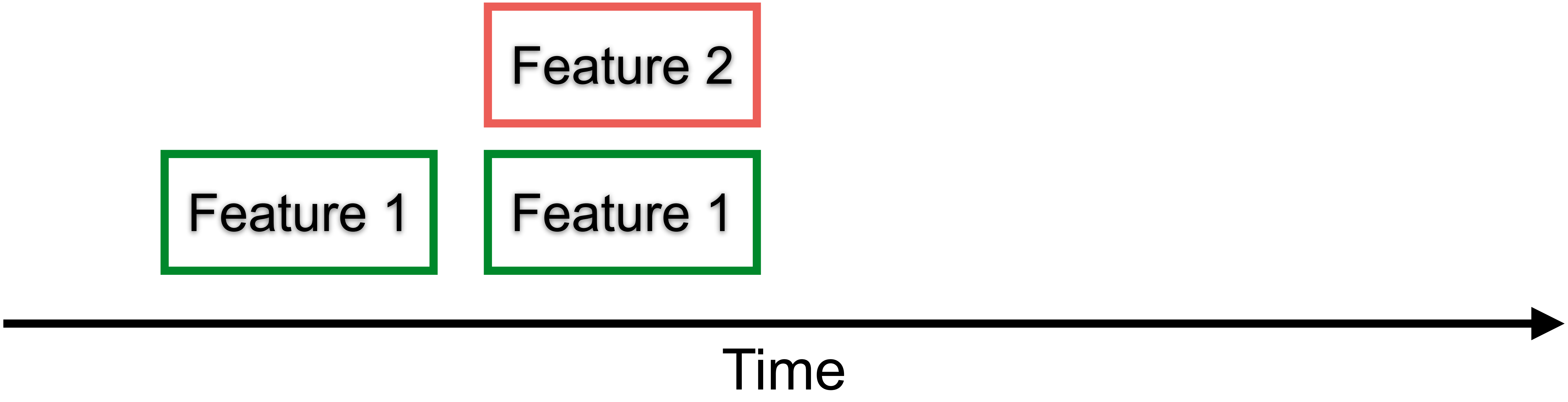


Feature 1

Time

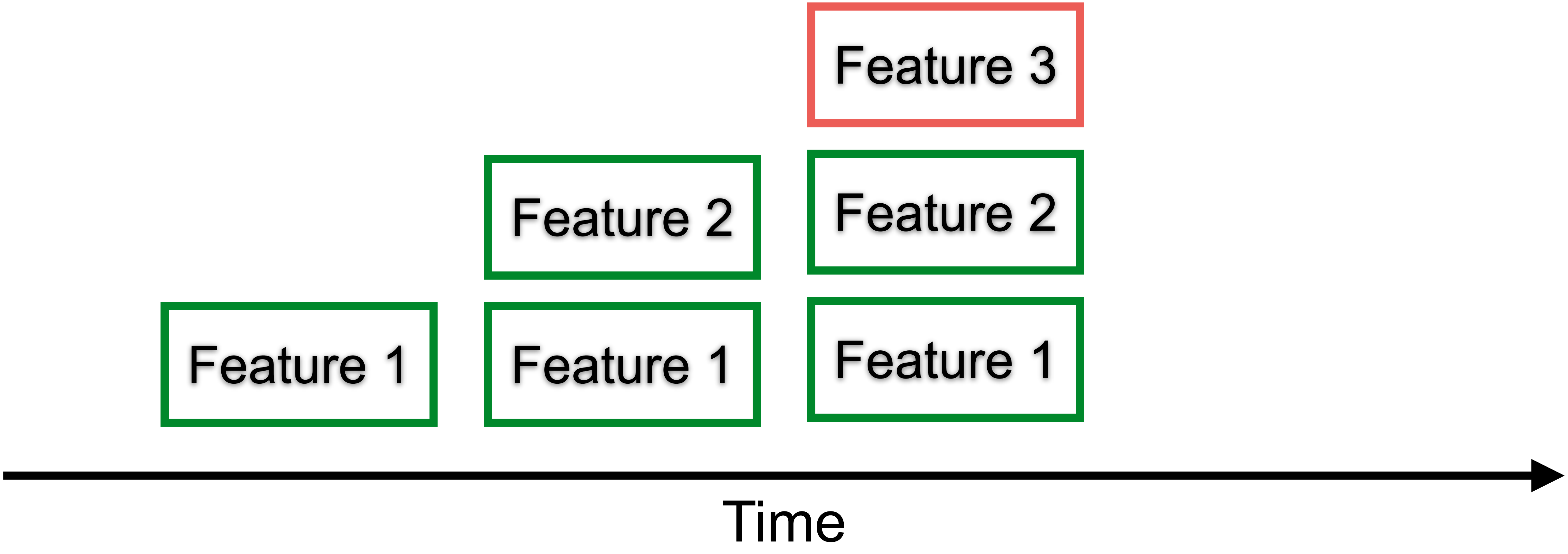
Iterative and incremental process

Done = coded and tested



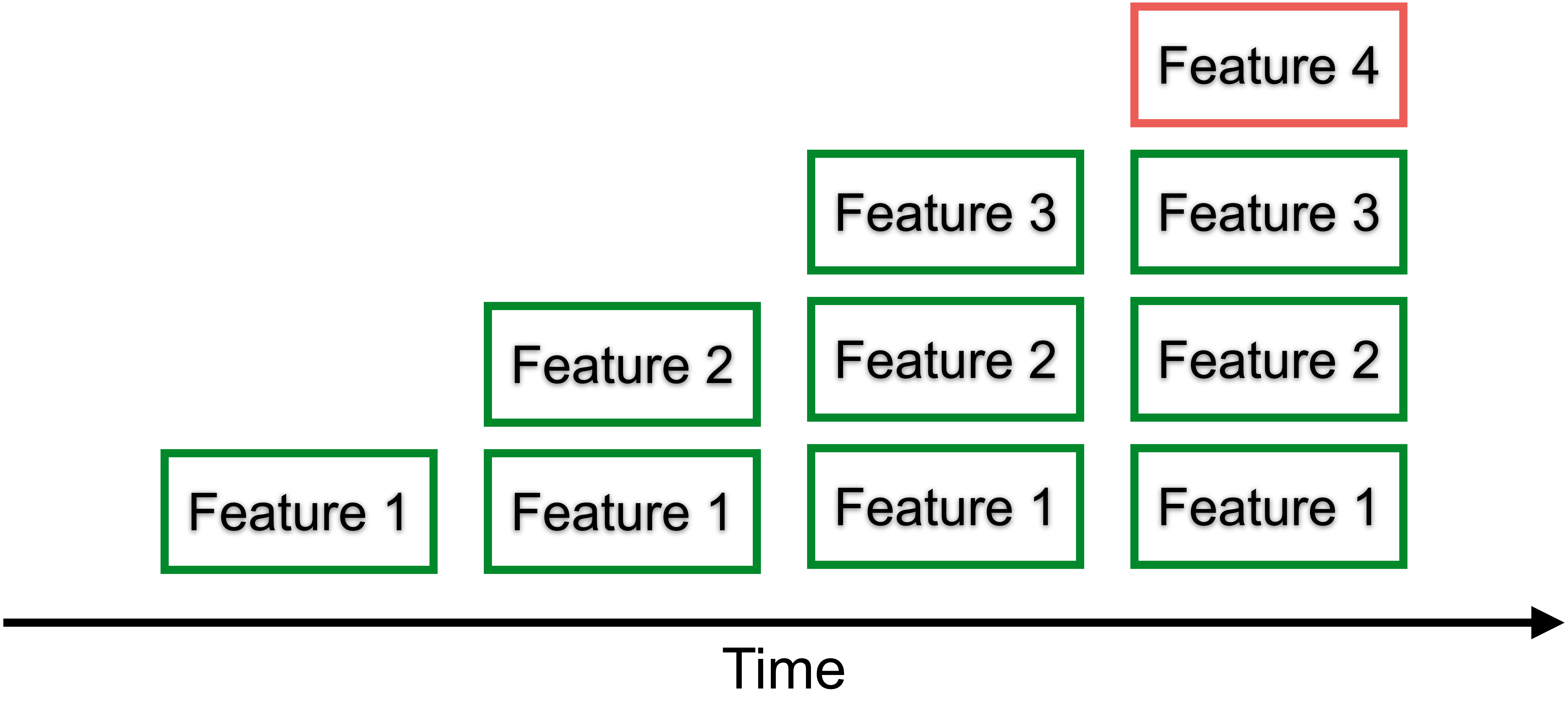
Iterative and incremental process

Done = coded and tested



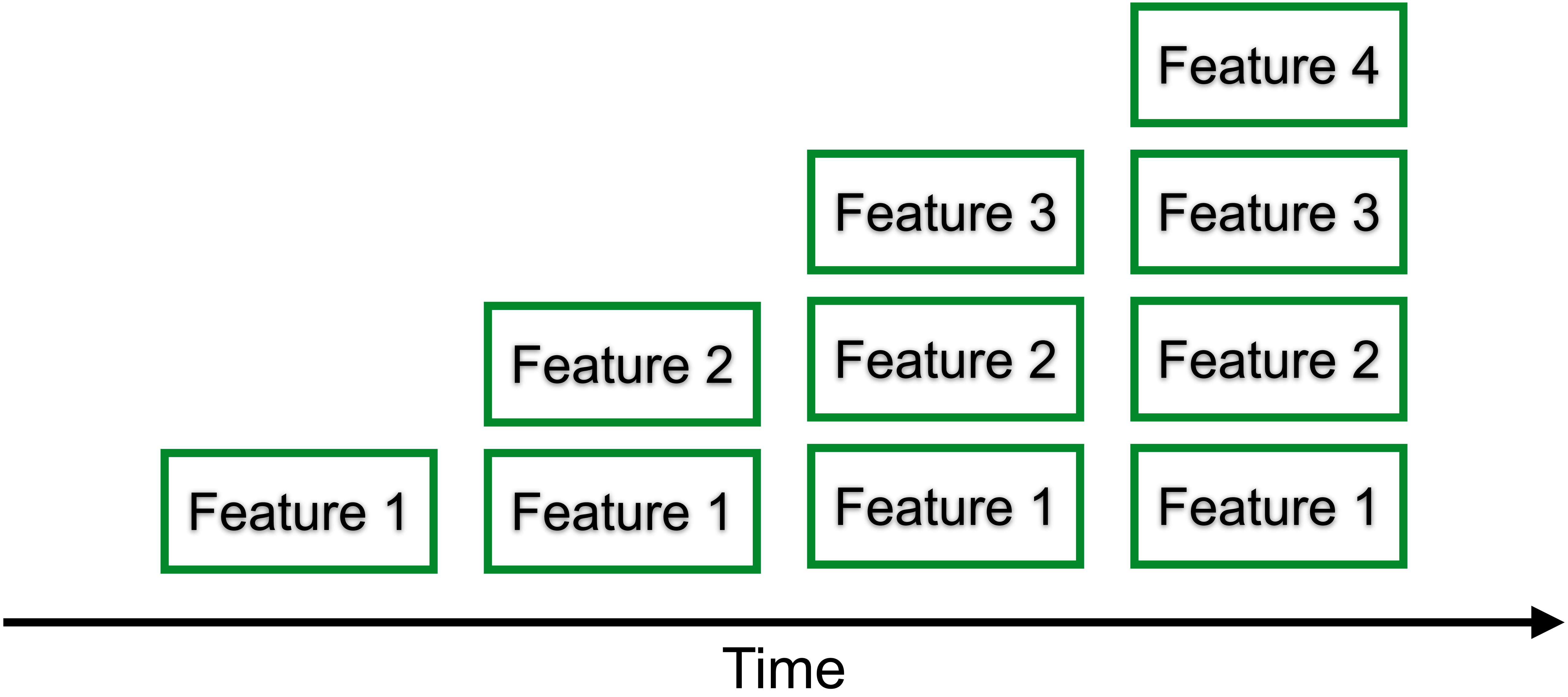
Iterative and incremental process

Done = coded and tested



Iterative and incremental process

Done = coded and tested



Feature 1

Feature 2

Feature 1

Feature 3

Feature 2

Feature 1

Feature 4

Feature 3

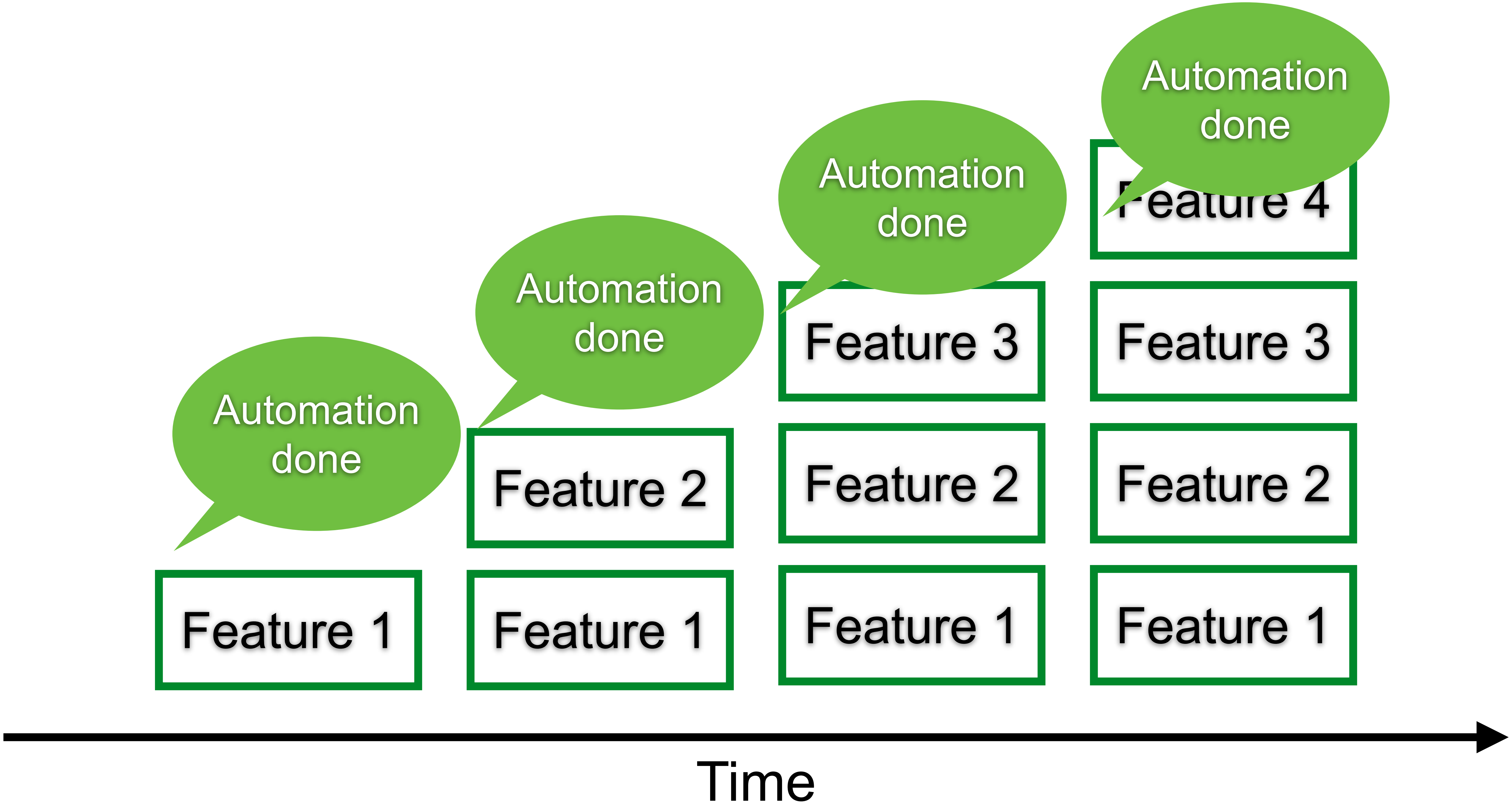
Feature 2

Feature 1

Time

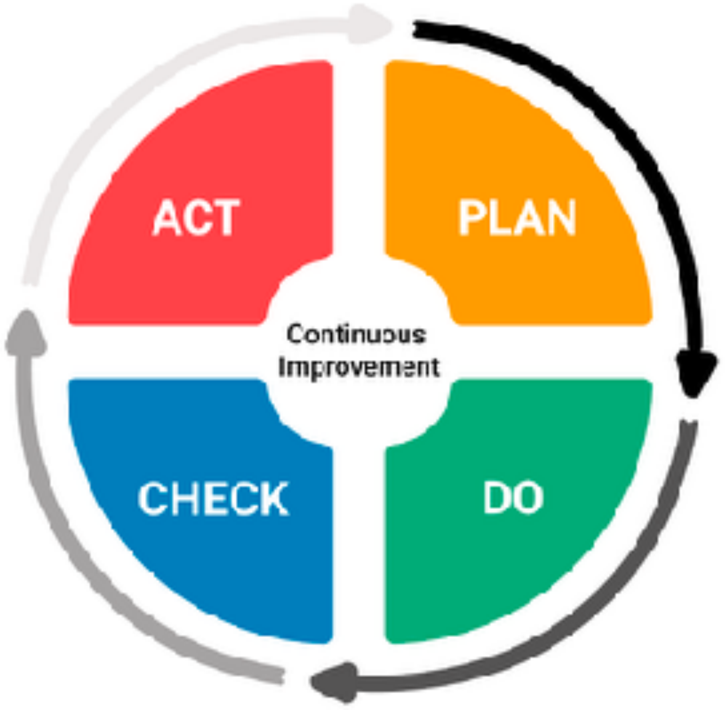
Iterative and incremental process

Done = coded and tested



Automation feedback

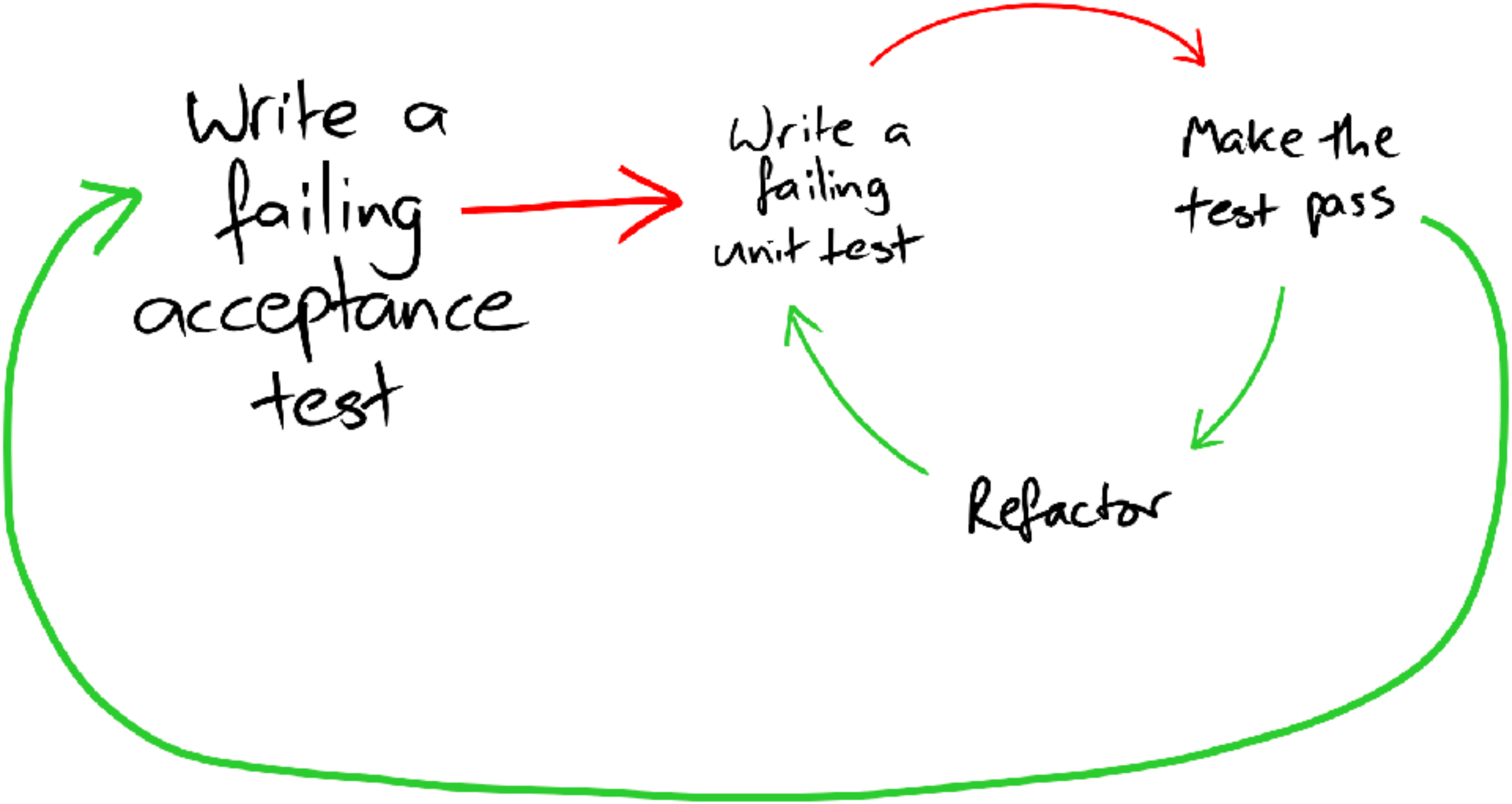
Easier over time ?
Time spent on maintenance ?
Test find regression bugs ?



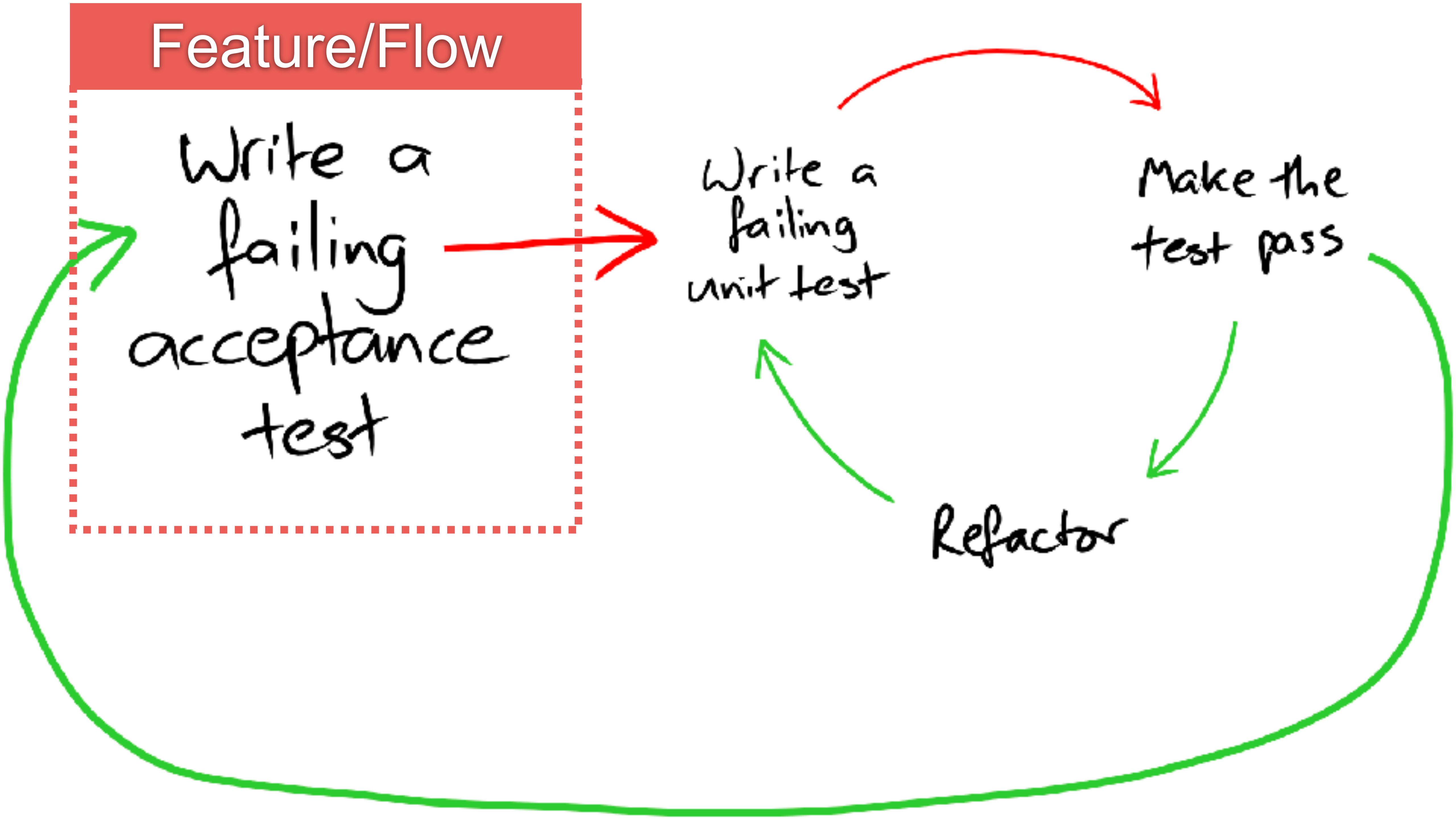
Start with simple

Use **feedback** to improve

Outside-in develop/test

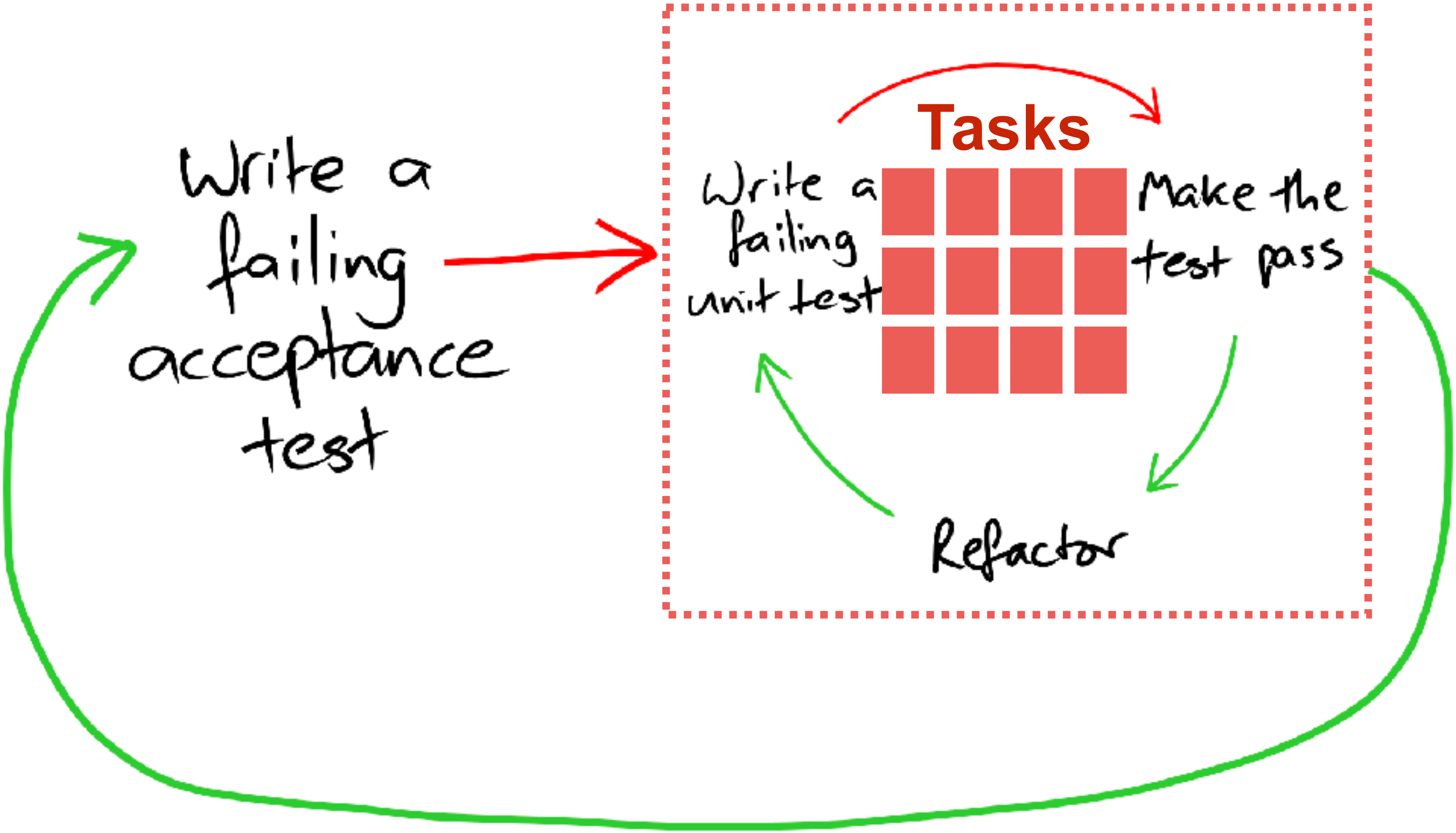


Outside-in develop/test



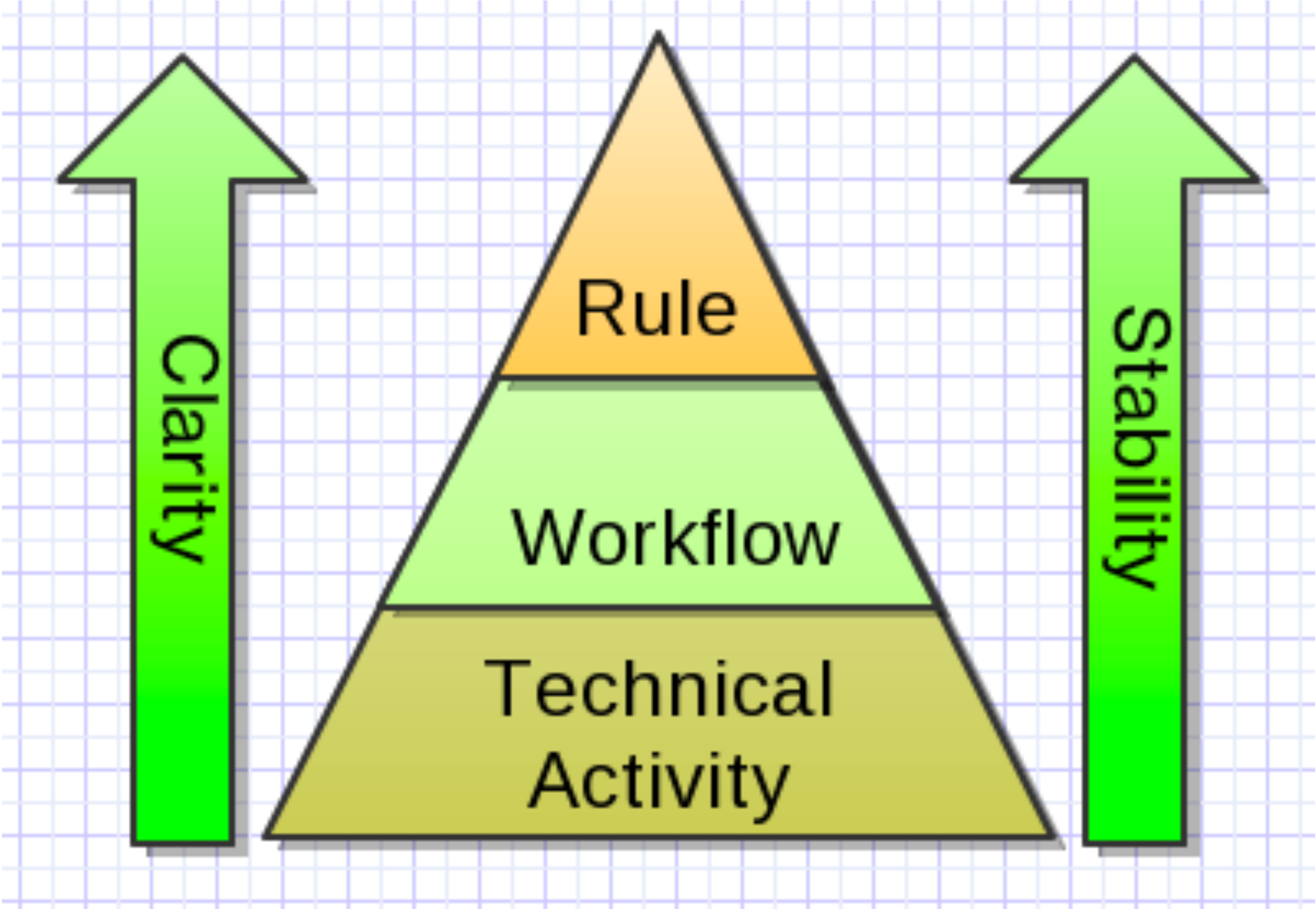
Feature/Flow

Outside-in develop/test



UI Test Automation

3 levels of UI test automation



3 levels of UI test automation

Business rule/functionality level

what is this test demonstrating or exercising

User interface workflow level

what does a user have to do to exercise the functionality through the UI

Technical activity level

what are the technical steps required to exercise the functionality

Finding and Using Elements

Appium Tools

Appium Server via npm
Appium Server GUI/Desktop
Appium Inspector

http://appium.io/docs/en/about-appium/getting-started/?lang=en#installing-appium

Locator Strategies

Strategy	Description

Accessibility ID	iOS = accessibility-id
	Android = content-desc

ID	iOS = name
	Android = resource-id

Name	Name of element
XPath	Pattern of element in XML (not recommended)
Class name	

http://appium.io/docs/en/commands/element/find-elements/index.html#selector-strategies

Good Locators

Unique

Descriptive

Resilient

Shorter in length (maintainability)

XPath

CML Path Language
Query language used to identify tag in XML
Appium builds XML representation of app

XPath is powerful by very dangerous

Benefits of XPath

Find any element that exists
Find elements by using complex criteria

Cons of XPath

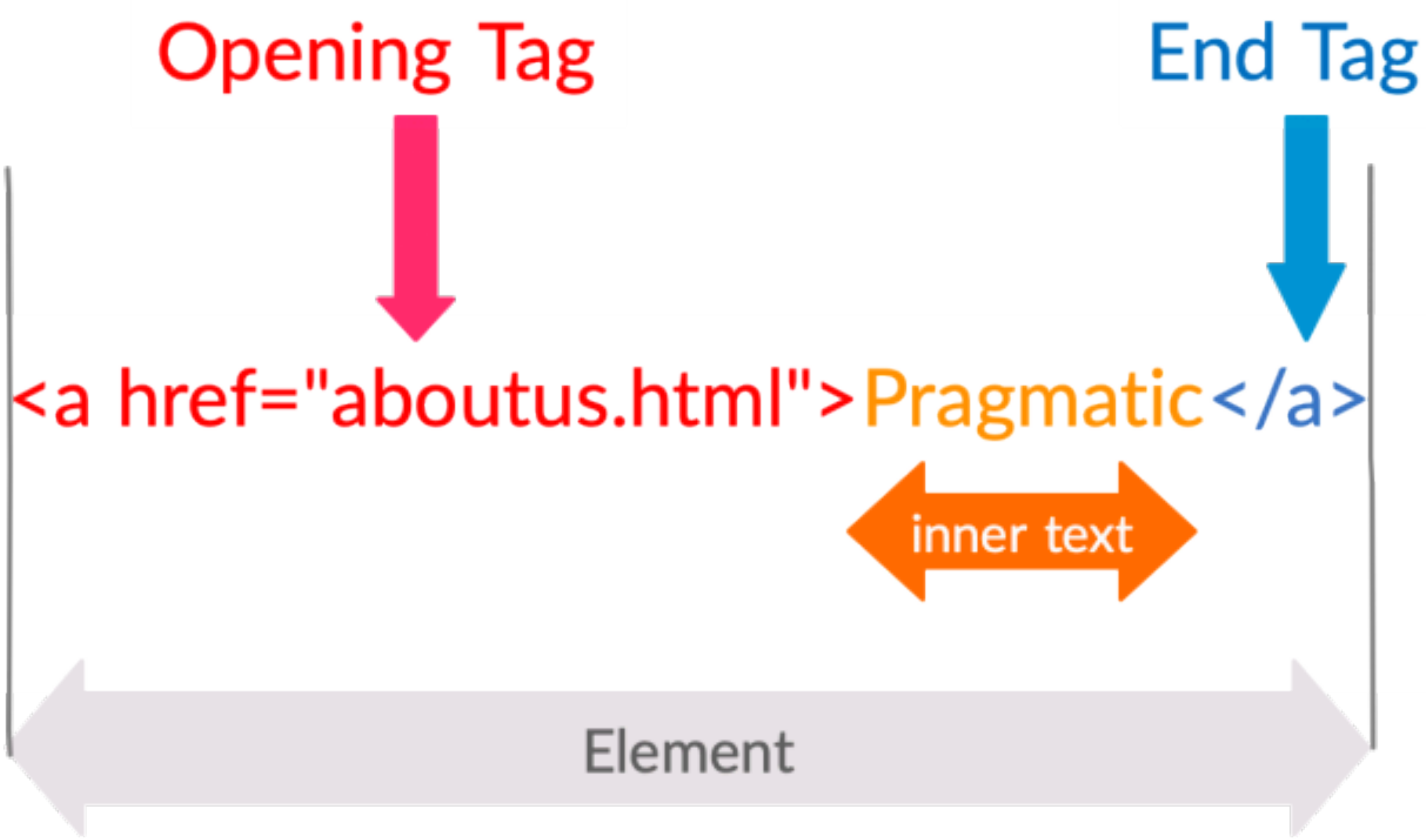
XPath selectors can be brittle

Slow

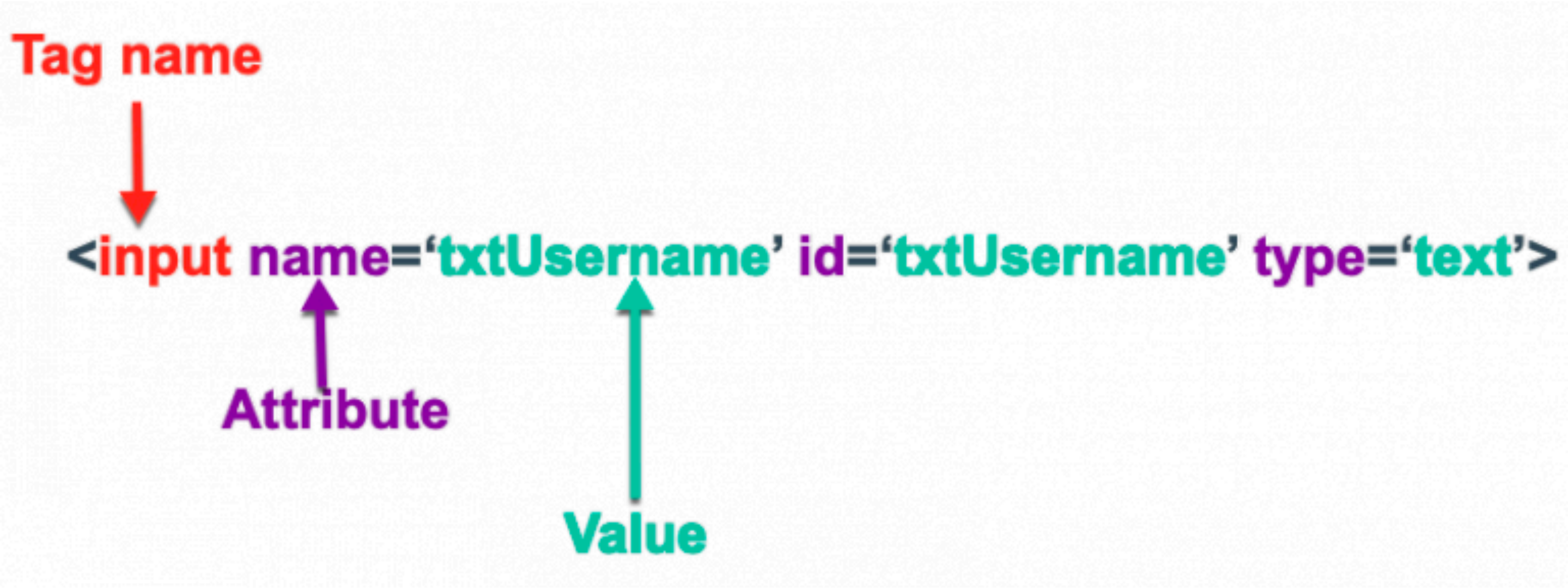
Broken test !!

Avoid brittle selectors by rely on unique tag attribute

XPath

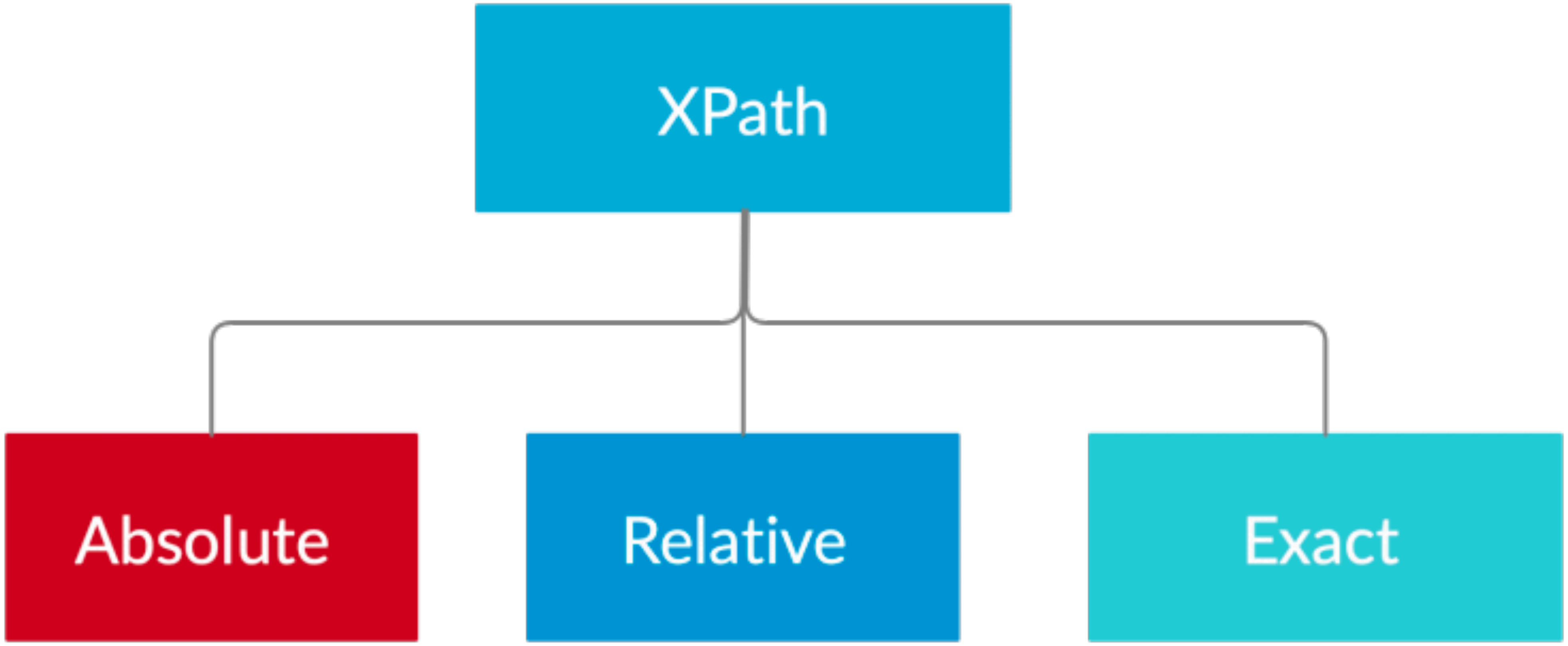


XPath



```
<input name='txtUsername' id='txtUsername' type='text'>
```

Types XPath



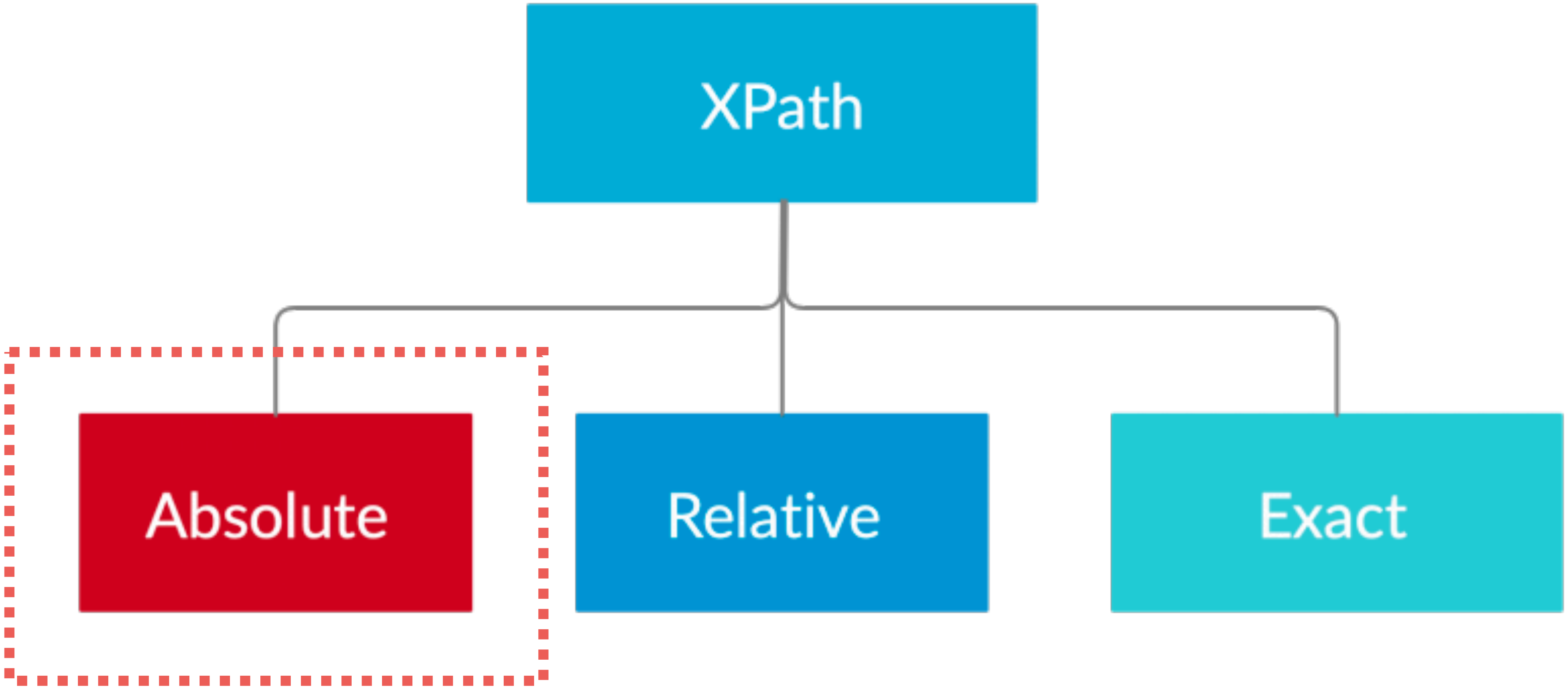
XPath

Absolute

Relative

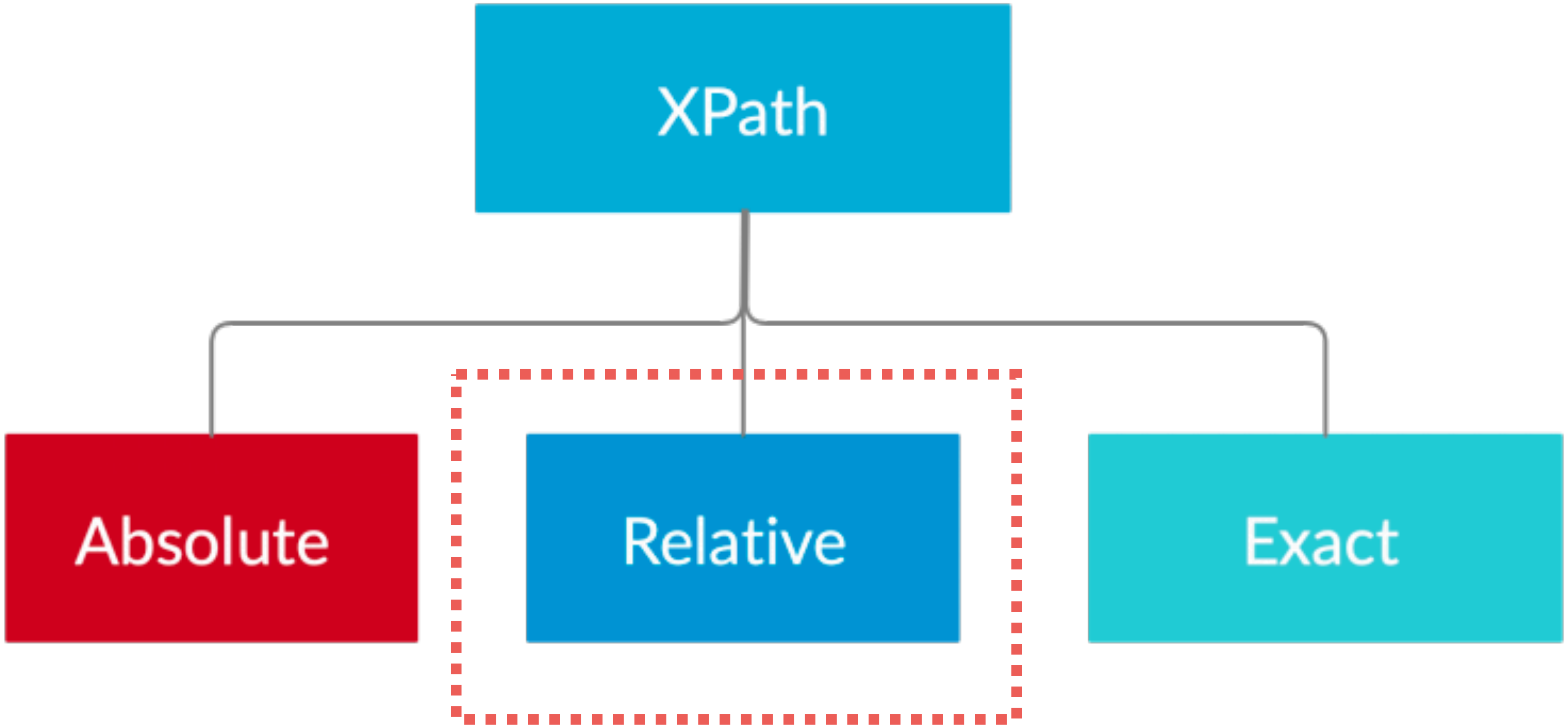
Exact

Don’t use !!



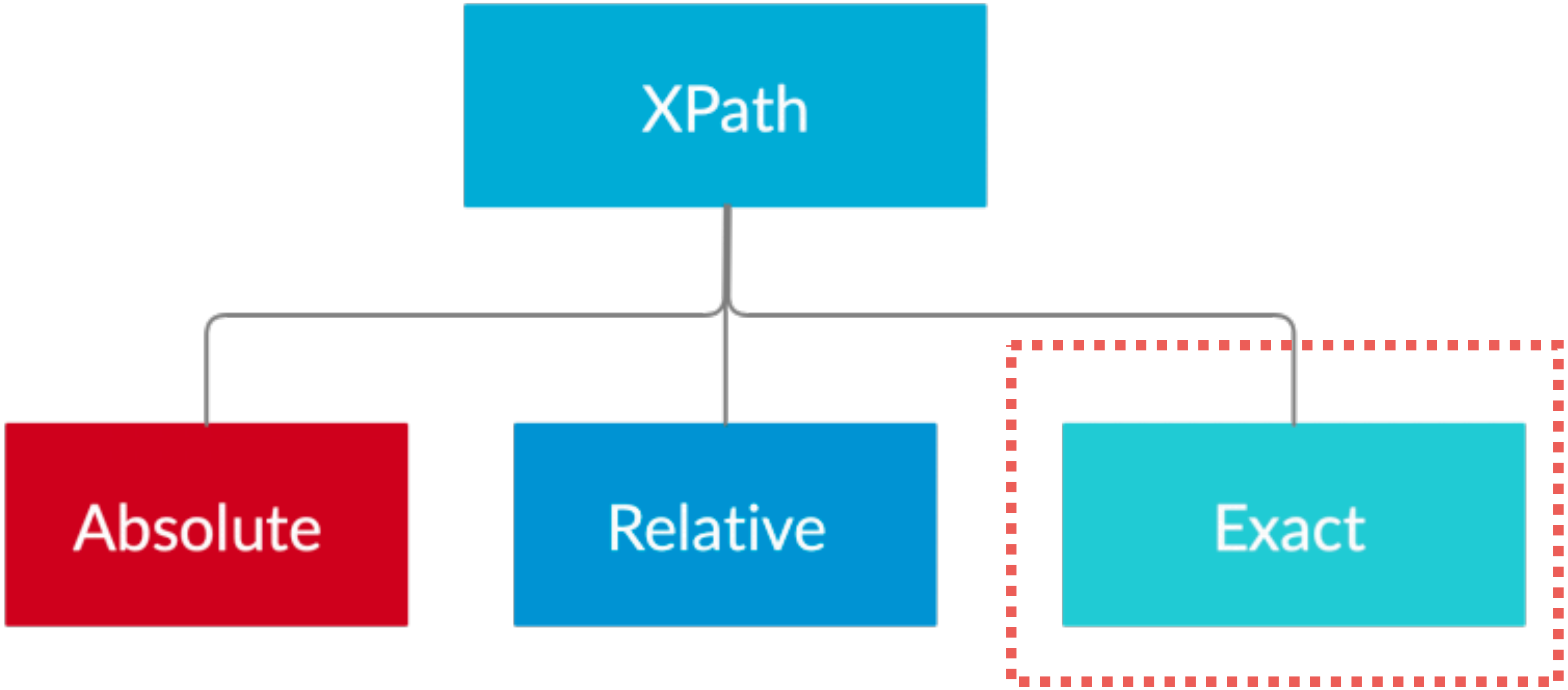
/html/body/div[1]/div/div[2]/form/div[2]/input

Relative



//div[@id='divUsername']/input
//form/div[@id='divUsername']/input
//form/*/input

Exact



//div[@class='datevalue currmonth']//span[./text()='2']

Absolute faster than Relative
But shortest is better

Element Interactions

Element Interactions

Command	Description
click()	Tab an element
sendKeys()	Enter keystrokes into an input field
clear()	Clear an input field
getText()	Retrieve the text displayed from a field or label

http://appium.io/docs/en/commands/element/find-elements/index.html#selector-strategies

Waiting for Elements

Waiting …

Static waits (sleep)

Explicit waits

Working with Robot Framework

https://robotframework.org/

https://github.com/serhatbolsu/robotframework-appiumlibrary

Install via pip

```
$pip install --upgrade robotframework
$pip install --upgrade robotframework-appiumlibrary
```

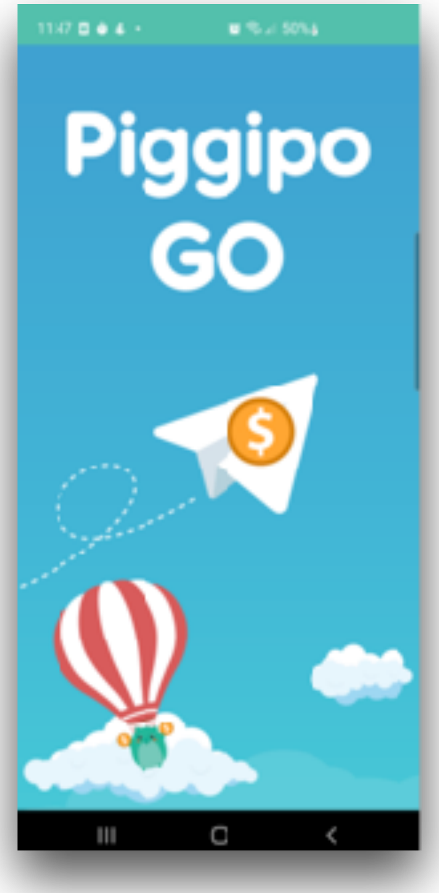
Manage App’s States

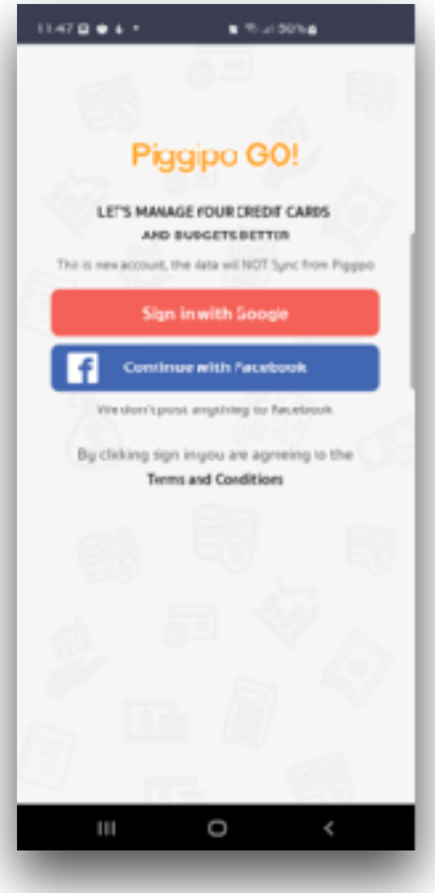
Manage App’s States

Easy for test

Reduce test steps

Manage App’s States




Piggipo GO!

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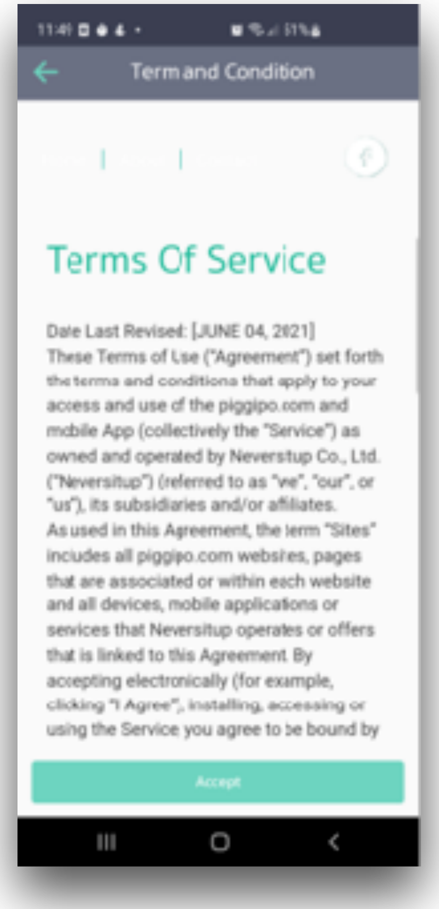
This is new account, the data will NOT Sync from Piggipo

We don't post anything to Facebook

By clicking sign in you are agreeing to the Terms and Conditions



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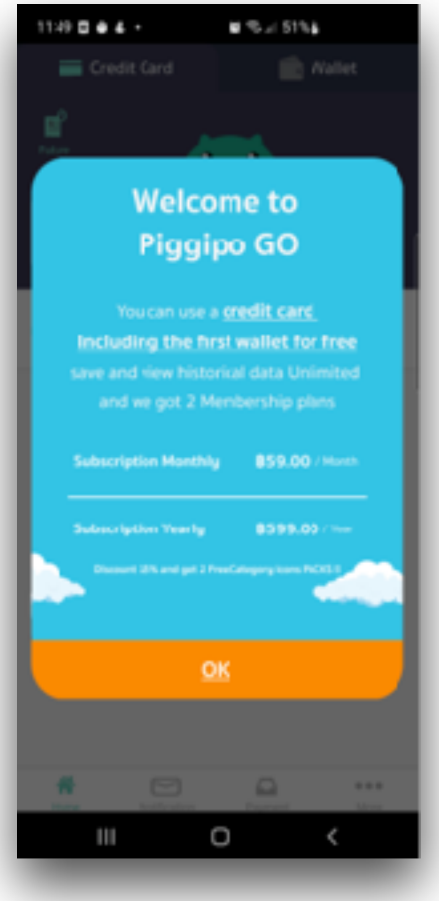

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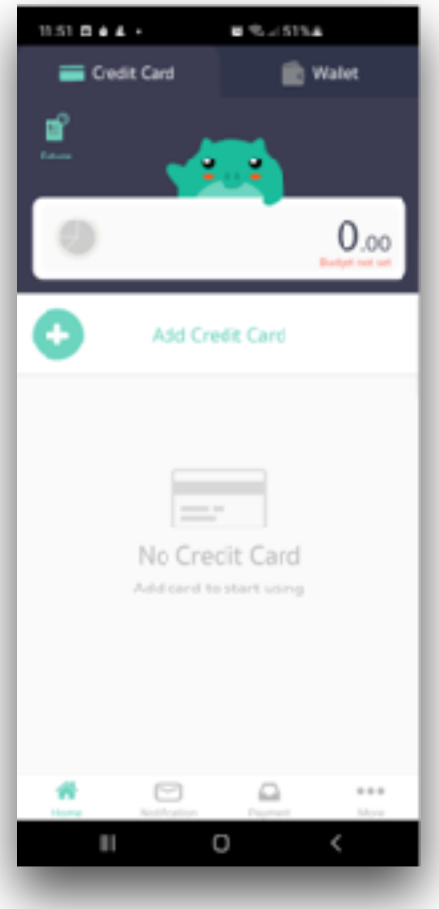
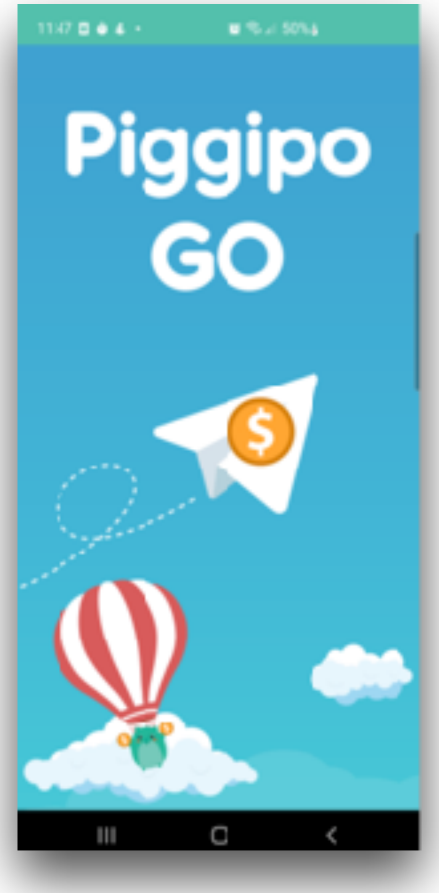
Discount [illegible]

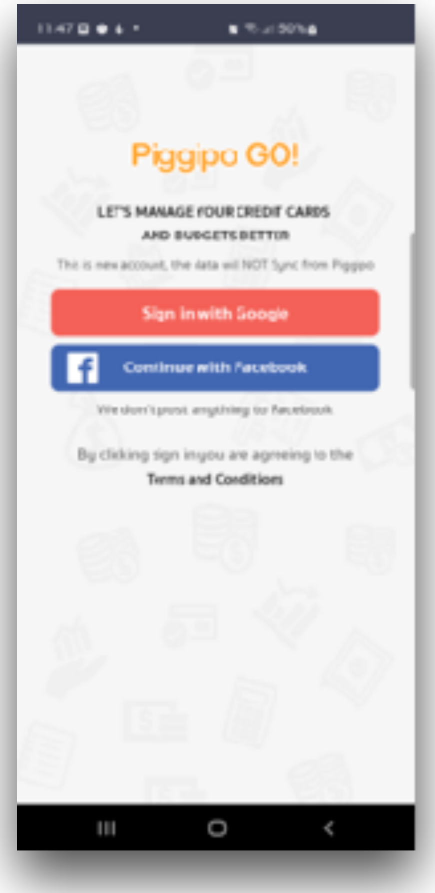


No Credit Card

Add card to start using

Manage App’s States





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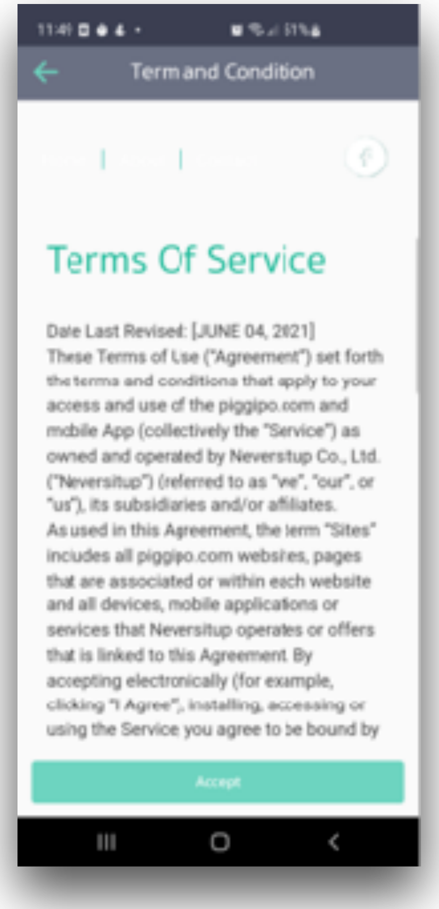

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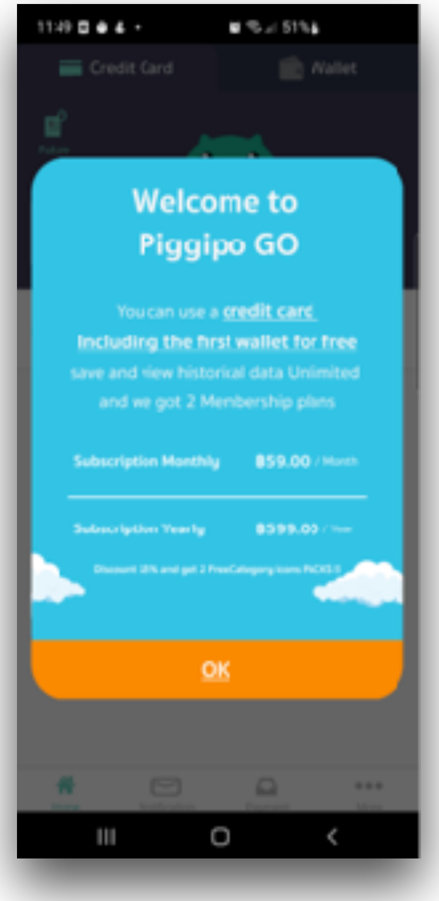

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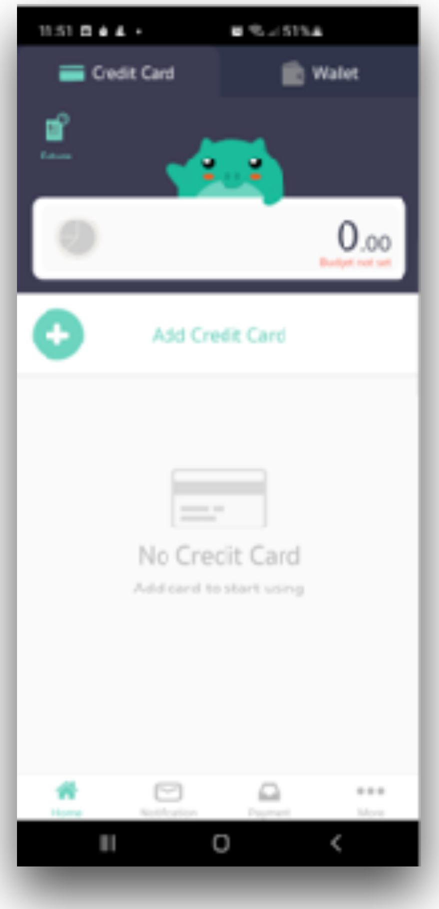


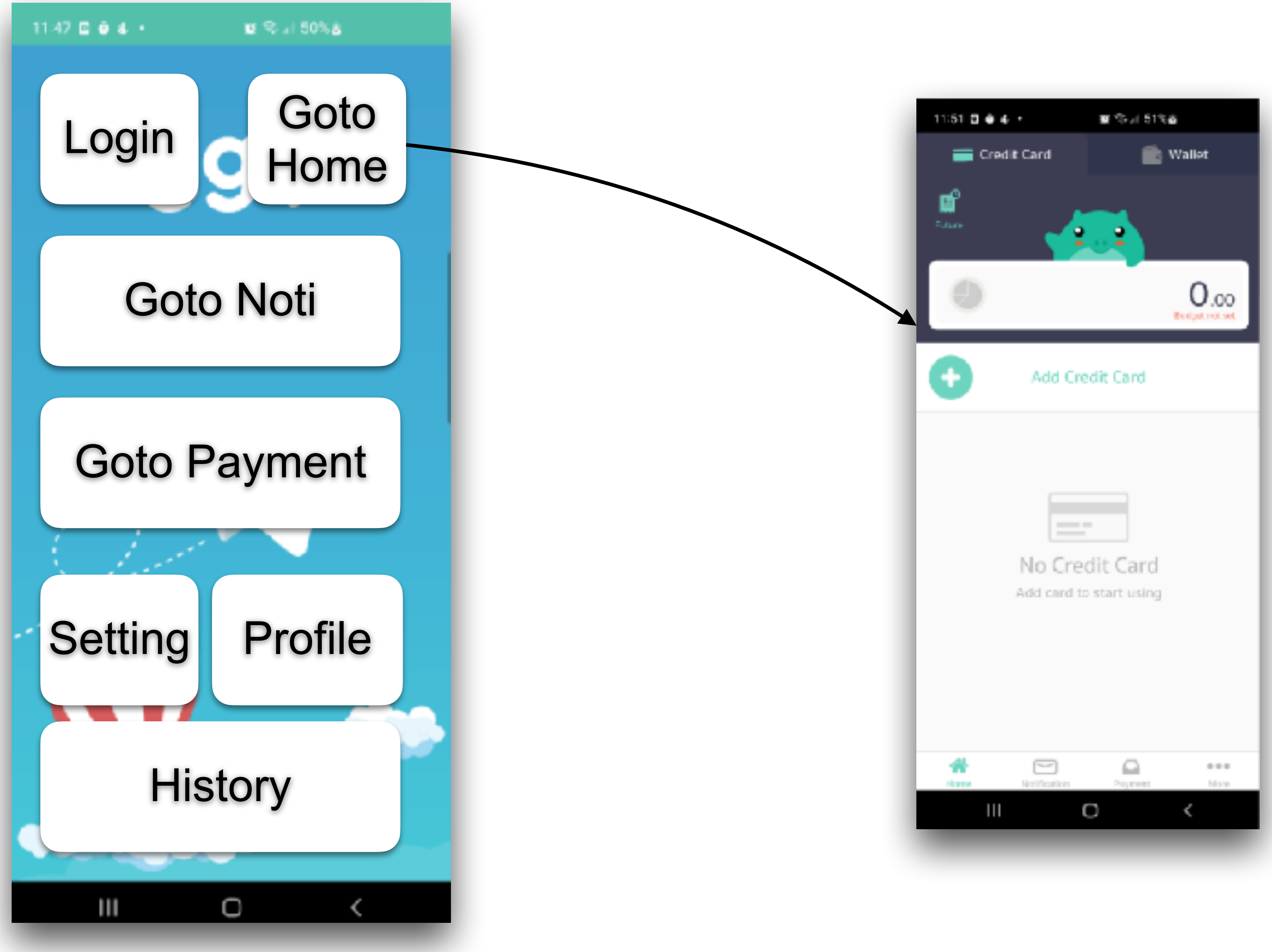
Manage App’s States

Use only in test build of the app

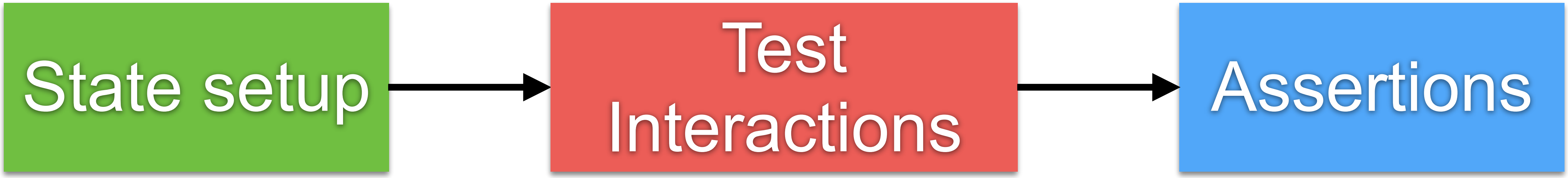
Screen with on-click link to all area of app

Link can even populate data

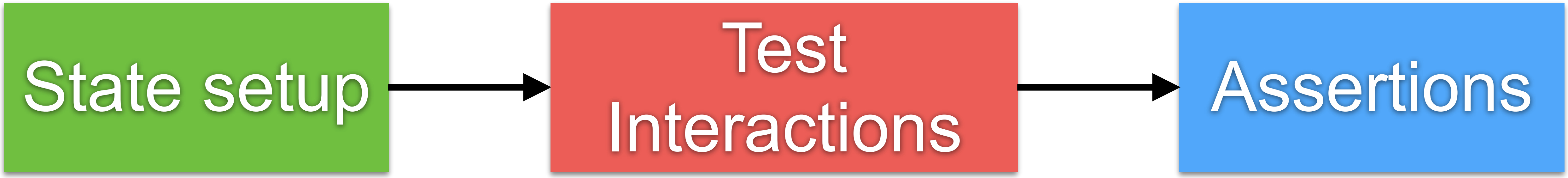
Manage App’s States



State vs. Assertions



State vs. Assertions



State setup

Test Interactions

Assertions

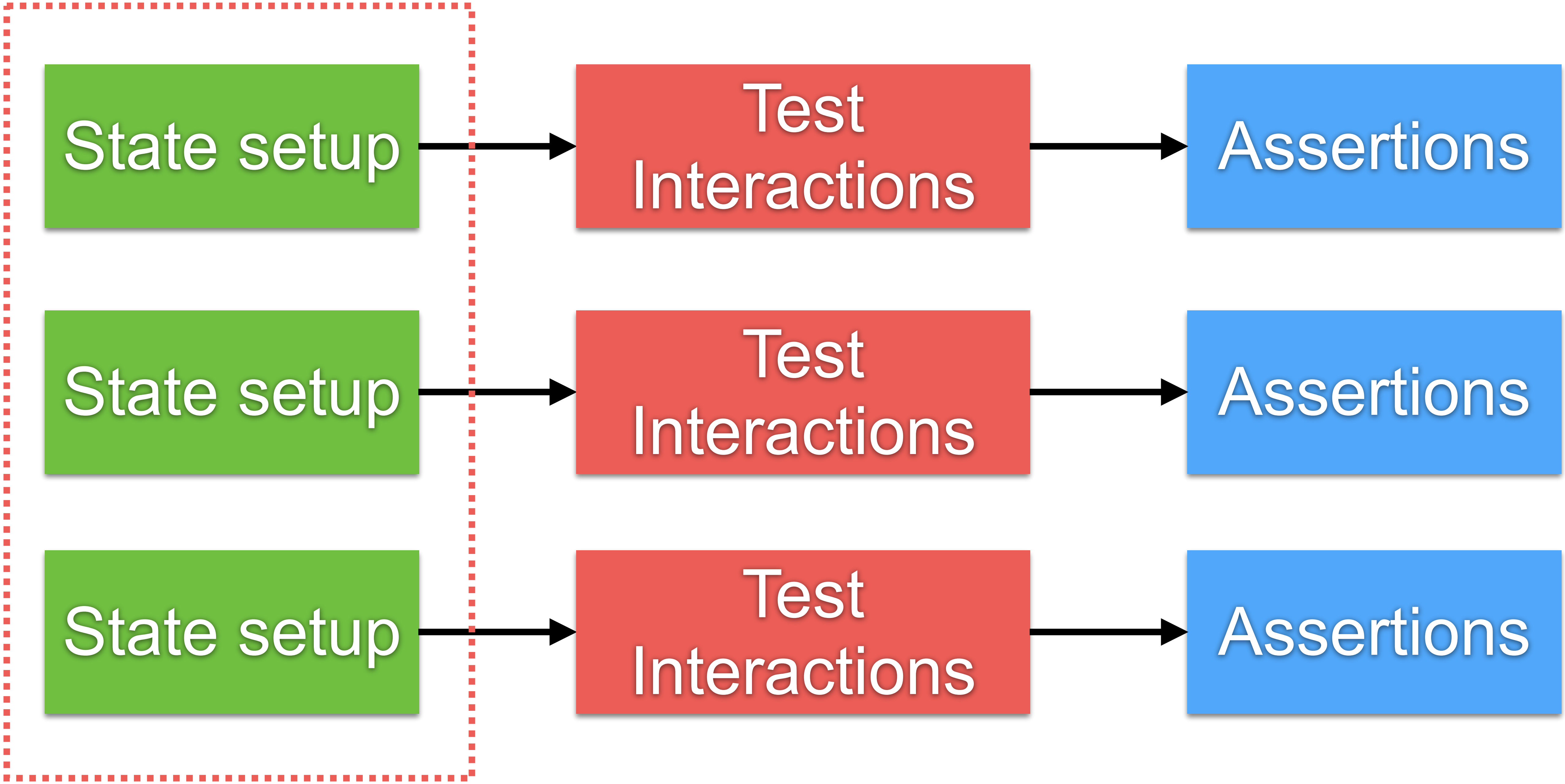
Create account and login

Add item to cart

Check cart quantity

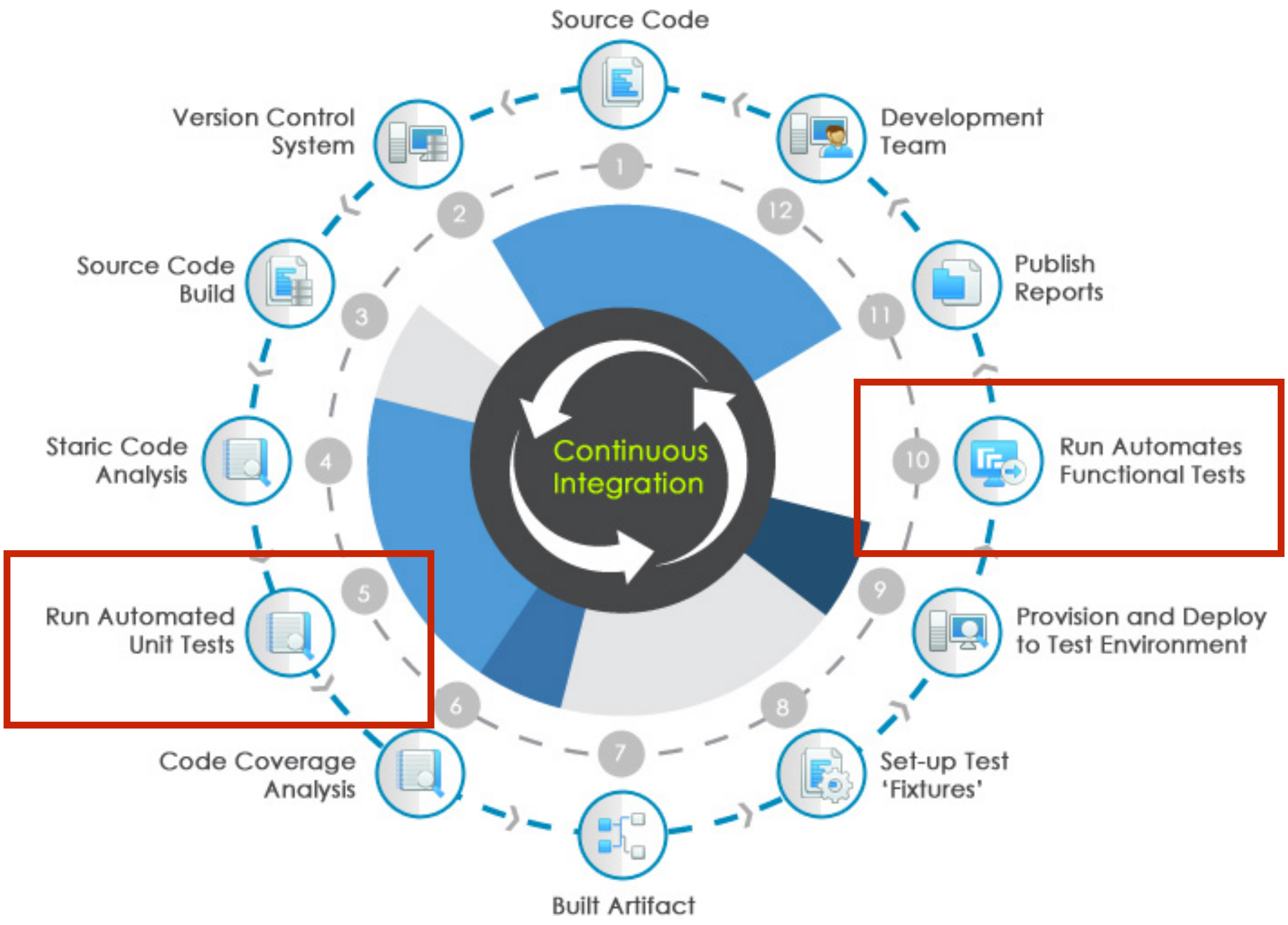
State vs. Assertions

Not too much time !!

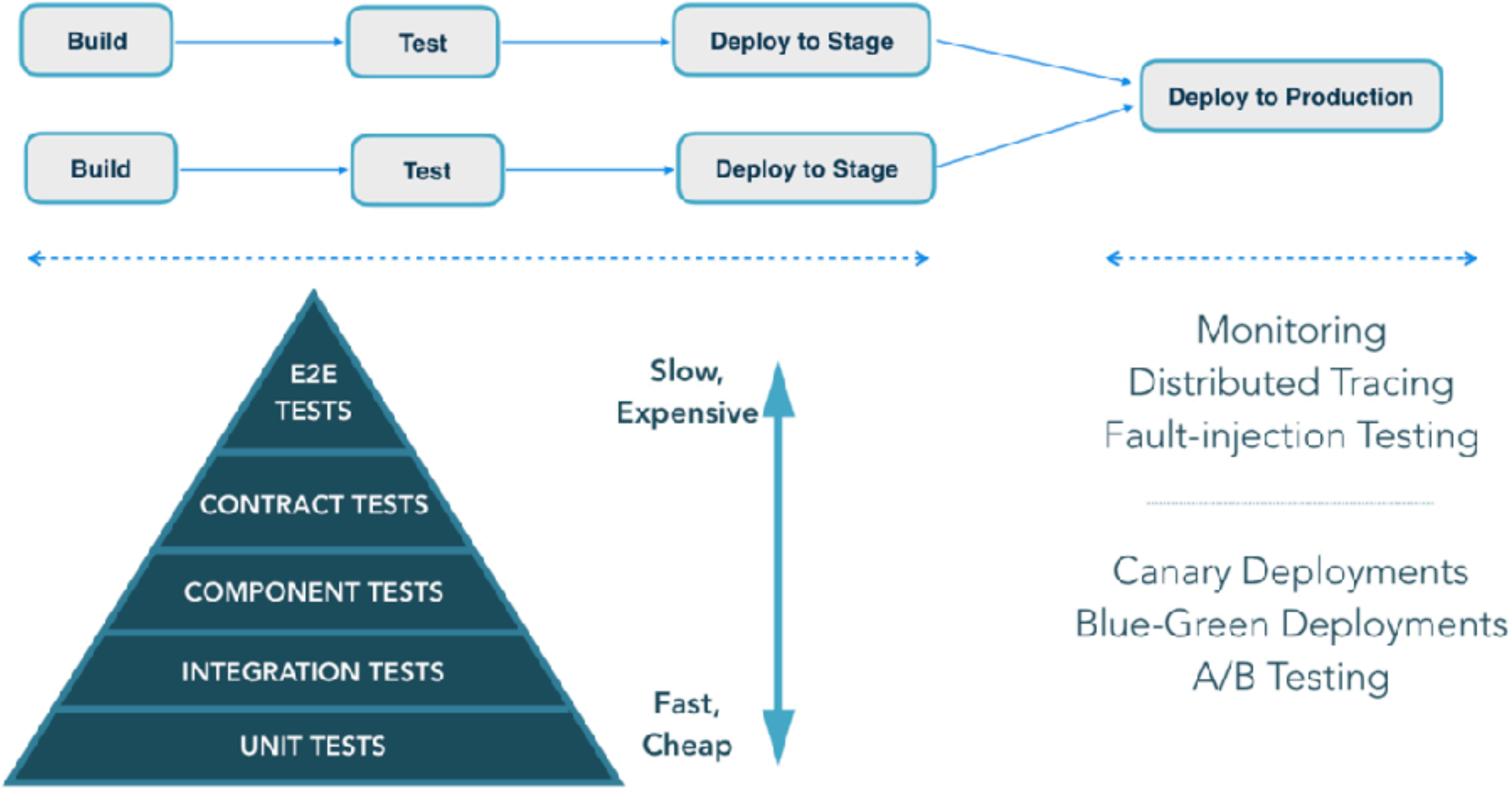


Continuous Integration

Continuous integration



Test strategy



Build → Test → Deploy to Stage

Build → Test → Deploy to Stage

Deploy to Production

E2E TESTS

CONTRACT TESTS

COMPONENT TESTS

INTEGRATION TESTS

UNIT TESTS

Slow, Expensive

Fast, Cheap

Monitoring

Distributed Tracing

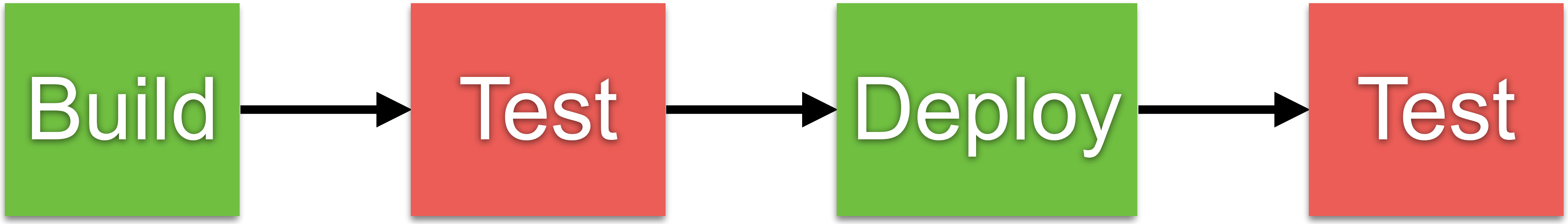
Fault-injection Testing

Canary Deployments

Blue-Green Deployments

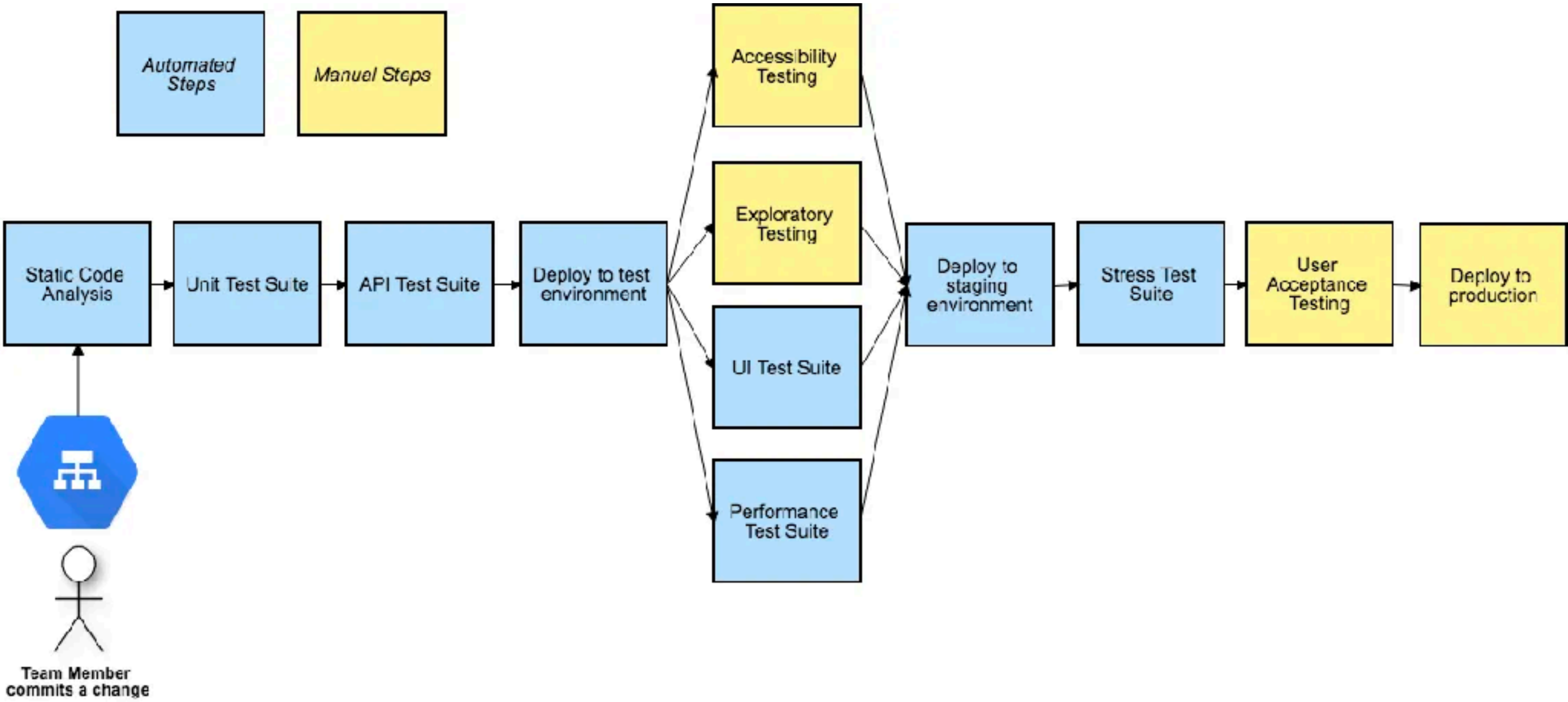
A/B Testing

Design your pipeline

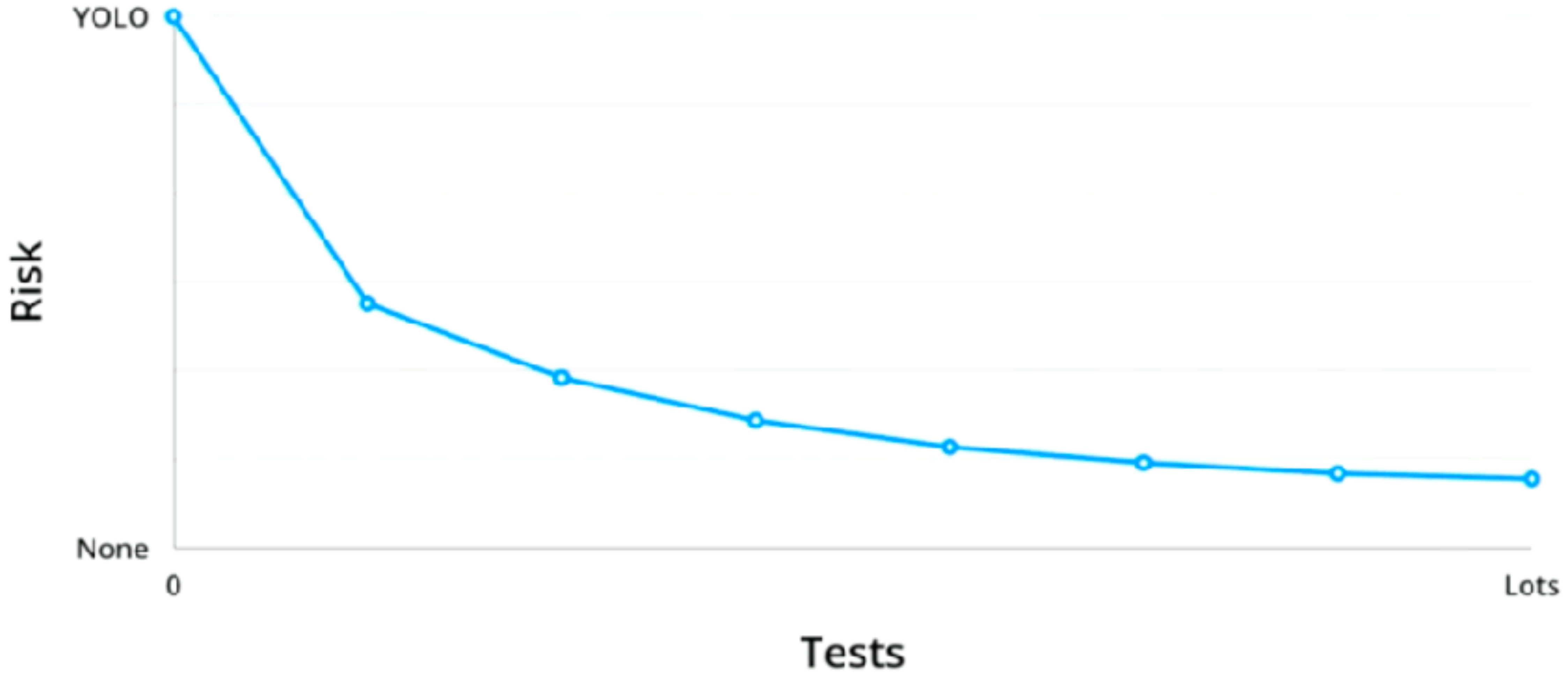


Build → Test → Deploy → Test

Design your pipeline/process



Reduce risk with tests



Q/A