



Tchelinux

Alegrete 2019

Automação de Testes de Software Mobile



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Alegrete 2019

Sobre a Palestante

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- Bacharel em Engenharia de Computação;
- Aluna de Pós-Graduação em Ciência da Computação;
- Atuação profissional nas áreas de verificação de circuitos digitais e teste de software.



github.com/llfreitas



[luanadfrees](https://t.me/luanadfrees)

Assuntos

- Teste de software em dispositivos Móveis
- Automação de testes de software
- Testes caixa-preta / UI

Por quê? Pra que?

- Qualidade de software é um dos fatores decisivos para o total sucesso do seu negócio. Por isso é essencial fazer teste de software.
- R\$ => Produto => Qualidade => Testes
- Solucionar problemas antes de serem problemas!

O que não é teste de software?

- Não é necessário
- Não é perda de tempo
- Não é bagunça
- Não é “compilou tá pronto”
- Não é “já tá rodando pra que mexer”
- Não é “se der tempo eu faço”

O que é teste de software?

- **Teste**

- O software é testado para revelar erros cometidos inadvertidamente quando projetado e construído.
- O teste começa pelo “pequeno” e passa para o “grande”.

- **Verificação**

- O processo de verificação confirma que o software atende todos os requisitos técnicos.

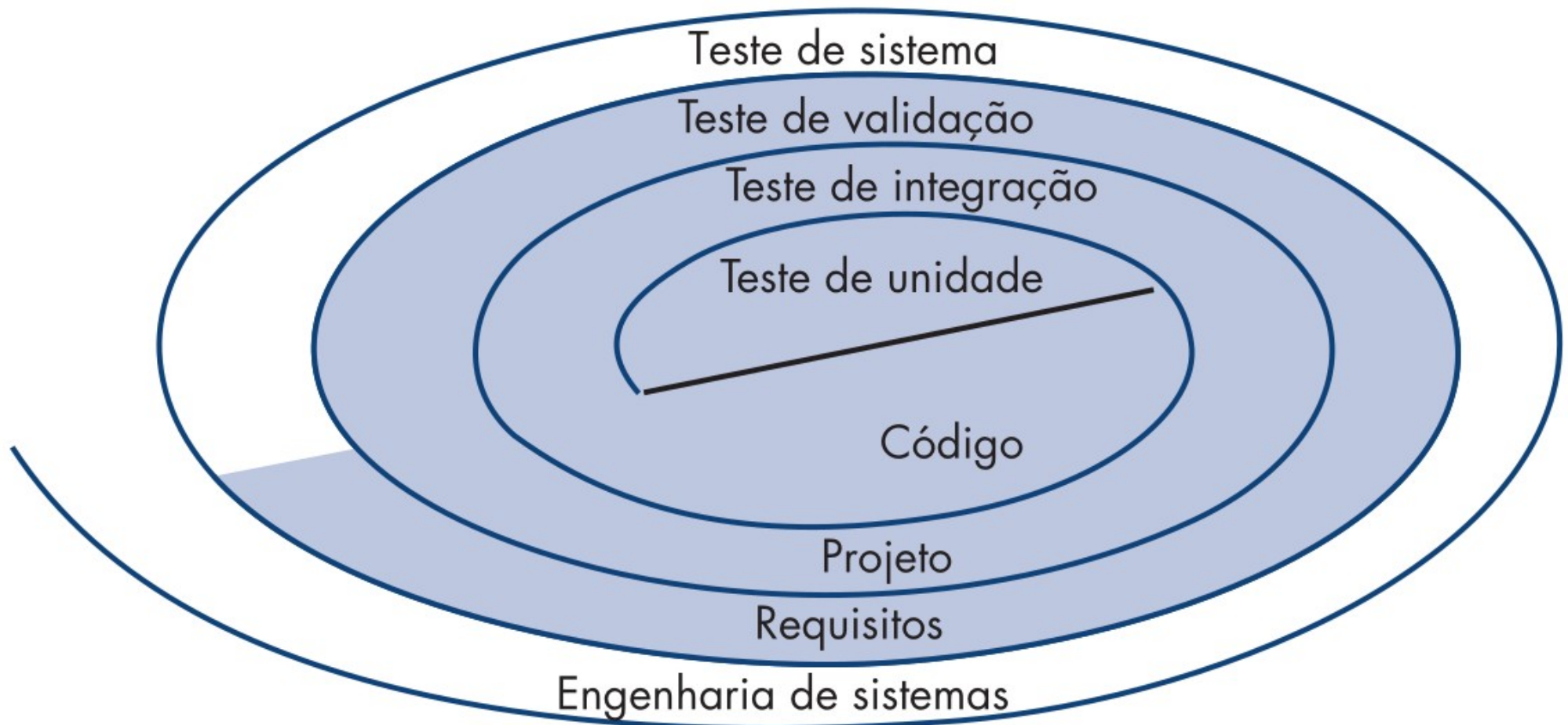
- **Validação**

- O processo de validação confirma que o software atende todos os requisitos funcionais e de negócio.

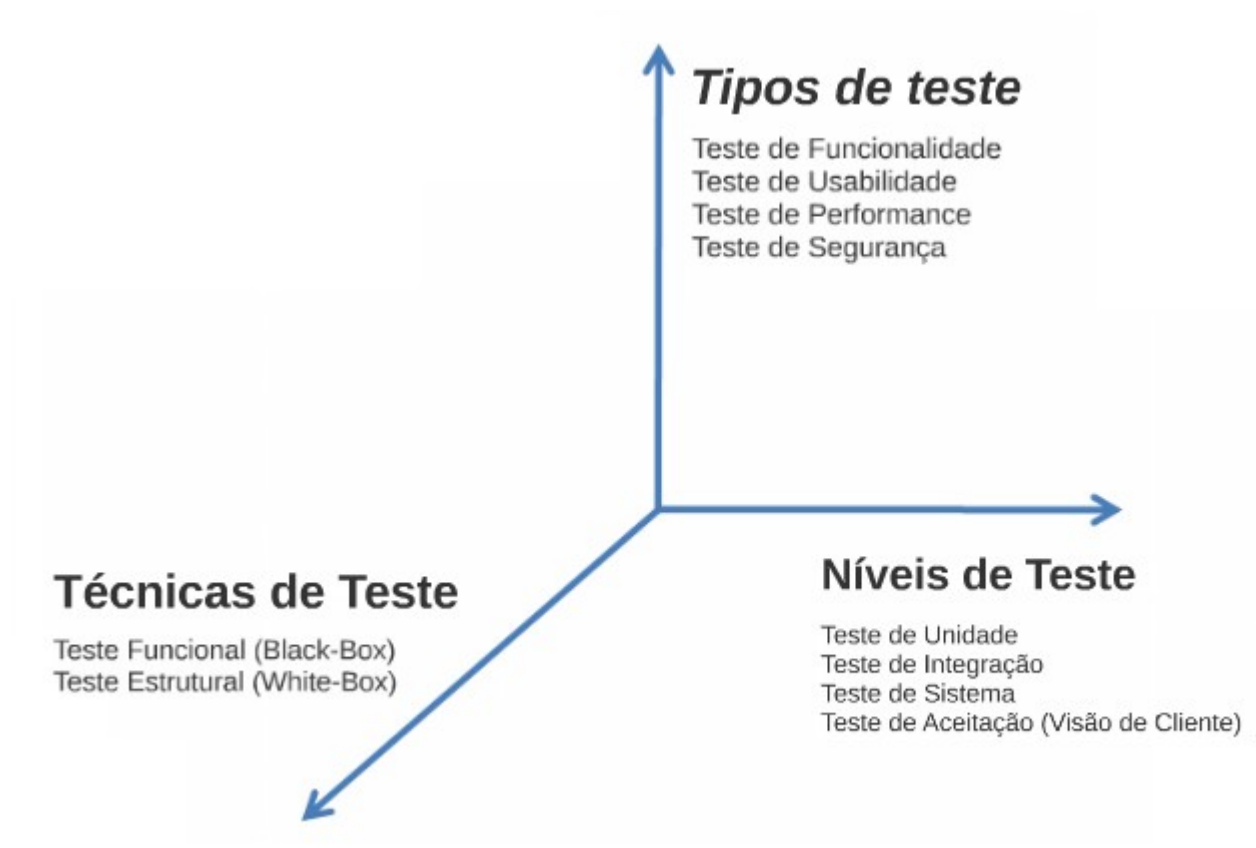
- **Busca de defeitos**

- O processo de busca de defeitos confirma se o software está se comportando como deveria, mesmo em cenários não esperados.

Conceitos de Teste de Software



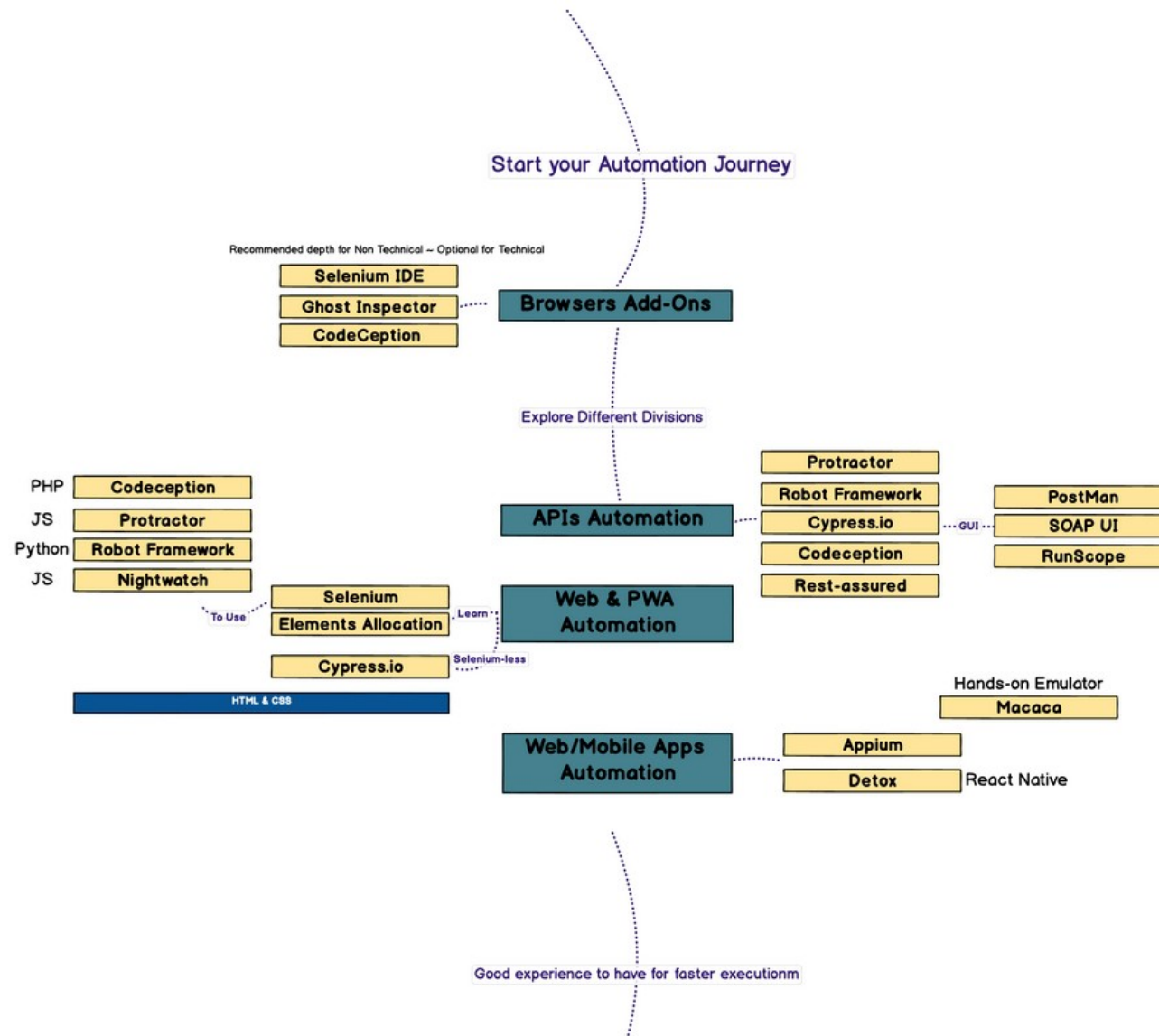
Conceitos de Teste de Software



Teste de Software Automatizado

Automation Testing Depth

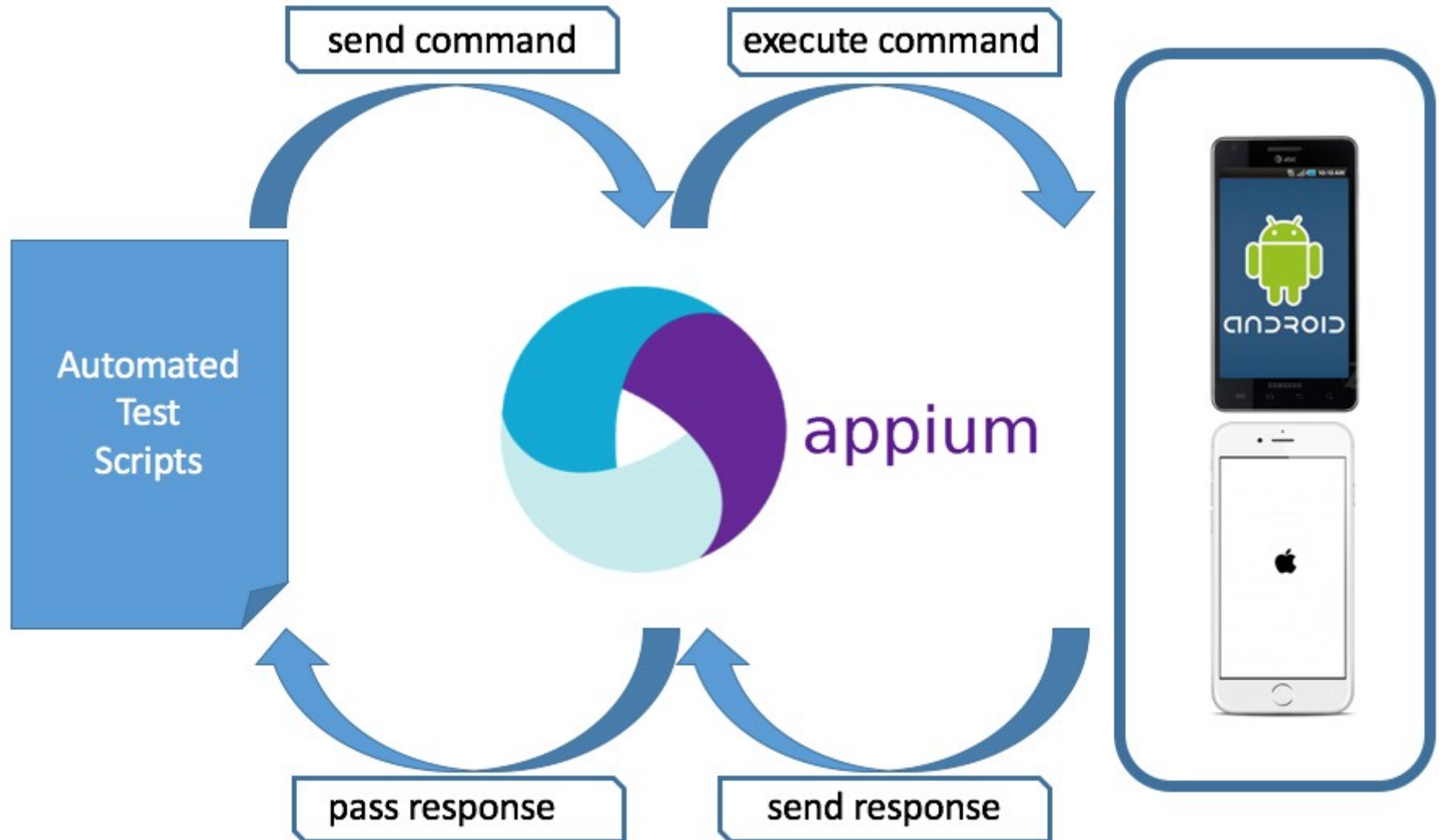
"It's automation, not automagic." — Jim Hazen



Teste de Software Automatizado



Appium: Arquitetura



Appium: Funcionalidades

- Drivers: UiAutomator, Selendroid, Espresso
XCUITest
- Comandos
 - Configuração / Status / Device
 - Find Elements: Estratégias
 - Ações: Click, Send_keys, touch
- Clientes: Ruby, Python, C++, Js ...

Appium: Funcionalidades

Selector Strategies

Strategy	Description
Accessibility ID	Read a unique identifier for a UI element. For XCUITest it is the element's <code>accessibility-id</code> attribute. For Android it is the element's <code>content-desc</code> attribute.
Class name	For IOS it is the full name of the XCUI element and begins with XCUIElementType. For Android it is the full name of the UIAutomator2 class (e.g.: <code>android.widget.TextView</code>)
ID	Native element identifier. <code>resource-id</code> for android; <code>name</code> for IOS.
Name	Name of element
XPath	Search the app XML source using xpath (not recommended, has performance issues)
Image	Locate an element by matching it with a base 64 encoded image file
Android UiAutomator (UiAutomator2 only)	Use the UI Automator API, in particular the <code>UISelector</code> class to locate elements. In Appium you send the Java code, as a string, to the server, which executes it in the application's environment, returning the element or elements.
Android View Tag (Espresso only)	Locate an element by its <code>view tag</code>
Android Data Matcher (Espresso only)	Locate an element using <code>Espresso DataMatcher</code>
IOS UIAutomation	When automating an iOS application, Apple's <code>Instruments</code> framework can be used to find elements

Ambiente de Desenvolvimento

- Selenium W3C → Appium
- Python
 - Appium_client_python
 - Pytest
- Android SDK
 - Adb, UIAutomator, apkanalyzer, emulador
- Android Studio
 - AVD

Váriaveis de Ambiente

```
export JAVA_HOME=/usr/lib/jvm/java-8-openjdk/
```

```
ANDROID_SDK_ROOT=/home/freitas/Android/Sdk
```

```
export ANDROID_SDK_ROOT
```

```
export ANDROID_HOME=/home/freitas/Android/Sdk
```

```
export PATH=$PATH:$JAVA_HOME/bin:$ANDROID_HOME/emulator
```


Execução do ambiente

```
Terminal - root@Voyager:/home/freitas

Arquivo  Editar  Ver  Terminal  Abas  Ajuda

Appium-server

[Voyager freitas]# appium-doctor
info AppiumDoctor Appium Doctor v.1.11.1
info AppiumDoctor ### Diagnostic for necessary dependencies starting ###
info AppiumDoctor ✓The Node.js binary was found at: /usr/bin/node
info AppiumDoctor ✓Node version is 12.9.1
info AppiumDoctor ✓ANDROID_HOME is set to: /home/freitas/Android/Sdk
info AppiumDoctor ✓JAVA_HOME is set to: /usr/lib/jvm/java-8-openjdk/
info AppiumDoctor ✓adb exists at: /home/freitas/Android/Sdk/platform-tools/adb
info AppiumDoctor ✓android exists at: /home/freitas/Android/Sdk/tools/android
info AppiumDoctor ✓emulator exists at: /home/freitas/Android/Sdk/tools/emulator
WARN AppiumDoctor ✗ Bin directory for $JAVA_HOME is not set
info AppiumDoctor ### Diagnostic for necessary dependencies completed, one fix needed. ###
info AppiumDoctor ### Diagnostic for optional dependencies starting ###
WARN AppiumDoctor ✗ opencv4nodejs cannot be found.
info AppiumDoctor ✓ffmpeg is installed at: /usr/bin/ffmpeg. ffmpeg version n4.2 Copyright (c) 2000-2019 the FFmpeg developers
WARN AppiumDoctor ✗ mjpeg-consumer cannot be found.
WARN AppiumDoctor ✗ bundletool.jar cannot be found
info AppiumDoctor ### Diagnostic for optional dependencies completed, 3 fixes possible. ###
info AppiumDoctor ### Manual Fixes Needed ###
info AppiumDoctor The configuration cannot be automatically fixed, please do the following first:
WARN AppiumDoctor →Add '$JAVA_HOME/bin' to your PATH environment
info AppiumDoctor ### Optional Manual Fixes ###
info AppiumDoctor The configuration can install optionally. Please do the following manually:
WARN AppiumDoctor →Why opencv4nodejs is needed and how to install it: https://github.com/appium/appium/blob/master/docs/en/writing-running-appium/image-comparison.md
WARN AppiumDoctor →mjpeg-consumer module is required to use MJPEG-over-HTTP features. Please install it with 'npm i -g mjpeg-consumer'.
WARN AppiumDoctor →bundletool.jar is used to handle Android App Bundle. Please read http://appium.io/docs/en/writing-running-appium/android/android-appbundle/ to install it
info AppiumDoctor ###
info AppiumDoctor Bye! Run appium-doctor again when all manual fixes have been applied!

[freitas@Voyager Alegrete2019]$ ~/Android/Sdk/tools/bin/uiautomatorviewer
08:11:03 E/adb: * daemon not running; starting now at tcp:5037
08:11:06 E/adb: * daemon started successfully
```

Inspector SDK
Android

```
Terminal - freitas@Voyager:/run/media/freitas/1058-275C/Alegrete2019

Arquivo  Editar  Ver  Terminal  Abas  Ajuda

Appium-Client +
pytest

test_tche_flutter2.py      test_tche_imdb_search_assert.webm
test_tche_flutter_fail.webm test_tche_imdb_search.py
test_tche_flutter.py       test_tche_imdb_search.webm
test_tche_flutter.webm

[freitas@Voyager Alegrete2019]$ pytest -s test_tche
test_tche_chess.py          test_tche_imdb_login.py
test_tche_flutter2.py       test_tche_imdb.py
test_tche_flutter_fail.webm test_tche_imdb_search_assert.webm
test_tche_flutter.py        test_tche_imdb_search.py
test_tche_flutter.webm      test_tche_imdb_search.webm

[freitas@Voyager Alegrete2019]$ pytest -s test_tche
test_tche_chess.py          test_tche_imdb_login.py
test_tche_flutter2.py       test_tche_imdb.py
test_tche_flutter_fail.webm test_tche_imdb_search_assert.webm
test_tche_flutter.py        test_tche_imdb_search.py
test_tche_flutter.webm      test_tche_imdb_search.webm

[freitas@Voyager Alegrete2019]$ pytest -s test_tche

Arquivo  Editar  Ver  Terminal  Abas  Ajuda

[freitas@Voyager Alegrete2019]$ emulator -list-avds
Pixel_2_API_24
Pixel_2_XL_API_28
[freitas@Voyager Alegrete2019]$ emulator -avd Pixel_2_API_24
emulator: emulator window was out of view and was recentered

Your emulator is out of date, please update by launching Android Studio:
- Start Android Studio
- Select menu "Tools > Android > SDK Manager"
- Click "SDK Tools" tab
- Check "Android Emulator" checkbox
- Click "OK"
```

Emulador SDK
Android

Execução do ambiente

- adb devices -l

List of devices attached

adb server version (41) doesn't match this client (39); killing...

* daemon started successfully

emulator-5554 device product:[sdk_gphone_x86_64](#)

model:Android_SDK_built_for_x86_64 device:generic_x86_64 transport_id:1

- freitas:~/Android/Sdk\$ adb shell

adb server version (41) doesn't match this client (39); killing...

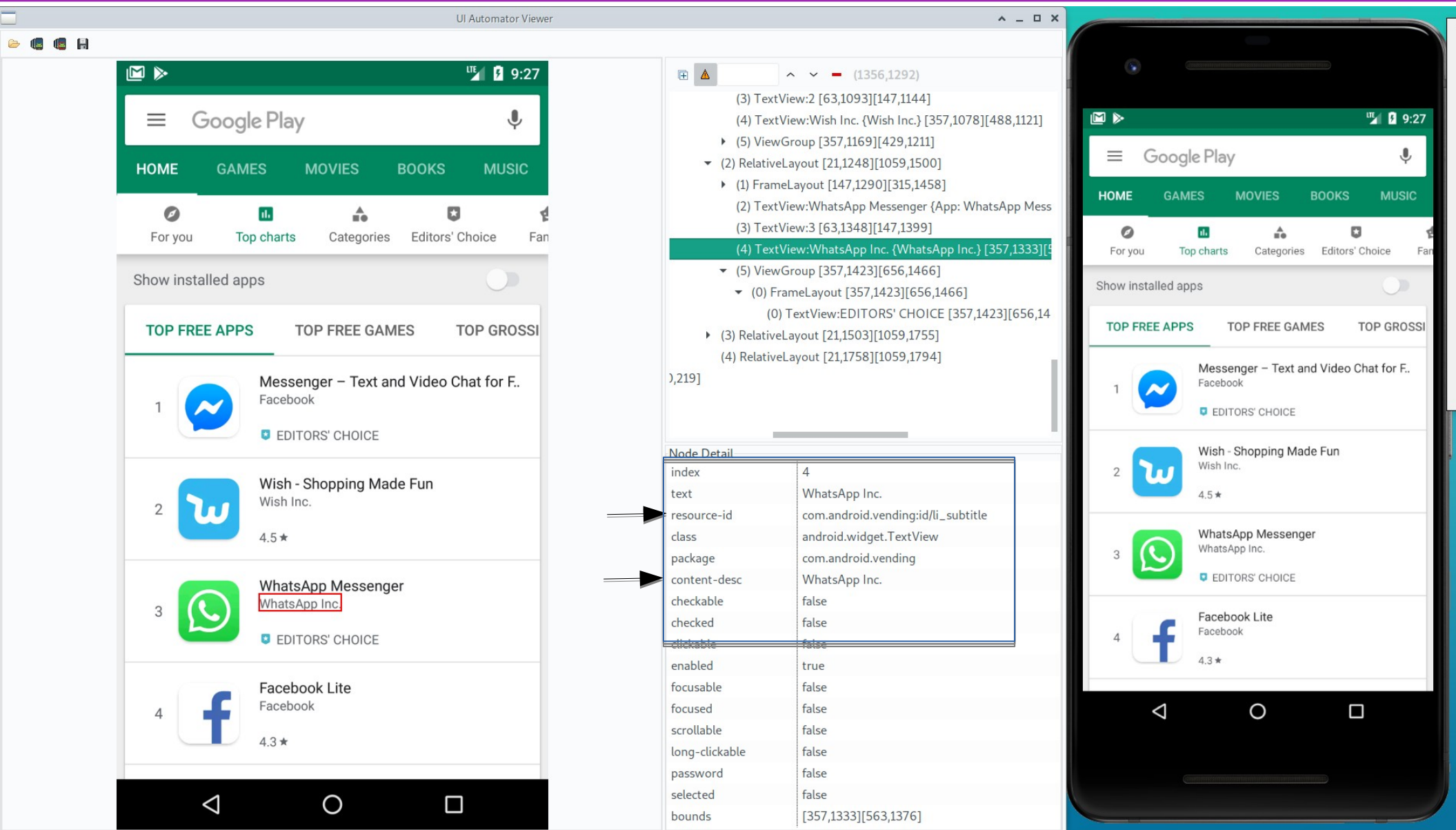
* daemon started successfully

dumpsys window windows | grep -E 'mCurrentFocus|mFocusedApp'

mCurrentFocus=Window{f349c26 u0 [com.imdb.mobile/com.imdb.mobile.HomeActivity](#)}

mFocusedApp=AppWindowToken{a7d809b token=Token{f0caca
ActivityRecord{1d1d395 u0 com.imdb.mobile/.HomeActivity t8}}}

UiAutomator



UiAutomator

UI Automator Viewer

The image displays the UI Automator Viewer interface, which is used for testing Android applications. The interface is divided into three main sections:

- Left Panel:** Shows a screenshot of the Google Play Store app list. The "Categories" tab is selected and highlighted with a red box. The list shows the top free apps, including Messenger, Wish, WhatsApp Messenger, and Facebook Lite.
- Middle Panel:** Displays the UI hierarchy (DOM) of the selected app (IMDb). The hierarchy is shown as a tree structure with nodes representing different UI elements. The "Categories" button is highlighted in green. Below the hierarchy, a "Node Detail" table provides information about the selected node.
- Right Panel:** Shows a screenshot of the IMDb app interface, including the app's title, rating, downloads, and a list of recommended apps.

Node Detail Table:

Property	Value
index	2
text	
resource-id	
class	android.widget.Button
package	com.android.vending
content-desc	Home, Categories
checkable	false
checked	false
clickable	true
enabled	true
focusable	true
focused	false
scrollable	false
long-clickable	false
password	false
selected	false
bounds	[491,336][726,483]

IMDb

UI Automator Viewer

10:10

IMDb

HOME MOVIES TV CELEBS AWARDS & EVENTS

IMDb EXCLUSIVE
TRAILER WITH COMMENTARY

'Hustlers' Trailer With Director's Comm...

2019 'Hustlers' Trailer With Director's Comm...

IMDb at TORONTO 2019 presented by The GOLDFINCH WATCH NOW

Eddie Redmayne Says He'd 'Love to Play the Riddler'

Node Detail

index	0
text	
resource-id	com.imdb.mobile:id/search
class	android.widget.TextView
package	com.imdb.mobile
content-desc	Search IMDb
checkable	false
checked	false
clickable	true
enabled	true
focusable	true
focused	false
scrollable	false
long-clickable	true
password	false
selected	false
bounds	[828,73][954,199]

10:11

IMDb

HOME MOVIES TV CELEBS AWARDS & EVENTS

WATCHMEN
NOTHING EVER ENDS...

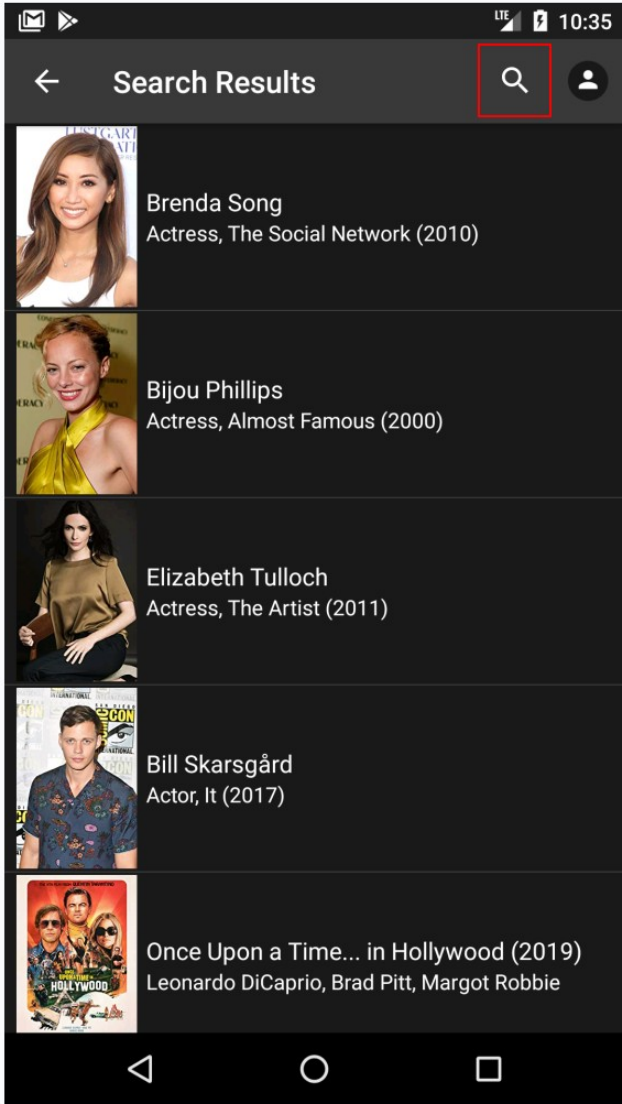
Watchmen
2019 Season 1 Trailer

IMDb at TORONTO 2019 presented by The GOLDFINCH WATCH NOW

Eddie Redmayne Says He'd 'Love to Play the Riddler'

IMDb

UI Automator Viewer



The screenshot shows a mobile app interface for IMDb search results. At the top, there's a dark header bar with a back arrow, the text "Search Results", a search icon (magnifying glass) highlighted with a red box, and a user profile icon. Below the header, there's a list of search results, each featuring a movie poster on the left and text on the right. The results include Brenda Song, Bijou Phillips, Elizabeth Tulloch, Bill Skarsgård, and a movie entry for "Once Upon a Time... in Hollywood (2019)".

Search Results

Brenda Song
Actress, The Social Network (2010)

Bijou Phillips
Actress, Almost Famous (2000)

Elizabeth Tulloch
Actress, The Artist (2011)

Bill Skarsgård
Actor, It (2017)

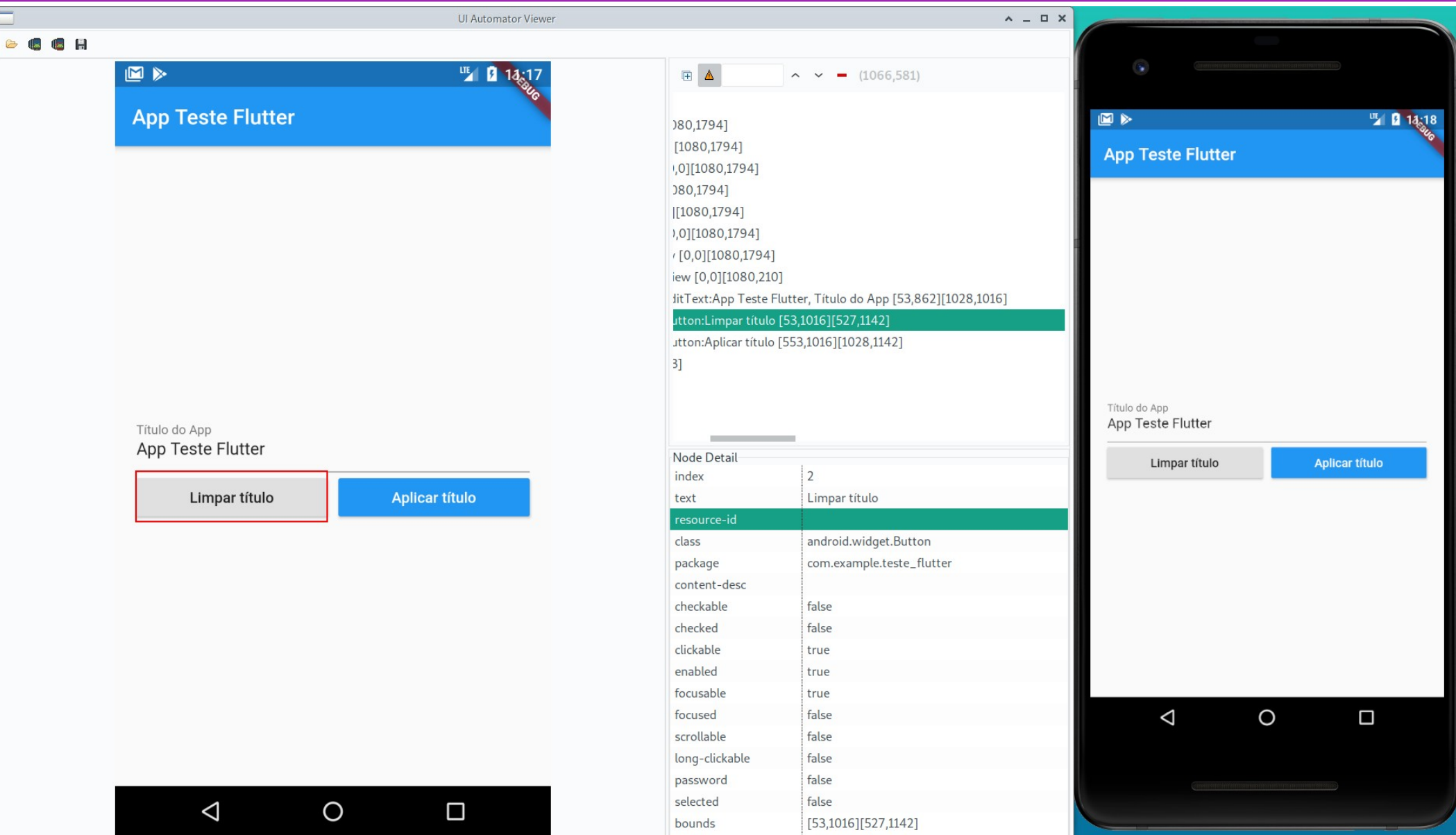
Once Upon a Time... in Hollywood (2019)
Leonardo DiCaprio, Brad Pitt, Margot Robbie

nearLayout [0,63][1080,1794]
) LinearLayout [0,63][1080,210]
(0) ViewGroup [0,63][1080,210]
(0) ImageButton {Navigate up} [0,63][147,210]
(1) TextView:Search Results [189,101][543,172]
▼ (2) android.support.v7.widget.LinearLayoutCompat [828,63][1080,1794]
(0) TextView {Search IMDb} [828,73][954,199]
(1) TextView {Account Page} [954,73][1080,199]
FrameLayout [0,210][1080,1794]
(0) FrameLayout [0,210][1080,1794]
▼ (0) ListView [0,210][1080,1794]
▼ (0) LinearLayout [0,210][1080,535]
(0) com.imdb.mobile.view.AsyncImageView [21,215][231,530]
▼ (1) LinearLayout [247,318][1080,426]
(0) TextView:Brenda Song [247,318][1038,375]
(1) TextView:Actress, The Social Network (2010) [247,375]

Node Detail

index	0
text	
resource-id	com.imdb.mobile:id/search
class	android.widget.TextView
package	com.imdb.mobile
content-desc	Search IMDb
checkable	false
checked	false
clickable	true
enabled	true
focusable	true
focused	false
scrollable	false
long-clickable	true
password	false
selected	false
bounds	[828,73][954,199]

Flutter



Relatórios

```
i: 3 Star Trek (1966 TV Series)
i: 4 William Shatner, Leonard Nimoy, DeForest Kelley
i: 5 Star Trek (2009)
i: 6 Chris Pine, Zachary Quinto, Simon Pegg
i: 7 Star Trek: The Motion Picture (1979)
i: 8 William Shatner, Leonard Nimoy, DeForest Kelley
i: 9 Star Trek: The Next Generation (1987 TV Series)
i: 10 Patrick Stewart, Brent Spiner, Jonathan Frakes
i: 11 Star Trek: Discovery (2017 TV Series)
i: 12 Sonequa Martin-Green, Doug Jones, Anthony Rapp
i: 0 Search Results
i: 1
i: 2
i: 3 Star Trek (1966 TV Series)
Shazam!!!!
i: 0 In the 23rd Century, Captain James T. Kirk and the crew of the USS Enterprise explore the galaxy and
  defend the United Federation of Planets.
.

===== 1 passed in 50.82s =====
[freitas@Voyager Alegrete2019]$ pytest test_tche_imdb_search_API24.py test_tche_imdb_search
test_tche_imdb_search_API24.py      test_tche_imdb_search.py
test_tche_imdb_search_assert.webm  test_tche_imdb_search.webm
[freitas@Voyager Alegrete2019]$ pytest test_tche_imdb_search_API24.py test_tche_imdb_search_API24.py
===== test session starts =====
platform linux -- Python 3.7.4, pytest-5.1.2, py-1.8.0, pluggy-0.12.0
rootdir: /run/media/freitas/1D88-27FC/Alegrete2019
collected 2 items

test_tche_imdb_search_API24.py ..

===== 2 passed in 99.38s (0:01:39) =====
[freitas@Voyager Alegrete2019]$
```


Relatórios

- report_all.html
- report_flutter.html
- report_all_api24.html
 - report_all-log_api24.html



Vida longa e próspera!



Os códigos fontes e demonstrações
estão disponíveis no github.

 github.com/llfreitas

 [luanadfrees](https://t.me/luanadfrees)



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