

Kotlin/Android TDD with Code Coverage

Presentation: <https://github.com/pajato/Argus/KOH.pdf>

Slides: <https://goo.gl/FLFXyn>

App: <https://github.com/pajato/Argus>

Create repo: <https://help.github.com/articles/create-a-repo/>

Getting started with Android Studio:
<https://developer.android.com/training/basics/firstapp/>

Tonight's Story

- The Three Laws of TDD video
- Google's Kotlin blessing
- Streaming video app frustration

Program Correctness != (Comprehensive Testing || 100% Code Coverage)

*“Program testing can be used to show the presence of bugs,
but never their absence.”*

- Edsger Dykstra, 1970, Notes on Structured Programming

*“Code coverage can show the high risk areas in a program, but
never the risk-free.”*

- Paul Reilly, 2018, Kotlin TDD with Code Coverage

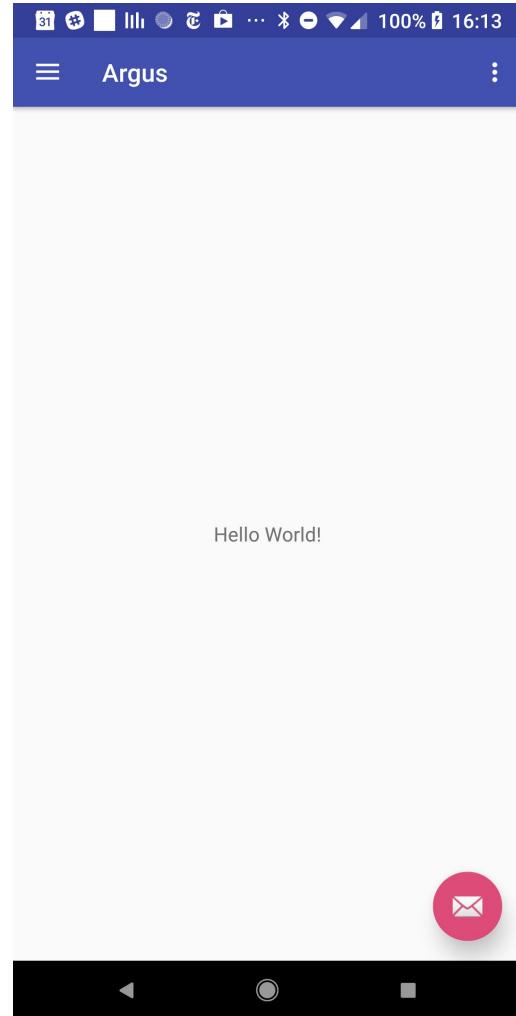
The Three Laws of TDD

<https://www.youtube.com/watch?v=qkblc5WRn-U>

- “Uncle” Bob Martin, a software legend
- The Three Laws of TDD (with Kotlin): Features
 - Instant gratification ... fun!
 - Less debugging
 - Provides documentation
 - Leads to testable production code
 - Leads to decoupled production code
 - Empowers clean code
 - Leads to clear “release” moment: ship, deploy, merge, post PR, etc.

Argus: Setup, Start & Code Coverage

- Start branch: cc-0-percent
- End branch: cc-100-percent



Kotlin/Android TDD with Code com.pajato.argus pmr

← → ⌂ ⓘ file:///Users/pmr/Projects/Argus/app/build/reports/coverage/debug/com.pajato.argus/i... ☆ Apps Apple Eclipse Emacs Git Google Health HTML Java Linux Maven Microsoft » Other Bookmarks

debugAndroidTest > com.pajato.argus Classes Sessions

com.pajato.argus

Element	Missed Instructions	Cov.	Missed Branches	Cov.	Missed	Cxty	Missed	Lines	Missed	Methods	Missed	Classes
MainActivity.kt	0%	0%	16	16	26	26	11	11	2	2	2	
Total	164 of 164	0%	10 of 10	0%	16	16	26	26	11	11	2	2

Generated by the Android Gradle plugin 3.0.1 Created with JaCoCo 0.7.4.201502262128

```
13.
14. class MainActivity : AppCompatActivity(), NavigationView.OnNavigationItemSelectedListener {
15.
16.     override fun onCreate(savedInstanceState: Bundle?) {
17.         super.onCreate(savedInstanceState)
18.         setContentView(R.layout.activity_main)
19.         setSupportActionBar(toolbar)
20.
21.         fab.setOnClickListener { view ->
22.             Snackbar.make(view, "Replace with your own action", Snackbar.LENGTH_LONG)
23.                 .setAction("Action", null).show()
24.         }
25.
26.         val toggle = ActionBarDrawerToggle(
27.             this, drawer_layout, toolbar, R.string.navigation_drawer_open, R.string.navigation_drawer_close)
28.         drawer_layout.addDrawerListener(toggle)
29.         toggle.syncState()
30.
31.         nav_view.setNavigationItemSelectedListener(this)
32.     }
33.
34.     override fun onBackPressed() {
35.         if (drawer_layout.isDrawerOpen(GravityCompat.START)) {
36.             drawer_layout.closeDrawer(GravityCompat.START)
37.         } else {
38.             super.onBackPressed()
39.         }
40.     }
41.
42.     override fun onCreateOptionsMenu(menu: Menu): Boolean {
43.         // Inflate the menu; this adds items to the action bar if it is present.
44.         menuInflater.inflate(R.menu.main, menu)
45.         return true
46.     }
47.
48.     override fun onOptionsItemSelected(item: MenuItem): Boolean {
49.         // Handle action bar item clicks here. The action bar will
50.         // automatically handle clicks on the Home/Up button, so long
51.         // as you specify a parent activity in AndroidManifest.xml.
52.         when (item.itemId) {
53.             R.id.action_settings -> return true
54.             else -> return super.onOptionsItemSelected(item)
55.         }
56.     }
57.
58.     override fun onNavigationItemSelected(item: MenuItem): Boolean {
59.         // Handle navigation view item clicks here.
60.         when (item.itemId) {
61.             R.id.nav_camera -> {
62.                 // Handle the camera action
63.             }
64.             R.id.nav_gallery -> {
65.             }
66.             R.id.nav_slideshow -> {
67.             }
68.             R.id.nav_manage -> {
69.             }
70.             R.id.nav_share -> {
71.             }
72.             R.id.nav_send -> {
73.             }
74.         }
75.         drawer_layout.closeDrawer(GravityCompat.START)
76.         return true
77.     }
78. }
79.
80.
81. 
```

Test Results — Tests in 'com.pajato.argus'

Cantina

file:///Users/pmr/Projects/Argus/Test%20Results%20-%20Tests_in_com_pajato_argus.html

Tests in 'com.pajato.argus': 11 total, 11 passed

11.21 s

[Collapse](#) | [Expand](#)

com.pajato.argus.ExampleInstrumentedTest	0 ms
useApplicationContext	passed 0 ms
com.pajato.argus.MainActivityTest	11.18 s
testNavMenuItems	passed 7.54 s
testInitialState	passed 307 ms
testFabButton	passed 638 ms
testBackPressUsingNavDrawer	passed 1.27 s
testOverflowMenuSettingsItem	passed 893 ms
testBackPress	passed 539 ms
com.pajato.argus.StringExtensionsUnitTest	25 ms
testStrip	passed 0 ms
testStripMiddle	passed 0 ms
testStripLeft	passed 0 ms
testStripRight	passed 25 ms

Generated by Android Studio on 2/6/18 3:39 PM

com.pajato.argus Cantina

file:///Users/pmr/Projects/Argus/app/build/reports/coverage/debug/com.pajato.argus/index.source.html

debugAndroidTest > com.pajato.argus Classes Sessions

com.pajato.argus

Element	Missed Instructions	Cov.	Missed Branches	Cov.	Missed	Cxty	Missed	Lines	Missed	Methods	Missed	Classes
MainActivity.kt	100%	100%	0	11	0	26	0	9	0	2	0	2
StringExtensions.kt	100%	n/a	0	4	0	4	0	4	0	1	0	1
Total	0 of 189	100%	0 of 4	100%	0	15	0	30	0	13	0	3

Generated by the Android Gradle plugin 3.0.1

Created with JaCoCo 0.7.4.201502262128

MainActivity.kt

```
15. 16. #ContainerOptions(CacheImplementation.NO_CACHE)
17. class MainActivity : AppCompatActivity(), NavigationView.OnNavigationItemSelectedListener {
18.
19.     override fun onCreate(savedInstanceState: Bundle?) {
20.         super.onCreate(savedInstanceState)
21.         setContentView(R.layout.activity_main)
22.         setSupportActionBar(toolbar)
23.
24.         fab.setOnClickListener { view ->
25.             Snackbar.make(view, "Replace with your own action", Snackbar.LENGTH_LONG)
26.                 .setAction("Action", null).show()
27.         }
28.
29.         val toggle = ActionBarDrawerToggle(
30.             this, drawer_layout, toolbar, R.string.navigation_drawer_open, R.string.navigation_drawer_close)
31.         drawer_layout.addDrawerListener(toggle)
32.         toggle.syncState()
33.
34.         nav_view.setNavigationItemSelectedListener(this)
35.     }
36.
37.     override fun onBackPressed() {
38.         if (drawer_layout.isDrawerOpen(GravityCompat.START)) {
39.             drawer_layout.closeDrawer(GravityCompat.START)
40.         } else {
41.             super.onBackPressed()
42.         }
43.     }
44.
45.     override fun onCreateOptionsMenu(menu: Menu): Boolean {
46.         // Inflate the menu; this adds items to the action bar if it is present.
47.         menuInflater.inflate(R.menu.main, menu)
48.         return true
49.     }
50.
51.     override fun onOptionsItemSelected(item: MenuItem): Boolean {
52.         // Handle action bar item clicks here. The action bar will
53.         // automatically handle clicks on the Home/Up button, so long
54.         // as you specify a parent activity in AndroidManifest.xml.
55.         when (item.itemId) {
56.             R.id.action_settings -> return true
57.             else -> return super.onOptionsItemSelected(item)
58.         }
59.     }
60.
61.     override fun onNavigationItemSelected(item: MenuItem): Boolean {
62.         // Handle navigation view item clicks here.
63.         when (item.itemId) {
64.             R.id.nav_camera -> {
65.                 // Handle the camera action
66.             }
67.             R.id.nav_gallery -> {
68.
69.             }
70.             R.id.nav_slideshow -> {
71.
72.             }
73.             R.id.nav_manage -> {
74.
75.             }
76.             R.id.nav_share -> {
77.
78.             }
79.             R.id.nav_send -> {
80.
81.             }
82.         }
83.         drawer_layout.closeDrawer(GravityCompat.START)
84.         return true
85.     }
86. }
87. }
```

StringExtensions.kt Cantina

← → ⌂ ⓘ file:///Users/pmr/Projects/Argus/app/build/reports/coverage/debug/com.pajato.argus/StringExtensions.kt.html ☆ ⋮

debugAndroidTest > com.pajato.argus > StringExtensions.kt Sessions

StringExtensions.kt

```
1. package com.pajato.argus
2.
3. /** Return a new String where white-space sequences are replaced with a single space. */
4. fun String.stripMiddle() = this.replace(Regex("\s+"), " ")
5.
6. /** Return a new String where the leading white-space is removed. */
7. fun String.stripLeft() = this.replace(Regex("^\\s+"), "")
8.
9. /** Return a new String where the trailing white-space is removed. */
10. fun String.stripRight() = this.replace(Regex("\\s+$"), "")
11.
12. /** Return a String where all white-space has been trimmed. */
13. fun String.strip() = this.stripLeft().stripRight().stripMiddle()
```

Generated by the Android Gradle plugin 3.0.1 Created with [JaCoCo](#) 0.7.4.201502262128

Argus: first feature - empty video list

- Start branch: cc-100-percent
- End branch: feature-empty-list
- TDD Rules
 1. Write production code only to make a failing unit test pass.
 2. Write only as much of a unit test as it takes to make it fail.
 3. Once a test passes, move onto the next feature/sub-feature, ad nauseum

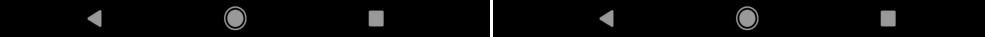


Argus

Hello World!



Tap the button below
to add a video.



← → ⌂ GitHub, Inc. [US] | https://github.com/pajato/Argus/compare/cc-100-percent...feature-empty-list?diff=split&name=feature-empty-list



```
@@ -14,7 +31,6 @@ import android.support.test.rule.ActivityTestRule
14 import android.support.test.runner.AndroidJUnit4
15 import android.view.Gravity
16 import android.view.View
17 -import kotlinx.android.synthetic.*
18 import kotlinx.android.synthetic.main.app_bar_main.*
19 import org.hamcrest.Matcher
20 import org.junit.Assert.fail

@@ -35,6 +51,8 @@ class MainActivityTest {
35
36     /** Ensure that the FAB button click handler code is invoked. */
37     @Test fun testFabButton() {
38         onView(withId(R.id.fab)).perform(click())
39         // TODO: ensure the search activity is invoked.
40     }
@@ -90,7 +108,8 @@ class MainActivityTest {
90     @Test fun testInitialState() {
91         checkViewVisibility(withId(R.id.nav_view), INVISIBLE)
92         checkViewVisibility(withId(R.id.toolbar), VISIBLE)
93 -        checkViewVisibility(withId(R.id.helloWorldText), VISIBLE)
94         checkViewVisibility(withId(R.id.fab), VISIBLE)
95     }
96
97
98
99
100
101
102
103
104
105
106
107
108     @Test fun testInitialState() {
109         checkViewVisibility(withId(R.id.nav_view), INVISIBLE)
110         checkViewVisibility(withId(R.id.toolbar), VISIBLE)
111 +        checkViewVisibility(withId(R.id.emptyListText), VISIBLE)
112 +        checkViewVisibility(withId(R.id.emptyListText), VISIBLE)
113         checkViewVisibility(withId(R.id.fab), VISIBLE)
114     }
115 }
```

Gradle Console

```
:app:compileDebugAndroidTestResources UP-TO-DATE
:app:generateDebugAndroidTestBuildConfig UP-TO-DATE
:app:generateDebugAndroidTestResValues UP-TO-DATE
:app:generateDebugAndroidTestResources UP-TO-DATE
:app:mergeDebugAndroidTestResources UP-TO-DATE
:app:splitsDiscoveryTaskDebugAndroidTest UP-TO-DATE
:app:processDebugAndroidTestResources
:app:compileDebugAndroidTestKotlin
Using Kotlin incremental compilation

e: /Users/pmr/Projects/Argus/app/src/androidTest/java/com/pajato/argus/MainActivityTest.kt: (93, 41): Unresolved reference: emptyListText

:app:compileDebugAndroidTestKotlin FAILED

FAILURE: Build failed with an exception.

* What went wrong:
Execution failed for task ':app:compileDebugAndroidTestKotlin'.
> Compilation error. See log for more details

* Try:
Run with --stacktrace option to get the stack trace. Run with --info or --debug option to get more log output.

* Get more help at https://help.gradle.org

BUILD FAILED in 3s

38 actionable tasks: 12 executed, 26 up-to-date
```



```
32                                     32
33     </android.support.design.widget.CoordinatorLayout>          33     </android.support.design.widget.CoordinatorLayout>

26  app/src/main/res/layout/content_main.xml
*@@ -9,13 +9,33 @@
 9      tools:context="com.pajato.argus.MainActivity"
10     tools:showIn="@layout/app_bar_main">
11
12 -     <TextView android:id="@+id/helloWorldText"
13         android:layout_width="wrap_content"
14         android:layout_height="wrap_content"
15 -         android:text="Hello World!">
16
17         app:layout_constraintBottom_toBottomOf="parent"
18         app:layout_constraintLeft_toLeftOf="parent"
19 -         app:layout_constraintRight_toRightOf="parent"
19 -         app:layout_constraintTop_toTopOf="parent" />
20
21     </android.support.constraint.ConstraintLayout>
22
23
24
25
26 +     <TextView
27 +         android:id="@+id/emptyListText"
28 +         android:layout_width="wrap_content"
29 +         android:layout_height="wrap_content"
30 +         android:layout_marginStart="32dp"
31 +         android:layout_marginLeft="32dp"
32 +         android:layout_marginEnd="32dp"
33 +         android:layout_marginRight="32dp"
34 +         android:textAlignment="center"
35 +         android:text="@string/EmptyListText"
36 +         android:textSize="20sp"
37
38
39 +     <ImageView
40 +         android:id="@+id/emptyListIcon"
41 +         android:layout_width="200dp"
42 +         android:layout_height="200dp"
43 +         android:contentDescription="@string/EmptyListIconDescription"
44 +         app:layout_constraintBottom_toBottomOf="parent"
45 +         app:layout_constraintEnd_toEndOf="parent"
46 +         app:layout_constraintStart_toStartOf="parent"
47 +         app:layout_constraintTop_toTopOf="parent"
48 +         app:layout_constraintVertical_bias="0.2"
49 +         app:srcCompat="@drawable/ic_argus_reverso"/>
50
51     </android.support.constraint.ConstraintLayout>
```

View ▾

Test Results — Tests in 'com.pajato.argus'

Cantina

file:///Users/pmr/Projects/Test%20Results%20-%20Tests_in_'com_pajato_argus'.html

Tests in 'com.pajato.argus': 11 total, 11 passed

11.16 s

[Collapse](#) | [Expand](#)

com.pajato.argus.ExampleInstrumentedTest		0 ms
useApplicationContext	passed	0 ms
com.pajato.argus.MainActivityTest		11.13 s
testNavMenuItems	passed	7.46 s
testInitialState	passed	331 ms
testFabButton	passed	604 ms
testBackPressUsingNavDrawer	passed	1.25 s
testOverflowMenuSettingsItem	passed	891 ms
testBackPress	passed	605 ms
com.pajato.argus.StringExtensionsUnitTest		26 ms
testStrip	passed	26 ms
testStripMiddle	passed	0 ms
testStripLeft	passed	0 ms
testStripRight	passed	0 ms

Generated by Android Studio on 2/6/18 5:31 PM

Test Results — Tests in 'com.pajato.argus' com.pajato.argus Cantina

file:///Users/pmr/Projects/Argus/app/build/reports/coverage/debug/com.pajato.argus/index.source.html

debugAndroidTest > com.pajato.argus Classes Sessions

com.pajato.argus

Element	Missed Instructions	Cov.	Missed Branches	Cov.	Missed	Cxty	Missed	Lines	Missed	Methods	Missed	Classes
MainActivity.kt	100%	100%	0	11	0	26	0	9	0	9	0	2
StringExtensions.kt	100%	n/a	0	4	0	4	0	4	0	4	0	1
Total	0 of 189	100%	0 of 4	100%	0	15	0	30	0	13	0	3

Generated by the Android Gradle plugin 3.0.1 Created with JaCoCo 0.7.4.201502262128

Argus: second feature - add a video item

- Start branch: feature-empty-list
- End branch: feature-add-video-item

Comparing feature-empty-list x Cantina

GitHub, Inc. [US] | <https://github.com/pajato/Argus/compare/feature-empty-list...feature-add-video-item?diff=split&name=feature-add-video-item>

```
106
107     /** Check that the initial display shows the main activity views. */
108     @Test fun testInitialState() {
109         checkViewVisibility(withId(R.id.nav_view), INVISIBLE)
110         checkViewVisibility(withId(R.id.toolbar), VISIBLE)
111         - checkViewVisibility(withId(R.id.emptyListText), VISIBLE)
112         - checkViewVisibility(withId(R.id.emptyListText), VISIBLE)
113         checkViewVisibility(withId(R.id.fab), VISIBLE)
114     }
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
```

```
106
107     /** Check that the initial display shows the main activity views. */
108     @Test fun testInitialState() {
109         checkViewVisibility(withId(R.id.nav_view), INVISIBLE)
110         checkViewVisibility(withId(R.id.toolbar), VISIBLE)
111         checkViewVisibility(withId(R.id.fab), VISIBLE)
112     }
113
114 +    /** Check that the empty video list content is correct. */
115 +    @Test fun testEmptyList() {
116 +        // Disable the non-empty video list content and enable the empty list video content.
117 +        val mainActivity = activityRule.activity
118 +        mainActivity.runOnUiThread {
119 +            mainActivity.emptyListFrame.visibility = View.VISIBLE
120 +            mainActivity.nonEmptyListFrame.visibility = View.GONE
121 +        }
122 +        checkViewVisibility(withId(R.id.emptyListIcon), VISIBLE)
123 +        checkViewVisibility(withId(R.id.emptyListText), VISIBLE)
124 +        checkViewVisibility(withId(R.id.listItems), GONE)
125 +    }
126 +
127 +    /** Check that the non-empty video list content is correct. */
128 +    @Test fun testNonEmptyList() {
129 +        // Disable the empty video list content and enable the non-empty video list content.
130 +        val mainActivity = activityRule.activity
131 +        mainActivity.runOnUiThread {
132 +            mainActivity.emptyListFrame.visibility = View.GONE
133 +            mainActivity.nonEmptyListFrame.visibility = View.VISIBLE
134 +        }
135 +        checkViewVisibility(withId(R.id.emptyListIcon), GONE)
136 +        checkViewVisibility(withId(R.id.emptyListText), GONE)
137 +        checkViewVisibility(withId(R.id.listItems), VISIBLE)
138 +    }
139 +
```

Gradle Console

```
:app:scriptDiscoveryTaskDebugAndroidTest UP-TO-DATE
:app:processDebugAndroidTestResources UP-TO-DATE
:app:compileDebugAndroidTestKotlin
Using Kotlin incremental compilation

e: /Users/pmr/Projects/Argus/app/src/androidTest/java/com/pajato/argus/MainActivityTest.kt: (119, 26): Unresolved reference: emptyListFrame
e: /Users/pmr/Projects/Argus/app/src/androidTest/java/com/pajato/argus/MainActivityTest.kt: (120, 26): Unresolved reference: nonEmptyListFrame
e: /Users/pmr/Projects/Argus/app/src/androidTest/java/com/pajato/argus/MainActivityTest.kt: (124, 41): Unresolved reference: listItems
e: /Users/pmr/Projects/Argus/app/src/androidTest/java/com/pajato/argus/MainActivityTest.kt: (132, 26): Unresolved reference: emptyListFrame
e: /Users/pmr/Projects/Argus/app/src/androidTest/java/com/pajato/argus/MainActivityTest.kt: (133, 26): Unresolved reference: nonEmptyListFrame
e: /Users/pmr/Projects/Argus/app/src/androidTest/java/com/pajato/argus/MainActivityTest.kt: (137, 41): Unresolved reference: listItems

:app:compileDebugAndroidTestKotlin FAILED

FAILURE: Build failed with an exception.

* What went wrong:
Execution failed for task ':app:compileDebugAndroidTestKotlin'.
> Compilation error. See log for more details

* Try:
Run with --stacktrace option to get the stack trace. Run with --info or --debug option to get more log output.

* Get more help at https://help.gradle.org

BUILD FAILED in 1s
```

Comparing feature-empty-list.x... Cantina

GitHub, Inc. [US] | https://github.com/pajato/Argus/compare/feature-empty-list...feature-add-video-item?diff=split&name=feature-add-video-item

24 app/src/main/res/layout/non_empty_list_content_main.xml

View ▾

... @@ -0,0 +1,24 @@

```
1 +<?xml version="1.0" encoding="utf-8"?>
2 +<android.support.constraint.ConstraintLayout
3 +    xmlns:android="http://schemas.android.com/apk/res/android"
4 +    xmlns:app="http://schemas.android.com/apk/res-auto"
5 +    xmlns:tools="http://schemas.android.com/tools"
6 +    android:layout_width="match_parent"
7 +    android:layout_height="match_parent"
8 +    app:layout_behavior="@string/appbar_scrolling_view_behavior"
9 +    tools:context="com.pajato.argus.MainActivity"
10 +    tools:showIn="@layout/app_bar_main">
11 +
12 +    <android.support.v7.widget.RecyclerView android:id="@+id/listItems"
13 +        android:layout_width="0dp"
14 +        android:layout_height="0dp"
15 +        android:layout_marginBottom="8dp"
16 +        android:layout_marginLeft="8dp"
17 +        android:layout_marginRight="8dp"
18 +        android:layout_marginTop="8dp"
19 +        app:layout_constraintBottom_toBottomOf="parent"
20 +        app:layout_constraintLeft_toLeftOf="parent"
21 +        app:layout_constraintRight_toRightOf="parent"
22 +        app:layout_constraintTop_toTopOf="parent" />
23 +
24 +</android.support.constraint.ConstraintLayout>
```

Test Results — Tests in 'com.pajato.argus'

Cantina

file:///Users/pmr/Projects/Test%20Results%20-%20Tests_in_`com_pajato_argus'.html

Tests in 'com.pajato.argus': 13 total, 13 passed

11.79 s

[Collapse](#) | [Expand](#)

com.pajato.argus.ExampleInstrumentedTest	0 ms
useApplicationContext	passed 0 ms
com.pajato.argus.MainActivityTest	11.74 s
testNavMenuItems	passed 7.59 s
testEmptyList	passed 420 ms
testInitialState	passed 295 ms
testNonEmptyList	passed 191 ms
testFabButton	passed 558 ms
testBackPressUsingNavDrawer	passed 1.21 s
testOverflowMenuSettingsItem	passed 901 ms
testBackPress	passed 569 ms
com.pajato.argus.StringExtensionsUnitTest	51 ms
testStrip	passed 26 ms
testStripMiddle	passed 0 ms
testStripLeft	passed 25 ms
testStripRight	passed 0 ms

Generated by Android Studio on 2/7/18 1:41 AM

Argus: next set of features

- Start branch: feature-add-video-item
- End branch: test-null-list-adapter

Test Results — Tests in 'com.pajato.argus' · Cantina

Tests in 'com.pajato.argus': 21 total, 21 passed 17.46 s

Collapse | Expand

com.pajato.argus.FabButtonTest		1.16 s
com.pajato.argus.ListAdapterTest		2.90 s
testNullAdapter	passed	1.30 s
testEmptyListToFullList	passed	1.29 s
testInitialState	passed	319 ms
com.pajato.argus.MainActivityTest		1.42 s
testActivityResultCanceled	passed	591 ms
testInitialState	passed	272 ms
testActivityResultNullData	passed	555 ms
com.pajato.argus.MainContentTest		545 ms
testEmptyList	passed	273 ms
testNonEmptyList	passed	272 ms
com.pajato.argus.NavDrawerTest		8.88 s
testNavMenuItems	passed	7.12 s
testBackPressUsingNavDrawer	passed	1.21 s
testBackPress	passed	550 ms
com.pajato.argus.OptionsMenuTest		905 ms
testOverflowMenuSettingsItem	passed	905 ms
com.pajato.argus.SearchActivityTest		1.40 s
testSaveEnabling	passed	292 ms
testNetworkAutoComplete	passed	918 ms
testInitialState	passed	190 ms
com.pajato.argus.SearchOptionsMenuTest		216 ms
testOverflowMenuSettingsItem	passed	216 ms
com.pajato.argus.StringExtensionsUnitTest		27 ms

Generated by Android Studio on 2/7/18 1:57 AM

Test Results — Tests in 'com.pajato.argus' com.pajato.argus Cantina

file:///Users/pmr/Projects/Argus/app/build/reports/coverage/debug/com.pajato.argus/index.source.html

debugAndroidTest > com.pajato.argus Classes Sessions

com.pajato.argus

Element	Missed Instructions	Cov.	Missed Branches	Cov.	Missed	Cqty	Missed	Lines	Missed	Methods	Missed	Classes
SearchActivity.kt	100%	100%	100%	100%	0	26	0	42	0	21	0	5
MainActivity.kt	100%	100%	100%	100%	0	18	0	43	0	12	0	3
ListAdapter.kt	100%	100%	n/a	n/a	0	8	0	13	0	8	0	2
StringExtensions.kt	100%	100%	n/a	n/a	0	8	0	5	0	8	0	2
Total	0 of 728	100%	0 of 22	100%	0	60	0	103	0	49	0	12

Generated by the Android Gradle plugin 3.0.1

Created with JaCoCo 0.7.4.201502262128

Test Results — Tests in 'com...x' | SearchActivity.kt | Cantina

```
18.
19. #ContainerOptions(CacheImplementation.NO_CACHE)
20. class SearchActivity : AppCompatActivity() {
21.
22.     companion object {
23.         val TYPE_KEY = "type"
24.         val TITLE_KEY = "title"
25.         val NETWORK_KEY = "network"
26.     }
27.
28.     override fun onCreate(savedInstanceState: Bundle?) {
29.         // Create the activity by establishing the layout, the toolbar and putting text watchers on
30.         // the edit text boxes so that the save button can enabled/disabled appropriately.
31.         super.onCreate(savedInstanceState)
32.         setContentView(R.layout.activity_search)
33.         setSupportActionBar(toolbar)
34.         searchName.afterTextChanged { processSaveButtonState() }
35.         network.afterTextChanged { processSaveButtonState() }
36.     }
37.
38.     override fun onCreateOptionsMenu(menu: Menu): Boolean {
39.         // Inflate the menu; this adds items to the action bar if it is available.
40.         menuInflater.inflate(R.menu.save_menu, menu)
41.         menu.getItem(0).isEnabled = false
42.         val color = ContextCompat.getColor(applicationContext, android.R.color.white)
43.         menu.getItem(0).icon.setColorFilter(color, PorterDuff.Mode.SRC_ATOP)
44.
45.         return true
46.     }
47.
48.     override fun onOptionsItemSelected(item: MenuItem): Boolean {
49.         // Handle a click on the save button by wrapping up the activity.
50.         if (item.itemId == R.id.save_button) {
51.             save()
52.             return true
53.         }
54.         return super.onOptionsItemSelected(item)
55.     }
56.
57.     override fun onResume() {
58.         // Add the no-fill resources to the networks input and set the focus on the search name
59.         // edit text widget (and cause the soft keyboard to display if there is no hard keyboard).
60.         super.onResume()
61.         val networks = resources.getStringArray(R.array.networks).toList()
62.         val id = android.R.layout.simple_dropdown_item_1line
63.         network.setAdapter(ArrayAdapter<String>(this, id, networks))
64.         searchName.requestFocus()
65.     }
66.
67.     private fun save() {
68.         // Return the collected data to the main activity.
69.         val result = Intent()
70.         result.putExtra(TYPE_KEY, "video")
71.         result.putExtra(TITLE_KEY, searchName.editableText.toString())
72.         result.putExtra(NETWORK_KEY, network.editableText.toString())
73.         setResult(Activity.RESULT_OK, result)
74.         finish()
75.     }
76.
77.     private fun EditText.afterTextChanged(afterTextChanged: (String) -> Unit) {
78.         // Establish an edit text extension function to go with the save button.
79.         this.addTextChangedListener(object : TextWatcher {
80.             override fun beforeTextChanged(p0: CharSequence?, p1: Int, p2: Int, p3: Int) {}
81.
82.             override fun onTextChanged(p0: CharSequence?, p1: Int, p2: Int, p3: Int) {}
83.
84.             override fun afterTextChanged(editable: Editable?) {
85.                 afterTextChanged.invoke(edible.toString())
86.             }
87.         })
88.     }
89.
90.     private fun processSaveButtonState() {
91.         val menu = searchToolbar.menu
92.         menu.getItem(0).isEnabled = !(searchName.text.isEmpty() || network.text.isEmpty())
93.     }
94. }
```

ListAdapter.kt

Cantina

file:///Users/pmr/Projects/Argus/app/build/reports/coverage/debug/com.pajato.argusListAdapter.kt.html

Sessions

ListAdapter.kt

```
1. package com.pajato.argus
2.
3. import android.support.v7.widget.RecyclerView
4. import android.view.LayoutInflater
5. import android.view.View
6. import android.view.ViewGroup
7. import android.widget.TextView
8.
9. class ListAdapter(val items: MutableList<Video>) : RecyclerView.Adapter<ListAdapter.ViewHolder>() {
10.
11.     override fun onCreateViewHolder(parent: ViewGroup, viewType: Int): ViewHolder {
12.         val layout = LayoutInflater.from(parent.context).inflate(R.layout.video_layout, parent, false)
13.         return ViewHolder(layout)
14.     }
15.
16.     override fun onBindViewHolder(holder: ViewHolder, position: Int) {
17.         val titleTextView: TextView = holder.layout.findViewWithTag("title")
18.         titleTextView.text = items[position].title
19.         val networkTextView: TextView = holder.layout.findViewWithTag("network")
20.         networkTextView.text = items[position].network
21.     }
22.
23.     override fun getItemCount(): Int {
24.         return items.size
25.     }
26.
27.     fun addItem(video : Video) {
28.         items.add(video)
29.         this.notifyItemInserted(items.size - 1)
30.     }
31.
32.     class ViewHolder(val layout: View) : RecyclerView.ViewHolder(layout)
33. }
```

Final thoughts:

- Argus: Realistic TDD example for Kotlin/Android
- Next challenge: apply to a non-trivial legacy project
- I'm sold

Questions: yours and mine

- Audience questions?
- How many of you were aware of the Dykstra testing quote?
- How many of you practice automated testing on your production projects?
- Of those, how many collect code coverage data?
- Anyone who previously did not try TDD, now willing to give it a shot?

Thanks!