Testing. Do it.

Jake Wharton

Robolectric & FEST

Instrumentation & Spoon

Dagger

Robolectric

Android APIs **do not** want you to test.

Hides the ugly with fake, stubbed, or empty implementations.

"Android:
The Good Parts"

Picasso

square.github.io/picasso/

Picasso

Download v1.0.1

A powerful **image downloading** and **caching** library for Android

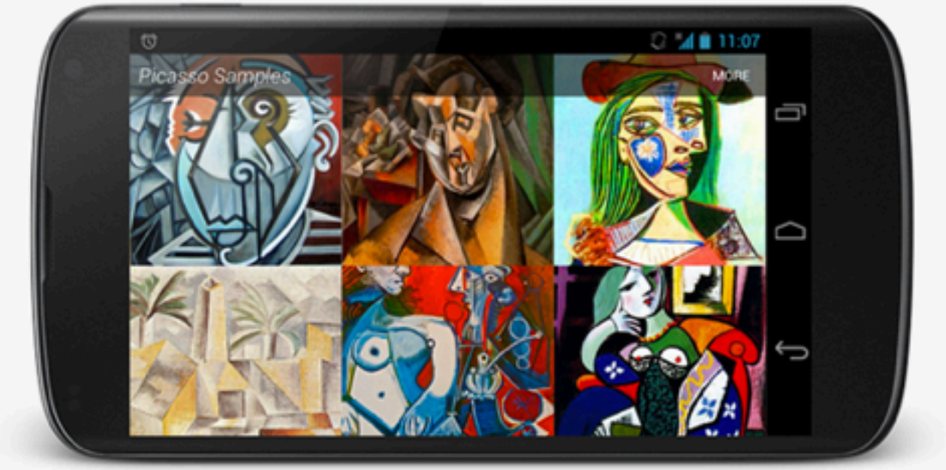
Introduction

Images add much-needed context and visual flair to Android applications. Picasso allows for hassle-free image loading in your application—often in one line of code!

```
Picasso.with(context).load("http://i.imgur.com/DvpvklR.png").into(imageView);
```

Many common pitfalls of image loading on Android are handled automatically by Picasso:

- Handling `ImageView` recycling and download cancelation in an adapter.
- Complex image transformations with minimal memory use.
- Automatic memory and disk caching.



public static Bitmap **createBitmap** (Bitmap source, int x, int y, int width, int height, Matrix m, boolean filter) Added in API level 1

Returns an immutable bitmap from subset of the source bitmap, transformed by the optional matrix. The new bitmap may be the same object as source, or a copy may have been made. It is initialized with the same density as the original bitmap. If the source bitmap is immutable and the requested subset is the same as the source bitmap itself, then the source bitmap is returned and no new bitmap is created.

Parameters

source	The bitmap we are subsetting
x	The x coordinate of the first pixel in source
y	The y coordinate of the first pixel in source
width	The number of pixels in each row
height	The number of rows
m	Optional matrix to be applied to the pixels
filter	true if the source should be filtered. Only applies if the matrix contains more than just translation.

Returns

A bitmap that represents the specified subset of source

Throws

IllegalArgumentException	if the x, y, width, height values are outside of the dimensions of the source bitmap.

```
static Bitmap transformResult(PicassoBitmapOptions options, Bitmap result, int exifRotation) {
  int inWidth = result.getWidth();
  int inHeight = result.getHeight();

  int drawX = 0;
  int drawY = 0;
  int drawWidth = inWidth;
  int drawHeight = inHeight;

  Matrix matrix = new Matrix();

  if (options != null) {
    int targetWidth = options.targetWidth;
    int targetHeight = options.targetHeight;

    float targetRotation = options.targetRotation;
    if (targetRotation != 0) {
      if (options.hasRotationPivot) {
        matrix.setRotate(targetRotation, options.targetPivotX, options.targetPivotY);
      } else {
        matrix.setRotate(targetRotation);
      }
    }

    if (options.centerCrop) {
      float widthRatio = targetWidth / (float) inWidth;
```

```java
package com.squareup.picasso;

import ...

@RunWith(RobolectricTestRunner.class)
@Config(manifest = Config.NONE)
public class PicassoTransformTest {
  @Test public void exifRotation() {
    Bitmap source = Bitmap.createBitmap(10, 10, ARGB_8888);

    Bitmap result = Picasso.transformResult(null, source, 90);

    ShadowBitmap shadowBitmap = shadowOf(result);
    assertThat(shadowBitmap.getCreatedFromBitmap()).isSameAs(source);

    Matrix matrix = shadowBitmap.getCreatedFromMatrix();
    ShadowMatrix shadowMatrix = shadowOf(matrix);
    assertThat(shadowMatrix.getPreOperations()).containsOnly("rotate 90.0");
  }

  @Test public void exifRotationWithManualRotation() {
    Bitmap source = Bitmap.createBitmap(10, 10, ARGB_8888);
    PicassoBitmapOptions options = new PicassoBitmapOptions();
    options.targetRotation = -45;

    Bitmap result = Picasso.transformResult(options, source, 90);

    ShadowBitmap shadowBitmap = shadowOf(result);
```

"Android:
The Good Parts"

"Android:
The Good Parts.
Some okay parts too."

Robolectric

robolectric.org

FEST Android

square.github.io/fest-android

Instrumentation

JUnit is small scope, low-level testing.

Larger scope testing that spans interaction patterns.

Instrumentation API
Robotium
UI Automator
Espresso
Some cucumber crap...

It does not matter.

Favor interaction over assertion

Go **black box** over IDs and view hierarchy

Instrumentation tests should work for you.

Spoon

square.github.io/spoon/

Spoon

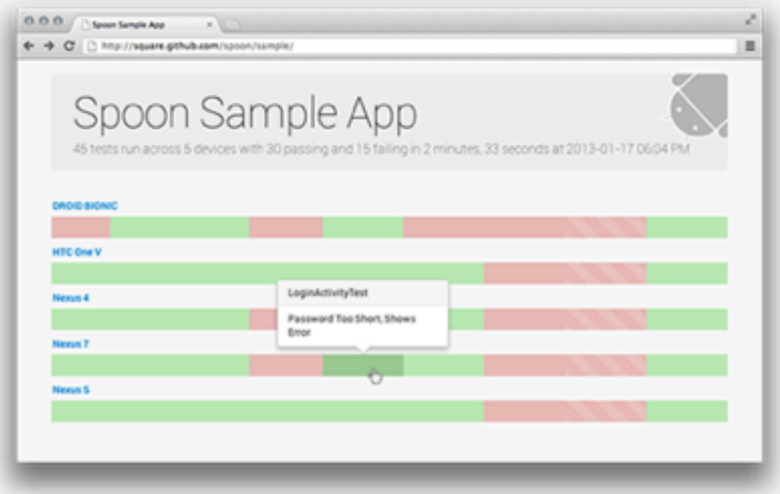
Download v1.0.3

Distributing **instrumentation tests** to all your Androids

Introduction

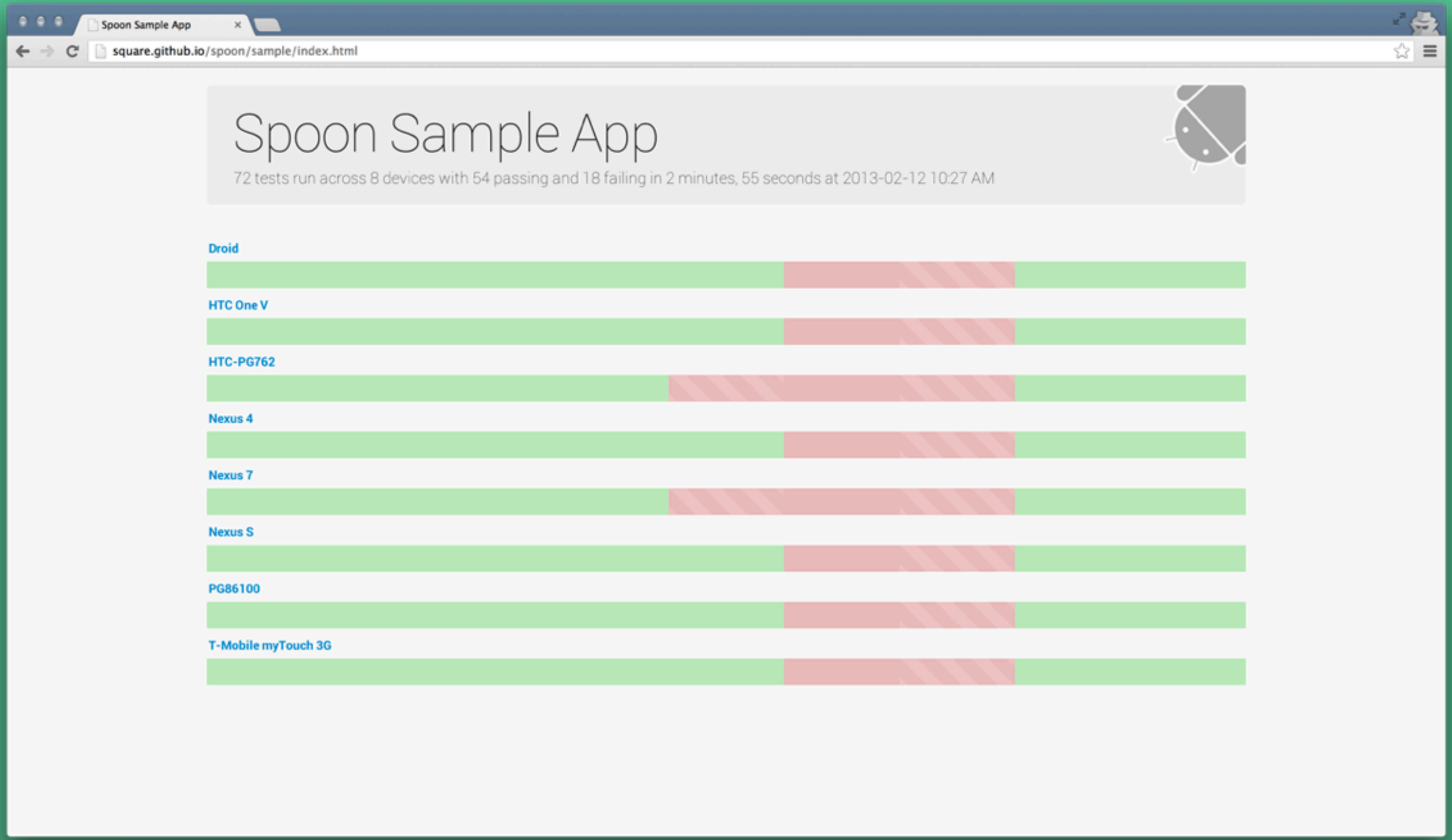
Android's ever-expanding ecosystem of devices creates a unique challenge to testing applications. Spoon aims to simplify this task by distributing instrumentation test execution and displaying the results in a meaningful way.

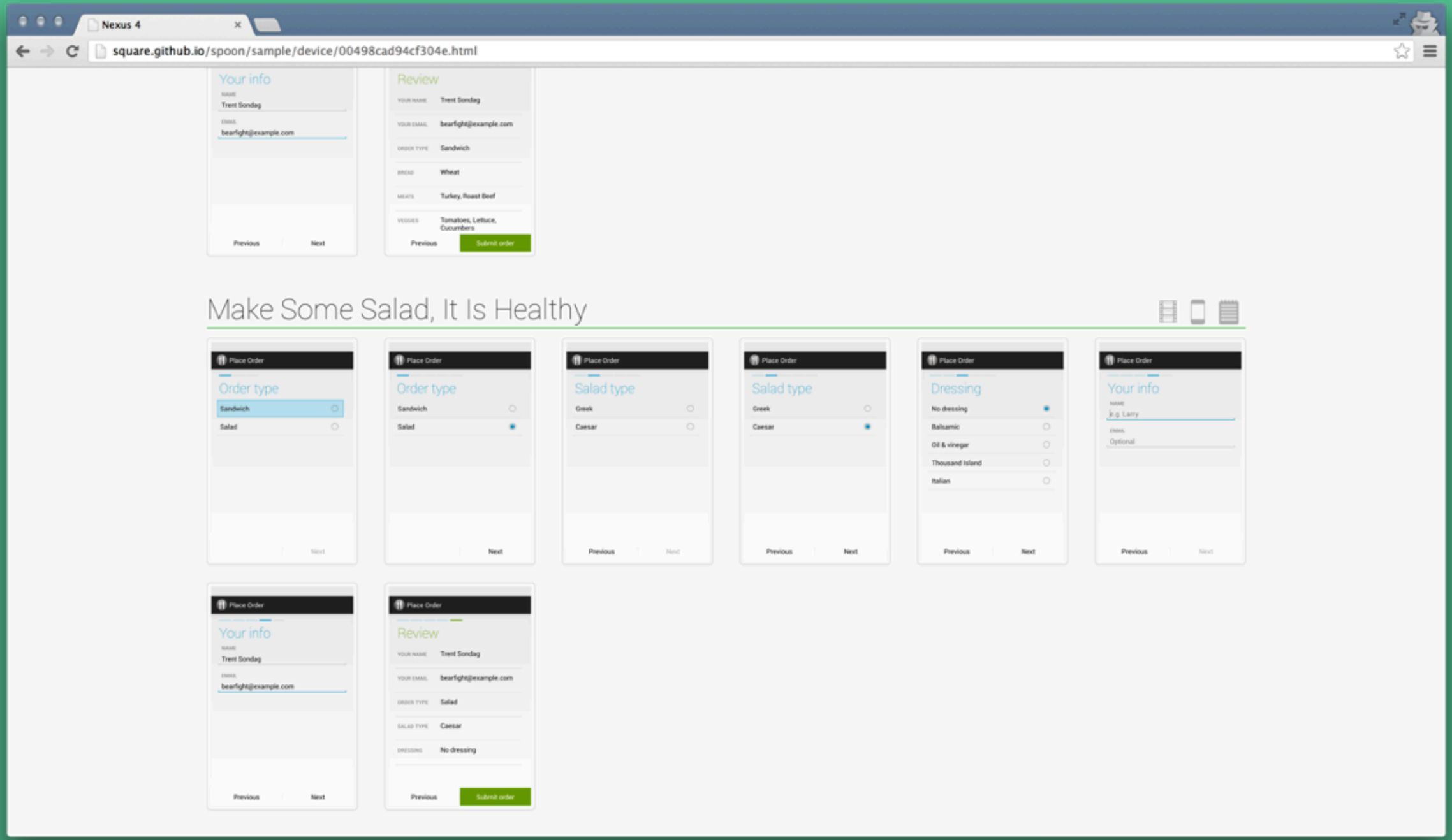
Instead of attempting to be a new form of testing, Spoon makes existing instrumentation tests more useful. Using the application APK and instrumentation APK, Spoon runs the tests on multiple devices simultaneously. Once all tests have completed, a static HTML summary is generated with detailed information about each device and test.



With the high-level output you can immediately see whether or not a test failure is specific to a single device or all devices. This view is designed to be displayed on a dedicated monitor or TV.

Spoon will run on all targets which are visible to `adb devices`. Plug in multiple different phones and tablets, start different configurations of emulators, or use some combination of both!


Spoon Sample App
square.github.io/spoon/sample/index.html
Spoon Sample App
72 tests run across 8 devices with 54 passing and 18 failing in 2 minutes, 55 seconds at 2013-02-12 10:27 AM
Droid
HTC One V
HTC-PG762
Nexus 4
Nexus 7
Nexus S
PG86100
T-Mobile myTouch 3G


Nexus 4
square.github.io/spoon/sample/device/00498cad94cf304e.html
Your info
Trent Sondag
bearfight@example.com
Previous
Next
Review
Trent Sondag
bearfight@example.com
Sandwich
Wheat
Turkey, Roast Beef
Tomatoes, Lettuce, Cucumbers
Previous
Submit order
Make Some Salad, It Is Healthy
Place Order
Order type
Sandwich
Salad
Next
Salad type
Greek
Caesar
Previous
Dressing
No dressing
Balsamic
Oil & vinegar
Thousand Island
Italian
Your info
e.g. Larry
Optional
Review
Salad
Caesar
No dressing
Submit order

Spoon

square.github.io/spoon

Dagger

A fast dependency injector for Android and Java

Separate “do” from the “how”

```
class TwitterClient {
  @Inject Twitter twitter;

  void show(String user) {
    List<Tweet> tweets = twitter.tweets(user);
    for (Tweet tweet : tweets) {
      System.out.println(tweet.text);
    }
  }
}
```

```
@Module
class OurModule {
  @Provide @Singleton
  public RestAdapter provideRestAdapter() {
    return new RestAdapter.Builder()
        .setServer("https://api.twitter.com/1/")
        .build();
  }


  @Provide @Singleton
  public Twitter provideTwitter(RestAdapter rest) {
    return rest.create(Twitter.class);
  }
}
```

```
TwitterClient client = new TwitterClient();
ObjectGraph graph = ObjectGraph.create(new OurModule());
graph.inject(client);
client.show("JakeWharton");

/*
Hey UIUC people! Come join me for a nerdy chat tomorrow evening. «@_chaebacca
http://t.co/SCsRFkdg»

FEST Android v1.0.1 released (while at 37,000 feet!) with a slew of new asserts,
generics, and spelling corrections. http://t.co/JSGRoO7m

@neilmctee @robolectric This is because Build.SDK.VERSION still reports '0'. Now
that we are using real code, it should probably return '16'

For this day and age, it's amazing how difficult and slow it is to move money
around between banks and individuals.

JavaWriter - A utility which aids in generating Java source files. https://t.co/
enypYzsW
*/
```

Annotation processing
code generation

```
class TwitterClient {
  @Inject Twitter twitter;

  void show(String user) {
    List<Tweet> tweets = twitter.tweets(user);
    for (Tweet tweet : tweets) {
      System.out.println(tweet.text);
    }
  }
}

class TwitterClient$$InjectAdapter {
  void inject(TwitterClient client, Twitter twitter) {
    client.twitter = twitter;
  }
}
```

```
class FooApplication extends Application {
  private ObjectGraph graph;

  @Override public void onCreate() {
    super.onCreate();
    graph = ObjectGraph.create(
      new ThisModule(),
      new ThatModule(),
      new OtherModule(this) // This module takes the context
    );
  }

  public void inject(Object object) {
    graph.inject(object);
  }
}
```

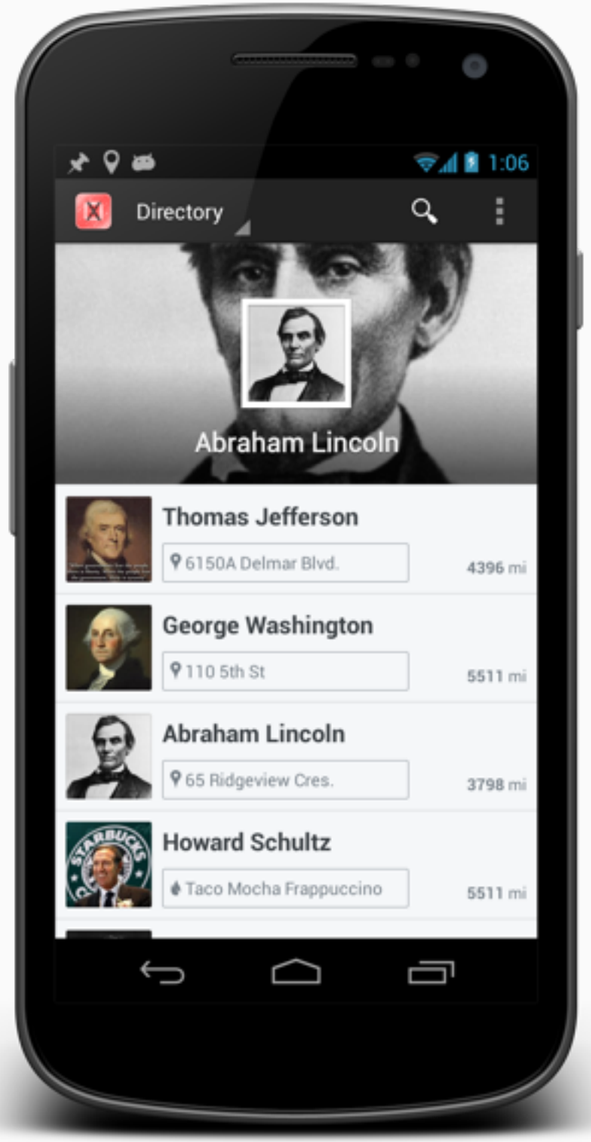
```
class BaseActivity extends Activity {
  @Override public void onCreate(Bundle saved) {
    super.onCreate(saved);

    // WARNING: Boilerplate!
    ((FooApplication) getApplication()).inject(this);
  }
}
```

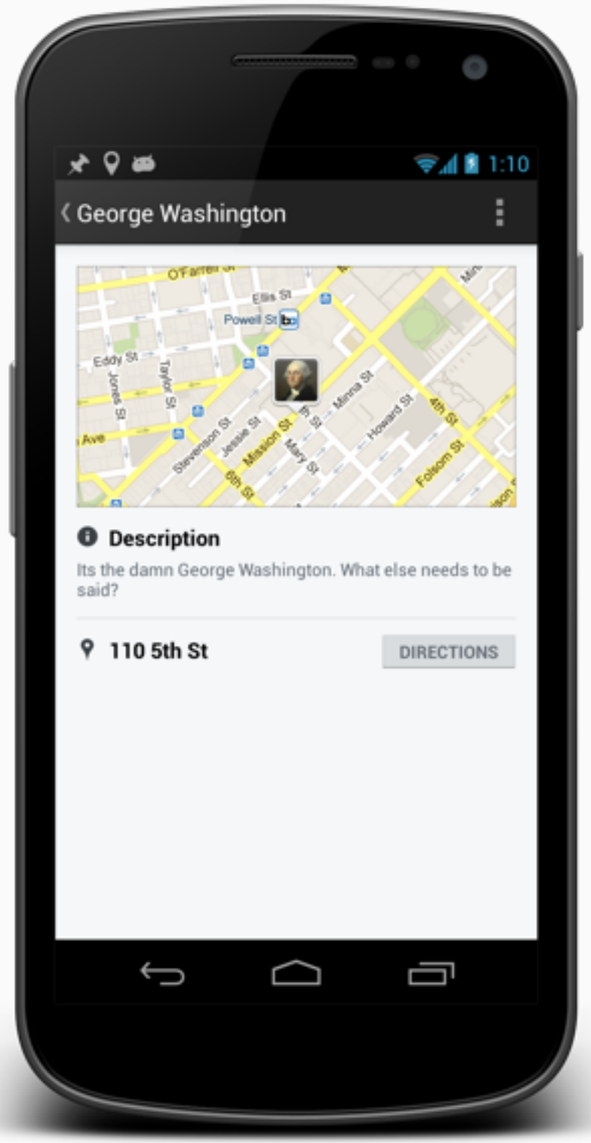
```
class TweetsActivity extends BaseActivity {
  @Inject Twitter twitter;

  @Override public void onCreate(Bundle saved) {
    super.onCreate(saved);

    setContentView(R.layout.tweets_activity);
    ListView lv = (ListView) findViewById(R.id.tweets_list);
    final ArrayAdapter adapter = new ArrayAdapter(/*...*/);
    lv.setAdapter(adapter);

    twitter.tweets("JakeWharton", new Callback<List<Tweet>>() {
      @Override public void onSuccess(List<Tweet> tweets) {
        adapter.addAll(tweets);
        adapter.notifyDataSetChanged();
      }
    }
  }
}
```

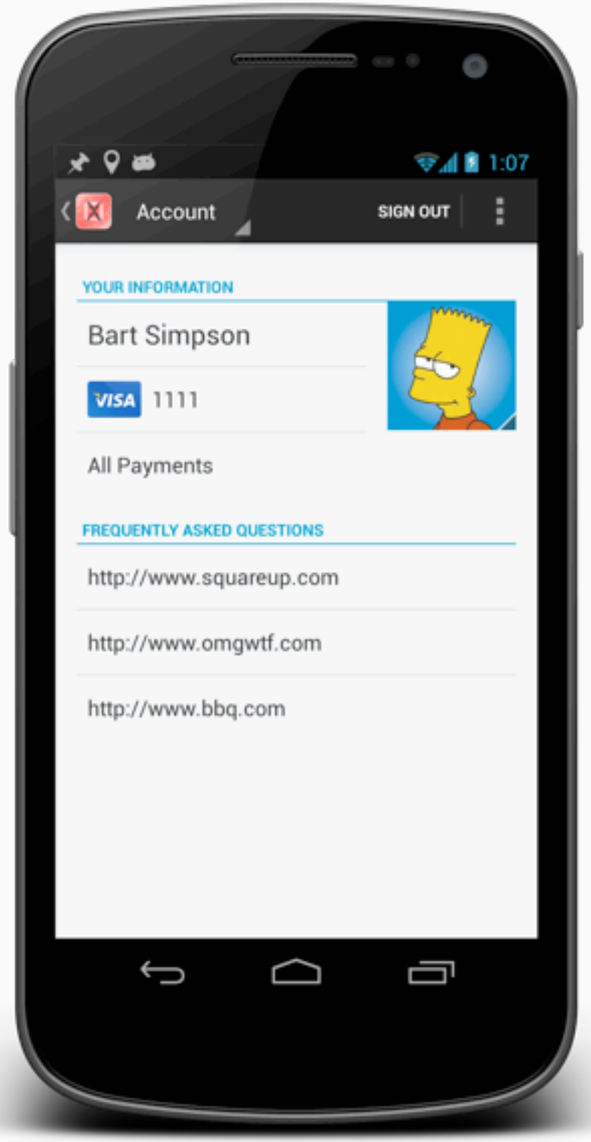
```
interface Twitter {
  @GET("statuses/user_timeline.json")
  List<Tweet> tweets(@Named("screen_name") String user);
}


class FakeTwitter implements Twitter {
  @Override public List<Tweet> tweets(String user) {
    return Arrays.asList(
      new Tweet("The quick brown fox"),
      new Tweet("Jumps over the lazy dog"),
      new Tweet("OMG WTF BBQ")
    );
  }
}
```

```
@Module(overrides = true)
class TestModule {
   @Provide @Singleton
   public Twitter provideTwitter() {
      return new FakeTwitter();
   }
}
```

```
if (test) {
   graph = graph.add(new TestModule());
}
```


1:06
Directory
Abraham Lincoln
Thomas Jefferson
6150A Delmar Blvd.
4396 mi
George Washington
110 5th St
5511 mi
Abraham Lincoln
65 Ridgeview Cres.
3798 mi
Howard Schultz
Taco Mocha Frappuccino
5511 mi


1:10
George Washington
Description
Its the damn George Washington. What else needs to be said?
110 5th St
DIRECTIONS


1:07
Account
SIGN OUT
YOUR INFORMATION
Bart Simpson
VISA 1111
All Payments
FREQUENTLY ASKED QUESTIONS
http://www.squareup.com
http://www.omgwtf.com
http://www.bbq.com

Dagger

square.github.io/dagger

square.github.io