The things to remember not to forget when you're testing Android apps

Who are we?

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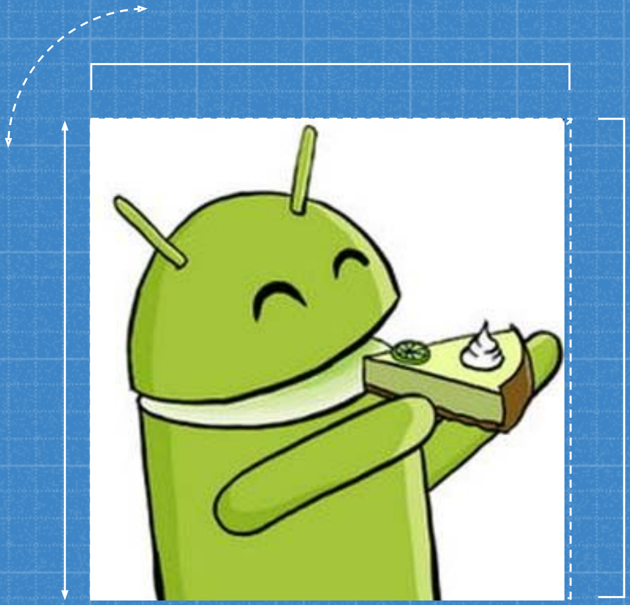
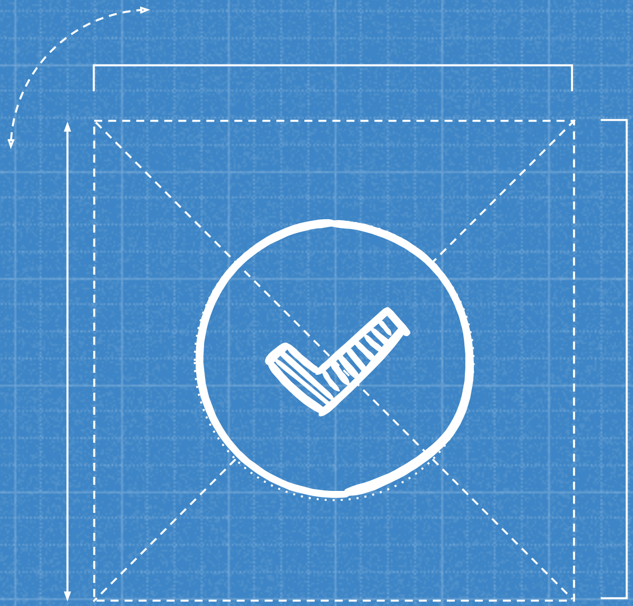




JOIN IN

Feel free to say “me too!” or
to add other ideas in as we go!

What did I forget to test?

LET’S TAKE AN SEMI-ANECDOTAL WALK TOGETHER

1

That time my notes App lost its notes...

Ah! A Classic!

> Using Google Keep, went to test an App feature by enabling the “Dont keep activities setting” returned to Google Keep with all notes lost...

SO WHAT HAPPENED?

- Android lifecycle events
- Don’t keep activities simulates your app being stopped due to low memory etc
- Need to write code to store inputs when this occurs.

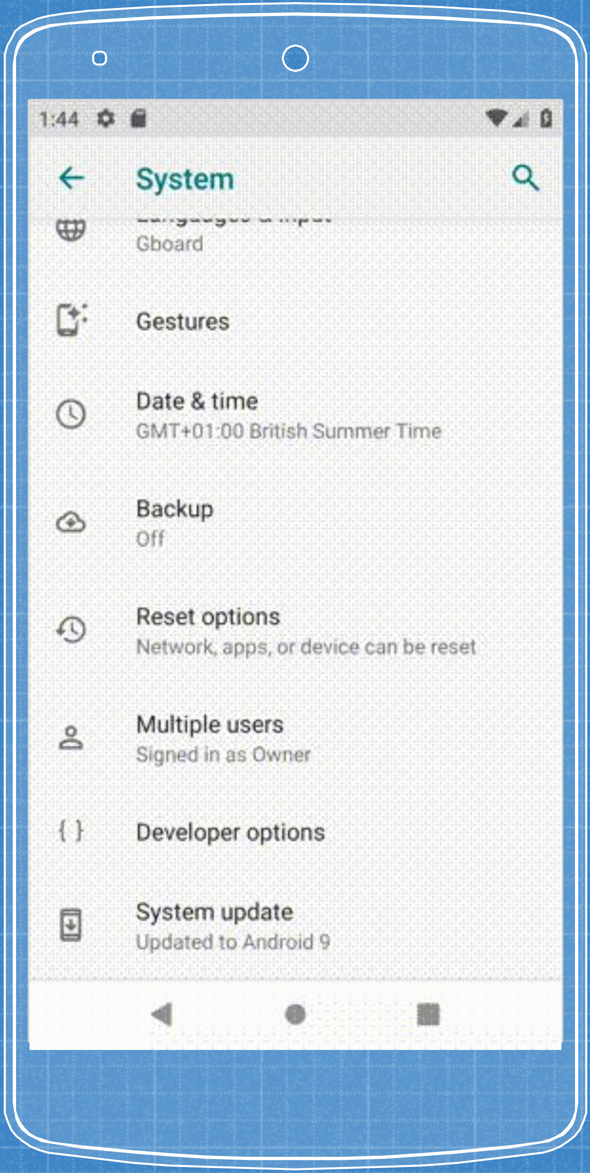
https://developer.android.com/guide/components/activities/activity-lifecycle

How can I test this?

Enable developer options on the device.

Go to Developer Settings

Enable “Don’t keep activities”



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System

Languages & input
Gboard

Gestures

Date & time
GMT+01:00 British Summer Time

Backup
Off

Reset options
Network, apps, or device can be reset

Multiple users
Signed in as Owner

Developer options

System update
Updated to Android 9

2

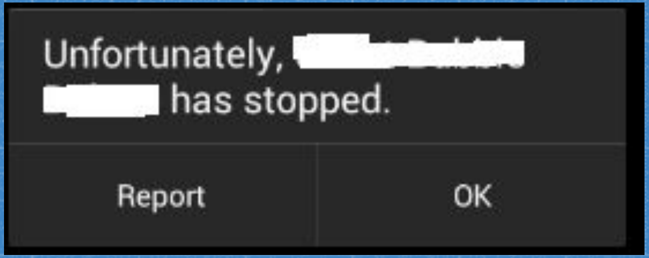
That time App crashed when it wasn’t on the screen

Yup another classic!

> Quite a classic example where something async normally tries to update the view after its gone

SO WHAT HAPPENED?

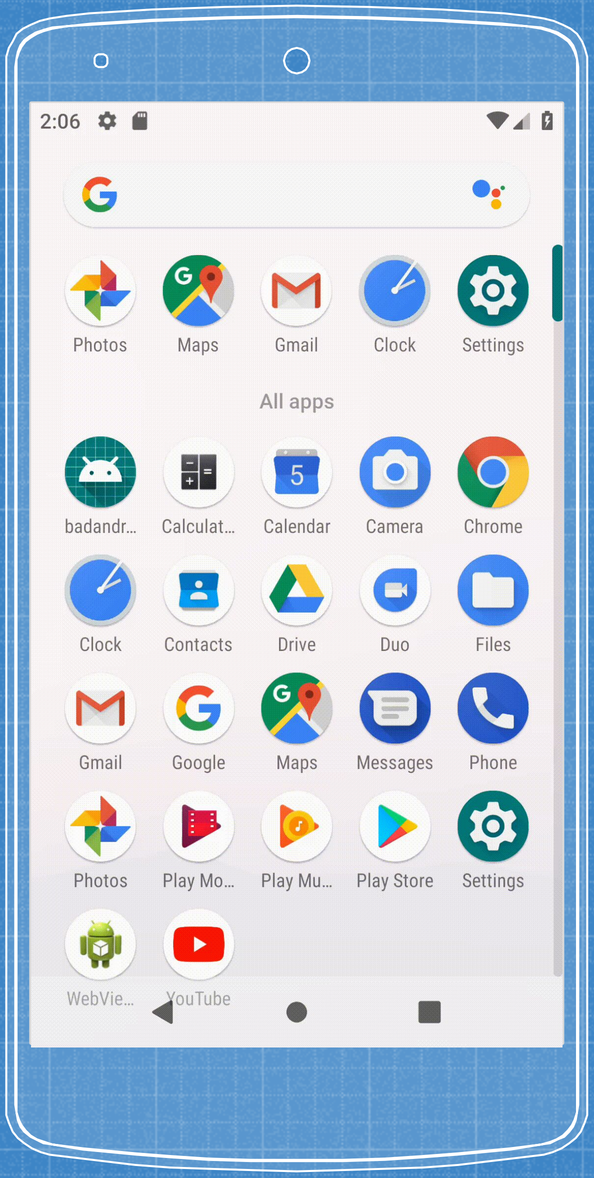
- Kick off some async process
- App no longer has Device focus
- After the async process finishes it tries to update the view.
- User receives a nasty NPE



Unfortunately, [redacted] has stopped.

How can I test this?

- Unit tests for the code!
  - Make use of Kotlin’s nullability operators
- Manual testing/UI testing possible but not so easy



3

That time App crashed when I rotated the screen

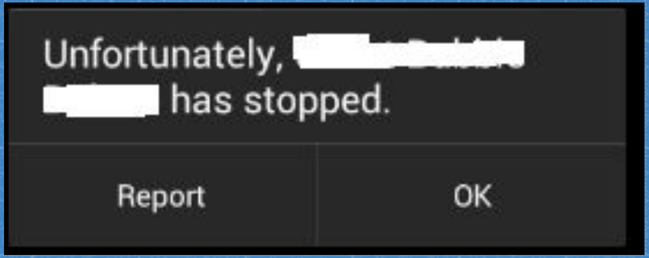
But I like landscape...

Did you know?

Your Activity gets recreated on rotation! But there are caveats and other options.

SO WHAT HAPPENED?

- The screen is rotated
- App loses state or get a bit confused
- User receives a nasty NPE or the UI doesn’t reflect the right state.



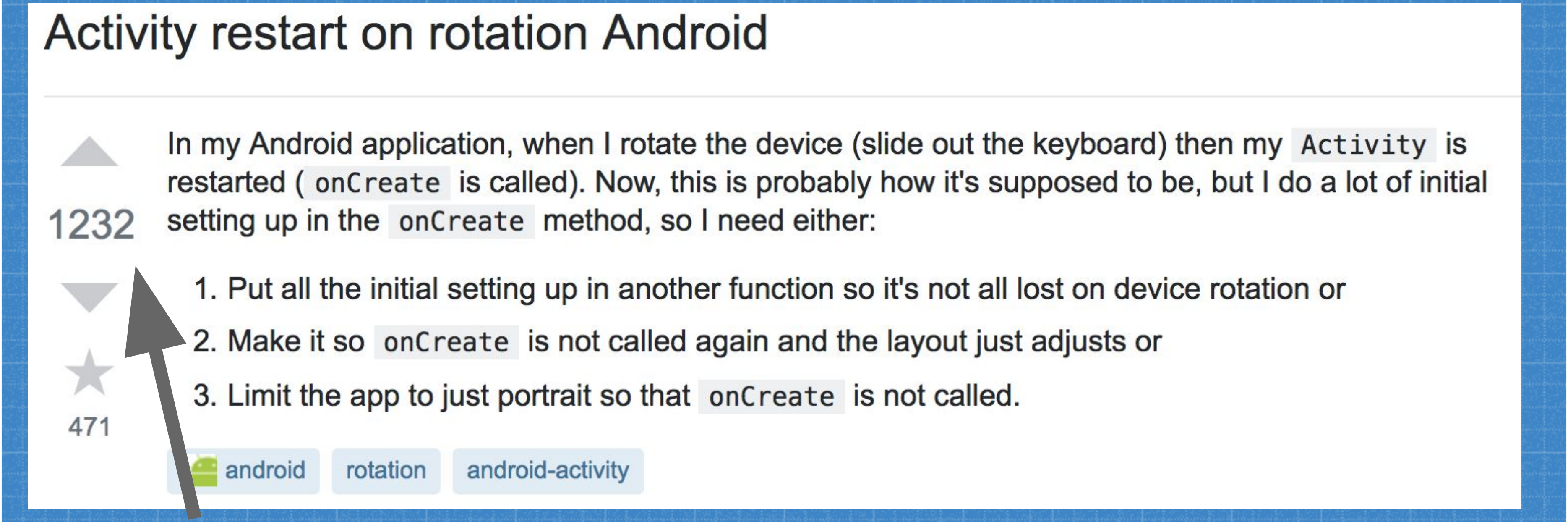
Unfortunately, [redacted]
[redacted] has stopped.

How can I test this?

- Lock it to portrait
  - The “painting over the stain solution”
- Look at what state is being held on to
- Do a Dan Casely and rock your phone back and forth 100000x

- Unit testing
  - Seriously do it!
- UI Automation tests
  - Espresso has support for this

This is a BIG topic…



Activity restart on rotation Android

1232

471

In my Android application, when I rotate the device (slide out the keyboard) then my `Activity` is restarted (`onCreate` is called). Now, this is probably how it's supposed to be, but I do a lot of initial setting up in the `onCreate` method, so I need either:

1. Put all the initial setting up in another function so it's not all lost on device rotation or
2. Make it so `onCreate` is not called again and the layout just adjusts or
3. Limit the app to just portrait so that `onCreate` is not called.

Be careful if you use **configChanges** in your manifest

https://stackoverflow.com/questions/456211/activity-restart-on-rotation-android

4

That time we shipped a new feature that immediately crashed

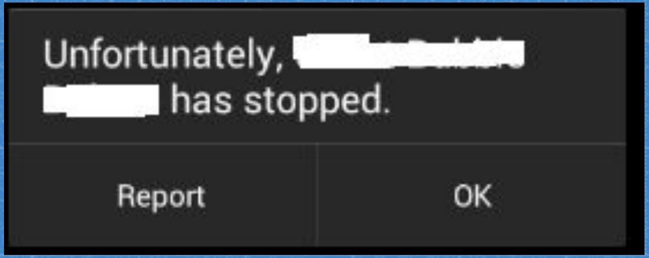
😭😭💥💥💀

We all make mistakes…

Time pressures & feature flagging hid an issue in the release build of the App caused by obfuscated code.

SO WHAT HAPPENED?

- Feature flagged a feature to “ON”
- Users pressed the new menu item
- App crashed immediately



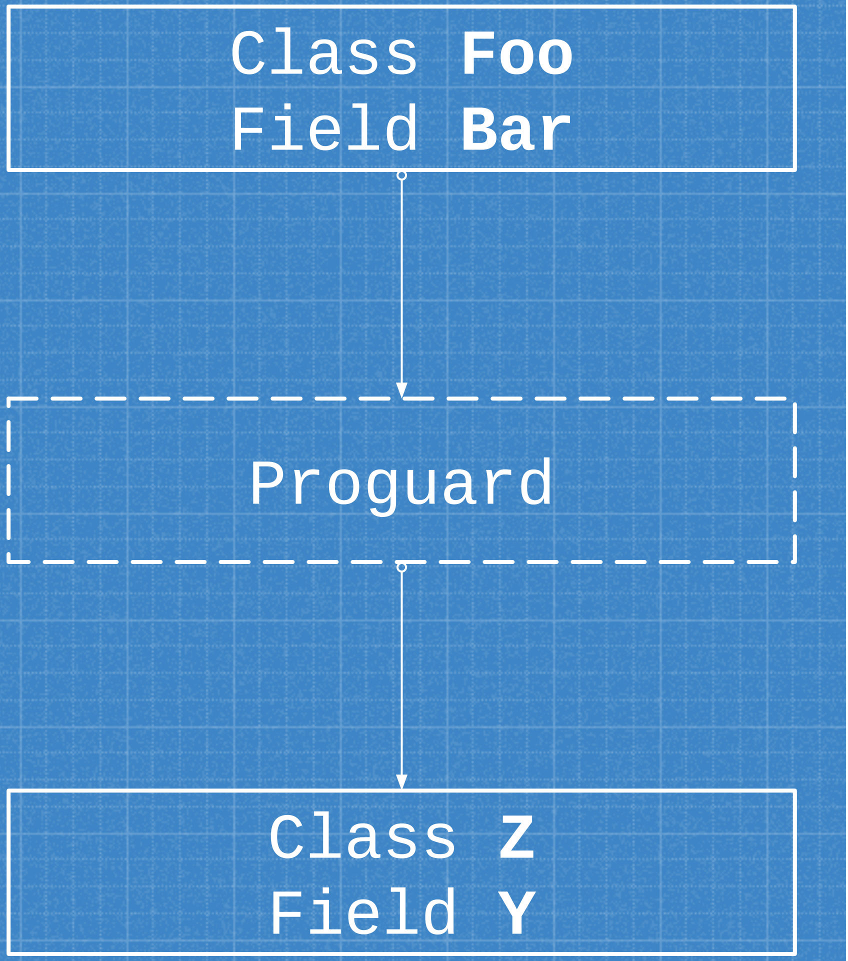
Unfortunately, [redacted] has stopped.

Be careful not to forget proguard

What is Proguard?

Proguard is used to minify and obfuscate the Java code when creating a release build.

Proguard is a really helpful tool!



Why did it crash the App?

Deserialization

Network responses get deserialized into classes

Unable to Map

The deserialization was unable to map the network response to the class.

Proguard

Proguard obfuscated class names and fields by default.

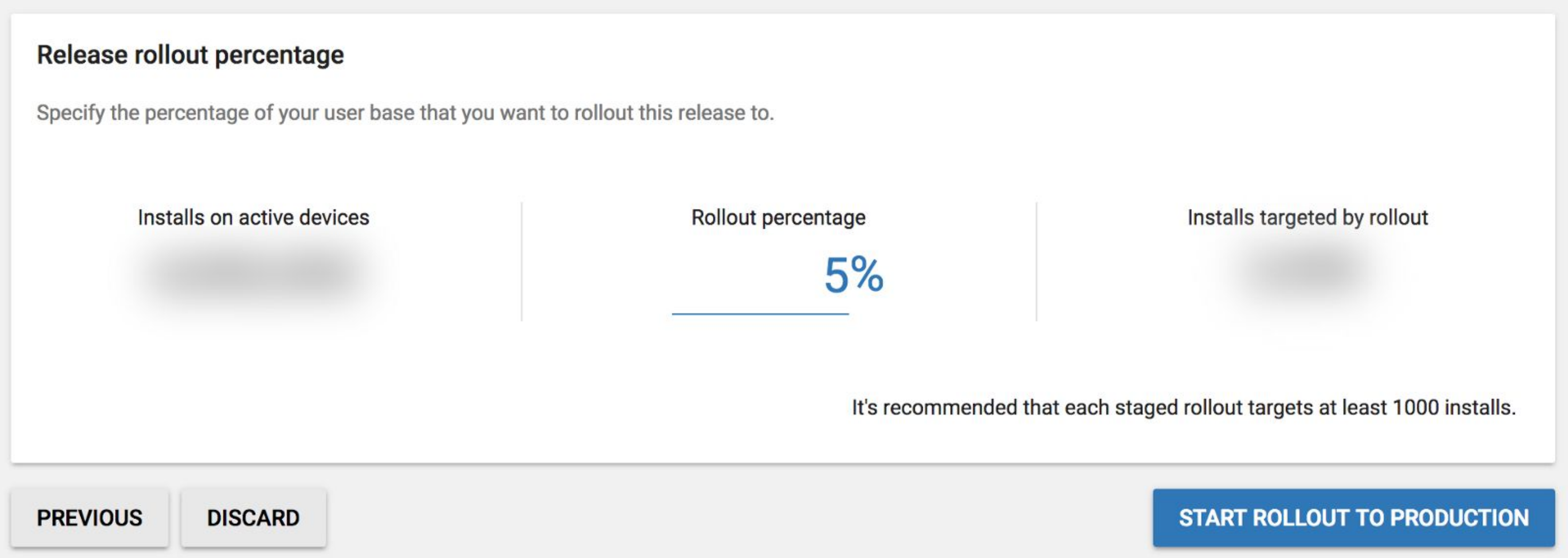
Dev builds excluded

Proguard is not run on feature/dev builds so the problem wasn’t apparent.

How can I fix this?

Test the live release!

We made a mistake - it was easy to fix. Luckily we have staged rollouts so the impact was minimal to the whole user base.



Release rollout percentage

Specify the percentage of your user base that you want to rollout this release to.

Installs on active devices

Rollout percentage: 5%

Installs targeted by rollout

It's recommended that each staged rollout targets at least 1000 installs.

5

Odds and Evens - Android Fragmentation gotchas...

A quick example, one of many...

Android ent of a
special from a
backg tion.

They removed it in 7.

They brought it back in 8+

SO WHAT HAPPENED?

- One to remember while in development
- Users interacts with a notification that opens an App.
- Android 5 & 7 works fine without the flag
- Android 6 & 8 crash.

So what do I do about it?

Remember to add the flag!

Make sure the code has the following OR use another mechanism!

```
intent.addFlags(Intent.FLAG_ACTIVITY_NEW_TASK);
```

Remember to test on multiple Android versions!

But you do this anyway… right?

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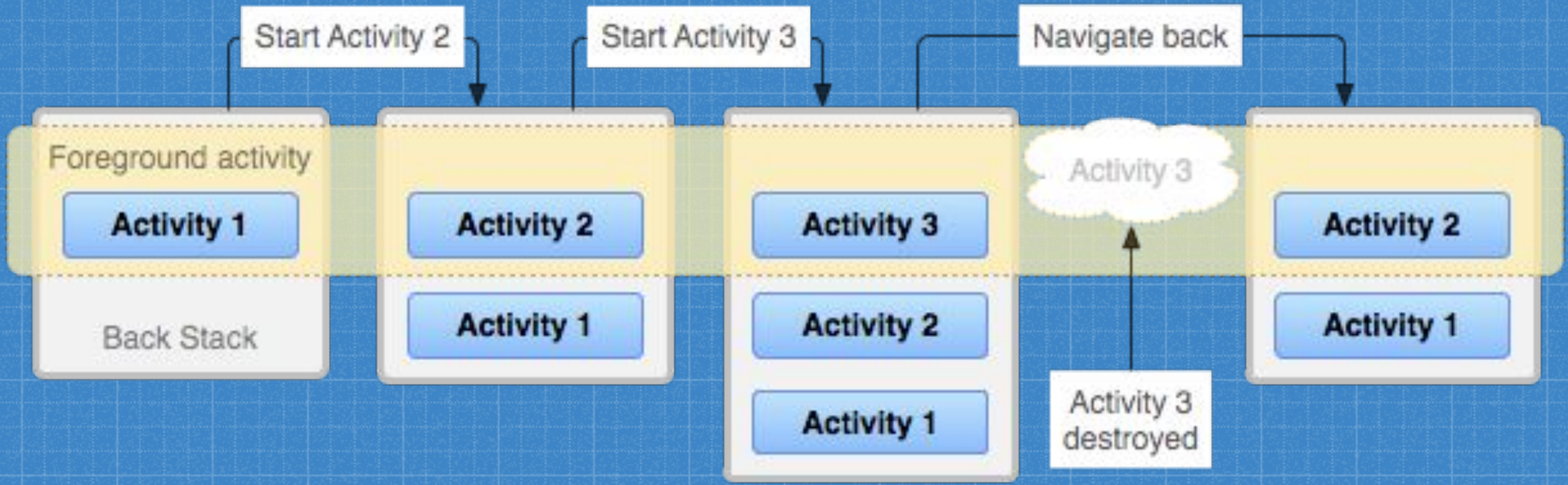
Application stacks, task affinities and the UX

Brace yourselves...



Start Activity 2

Start Activity 3

Navigate back

Foreground activity

Activity 1

Back Stack

Activity 2

Activity 1

Activity 3

Activity 2

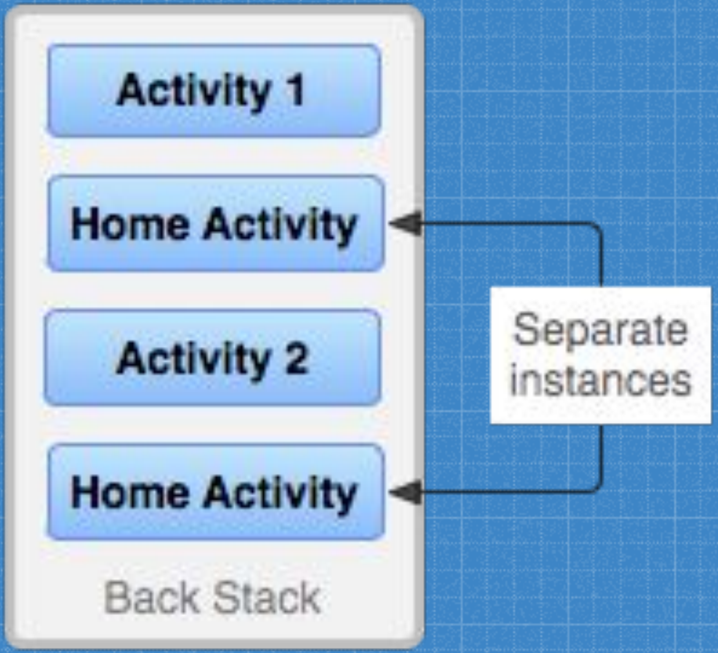
Activity 1

Activity 3

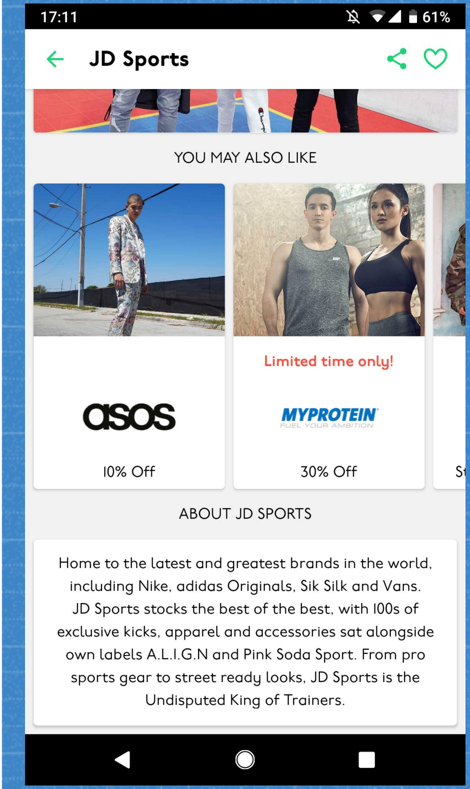
Activity 3 destroyed

Activity 2

Activity 1


Activity 1
Home Activity
Activity 2
Home Activity
Separate instances
Back Stack

Real world example



17:11 61%

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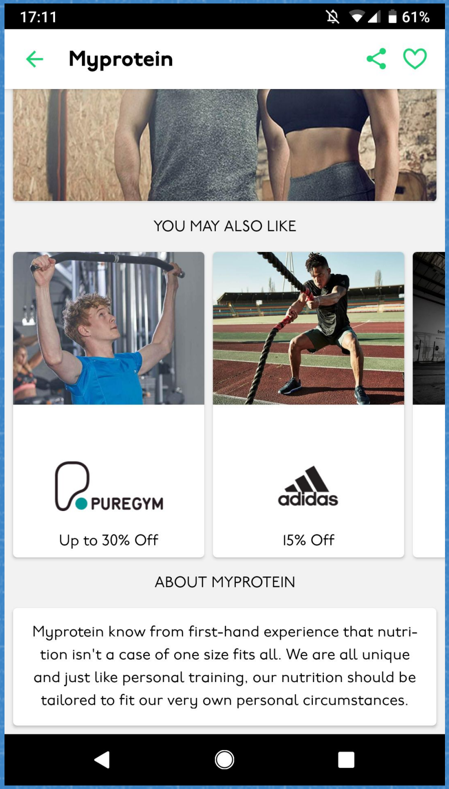

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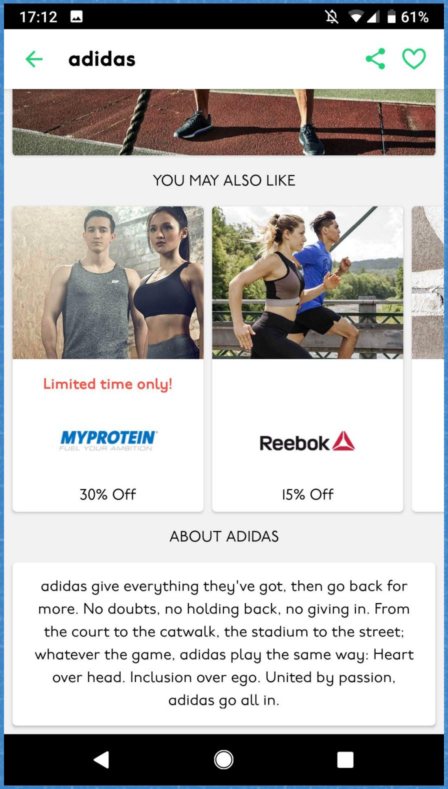
Myprotein know from first-hand experience that nutrition isn't a case of one size fits all. We are all unique and just like personal training, our nutrition should be tailored to fit our very own personal circumstances.



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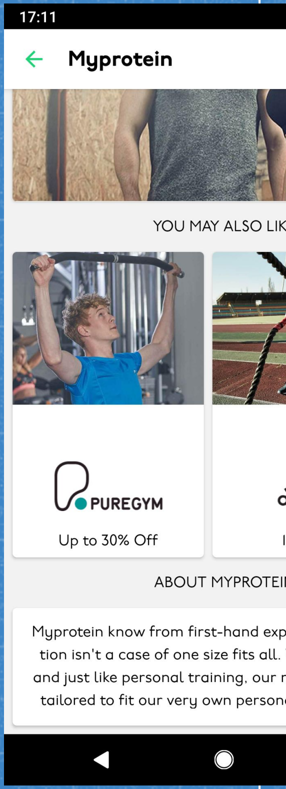

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Myprotein know from first-hand exp
tion isn't a case of one size fits all.
and just like personal training, our r
tailored to fit our very own person

How can I fix this?

Remember check the launch mode of the Activity!

There are lots of different modes that change the way Android creates Activities.

In the example before we reuse the existing Activity so to keep memory use down.

Learn about Android Tasks

Check out the Android documentation:

https://developer.android.com/guide/components/activities/tasks-and-back-stack

7

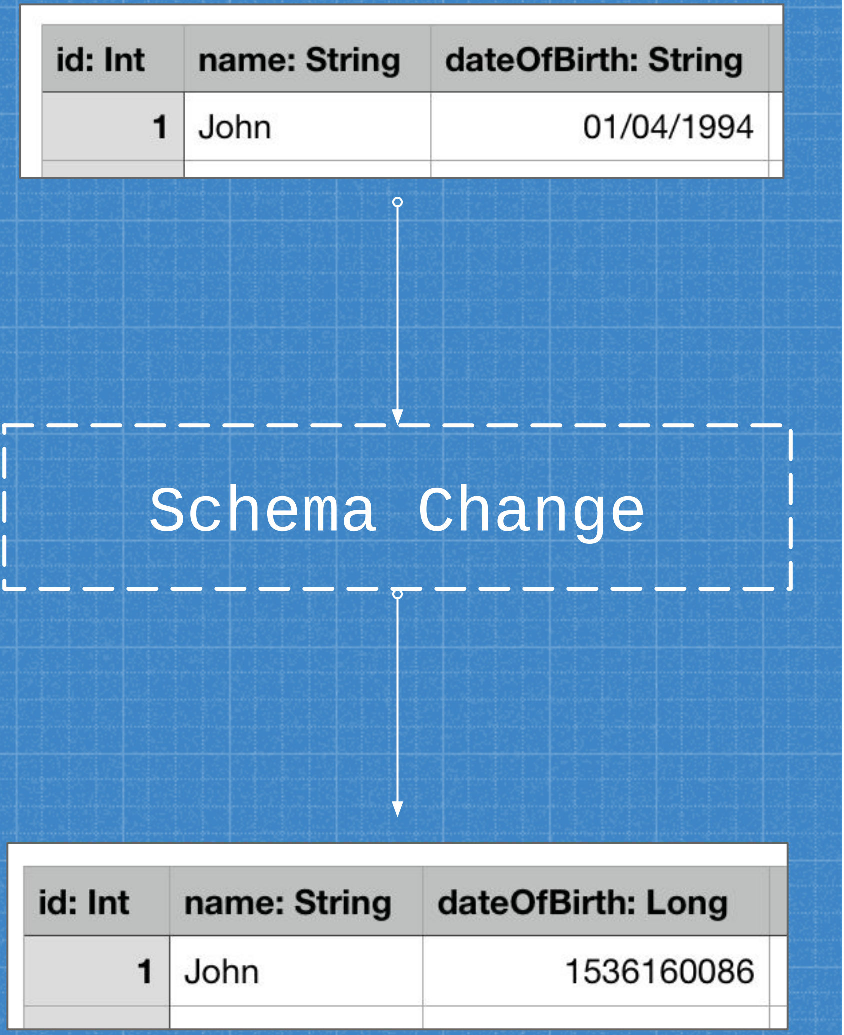
Migration testing

Last one, promise

Your app probably stores data, like databases and preferences. Make sure your app updates are compatible with data created by previous versions, or implement a migration!

SO WHAT HAPPENED?

- Your App stored some data in a database
- An update is released with changes to the database schema
- The App updates and now the app doesn’t understand it’s own database
- Either an error or data loss!



id: Int	name: String	dateOfBirth: String
1	John	01/04/1994

Schema Change

id: Int	name: String	dateOfBirth: Long
1	John	1536160086

How can I test this?

- Before publishing a new version run your old version and then install the new version over the top. Does everything still work?
- Consider that installing version v7 of your app over version v2 or your app may also produce the same issue.
- It’s boring but it’s important!

```
adb uninstall "${PACKAGE_NAME}"

adb install "app-release-v2.apk"
adb shell monkey -p "${PACKAGE_NAME}" 1 # launch

complete_onboarding

adb install "app-release-v7.apk"
adb shell monkey -p "${PACKAGE_NAME}" 1 # launch
```

Thanks!

ANY QUESTIONS?