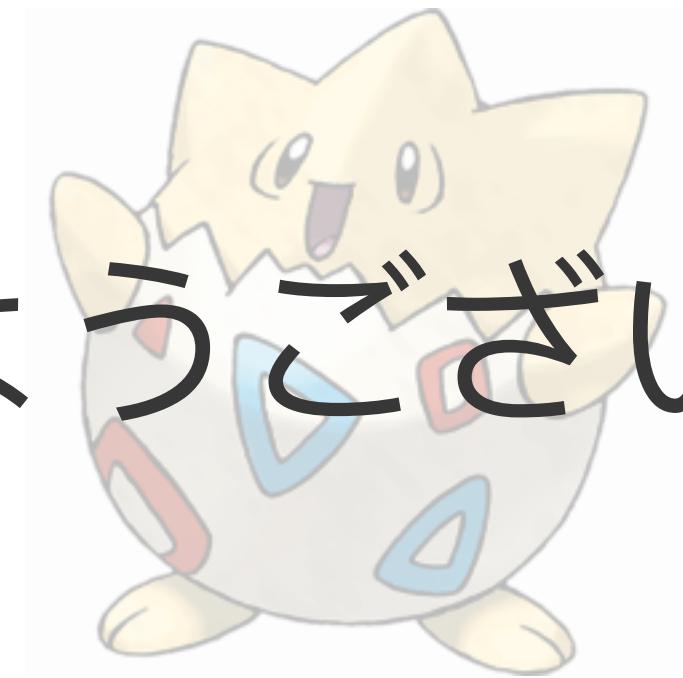


# Prototyping Magic

おはようございます!



# Who am I?

- Adam Bell
- Canadian
- @b3ll on Twitter
- iOS Engineer @ Facebook (App Experiences)
  - Animation and Music are my specialties.
- *#gottagofast*

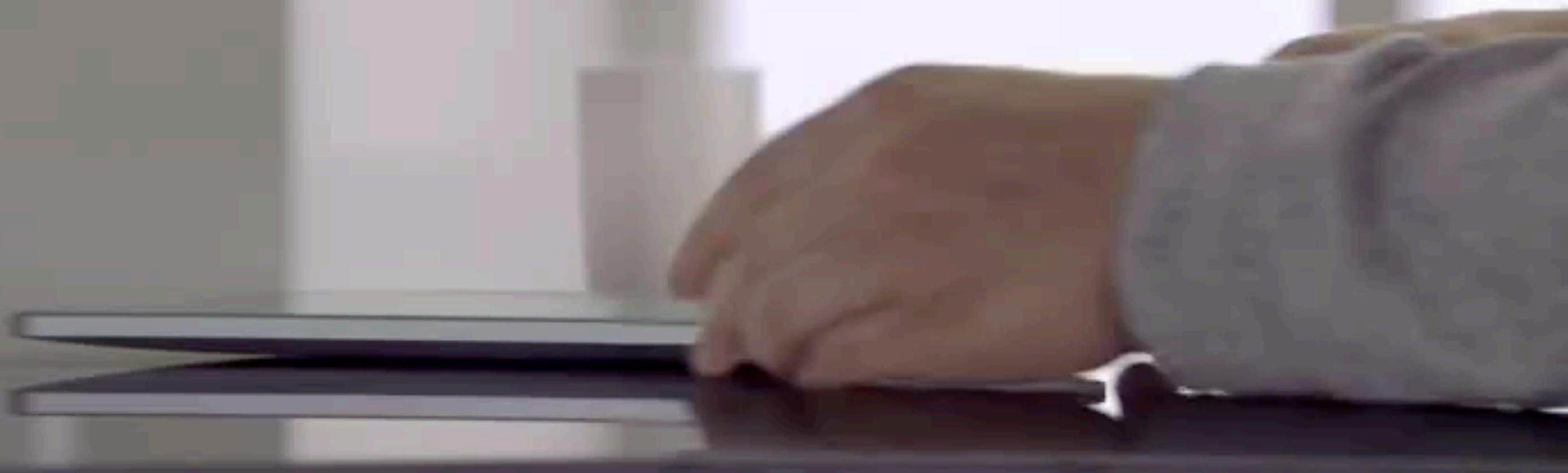
# A Bit of History...

- Started out with Cydia:
  - MessageBox: Chat Heads hack for the Facebook App (and Paper)
  - Stride: Unlock your phone with touch gestures
- Helped me learn a bunch about the internals of iOS.

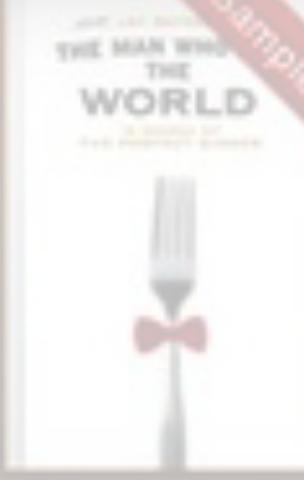
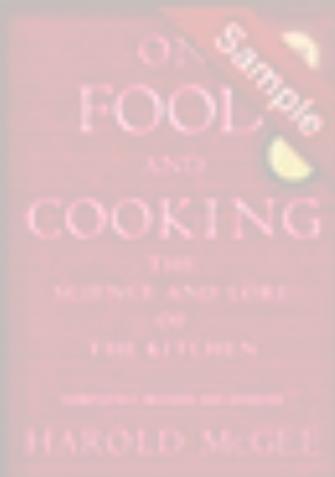
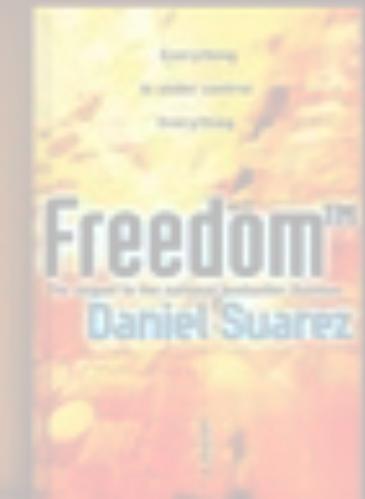
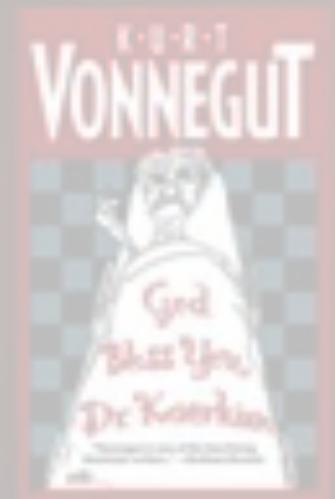
# A Little Bit More of History...

- Also did some work on the App Store:
  - Reprise: DJ-inspired Music Player
  - ARTPOP: Lady Gaga's companion app for the album

# The Early Days



# iBooks



# Photos



Argentina-Venezuela...



Dakar



Big Sur



Buenos Aires



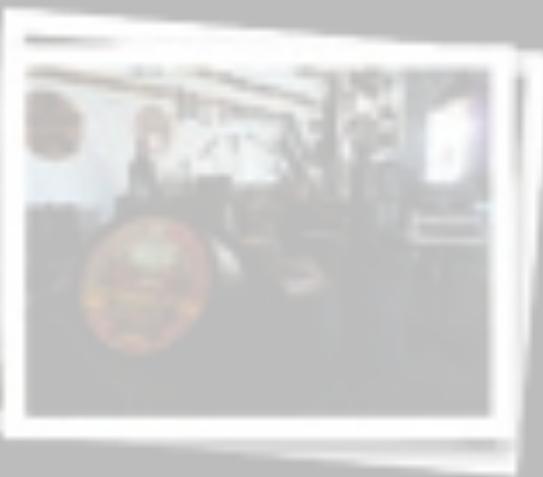
Catalina



Half Moon Bay



LA



Mendoza



stevepoling (@stevepoling) me...  
Direct message sent by stevepoling  
(@stevepoling) to you (@mysticgeek) on  
Feb 20, 1:16 PM. "Thank you for the fol..."

## LinkedIn Connections 12:45 PM

See what Don has been up to...  
Brian, Congratulations! You and Don are  
now connected. Don Rose Senior  
Contributor, BYTE.com Greater Los An...

## Windows Home Ser... 10:25 AM

Welcome to Windows Home...  
LinkedIn ----- \* Group: Windows  
Home Server \* Subject: Welcome to  
Windows Home Server on LinkedIn Hi...

## groovyPost.com 9:23 AM

groovyPost Daily - Facebook...  
groovyPost Your Daily Dose of Groovy  
Posts! http://www.groovypost.com?  
awl\_inSWlyWR&awl\_m=3ek9nw\_gEwP...

## Amazon.com 6:25 AM

Your Amazon.com Order (DO...  
[Amazon.com Logo]  
<[http://www.amazon.com/gp/homepage.html/ref=cs\\_no\\_amp](http://www.amazon.com/gp/homepage.html/ref=cs_no_amp)> [Your Account]...

## Macworld Weekly 6:20 AM

What You Need to Know Abo...  
[Macworld] View this newsletter  
[online<http://newsletter.macworld.com/U342534/165027793/2/0458/0/>](http://newsletter.macworld.com/U342534/165027793/2/0458/0/) | News...

## Search Engine Land... 6:07 AM

[4] discussions and [6] comme...  
Search Engine Land Today's new...

From: Windows Phone

Hide

To: mysticgeek@live.com

Mark

## Getting started with Windows Phone 7.5

February 19, 2012 10:05 AM

See top 5 how-to's for your new phone

[See top apps](#) | [Help & how-to](#) | [Get started](#)

Share this:

# Mail

Let's get started with Mail on Windows Phone. Thanks again for choosing Windows Phone. This email is to help answer some common questions we hear from people when they first start using their phone.

## Get more apps and games

Tap Marketplace on your Start Screen or in your App list.  
Tap a category: apps, games, music, or podcasts. Then flick left or right to browse through the options.  
Or tap Search and type what you're looking for.

[Learn more](#)

Share this:

## 3 ways to enjoy music on your phone

Sync your music collection from your computer to your phone with the free Zune software.

# Motion

- Obvious with their intent.
- Enhance the experience of the app.
- Feel like *magic*.

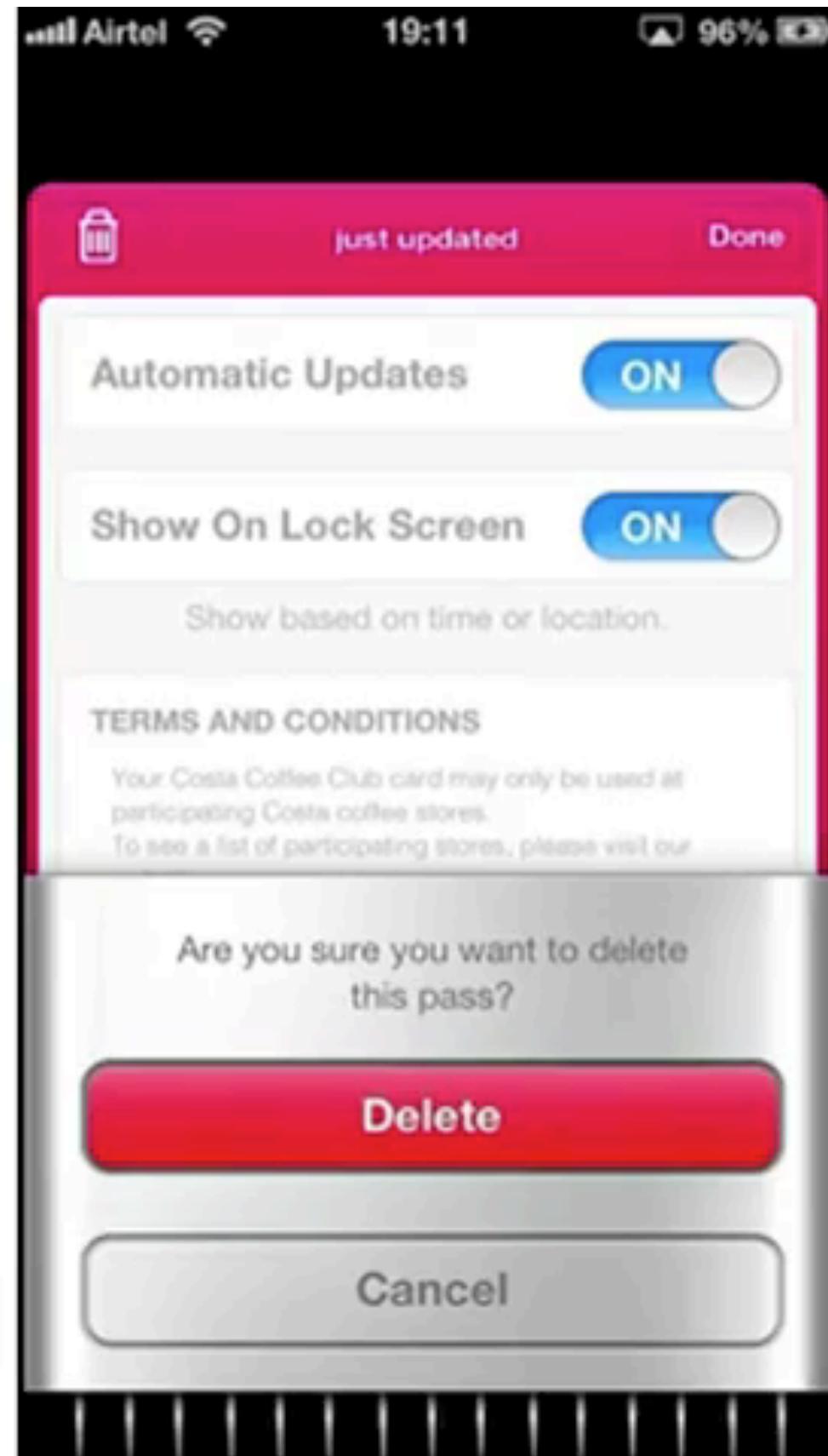
"Any sufficiently advanced  
technology is indistinguishable from  
magic."

– Arthur C. Clarke

# ios 7



# Passbook



# Wallet



Apple



Twitter for iPad



Twitter

Art &amp; Design

Books

Business

Charity

Deals &amp; Discounts

Entertainment

Family

Fashion

Food &amp; Drink

Funny

Health

Music

News

Politics



nytimesarts

Books of The Times: Safety in Numbers? Not for This Heroine <http://nyti.ms/cnFTqJ>



nytimesarts

Have Your Brunch and Listen to It, Too <http://nyti.ms/broYC9>



mezzoblue

Still some work to do, but basic convolution matrices are functional and will be in PaintbrushJS soon. (English translation: sharpening)



yokoono

» Iceland events to celebrate John Lennon's 70th Birthday: 9th October 2010 <http://bit.ly/czCdUK>



dwell

what wines taste like, very nice infographic <http://bit.ly/AdDn> by @tashian now i know when to use the appropriate sommelier jargon #design



Behance

The Art of Momentum: Why Your Ideas Need Speed :: <http://bit.ly/bnxM5Z>



estria

RT @estriabattle: just confirmed a cake decorating battle for this year's #EIGB!! details to follow... #fb



nytimesarts

Movie Review | 'The Last Exorcism': Loosening



dwell

what wines taste like infographic <http://bit.ly/AdDn> by @tashian now i know when to use the appropriate sommelier jargon #design

7 hours ago via twitterforipad



dwell

@dwell  
#16661296

bio Following our team around the world. See who's saying what on twitter

web [dwell.com](http://dwell.com)

Tweets



Mention

Lists

dwell

Following

98

Similar to dwell



FLOR

FLOR



semigood

Braden Callahan

Twitter for iPad... Pro?



**rstevens** ✨☕✨ @rstevens  
Yes, I have eight fingers per hand

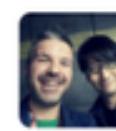
6s



**Abdel Ibrahim** @abdophoto 19s  
Yes. Versatility will be a huge selling point in years to come.



**Riccardo Mori** @merrick 32s  
My birthday is in 8 days, Apple.



**Antonio Fucito** ☀ @Tanzen 1m  
Lettori di Torino e dintorni: il 20 e 21 sono in zona, farò anche un talk per @Multiplayerit ad ingresso libero!

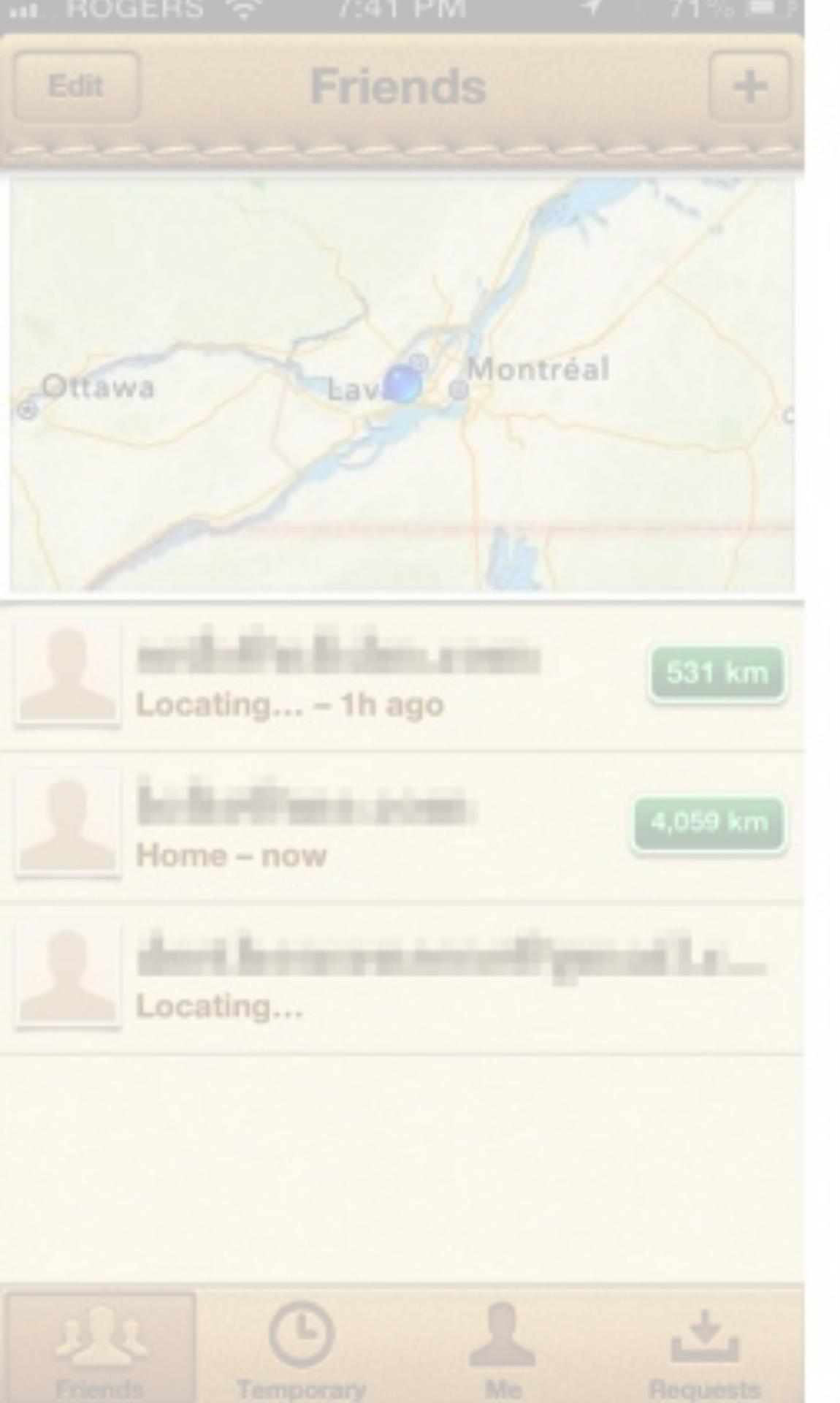


Appuntamento al 20 e 21 novembre con  
Wearable Tech Torino  
[multiplayer.it](http://multiplayer.it)



# Garageband





*Skeumorphism*: the act of making something digital resemble its real-world counterpart.

*Interaction:* the fashion in which one thing can affect another thing.

Skeumorphism ≠ Interaction

# Animations

- Define and bring closure to actions.
- Make sense of what's happening.
- Create a navigational hierarchy of intent.

"Flat and simple" apps are sidelining  
animation and interaction.

# Top 3 Excuses

Nowadays features and shipping speed are a priority:

1. They're unnecessary.
2. They're slow.
3. They're hard to build.

aka

1. Psychological Intent.
2. Technological Capability.
3. Laziness.

# "Animations are unnecessary."

Why?

- Do they result in a poorer experience?
- Do they make the experience confusing?
- How do we mitigate confusion?

Animations tell a story.

Animations are about *progression*.

Don't disable all animations.

If you disable animations, you're  
robbing someone of their ability to  
understand.

Don't go overboard.



Animations need purpose. Perform  
animations with a specific intent.

Explain "how did I get here" through  
animation and interaction.

## Recap:

- Animations should be subtle in nature.
- Animations should indicate a specific intent.
- Animations should compliment interactions and events.

# "Animations are slow."

- What part is slow?
- Do they drop frames?
- Do they run for too long?

# Core Animation is /Not/ Slow

- All animations on iOS are done out of process:  
`CARenderServer`
- They're done on the GPU.
- They're given top priority.
- They won't ever be slow unless your app physically taxes the system.

# Slow Animations are Slow

- Slow animations are more painful than laggy ones.
- Don't go overboard: Excessively long animations are infuriating.
- Subtle animations are quick and satisfying.



## ≡ Home



Jonathan Ždziarski

@JZdziarski

25s

Irony of the day: A restaurant named Amicus Apple (Google's not perfect) [facebook.com/Amicus-Apple-4319...](https://facebook.com/Amicus-Apple-4319...)



Matt Weinberger

@gamoid

26s



@kanyewest @TIDALHiFi is this for deadmau5 or are you accepting applications

retweeted by @drew



Rob Rix

@rob\_rix

39s

Well, my days of not taking you seriously are certainly coming to a middle.



Melissa ★

@0xabad1dea

48s

(The headline is a little misleading but not wrong)



The Intercept

@the\_intercept

5h

It is now a federal crime to protest a Trump rally, punishable by up to 10 years in prison. [interc.pt/21D...](https://interc.pt/21D...)



If someone has to fight with your  
app... they will **delete** it.



They will then rate your app one star  
and yell at you.

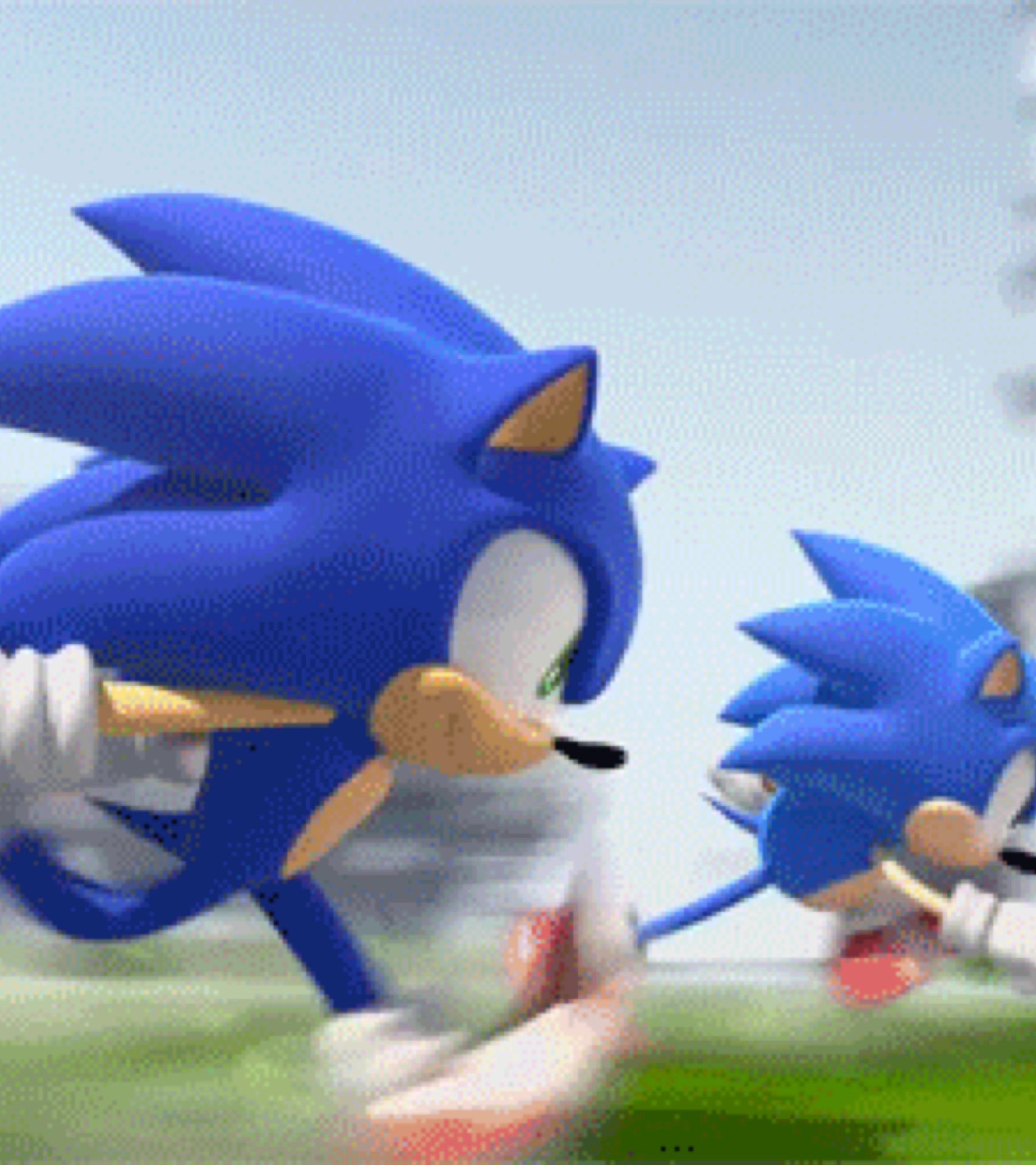
**Worst App Ever ★**  
by Everyone

Your app is slow. You're a terrible person. I hate you. 😡😡👉

You will be sad. 😞

## Recap:

- Use animations with a specific intent.
- Be simple and quick.



Good animations educate.  
Bad animations frustrate.

Delightful animations paired with  
interactions make people smile.



# "Animations are hard to build."

- Don't take the easy route, challenge yourself.
- As an engineer, problem solving is your forte.
- Building a beautiful animation is extremely rewarding to both yourself and whoever uses your app.

"When a designer hands you  
something to build...  
don't say no."

# Iterate. Don't delete.

- Difficulty should never be a reason to settle and scrap an idea.
- If something is too taxing on the system, iterate on the idea.
- Work together to create something great!

Speaking of iteration...

Prototyping allows you to understand the potential of what you will build, and perfect what you are building.

How?

# Prototyping Tools

- Loads of tools to help you build and prototype animations.
- Origami, Quartz Composer, Form, Framer, Pixate, etc.

What about Xcode?

Before Swift, Xcode was *terrible* for prototyping.

However...

Balloons.playground &gt; f setupHero(\_:\_:)

```

func didMoveToView(scene : SKScene,
                   delegate : SKPhysicsContactDelegate) {

    // ===== Blimp Control =====

    yOffsetForTime = { i in
        return 80 * sin(i / 10.0)
    }

    // ===== Scene Configuration =====

    // Set up balloon lighting and per-pixel collisions.
    balloonConfigurator = { b in
        b.physicsBody.categoryBitMask = CONTACT_CATEGORY
        b.physicsBody.fieldBitMask = WIND_FIELD_CATEGORY
        b.lightingBitMask = BALLOON_LIGHTING_CATEGORY
    }

    // Load images for balloon explosion.
    balloonPop = (1...4).map {
        SKTexture(imageNamed: "explode_0\($0)")
    }

    // Install turbulent field forces.
    var turbulence = SKFieldNode.noiseFieldWithSmoothness(0.7,
                                                       animationSpeed: 0.8)
    turbulence.categoryBitMask = WIND_FIELD_CATEGORY
    turbulence.strength = 0.21
    scene.addChild(turbulence)

    cannonStrength = 210.0

    // ===== Scene Initialization =====

    // Do the rest of the setup and start the scene.
    setupHero(scene, delegate)
    setupFan(scene, delegate)
    setupCannons(scene, delegate)
}

func handleContact(bodyA : SKSpriteNode,
                  bodyB : SKSpriteNode) {

    if (bodyA == hero) {
        bodyB.normalTexture = nil
        bodyB.runAction(removeBalloonAction)
    } else if (bodyB == hero) {
        bodyA.normalTexture = nil
        bodyA.runAction(removeBalloonAction)
    }
}

```

(Function)  
(1058 times)

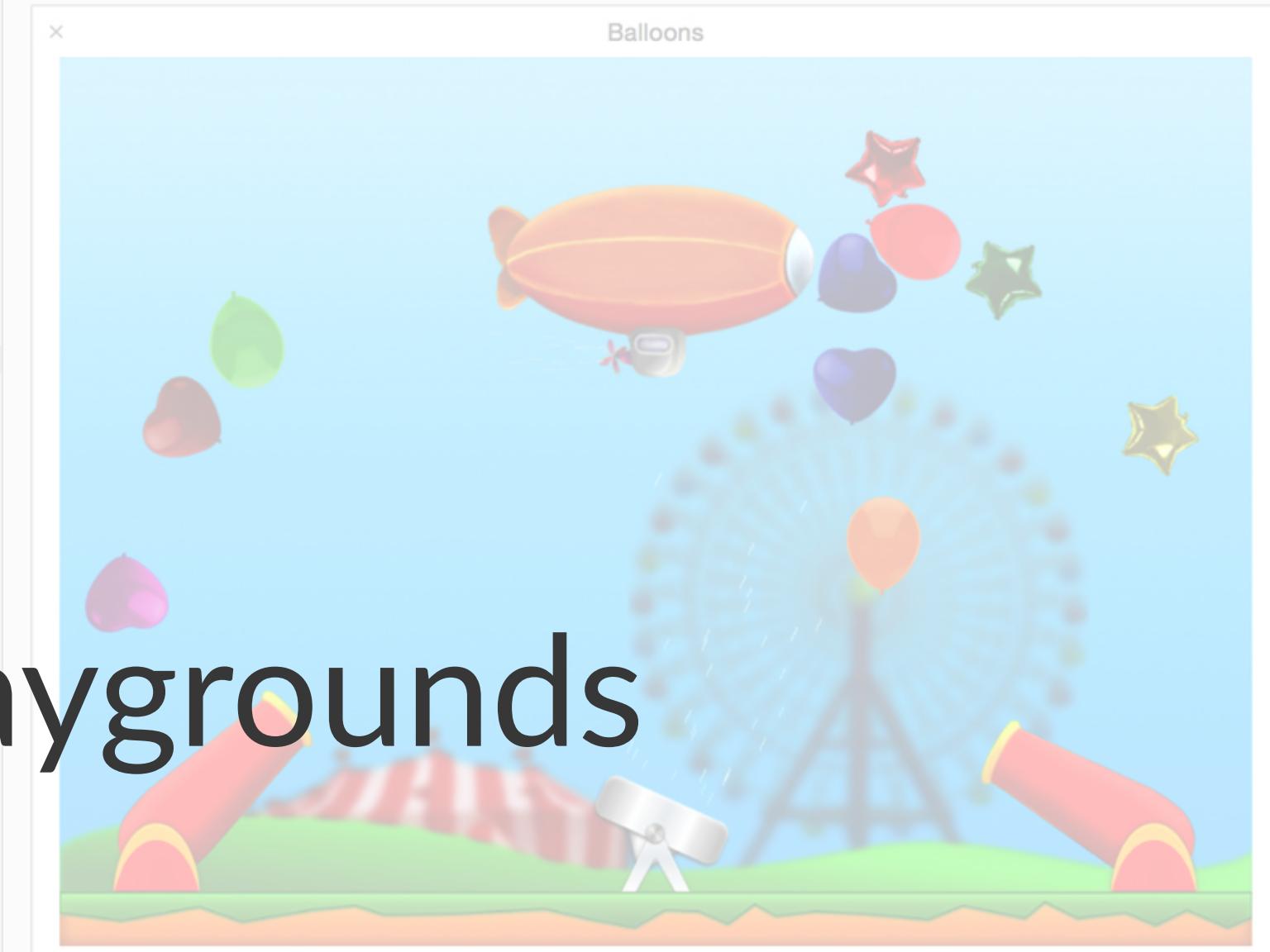
(Function)

(55 times)

[SKTexture, SKTexture, SKTe...  
(4 times)

210.0

Timeline &gt; Balloons.playground (Timeline)



Xcode Playgrounds Are Awesome.

# Xcode Playgrounds

- Powered by... Swift!
- Amazing for iterating on ideas.
- Changes update in real-time.
- Code can be reused line-for-line.

# Interactive Xcode Playgrounds

- Xcode playgrounds now support touches! 
  - `UIGestureRecognizer`? Yep.
  - `UIPanGestureRecognizer`? Yep.
  - `UI*GestureRecognizer`? Yep.

# Xcode Playgrounds + Gestures

- Take forever to setup, loads of boilerplate code:

```
let tapGestureRecognizer = UITapGestureRecognizer(self, selector:Selector("doTheThing"))
aView.addGestureRecognizer(tapGestureRecognizer)
@objc private func doTheThing(tapGestureRecognizer: UITapGestureRecognizer) {
    switch(tapGestureRecognizer.state) {
    case: UIGestureRecognizerStateEnded:
        print("ohai")
        break
    default:
        break
    }
}
```

gross.

Let's fix that.



# SwiftyGestureRecognition



```
let tapGestureRecognizer = UITapGestureRecognizer(view: aView)
    .didEnd { (gestureRecognizer) in
        print("ohai")
}
```

#yatusabes

woah.

wat.



# SwiftyGestureRecognition

- Similar syntactic sugar to Alamofire.
- Hacks internalized with Objective-C's Associated Objects.
- Trailing closures are magic.

Let's take a look!

What about prototyping  
animations?

pop

# POP

- Excellent library for writing interactive / advanced animations.
- Powered by Core Animation.
- Open Source!

"Why not just use Core Animation  
only?"

Nothing wrong with Core Animation.

I ❤️ Core Animation.

**CALayer is hard.**

# CALayer

- Powered by two internal layers:
  - Presentation Layer: State during an animation.
  - Model Layer: State when no animation is active.
- Animation only changes the Presentation Layer.

Interrupting animations properly on CALayer  
is hard.

CALayers can get out of sync.

# CAPropertyAnimation

```
let layer = ...
guard let transform = (layer.presentationLayer() as? CALayer)?.transform else {
    return
}
layer.removeAllAnimations()
layer.transform = transform
```

# POP

```
let layer = ...  
layer.pop_removeAllAnimations()
```

# POP vs. CPropertyAnimation

- With Core Animation the Presentation Layer and Model Layer become out of sync.
- POP keeps them in sync.
- When you remove an animation, whatever you're animating freezes and stops... it doesn't reset.

# POP vs. UIView Animations

- Interrupting UIView animations is insane.
- That's all.

# POP + Gestures

- No touch delay, interruptibility is easy.
- You can feed POP animations with velocity, so they feel more natural.
- Decay animations and springs!

# How to Make Things POP

Super similar to Core Animation:

```
let animation = POPBasicAnimation(kPOPLayerTranslationX)
animation.toValue = 50
layer.pop_addAnimation(animation, forKey: "translationAnimation")
```

# More Playgrounds Awesomeness!

- Xcode 7.2 lets us import modules!
- We can import POP!

# How to Prototype POP Animations with Playgrounds

- import POP.
- Set XCPlaygroundPage's liveView to a container view.
- Use the container view to mess with things.

tldr: Use Playgrounds to Prototype  
Animations.

Thanks everyone! Enjoy try! Swift! 

just kidding

Seriously that was probably the worst demo ever.

Let's prototype something

# Pokémon ポケモン



# Pokémon

Reasons to do a pokémon demo:

- Celebrating 20 years! 🎉
- Invented in Japan 🇯🇵
- Pokémon can learn the move "Swift".
- Pikachu 😊





Let's build a Pokédex!

We can do better.

CATERPIE

Lu4



HP



G

Let's try! it()



# Recap

1. We used some fancy Swift syntactical sugar to aid in prototyping gestures.
2. We built some pretty fun and fluid animations using POP.
3. We used Xcode playgrounds to iterate on our pokédex app to make something pretty fun to play with.

# In Closing

Instilling magic into apps is something we should strive towards and continue pushing.

The extra finesse that goes into what makes iOS great is now easier than ever with Swift and Xcode Playgrounds.

Building an app should feel like  
you're composing a symphony.

-

Using it should feel as though you're  
conducting an orchestra.

Thank you

ありがとうございます

@b3ll

