Introducing Text Kit

Session 210

Ian Baird
iOS Text Kit Lead Engineer

These are confidential sessions—please refrain from streaming, blogging, or taking pictures

Agenda

- Motivation

Agenda

- Motivation
- What is Text Kit?

Agenda

- Motivation
- What is Text Kit?
- Feature set

Agenda

- Motivation
- What is Text Kit?
- Feature set
- Rich Text

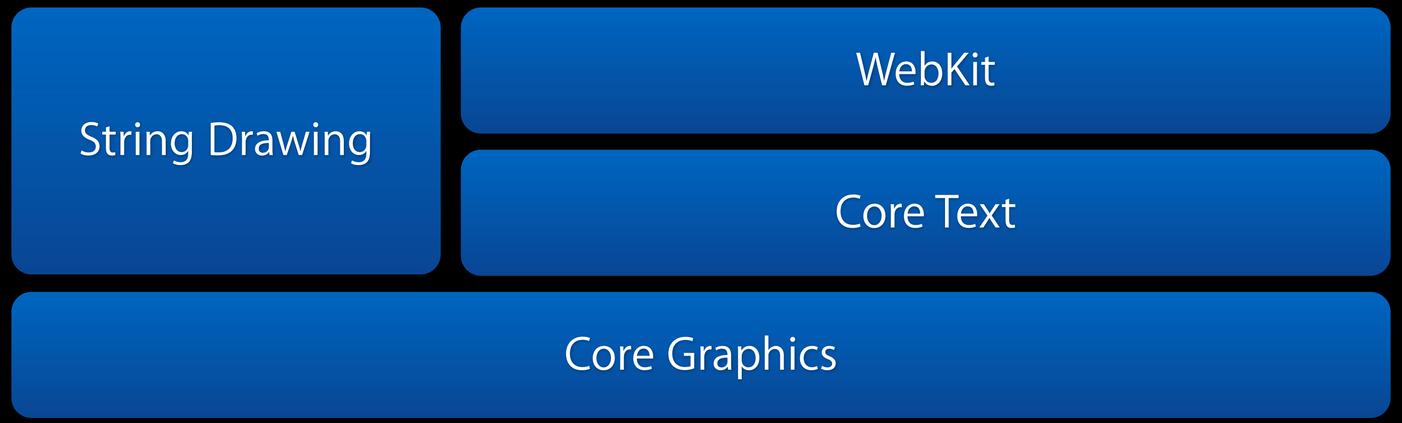
Motivation

Motivation

In the beginning…

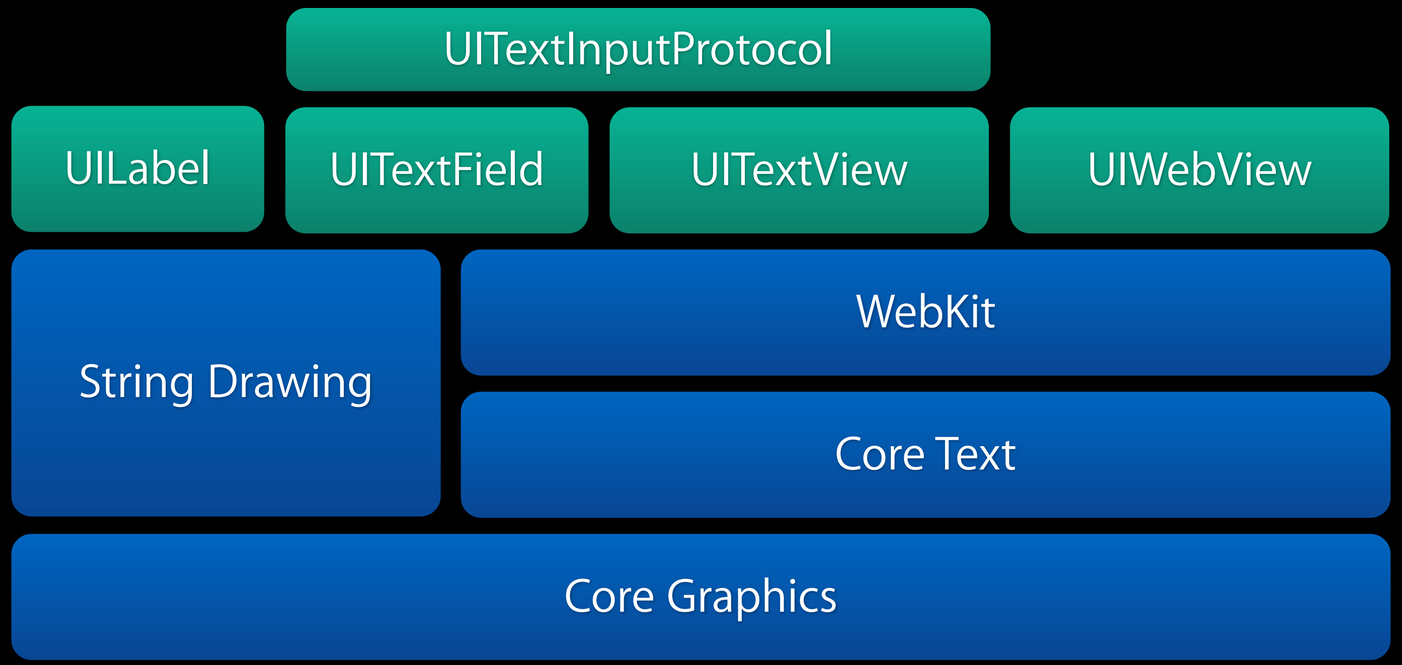
Motivation

In the beginning…



Motivation

In the beginning…



Motivation

Core Text is very advanced

- Mastering Core Text considered to be a “rite of passage”

Motivation

Core Text is very advanced

- Mastering Core Text considered to be a “rite of passage”
- Advanced Unicode layout engine

Motivation

Core Text is very advanced

- Mastering Core Text considered to be a “rite of passage”
- Advanced Unicode layout engine
- Many concepts Toll-Free Bridged with Text Kit now

Motivation

UIWebView

- Great for embedding web content

Motivation

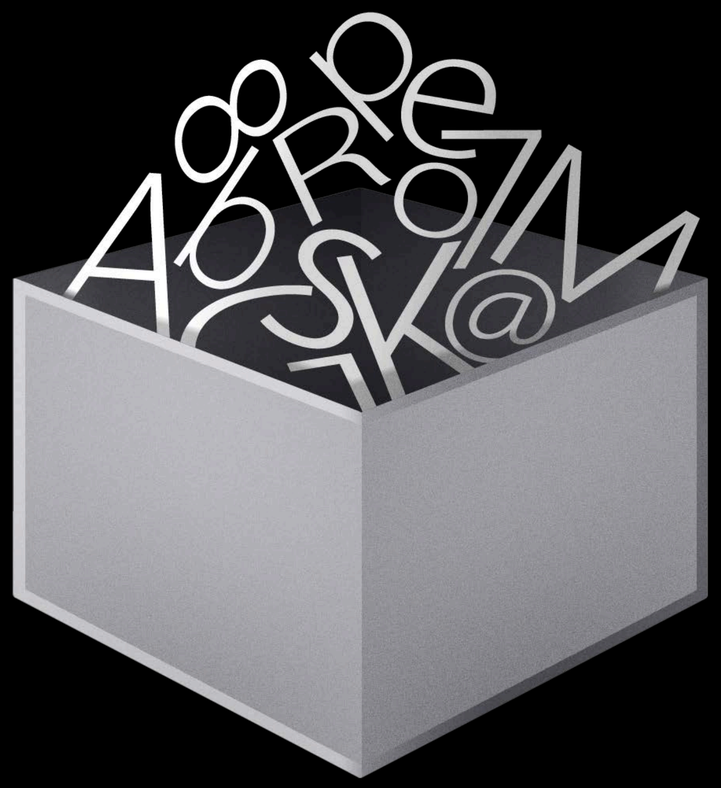
UIWebView

- Great for embedding web content
- WebKit is a great HTML rendering engine

Motivation

UIWebView

- Great for embedding web content
- WebKit is a great HTML rendering engine
- Unexpected behavior with scroll view objects



Text Kit

What Is Text Kit?

What Is Text Kit?

Introduction

- Fast modern text layout and rendering engine

What Is Text Kit?

Introduction

- Fast modern text layout and rendering engine
- Built on Core Text

What Is Text Kit?

Introduction

- Fast modern text layout and rendering engine
- Built on Core Text
- Great integration with UIKit

What Is Text Kit?

What Is Text Kit?

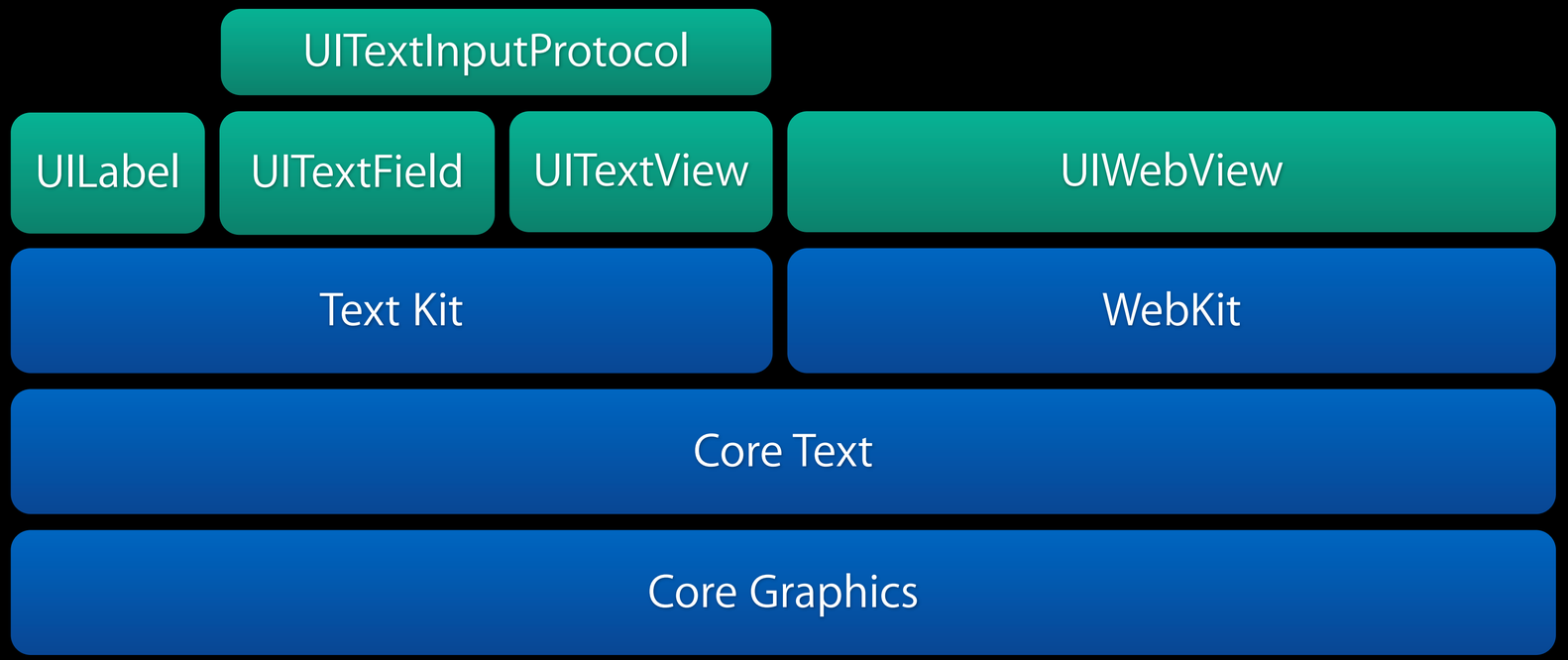
Text Kit

WebKit

Core Text

Core Graphics

What Is Text Kit?



What Is Text Kit?

Text Kit is a “first-class citizen” in UIKit

- Complete control over text rendering in UI elements

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Text Kit is a “first-class citizen” in UIKit

- Complete control over text rendering in UI elements
- UITextView, UITextField, and UILabel rebuilt on Text Kit

What Is Text Kit?

Text Kit is a "first-class citizen" in UIKit

- Complete control over text rendering in UI elements
- UITextView, UITextField, and UILabel rebuilt on Text Kit
- Seamlessly integrates with animations, UICollectionView, and UITableView

What Is Text Kit?

Extensible object-oriented architecture

- Subclassing
- Delegation
- Notifications

```
NSTextStorageWillProcessEditingNotification
NSTextStorageDidProcessEditingNotification
```

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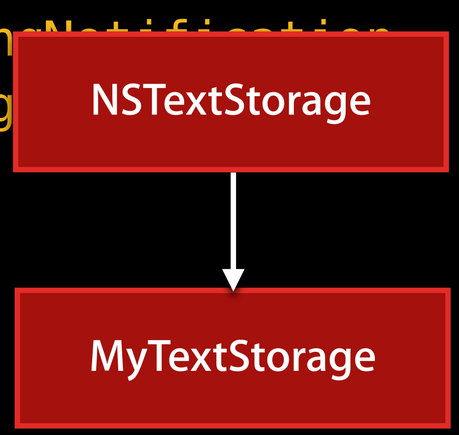

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What Is Text Kit?

Extensible object-oriented architecture

- Subclassing
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- Notifications

```
NSTextStorageWillProcessEditingNotification
NSTextStorageDidProcessEditingNotification
```

Feature Set

A tour of Text Kit

Feature Set

Paginated text

Present with high impact. Anytime. Anywhere.

iPad provides a uniquely powerful way to share your Keynote or PowerPoint presentations in virtually any setting. With iPad in your briefcase, you're able to collaborate and present business propositions at a moment's notice—whether you're in a client meeting, on an airplane, or in the boardroom.

Showcasing your product or service on the large LED-backlit iPad display makes everything you see remarkably crisp, vivid, and bright. You can even connect your iPad to an HDTV or projector to deliver your presentation on the big screen and captivate the attention of a larger audience. And because iPad wakes up from sleep instantly, your presentation is ready when you are.

Use iPad to create new opportunities:

- Turn impromptu meetings into sales transactions
- Give a sales pitch on the fly
- Deliver training at a moment's notice
- Share and spark ideas anywhere

Wherever your work takes you, iPad gives you the flexibility and power to advance your business goals with immediate results.

Showcase your presentation.

With the Keynote app[4], you can create and deliver professional-looking presentations right on your iPad—even if the file was originally created on a PC in Microsoft PowerPoint. Keynote for iPad is a powerful, affordable application that lets you quickly design and edit world-class presentations by simply touching and tapping.

Photos, charts, tables, and themes are only a tap away. Organize your data with beautiful tables and charts. And add high-quality animations such as Magic Move, Flip, and Twirl to grab your audience.

Keynote
Open, edit, and present Keynote and PowerPoint presentations on iPad. Use templates, transitions, and graphics to create stunning presentations.

The Keynote app lets you view and edit Keynote '09 and PowerPoint files on your iPad. And the presentations you create in Keynote on iPad can be exported as Keynote '09, PowerPoint, or PDF files. Whether you use a Mac or PC, you always have the flexibility to work with the files you need, right from your iPad.

When you're ready to present, simply tap to begin and swipe to move forward or backward through your slides. The Multi-Touch iPad display transforms your finger gestures into lifelike actions, so presenting is easy and intuitive.

But don't keep iPad to yourself. Pass it to your customer or colleague and let them swipe, tap, and pinch through your presentation. The immersive experience will lend itself to a memorable customer engagement.

"iPad is a great tool to sell the hotel. Especially in this industry, where you've got to show bedrooms, banquet space, all the things we have to offer guests."

– John Wallis, Global Head of Marketing and Brand Strategy

Hyatt Hotels & Resorts, Chicago, IL
Hospitality

Feature Set

Text in columns

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Feature Set

Text wrapping

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Feature Set

Rich Text editing

Heading One

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Feature Set

Interactive text coloring

Feature Set

Interactive text coloring

@somebody

Feature Set

Interactive text coloring

@somebody: nice layout!

Feature Set

Text folding

Heading 1

This is a snippet of text we'd like to hide.

Heading 2

This is a range of text we'd like to keep visible.

Feature Set

Text folding

Heading 1

Heading 2

This is a range of text we'd like to keep visible.

Feature Set

Custom truncation

Mary had a little lamb its fleece
was white as snow.

Feature Set

Custom truncation

Mary had … fleece … was white.

Feature Set

Enhanced in iOS 7

- Advanced techniques work in stock components

Feature Set

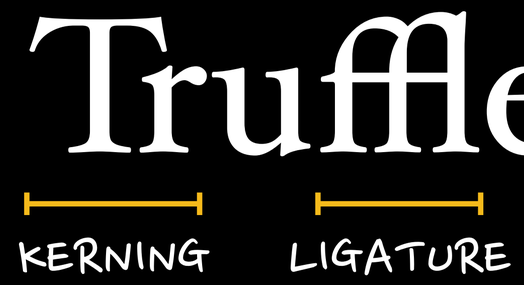
Enhanced in iOS 7

- Advanced techniques work in stock components
- UITextView and UITextField support **all** text attributes

Feature Set

Enhanced in iOS 7

- Advanced techniques work in stock components
- UITextView and UITextField support **all** text attributes
- Kerning and ligatures everywhere



Feature Set

Enhanced in iOS 7

- Advanced techniques work in stock components
- UITextView and UITextField support **all** text attributes
- Kerning and ligatures everywhere
- Letterpress

Advanced Text Layouts and Effects with Text Kit

Mission
Thursday 2:00PM

Feature Set

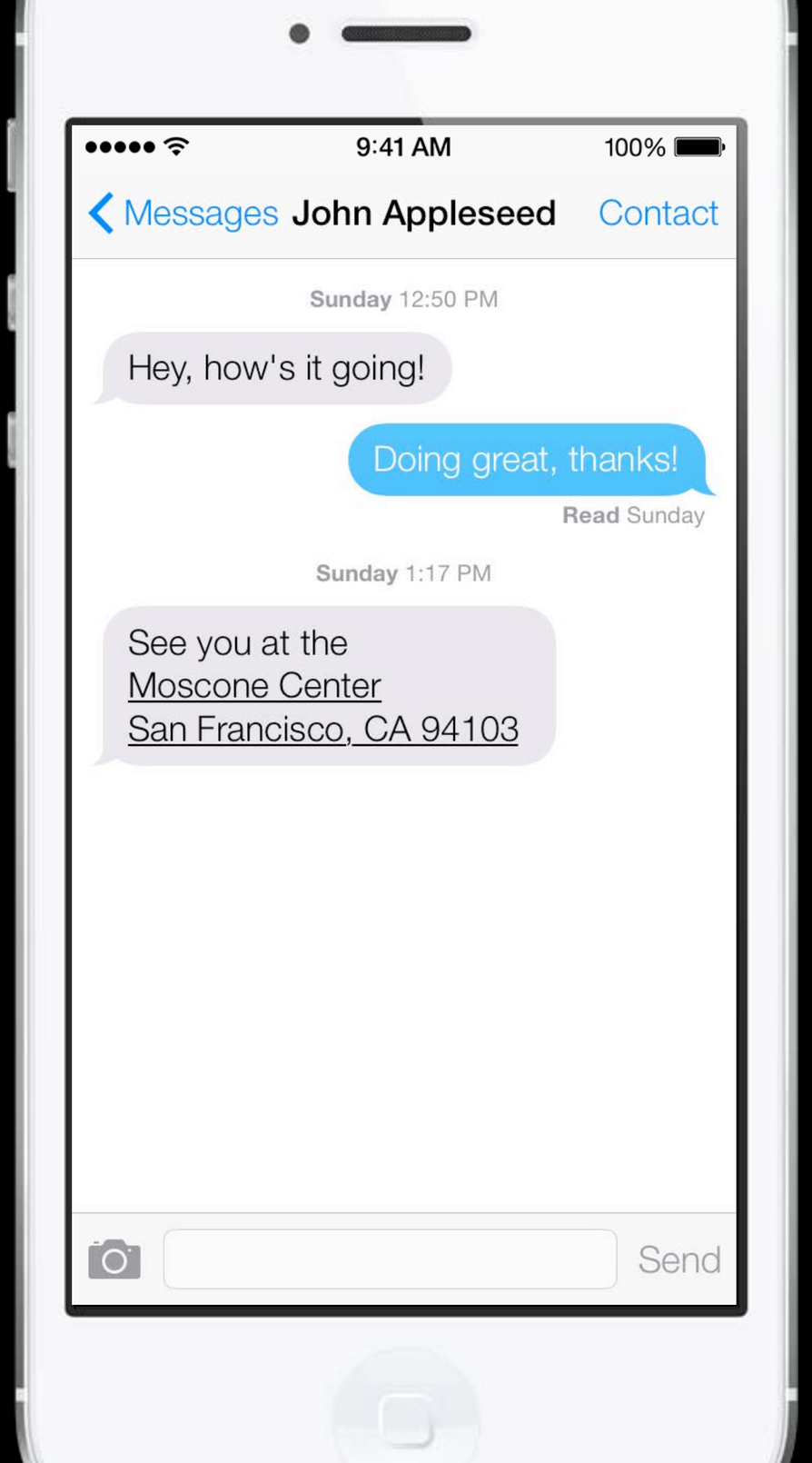
Dynamic Type

- Designed type styles

Feature Set

Dynamic Type

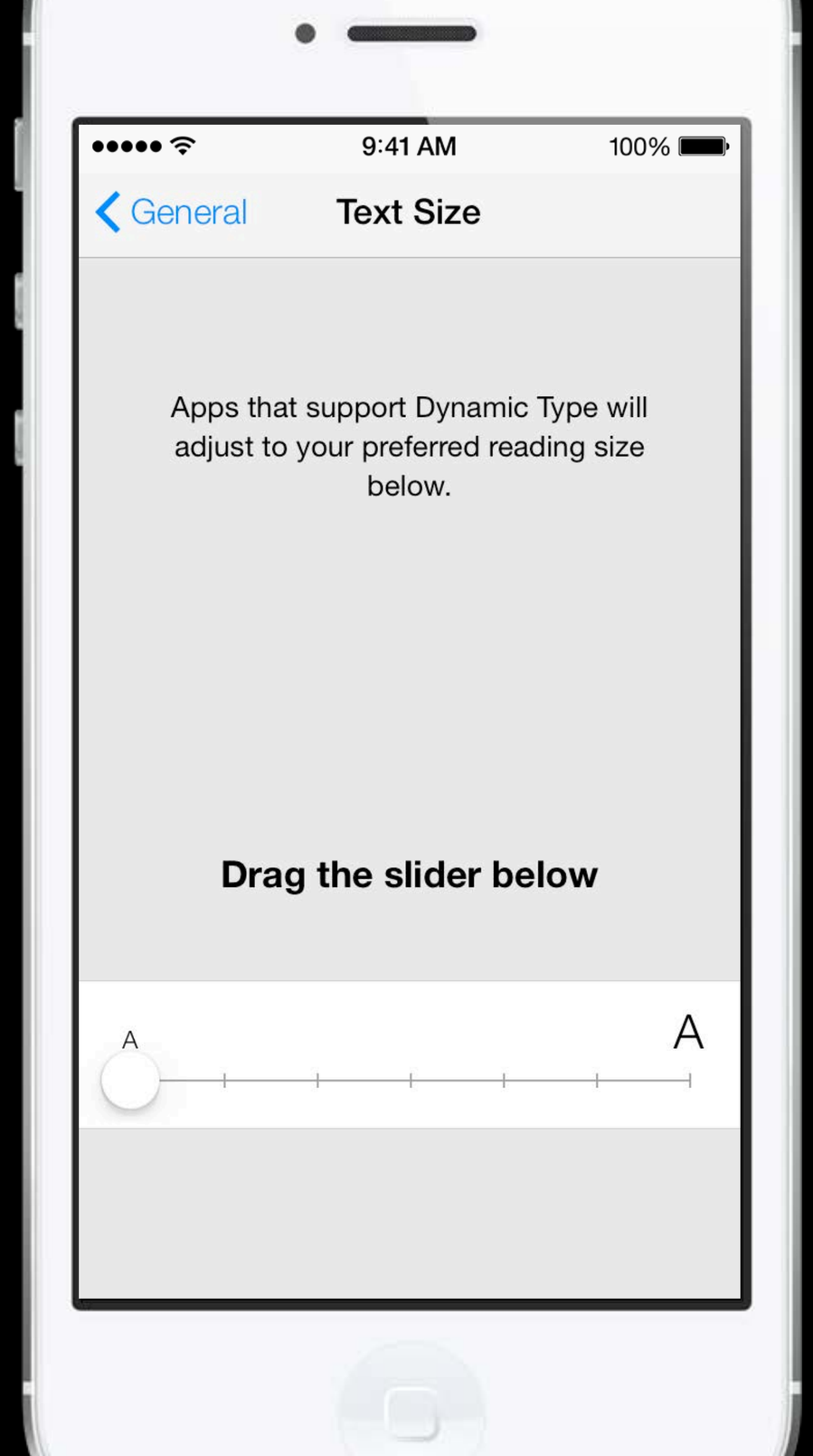
- Designed type styles
- Optimized for legibility



Feature Set

Dynamic Type

- Designed type styles
- Optimized for legibility
- User picks size



Feature Set

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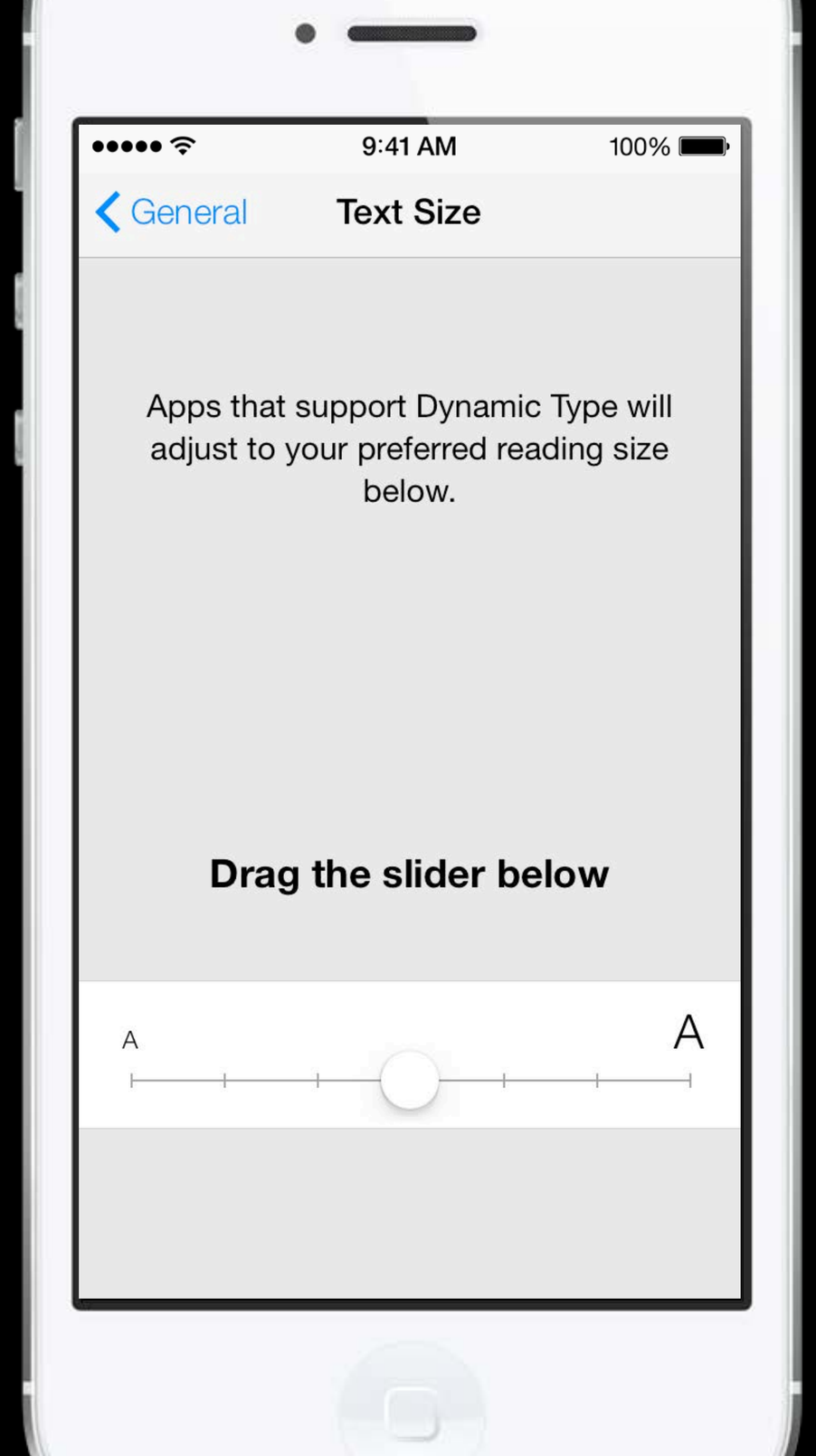

Feature Set

Dynamic Type

- Designed type styles
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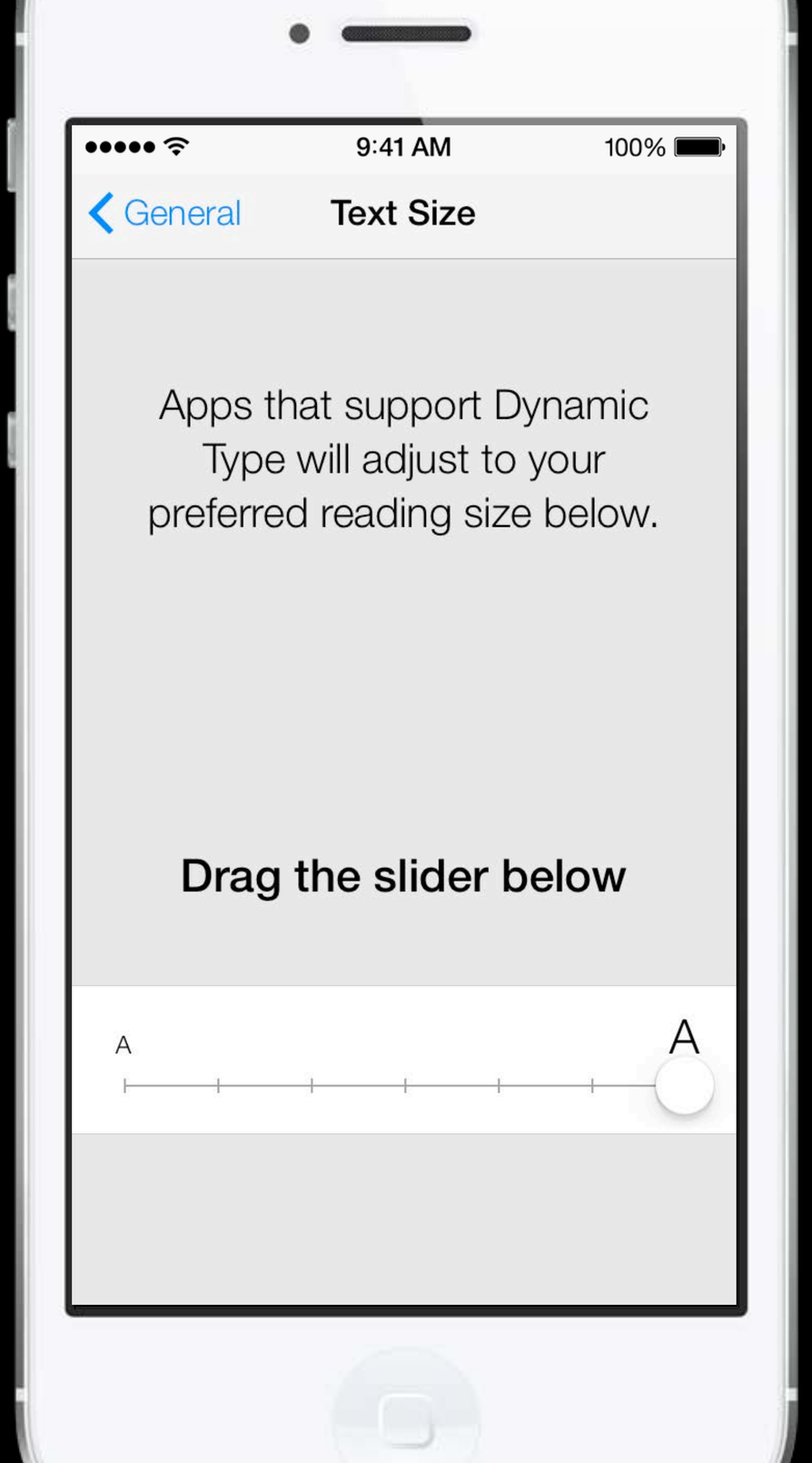
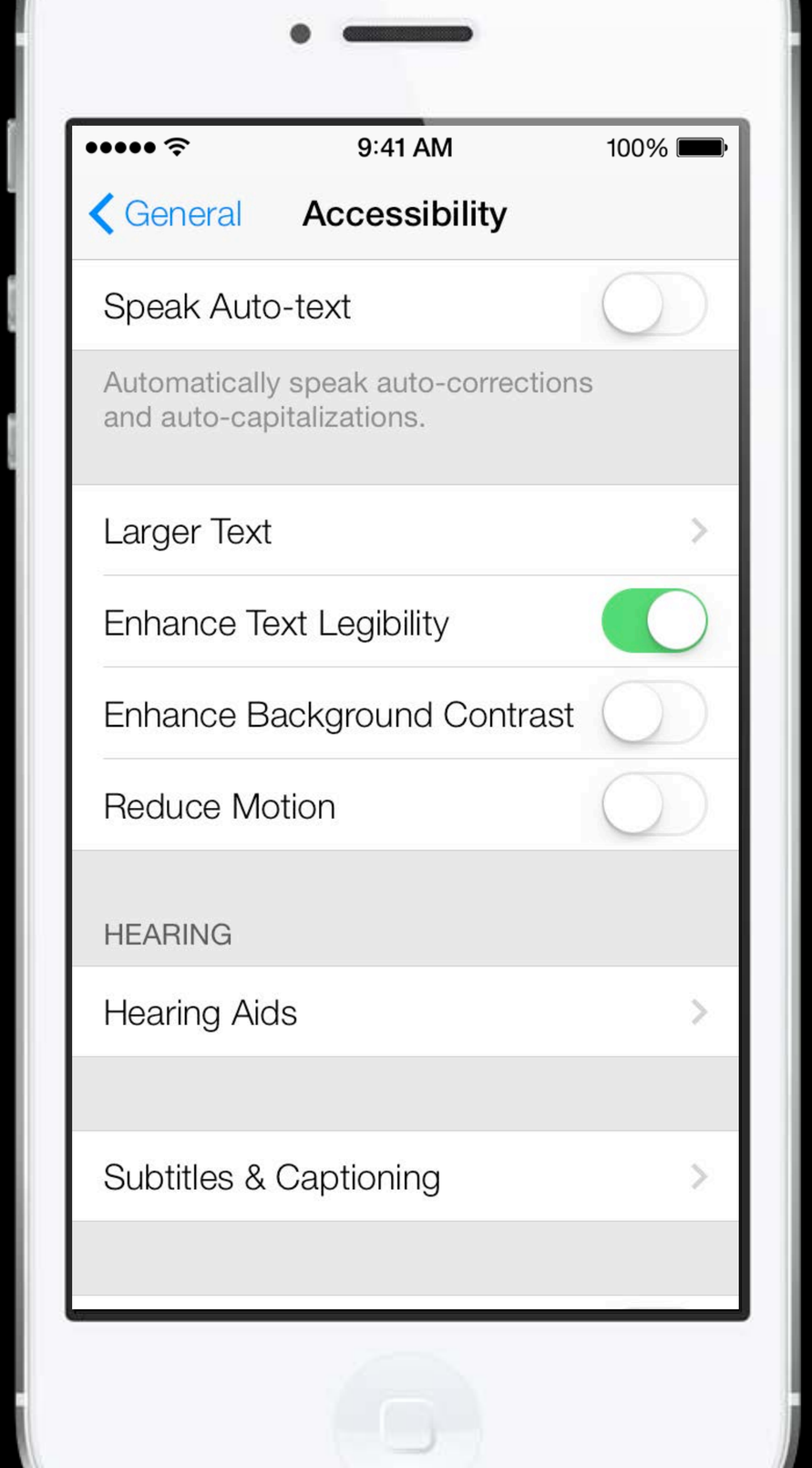


Feature Set

Dynamic Type

- Designed type styles
- Optimized for legibility
- User picks size
- Accessibility



Feature Set

Dynamic Type

- Designed type styles
- Optimized for legibility
- User picks size
- Accessibility
- Xcode 5

Feature Set

Font descriptors

- Specifies a font

Feature Set

Font descriptors

- Specifies a font
- Queries fonts (and supplies the result)

Feature Set

Font descriptors

- Specifies a font
- Queries fonts (and supplies the result)
- Can be archived

Using Fonts with Text Kit

Presidio
Friday 9:00AM

Feature Set

Symbolic traits

Headline 1

Headline 2

Subheadline 1

Subheadline 2

Body

Footnote

Caption 1

Caption 2

Feature Set

Symbolic traits

Headline 1

Headline 2

Subheadline 1

Subheadline 2

Body

Footnote

Caption 1

Caption 2

Feature Set

Symbolic traits

Regular

Headline 1

Headline 2

Subheadline 1

Subheadline 2

Body

Footnote

Caption 1

Caption 2

Feature Set

Symbolic traits

Regular	Bold	Italic
Headline 1	**Headline 1**	*Headline 1*
Headline 2	**Headline 2**	*Headline 2*
Subheadline 1	**Subheadline 1**	*Subheadline 1*
Subheadline 2	**Subheadline 2**	*Subheadline 2*
Body	**Body**	*Body*
Footnote	**Footnote**	*Footnote*
Caption 1	**Caption 1**	*Caption 1*
Caption 2	**Caption 2**	*Caption 2*

Feature Set

Symbolic traits

Regular

Headline 1

Headline 2

Subheadline 1

Subheadline 2

Body

Footnote

Caption 1

Caption 2

Feature Set

Symbolic traits

Regular

Headline 1
Headline 2
Subheadline 1
Subheadline 2
Body
Footnote
Caption 1
Caption 2

Expanded

Headline 1
Headline 2
Subheadline 1
Subheadline 2
Body
Footnote
Caption 1
Caption 2

Condensed

Headline 1
Headline 2
Subheadline 1
Subheadline 2
Body
Footnote
Caption 1
Caption 2

Feature Set

Line spacing

Regular

Lorem ipsum
dolor sit amet,
consectetuer
adipiscing elit,
sed diam
nonummy nibh
euismod

Feature Set

Line spacing

Regular

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod

Loose

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh

Tight

Lorem ipsum dolor sit amet, consectetuer adipiscing elit, sed diam nonummy nibh euismod tincidunt ut

Font Enhancements

CSS font values

Font Enhancements

CSS font values

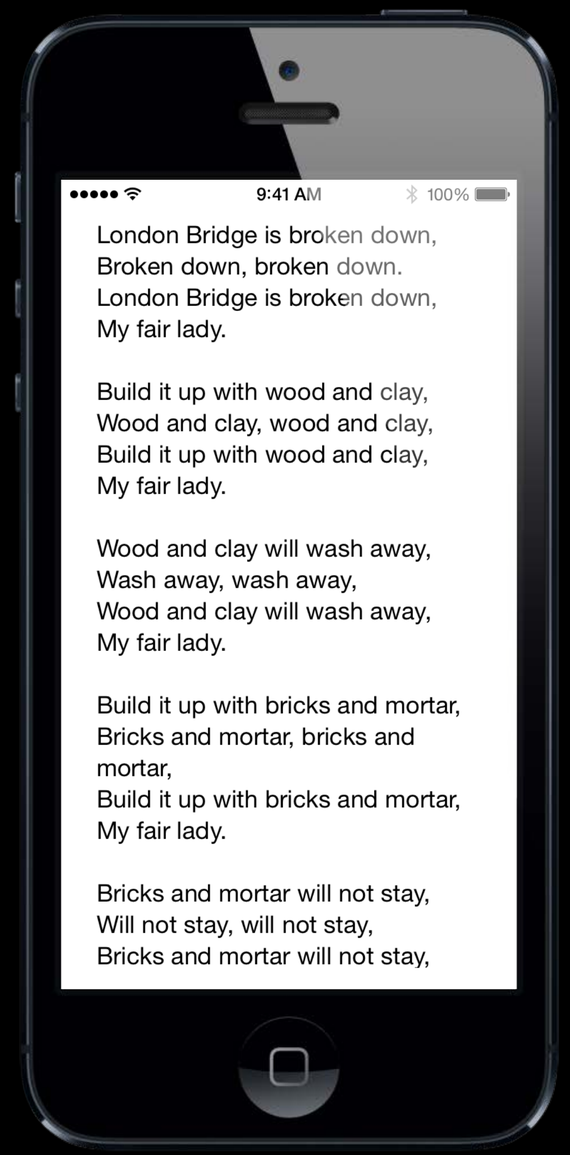
```
-apple-system-headline1
-apple-system-headline2
-apple-system-body
-apple-system-subheadline1
-apple-system-subheadline2
-apple-system-footnote
-apple-system-caption1
-apple-system-caption2
-apple-system-short-headline1
-apple-system-short-headline2
-apple-system-short-body
-apple-system-short-subheadline1
-apple-system-short-subheadline2
-apple-system-short-footnote
-apple-system-short-caption1
-apple-system-tall-body
```

What’s New in Safari and WebKit for Web Developers

Mission
Tuesday 9:00AM

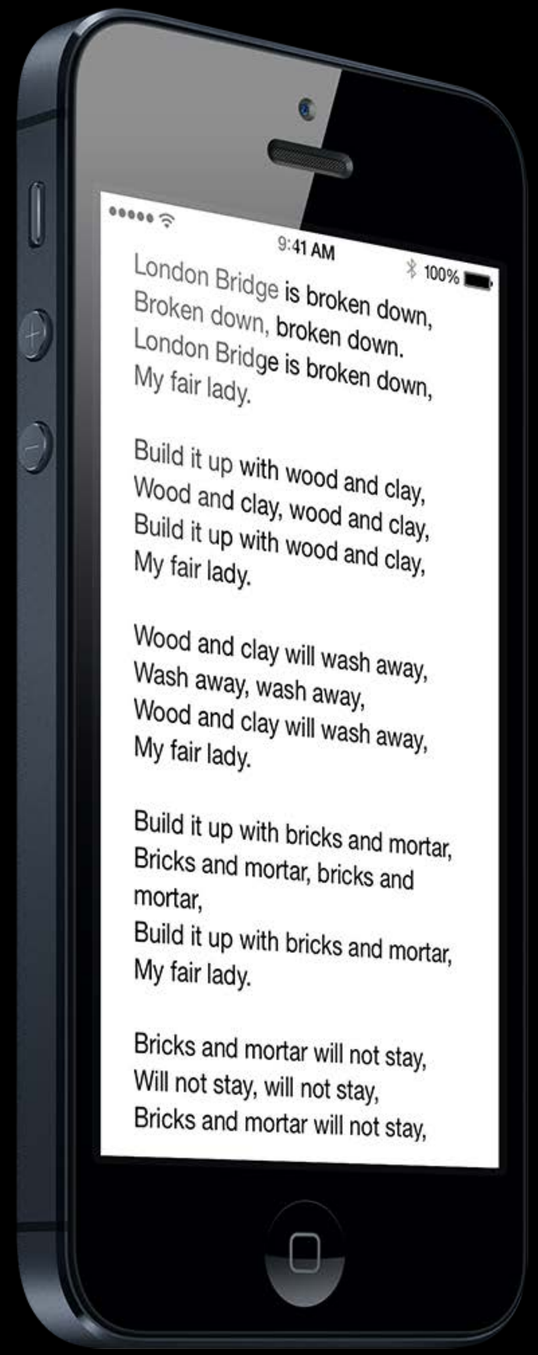
Feature Set

UITextView composition



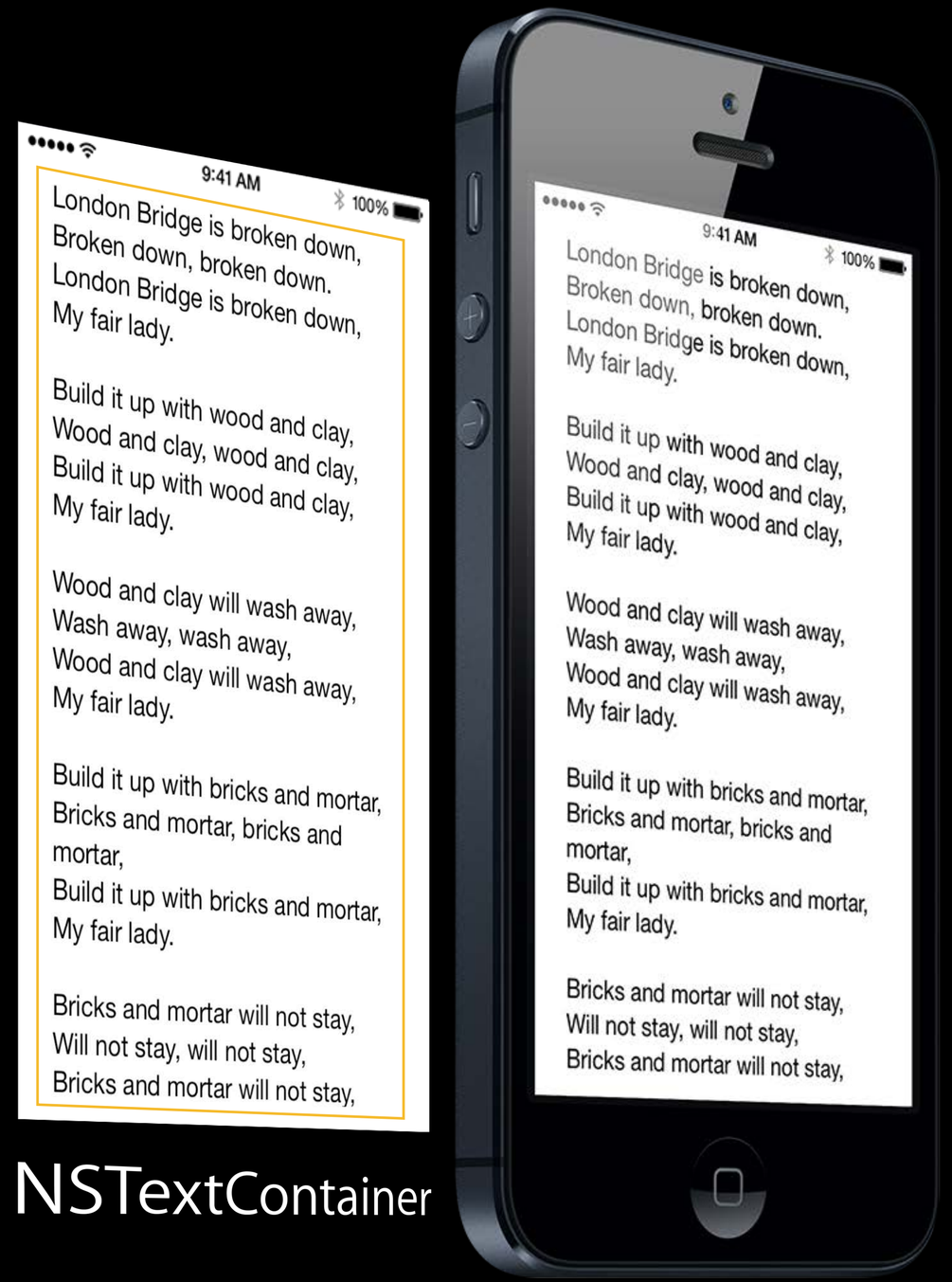
Feature Set

UITextView composition



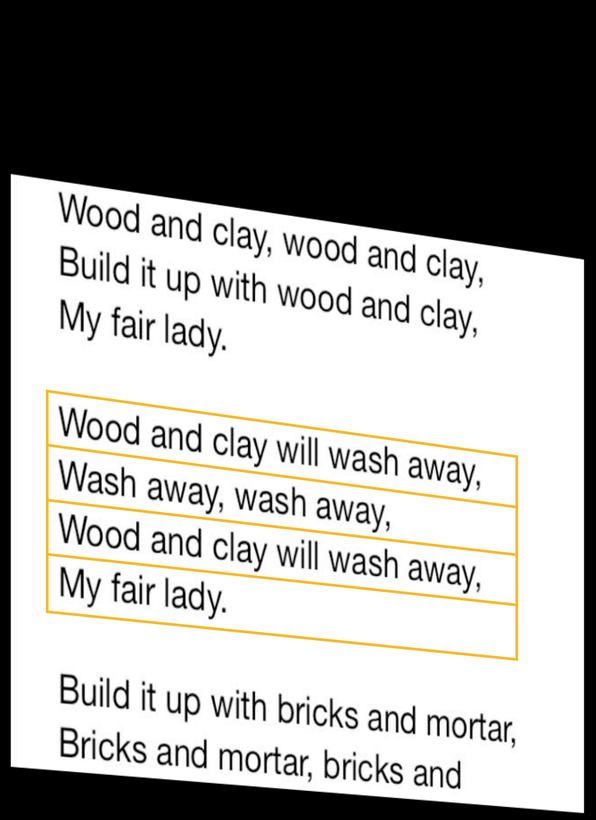
Feature Set

UITextView composition

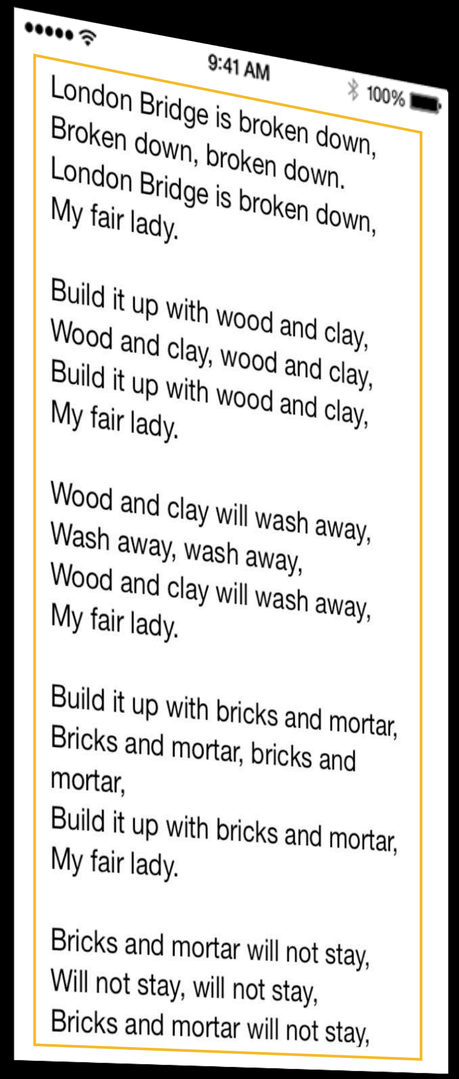


Feature Set

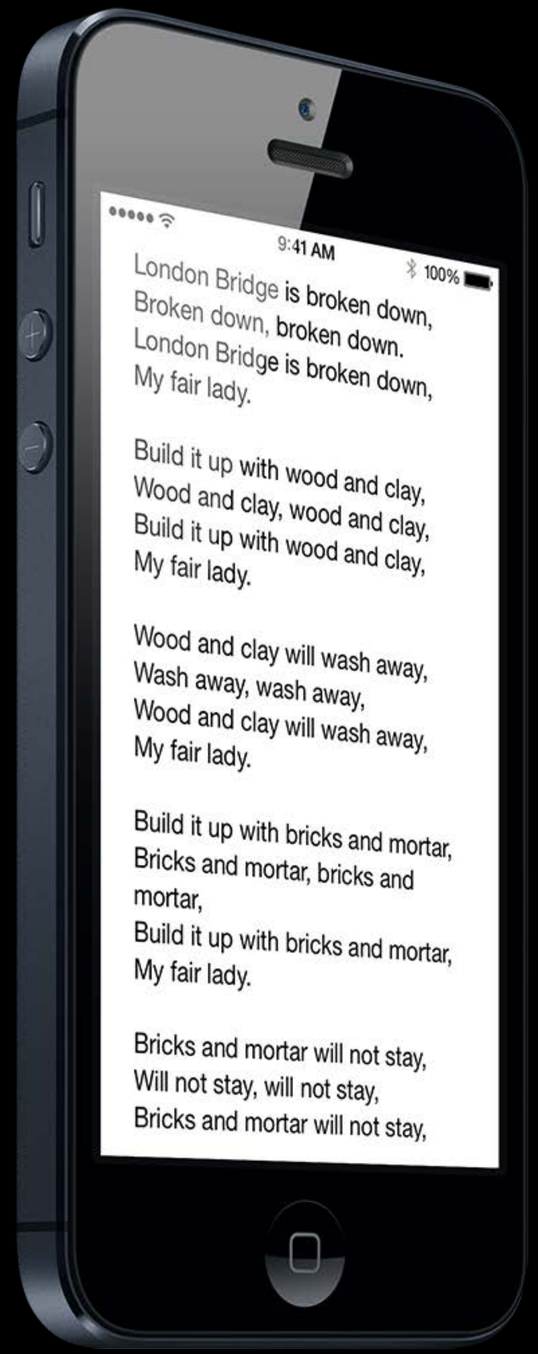
UITextView composition



NSLayoutManager



NSTextContainer



Feature Set

UITextView composition

NSTextStorage

Wood and clay, wood and clay,
Build it up with wood and clay,
My fair lady.

Wood and clay will wash away,
Wash away, wash away,
Wood and clay will wash away,
My fair lady.

Build it up with bricks and mortar,
Bricks and mortar, bricks and

NSLayoutManager

9:41 AM 100%

London Bridge is broken down,
Broken down, broken down.
London Bridge is broken down,
My fair lady.

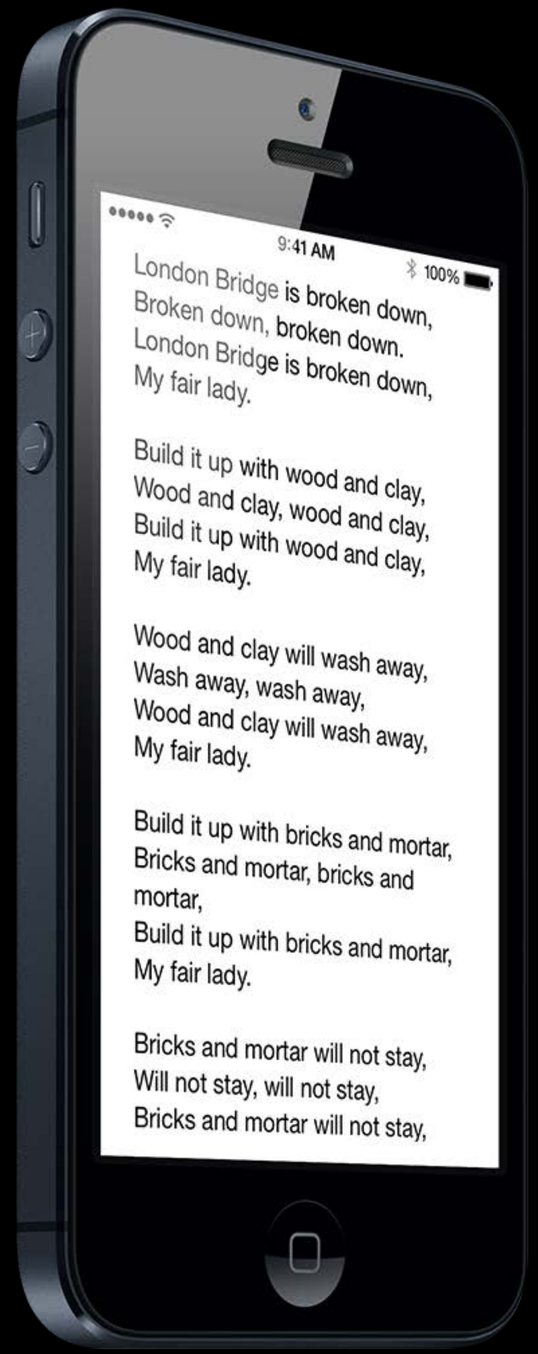
Build it up with wood and clay,
Wood and clay, wood and clay,
Build it up with wood and clay,
My fair lady.

Wood and clay will wash away,
Wash away, wash away,
Wood and clay will wash away,
My fair lady.

Build it up with bricks and mortar,
Bricks and mortar, bricks and
mortar,
Build it up with bricks and mortar,
My fair lady.

Bricks and mortar will not stay,
Will not stay, will not stay,
Bricks and mortar will not stay,

NSTextContainer



Feature Set

Exclusion paths

- Simple figures and cutouts

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Phasellus lacinia pretium diam non tempor. Aenean mollis pellentesque lectus, vitae ultrices urna tincidunt eu. Mauris ullamcorper elementum pharetra. Donec imperdiet lacinia porttitor. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Nulla lobortis tortor libero. Donec fringilla placerat lectus sed commodo. Nulla nisl nulla, feugiat eu sodales nec, semper non nibh. Nunc porta lacinia cursus. Vestibulum ultrices euismod euismod. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos himenaeos. Quisque nec lectus id diam molestie consectetur sed sed ligula. Nulla non luctus nibh. Integer viverra posuere urna, vel volutpat eros eleifend in. Donec pharetra tincidunt lectus vitae luctus.

Ut semper vulputate quam in dictum. Maecenas lobortis porttitor lorem vel molestie. Nam eros orci, mattis ac placerat nec, blandit sed orci. In consequat convallis risus eu fermentum. Mauris accumsan lobortis porta. Nunc feugiat, leo et consequat varius, velit metus consectetur ante, in bibendum neque felis vel sapien. Fusce vel risus in tellus convallis facilisis. Nunc consectetur fringilla sem vel varius. Etiam cursus auctor tortor vitae dictum. Sed interdum fringilla orci, sed commodo magna ultricies fringilla. Donec eget convallis lacus.

Etiam nec mauris lacus. Cras mattis lobortis dignissim. Sed lorem turpis, feugiat at sodales eget, porta vel purus. Sed ullamcorper diam ac justo hendrerit porta. Aliquam sed erat ut lorem facilisis sollicitudin quis eget mi. Sed vitae massa id magna sagittis commodo. Ut feugiat tincidunt purus, et imperdiet diam convallis vitae. Donec augue libero, blandit ut dapibus id, vulputate at velit. Morbi condimentum bibendum turpis, sed fermentum turpis ornare non.

In hac habitasse platea dictumst. Nulla facilisi. Proin vel nibh mi, quis congue lectus. Etiam sit amet est nec quam iaculis lobortis sit amet eu leo. Nulla mollis feugiat quam, a interdum sapien pellentesque sed. Pellentesque eu sem ut elit fringilla scelerisque a vel leo. Aenean quis lacus eget massa condimentum adipiscing ac vitae sapien. Vivamus id nibh aliquet ante blandit varius ac lobortis nisl. Pellentesque turpis ante, consectetur egestas semper eget, sodales non tellus. Pellentesque ullamcorper felis non nibh vehicula in mollis mi eleifend. Integer eget interdum velit.

Nulla scelerisque nibh non neque tincidunt semper. Integer lorem est, consequat eu convallis in, egestas quis purus. Phasellus egestas mi risus. Phasellus a quam nec sapien vulputate cursus. Maecenas mattis congue placerat. Pellentesque et euismod massa. Morbi rhoncus euismod luctus.

Feature Set

Exclusion paths

- Simple figures and cutouts

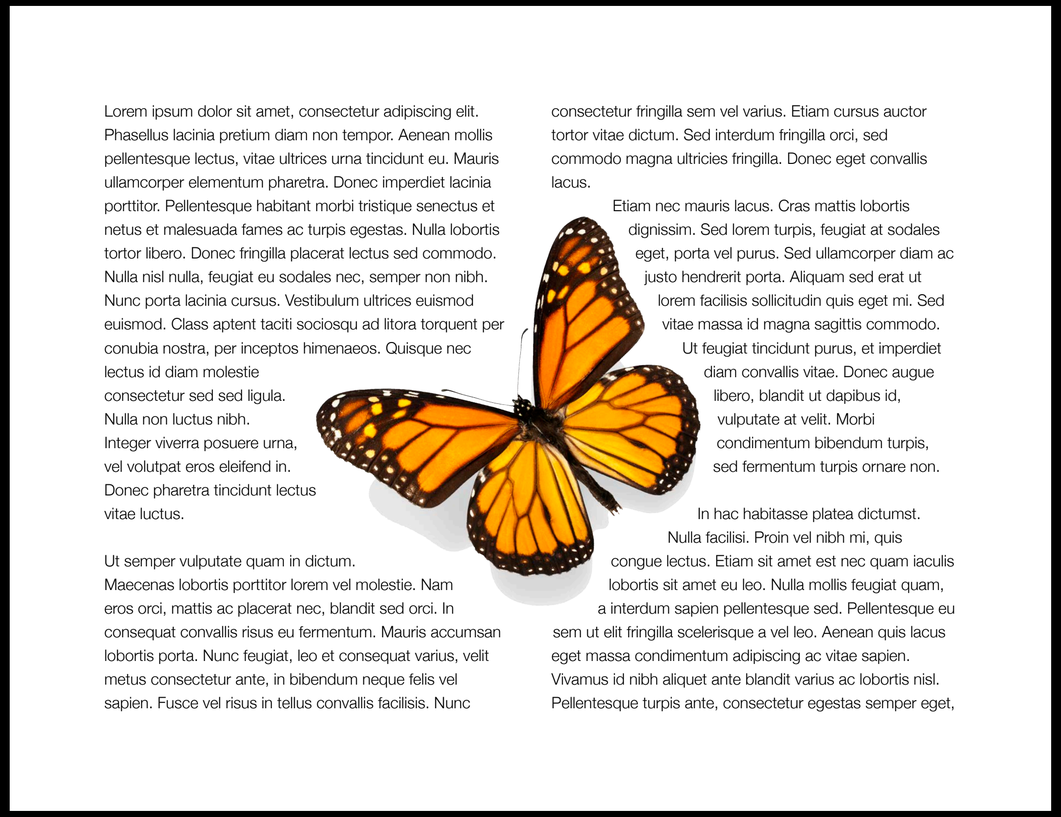
```
UIBezierPath *exclusion = ButterflyBezierPath;
```

Feature Set

Exclusion paths

- Simple figures and cutouts

```
UIBezierPath *exclusion = ButterflyBezierPath;
textContainer.exclusionPaths = @[exclusion];
```



Feature Set

Exclusion paths

- Easy, declarative model

Feature Set

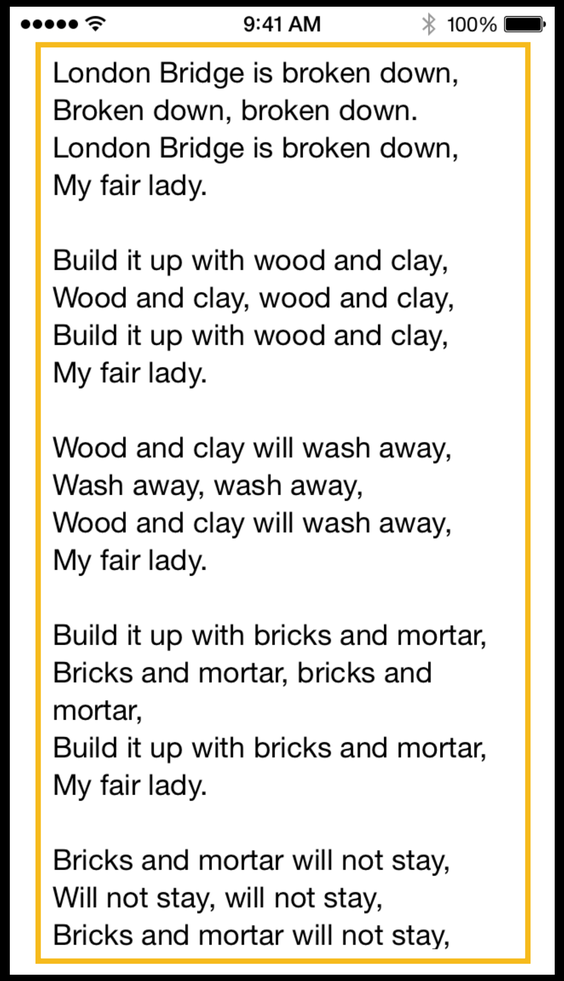
Exclusion paths

- Easy, declarative model
- No subclassing or delegation needed

Feature Set

NSTextContainer

- Defines coordinate system and geometry for NSLayoutManager
- Exclusion paths live in NSTextContainer's coordinates
- Hit-testing done in NSTextContainer's coordinates



NSTextContainer

Feature Set

NSTextContainer

- Defines coordinate system and geometry for NSLayoutManager
- Exclusion paths live in NSTextContainer's coordinates
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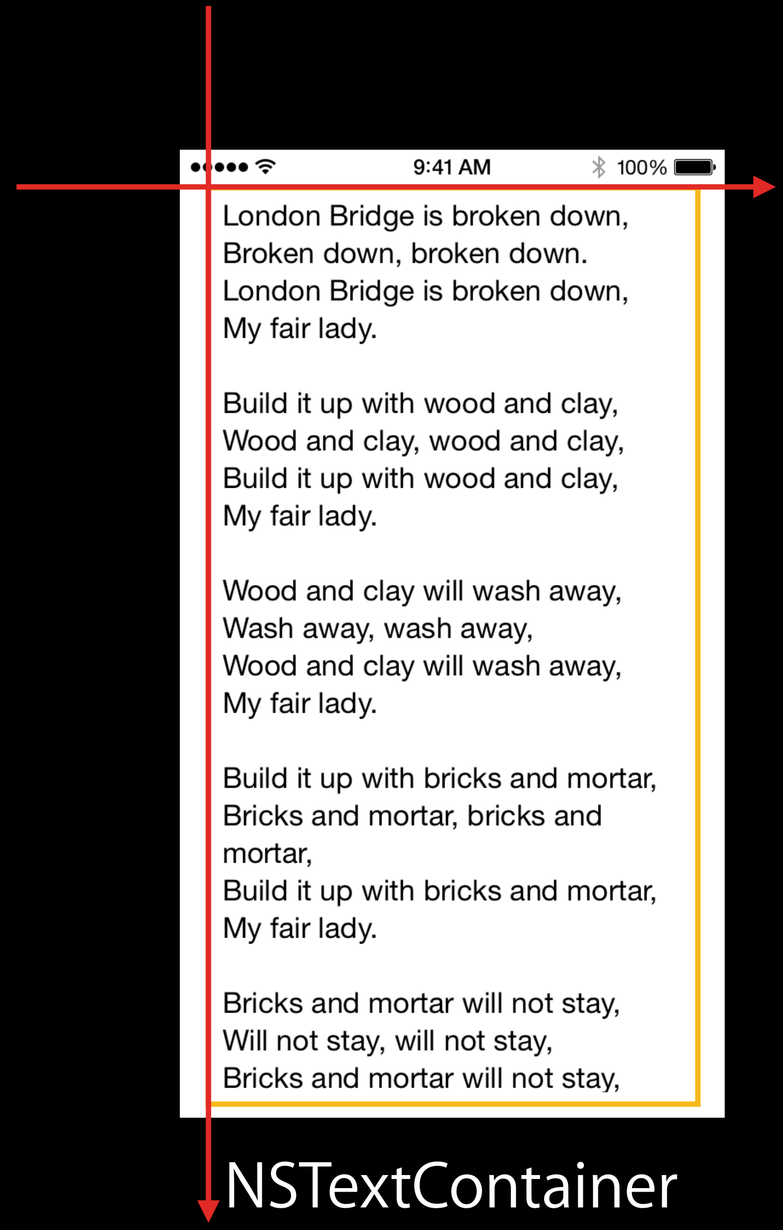
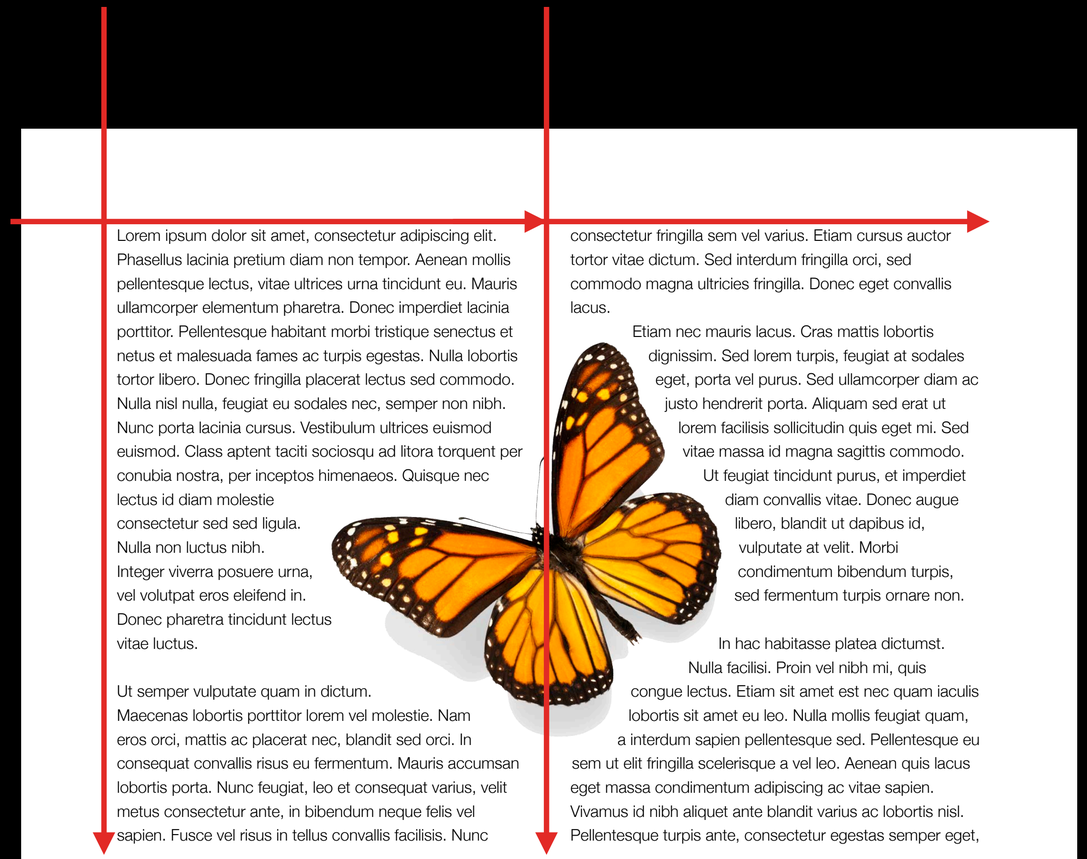


Feature Set

NSTextContainer

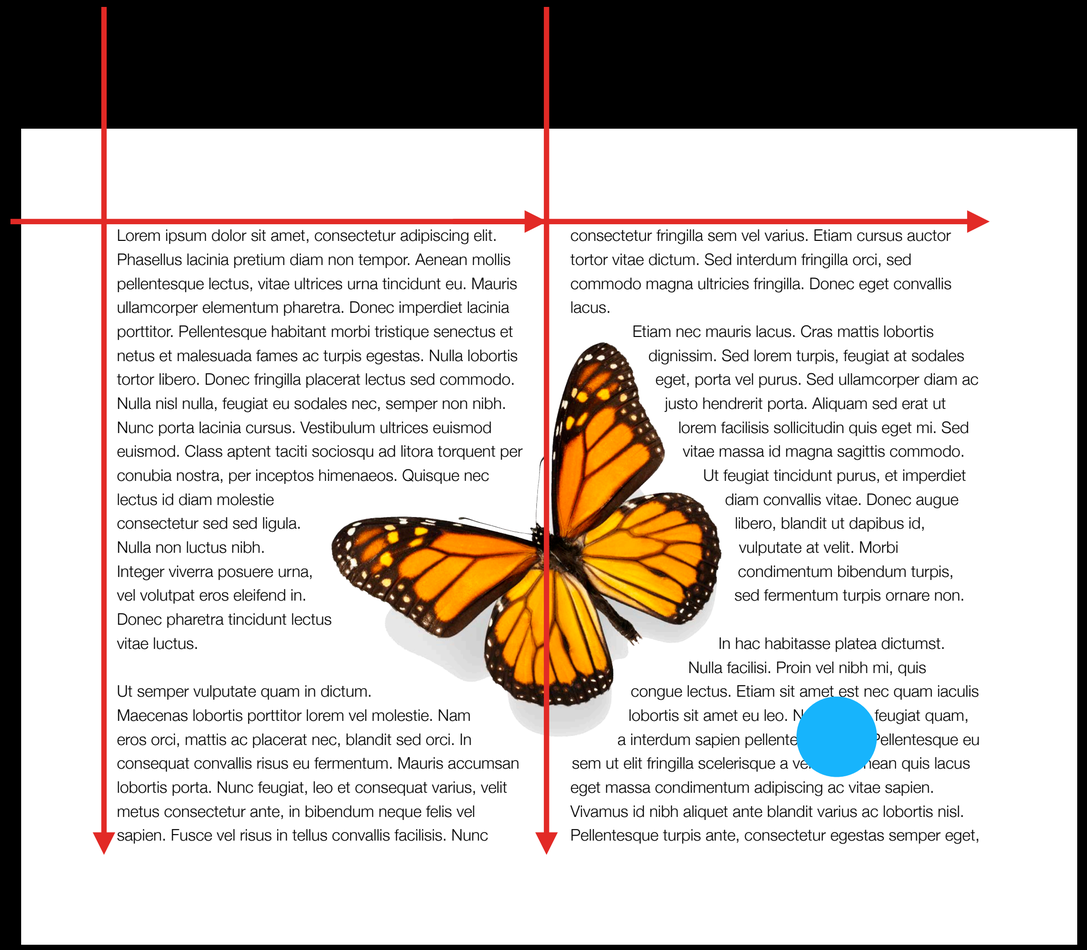
- Defines coordinate system and geometry for NSLayoutManager
- Exclusion paths live in NSTextContainer’s coordinates



Feature Set

NSTextContainer

- Defines coordinate system and geometry for NSLayoutManager
- Exclusion paths live in NSTextContainer’s coordinates
- Hit-testing done in NSTextContainer’s coordinates

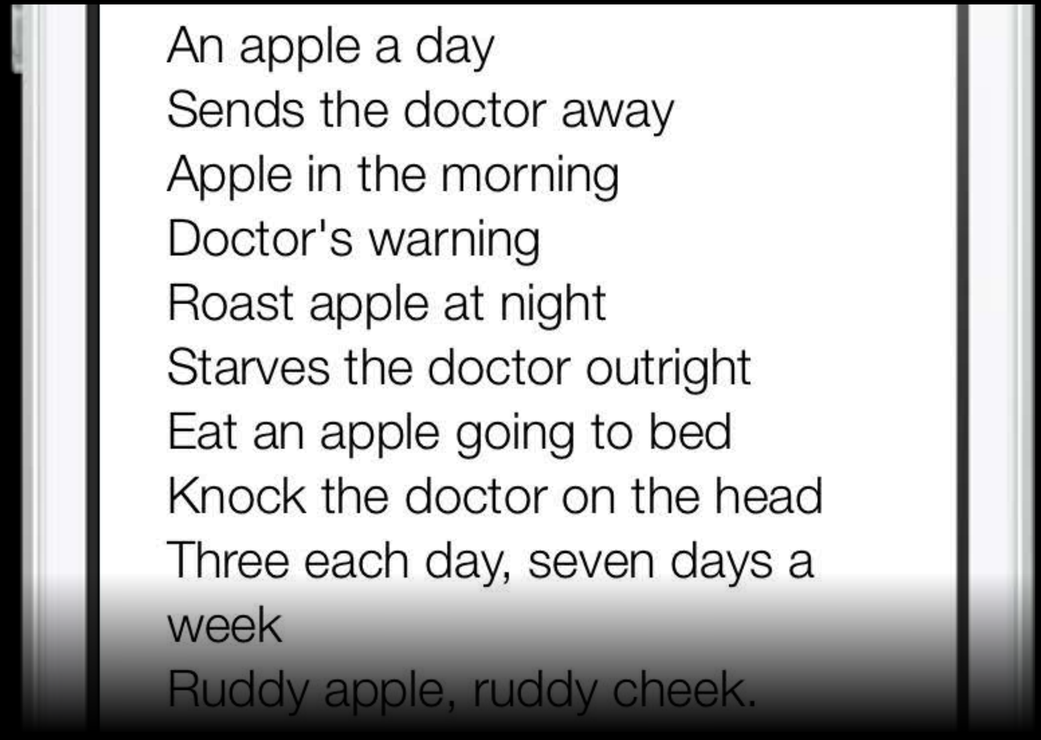


Feature Set

Hit-testing with NSLayoutManager

- Resolving tap to a character index

```
-(NSUInteger)characterIndexForPoint:(CGPoint)point
                        inTextContainer:(NSTextContainer *)container
 fractionOfDistanceBetweenInsertionPoints:(CGFloat *)partialFraction;
```



Feature Set

Hit-testing with NSLayoutManager

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```
-(NSUInteger)characterIndexForPoint:(CGPoint)point
                        inTextContainer:(NSTextContainer *)container
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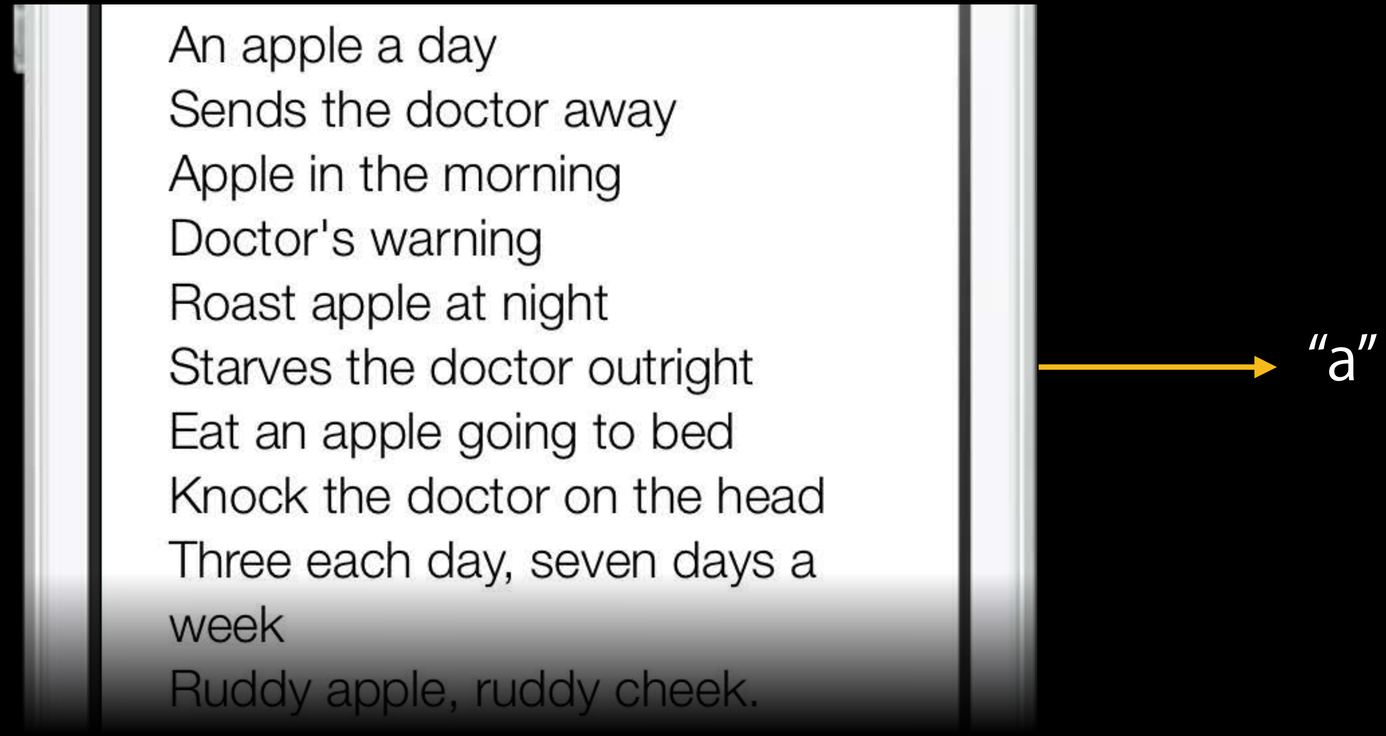


Feature Set

Glyphs

- What’s a glyph?

Feature Set

Glyphs

- What’s a glyph?
- Represents one or more characters

Feature Set

Glyphs

- What’s a glyph?
- Represents one or more characters
- No 1:1 mapping from glyph(s) to character(s) or vice-versa

Feature Set

Hit-testing with NSLayoutManager

- Glyph range to character range

Feature Set

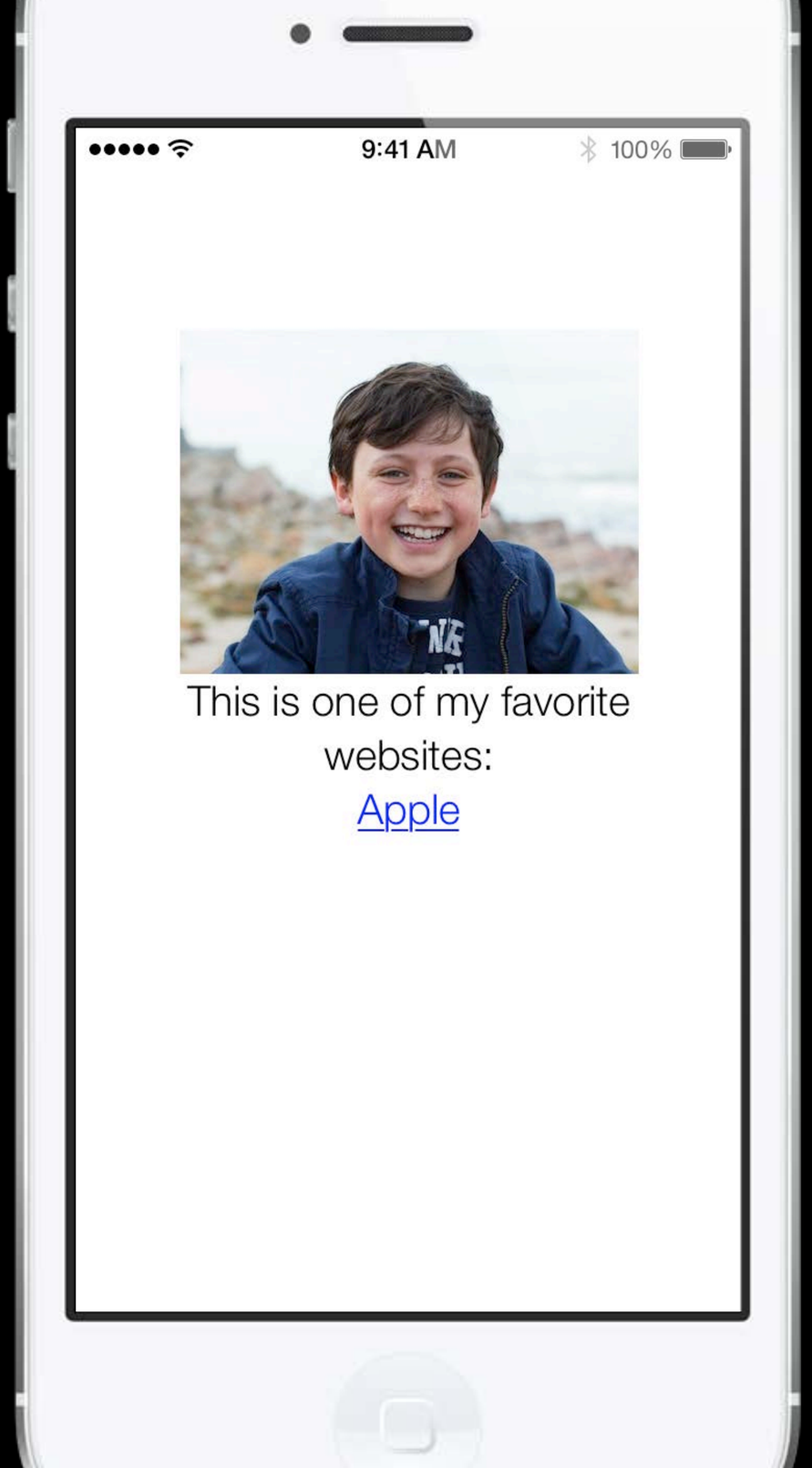
Hit-testing with NSLayoutManager

- Glyph range to character range

```
– (NSRange)characterRangeForGlyphRange:(NSRange)glyphRange
                      actualGlyphRange:(NSRangePointer)actualGlyphRange;
```

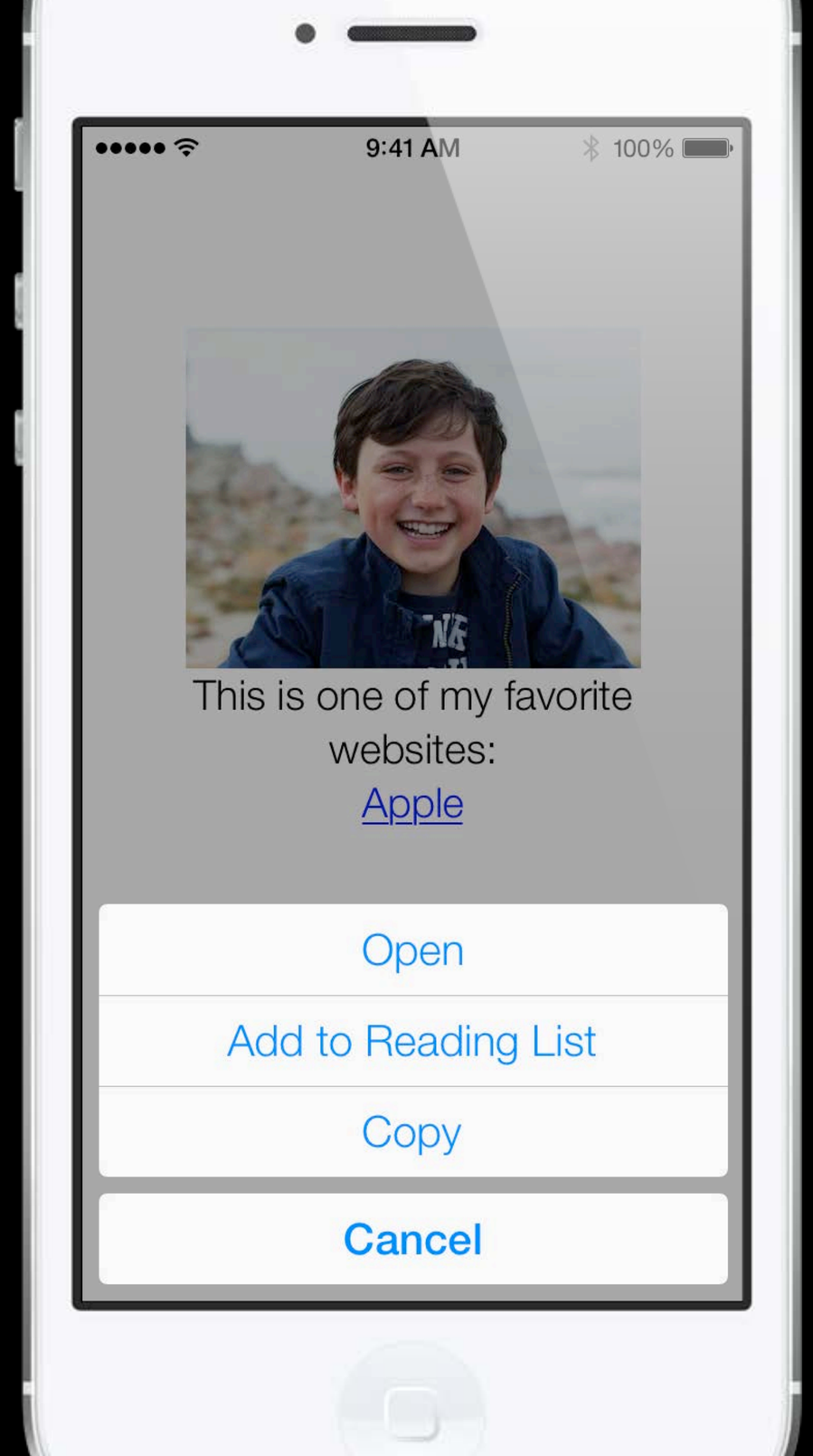
Feature Set

Interacting with links



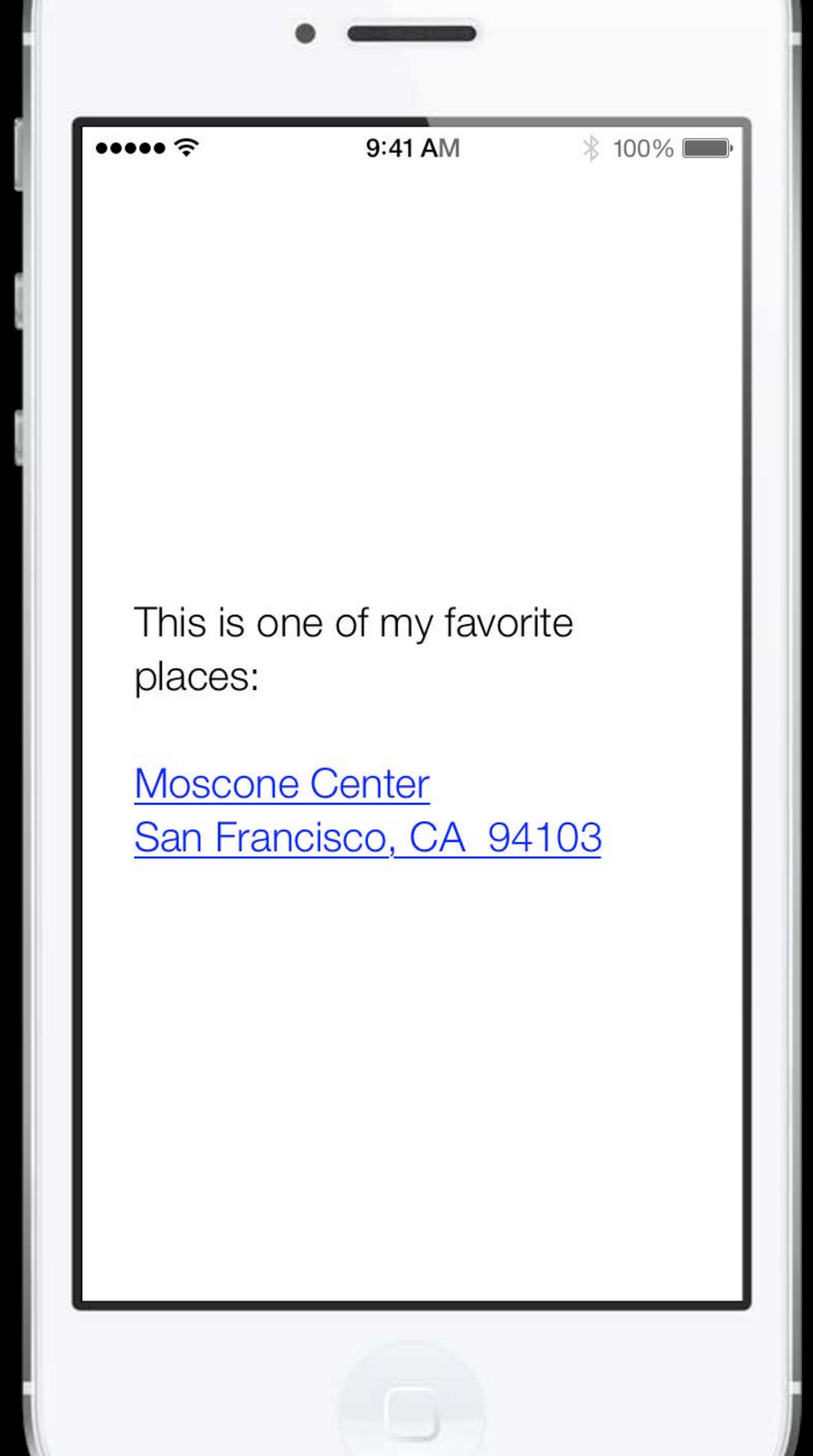
Feature Set

Interacting with links



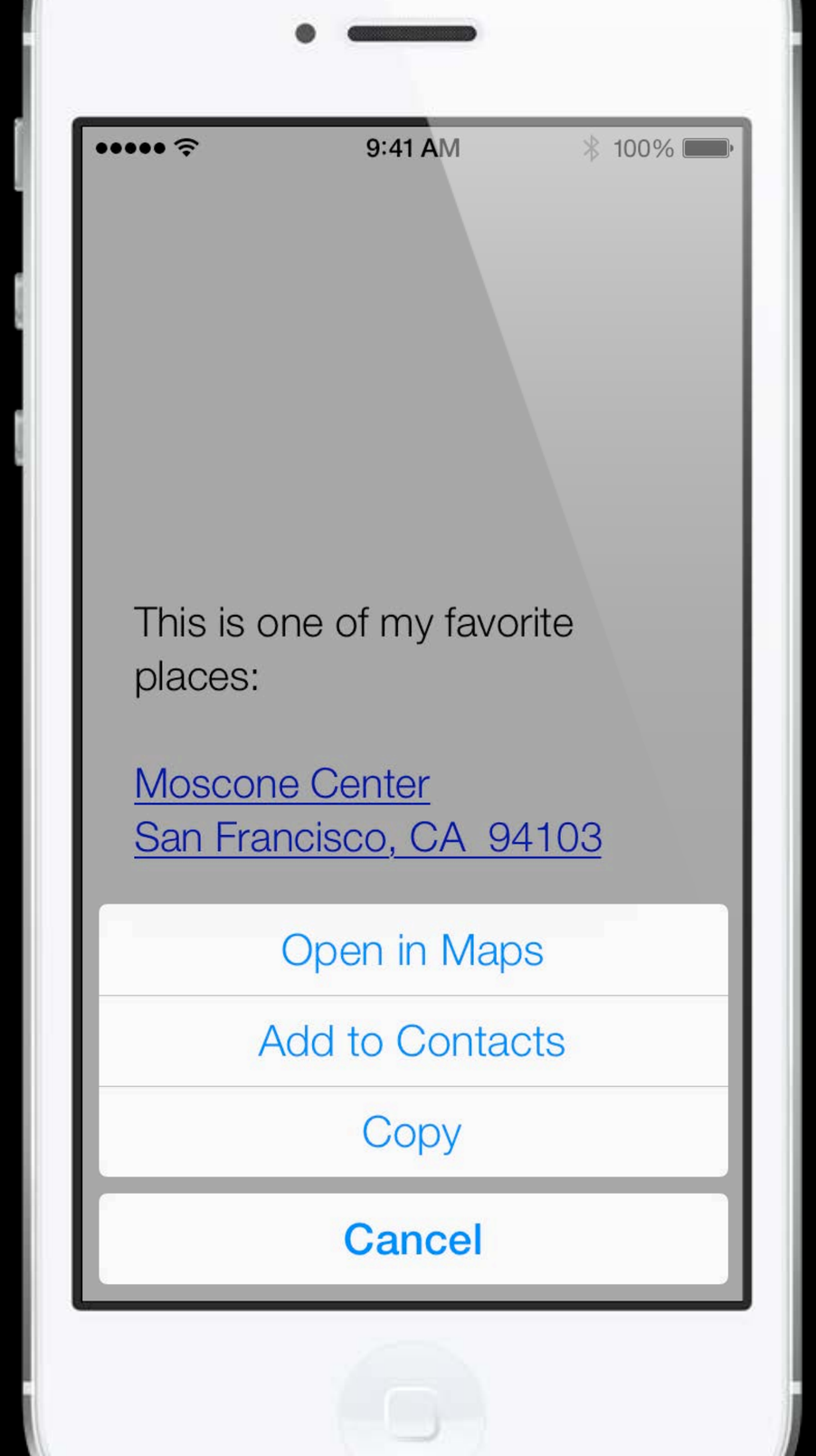
Feature Set

Data Detectors



Feature Set

Data Detectors



Feature Set

Text attachments

Feature Set

Text attachments

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Etiam nec mauris lacus. Cras mattis lobortis dignissim. Sed lorem turpis, feugiat at sodales eget, porta vel purus. Sed ullamcorper diam ac justo hendrerit porta. Aliquam sed erat ut lorem facilisis sollicitudin quis eget mi. Sed vitae massa id

Attachment

Feature Set

Text attachments

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Etiam nec mauris lacus. Cras mattis lobortis dignissim. Sed lorem turpis, feugiat at sodales eget, porta vel purus. Sed ullamcorper diam ac justo hendrerit porta. Aliquam sed erat ut lorem facilisis sollicitudin quis eget mi. Sed vitae massa id

Attachment

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Ut semper vulputate quam in dictum. Maecenas lobortis porttitor lorem vel molestie. Nam eros orci, mattis ac placerat nec, blandit sed orci. In consequat convallis risus eu fermentum. Mauris accumsan lobortis porta. Nunc feugiat, leo et consequat varius, velit metus consectetur ante, in bibendum neque felis vel sapien. Fusce vel risus in tellus convallis facilisis. Nunc consectetur fringilla sem vel varius. Etiam cursus auctor tortor vitae dictum. Sed interdum fringilla orci, sed commodo magna ultricies fringilla. Donec eget convallis lacus.
Etiam nec mauris lacus. Cras mattis lobortis dignissim. Sed lorem turpis, feugiat at sodales eget, porta vel purus. Sed ullamcorper diam ac justo hendrerit porta. Aliquam sed erat ut lorem facilisis sollicitudin quis eget mi. Sed vitae massa id magna sagittis commodo. Ut feugiat tincidunt purus, et imperdiet diam convallis vitae. Donec augue libero, blandit ut dapibus id, vulputate at velit. Morbi condimentum bibendum turpis, sed fermentum turpis ornare non.

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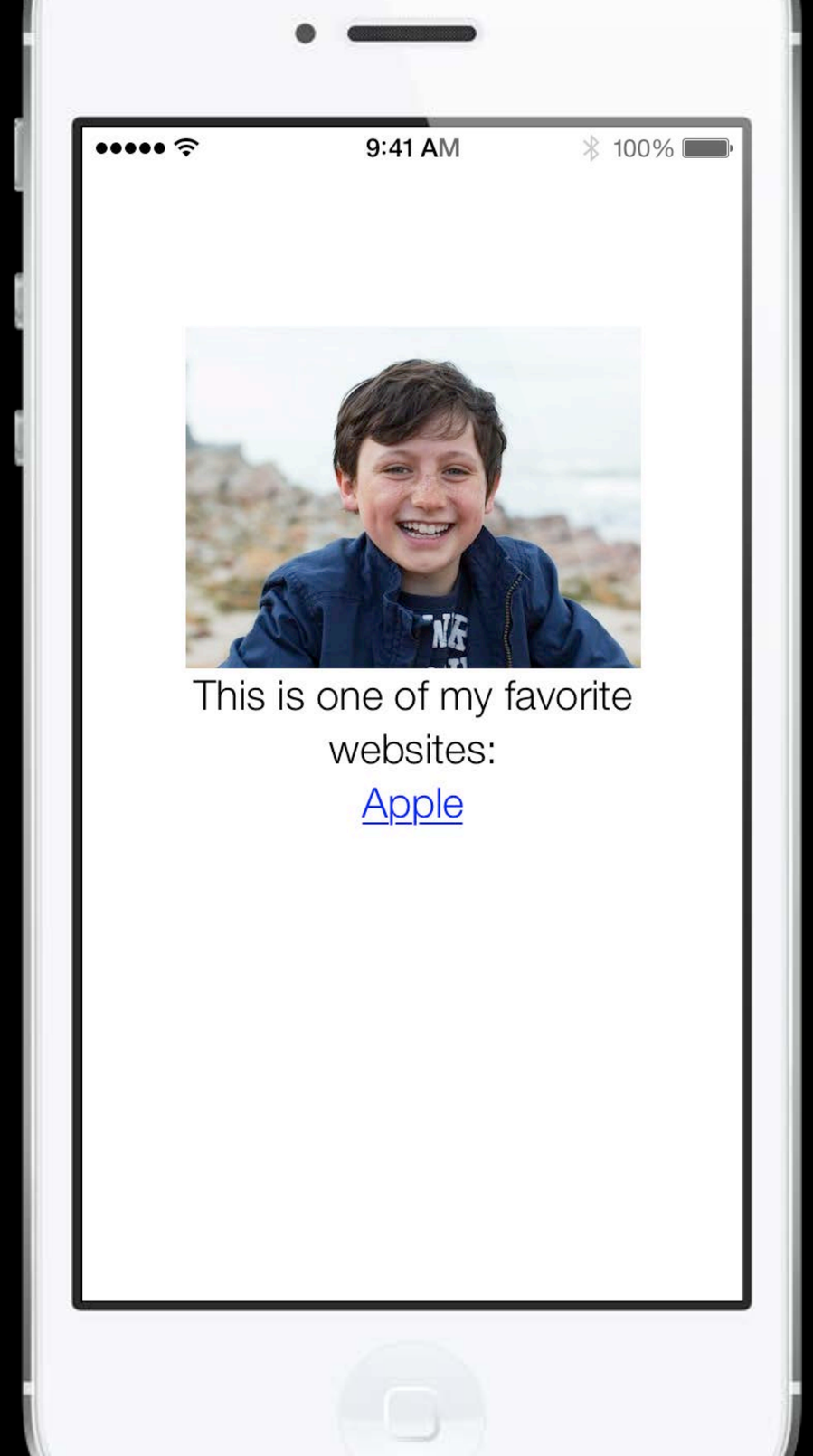
Exclusion

Feature Set

Text attachments

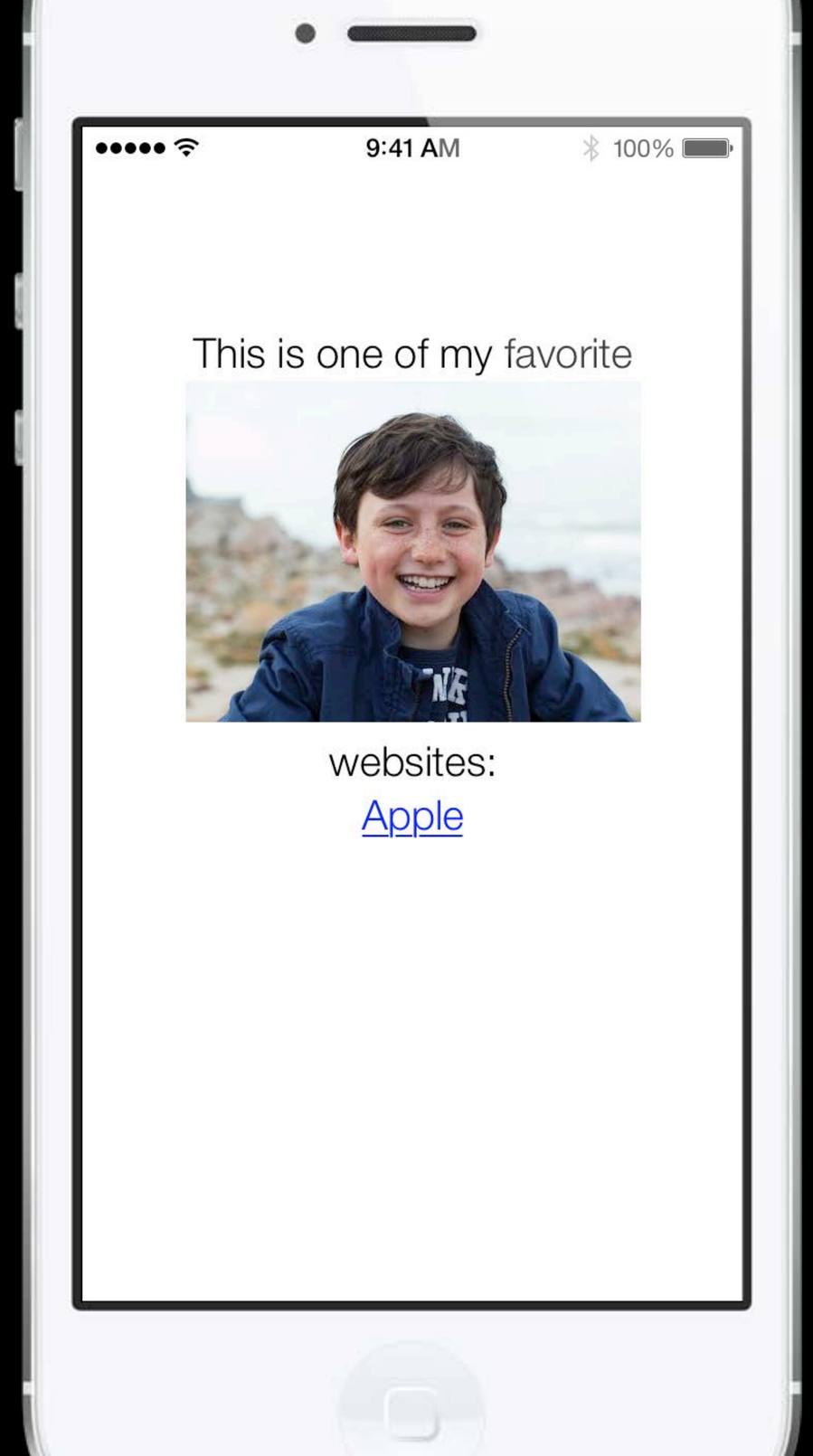
- Usually used for inline images



Feature Set

Text attachments

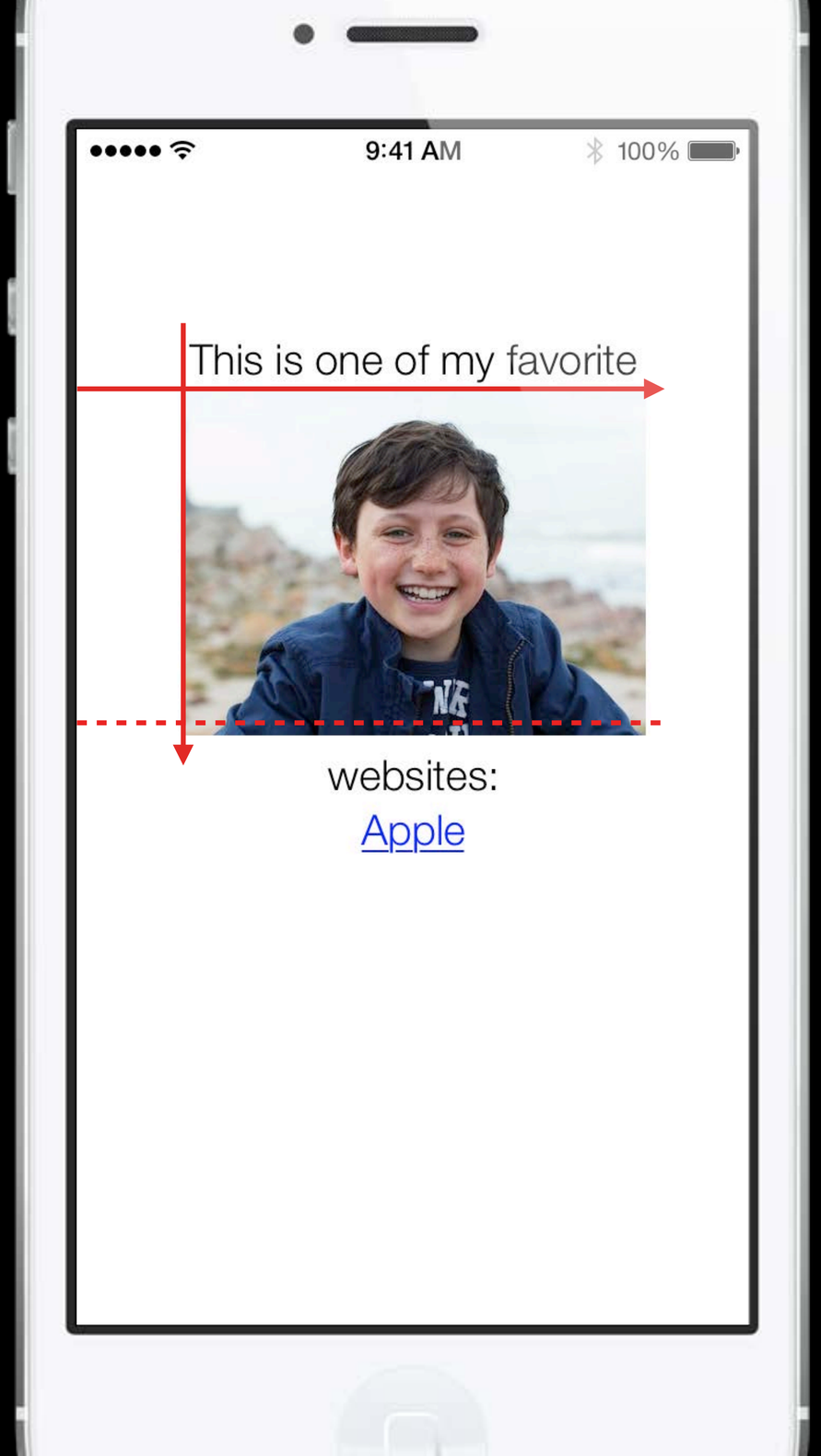
- Usually used for inline images
- Affects text layout



Feature Set

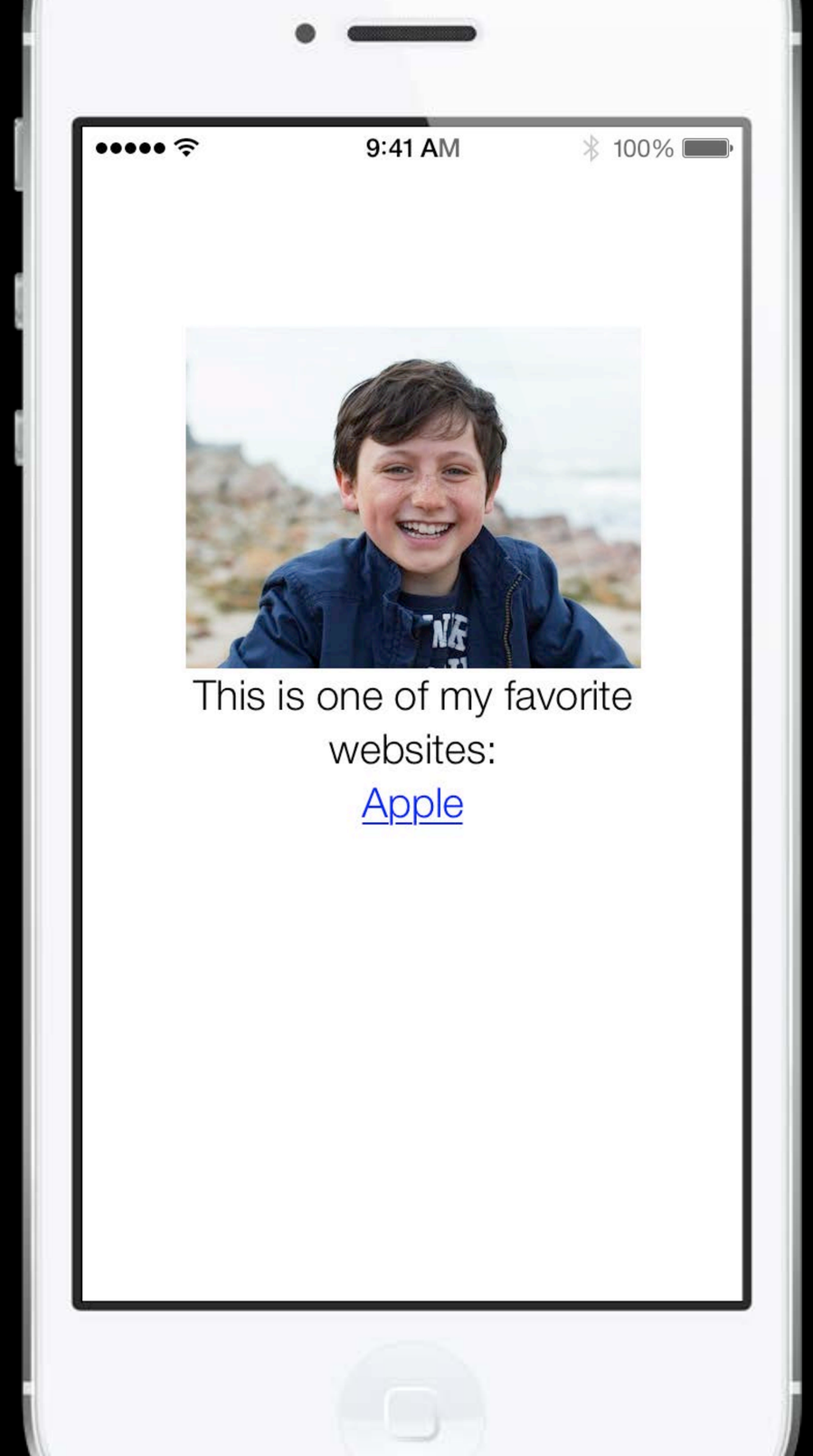
Text attachments

- Usually used for inline images
- Affects text layout
- Geometry for the contained data



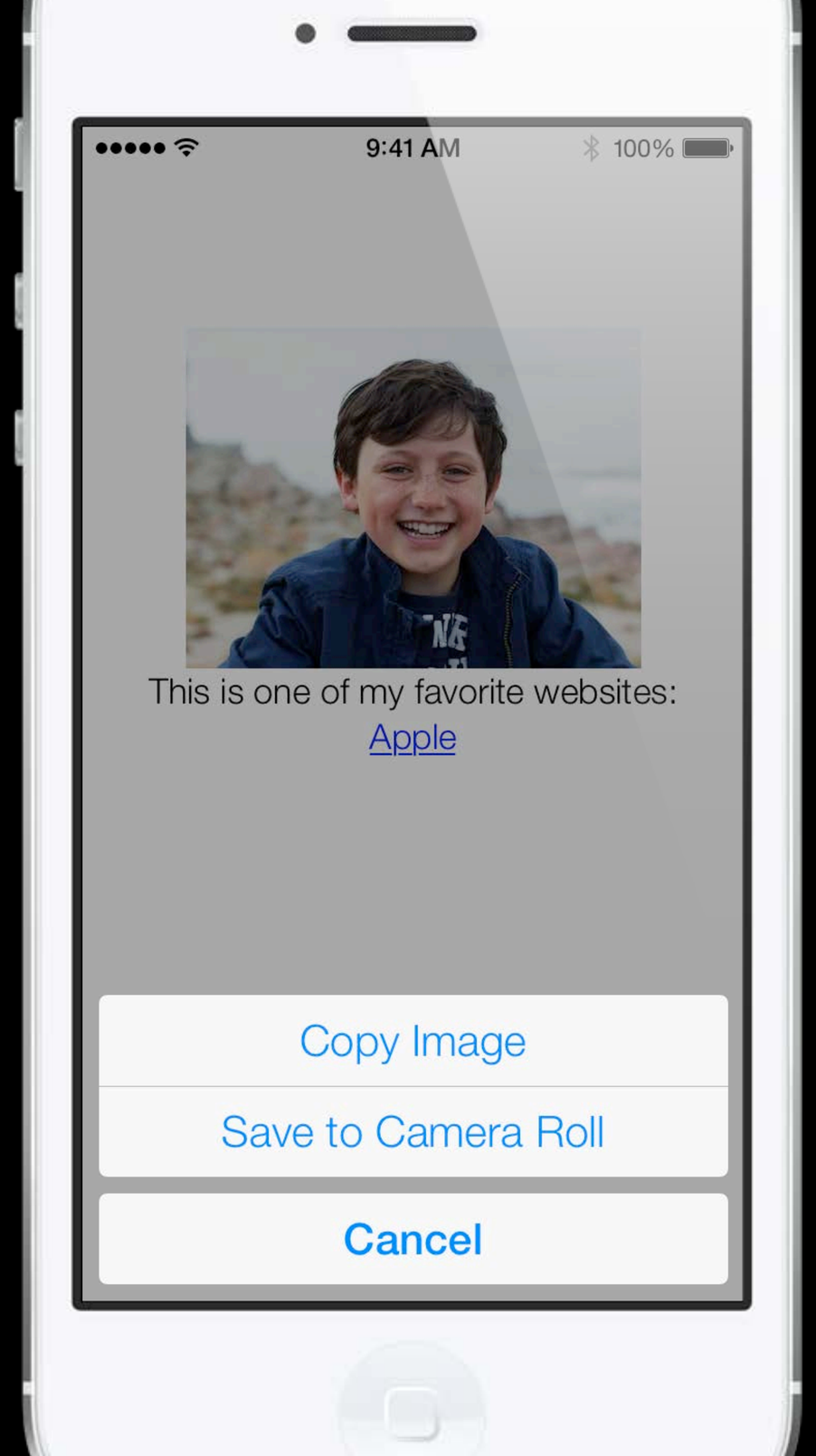
Feature Set

Interacting with attachments



Feature Set

Interacting with attachments



Demo

Interaction and layout

Jordan Breeding
UIKit Engineer

Text Kit Tour

Demo summary

- Data Detectors for basic interaction

Text Kit Tour

Demo summary

- Data Detectors for basic interaction
- Text views in collection view cells

Text Kit Tour

Demo summary

- Data Detectors for basic interaction
- Text views in collection view cells
- Text Styles

Text Kit Tour

Demo summary

- Data Detectors for basic interaction
- Text views in collection view cells
- Text Styles
- Exclusion paths

Text Kit Design

Realizing amazing designs with Text Kit

Ian Baird
iOS Text Kit Lead Engineer

Text Kit Design

Layout and positioning techniques

Text Kit Design

Layout and positioning techniques

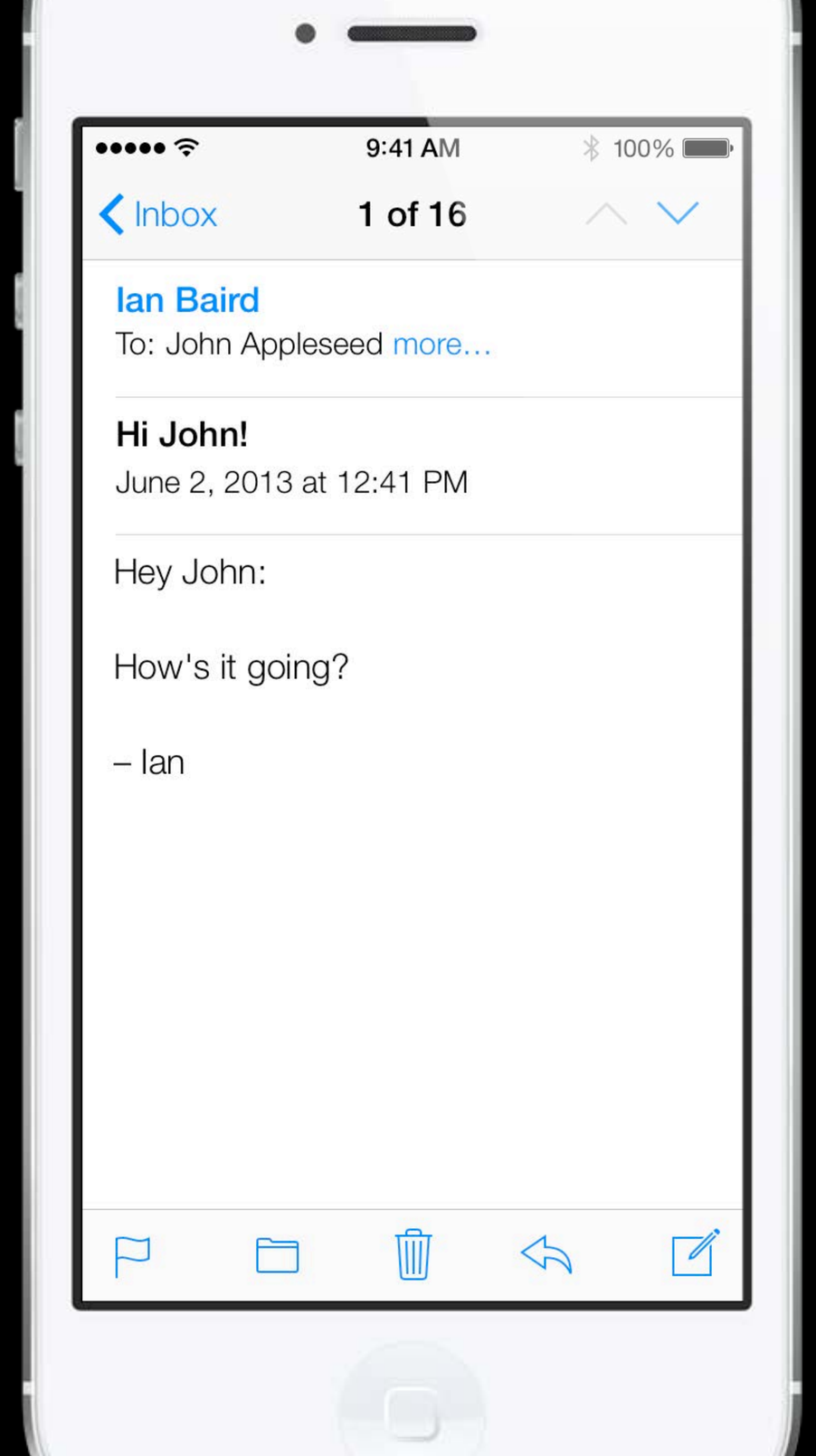
Text Kit Design

Layout and positioning techniques

Text Kit Design

Layout and positioning

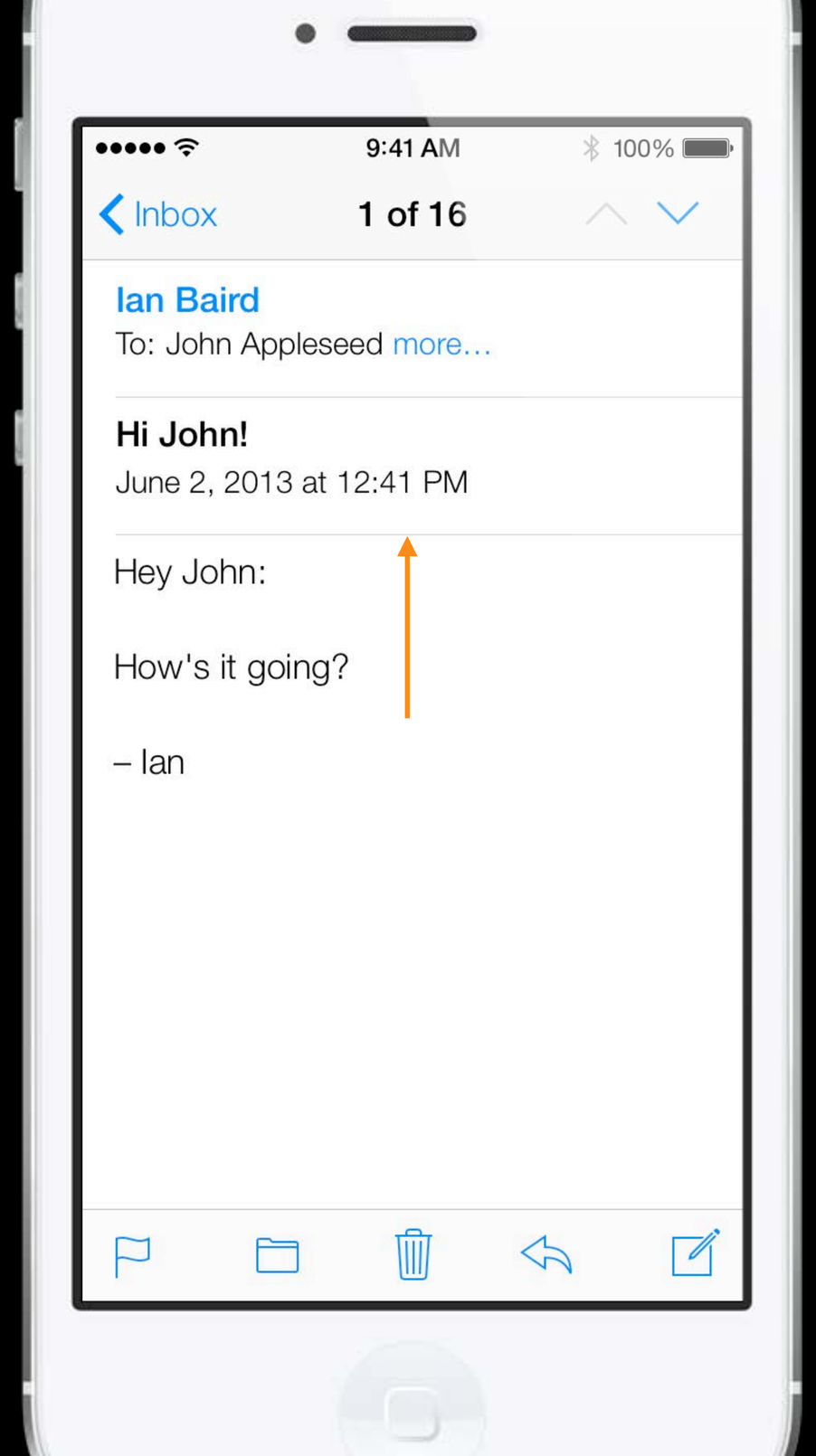
Hey John:



Text Kit Design

Layout and positioning

Hey John:

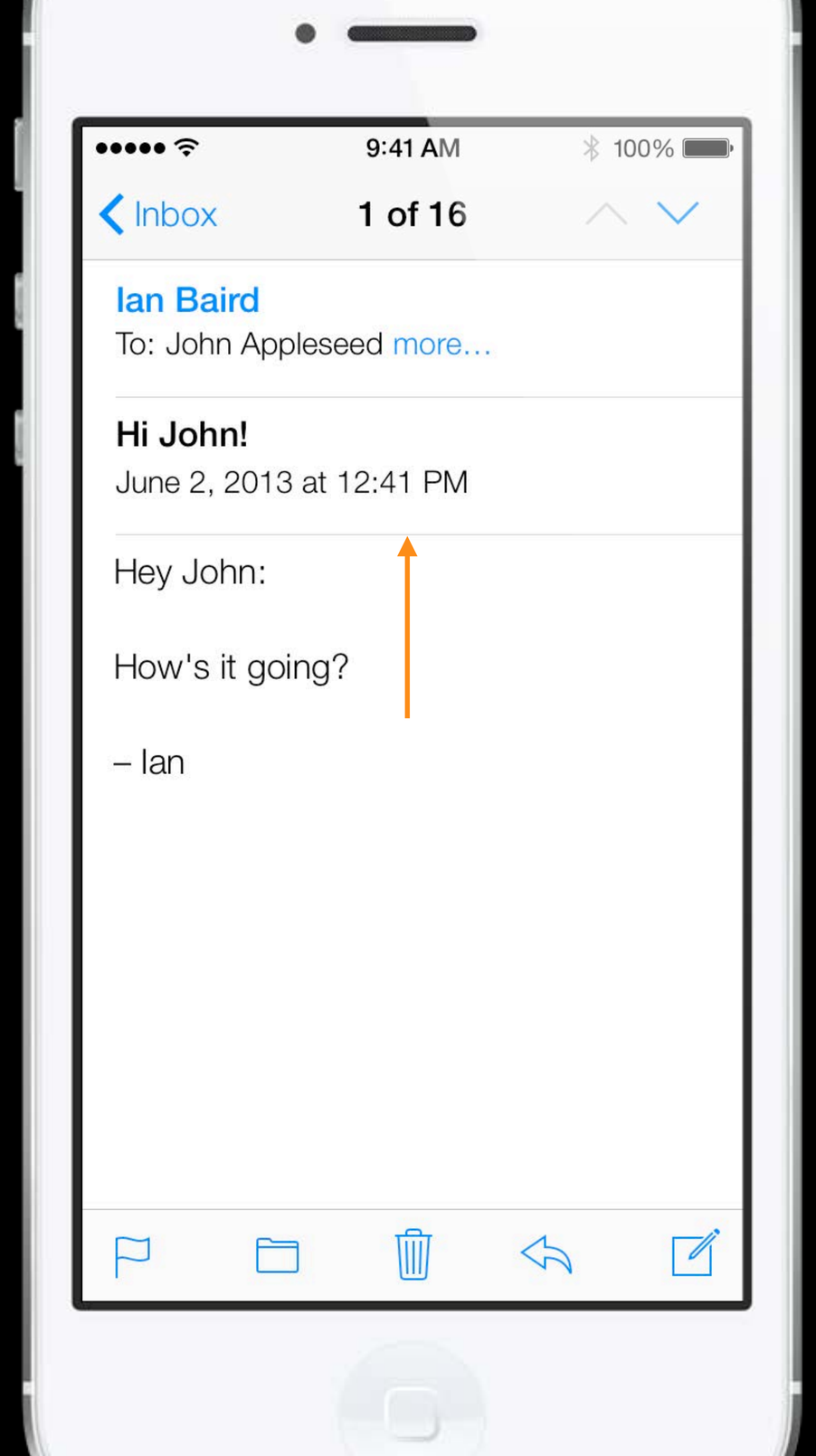


Text Kit Design

Layout and positioning

.8 * Cap height

Hey John:



Text Kit Design

Font metrics

- If you have a detailed spec (like Mail) you'll need to become familiar with the following font metrics

Abcdefg

Abcdefg

Text Kit Design

Font metrics

- If you have a detailed spec (like Mail) you'll need to become familiar with the following font metrics
- Line height

```
[myFont lineHeight]
```

Text Kit Design

Font metrics

- If you have a detailed spec (like Mail) you'll need to become familiar with the following font metrics
- Line height

```
[myFont lineHeight]
```

- Cap height

```
[myFont capHeight]
```

Text Kit Design

Font metrics

- If you have a detailed spec (like Mail) you'll need to become familiar with the following font metrics
- Line height

```
[myFont lineHeight]
```

- Cap height

```
[myFont capHeight]
```

- Leading: space between lines of text

```
[myFont leading]
```

Text Kit Design

Font metrics

- If you have a detailed spec (like Mail) you'll need to become familiar with the following font metrics
- Line height

```
[myFont lineHeight]
```

- Cap height

```
[myFont capHeight]
```

- Leading: space between lines of text

```
[myFont leading]
```

- Can be negative to move lines closer together!

Text Kit Design

Changing size

- `UIContentSizeCategoryDidChangeNotification` emitted when user selects a new size

Text Kit Design

Changing size

- `UIContentSizeCategoryDidChangeNotification` emitted when user selects a new size
- Observe `UIContentSizeCategoryDidChangeNotification` and re-layout your UI when received

Text Kit Design

Changing size

- `UIContentSizeCategoryDidChangeNotification` emitted when user selects a new size
- Observe `UIContentSizeCategoryDidChangeNotification` and re-layout your UI when received
  - Invalidate intrinsic content size on UIKit views positioned by Auto Layout

Text Kit Design

Changing size

- `UIContentSizeCategoryDidChangeNotification` emitted when user selects a new size
- Observe `UIContentSizeCategoryDidChangeNotification` and re-layout your UI when received
  - Invalidate intrinsic content size on UIKit views positioned by Auto Layout
  - Call `setNeedsLayout` to re-layout your UI if positioning manually

Text Kit Design

Changing size

- `UIContentSizeCategoryDidChangeNotification` emitted when user selects a new size
- Observe `UIContentSizeCategoryDidChangeNotification` and re-layout your UI when received
  - Invalidate intrinsic content size on UIKit views positioned by Auto Layout
  - Call `setNeedsLayout` to re-layout your UI if positioning manually
  - Invalidate cached preferred fonts or font descriptors

Demo

Text Kit and design

Jordan Breeding
UIKit Engineer

Text Kit and Design

It’s dynamic!

- Realize complex designs

Text Kit and Design

It’s dynamic!

- Realize complex designs
- Respond to the change notification

Text Kit and Design

It’s dynamic!

- Realize complex designs
- Respond to the change notification
- Customize text container line break mode

Interactive Rich Text

Content modification during user input

Johannes Fortmann
UIKit Engineer

Text Kit and Rich Text

Interactive content updates

Text Kit and Rich Text

Interactive content updates

- iOS 6: `–attributedText` property

Text Kit and Rich Text

Interactive content updates

- iOS 6: `–attributedText` property
- iOS 7: direct access to `–textStorage`

Text Kit and Rich Text

Interactive content updates

- iOS 6: `–attributedText` property
- iOS 7: direct access to `–textStorage`
- Selective editing messages with change notifications

Text Kit and Rich Text

Anatomy of an update

Text Kit and Rich Text

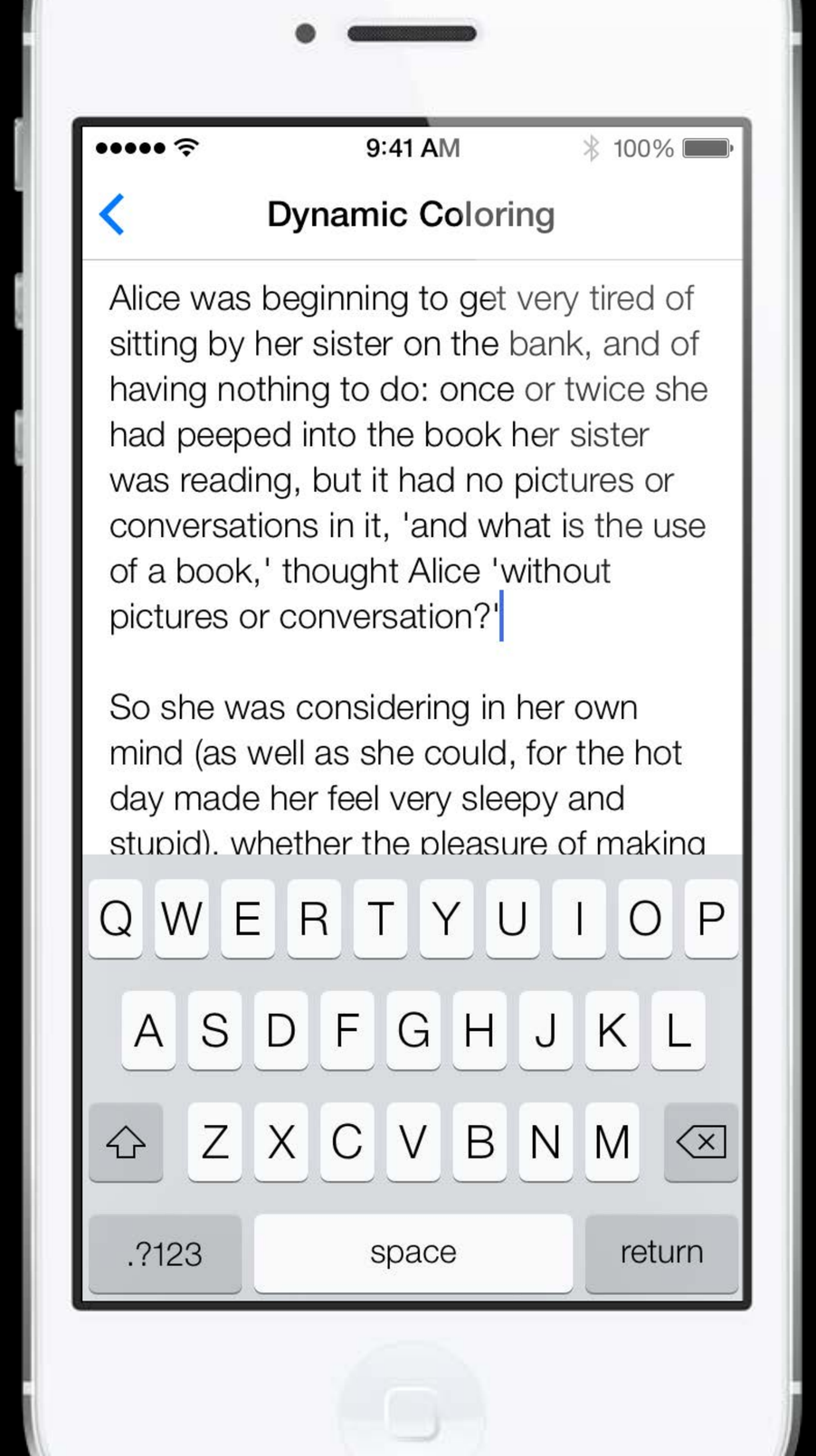
Anatomy of an update

- Use attributed string methods to modify

Text Kit and Rich Text

Anatomy of an update

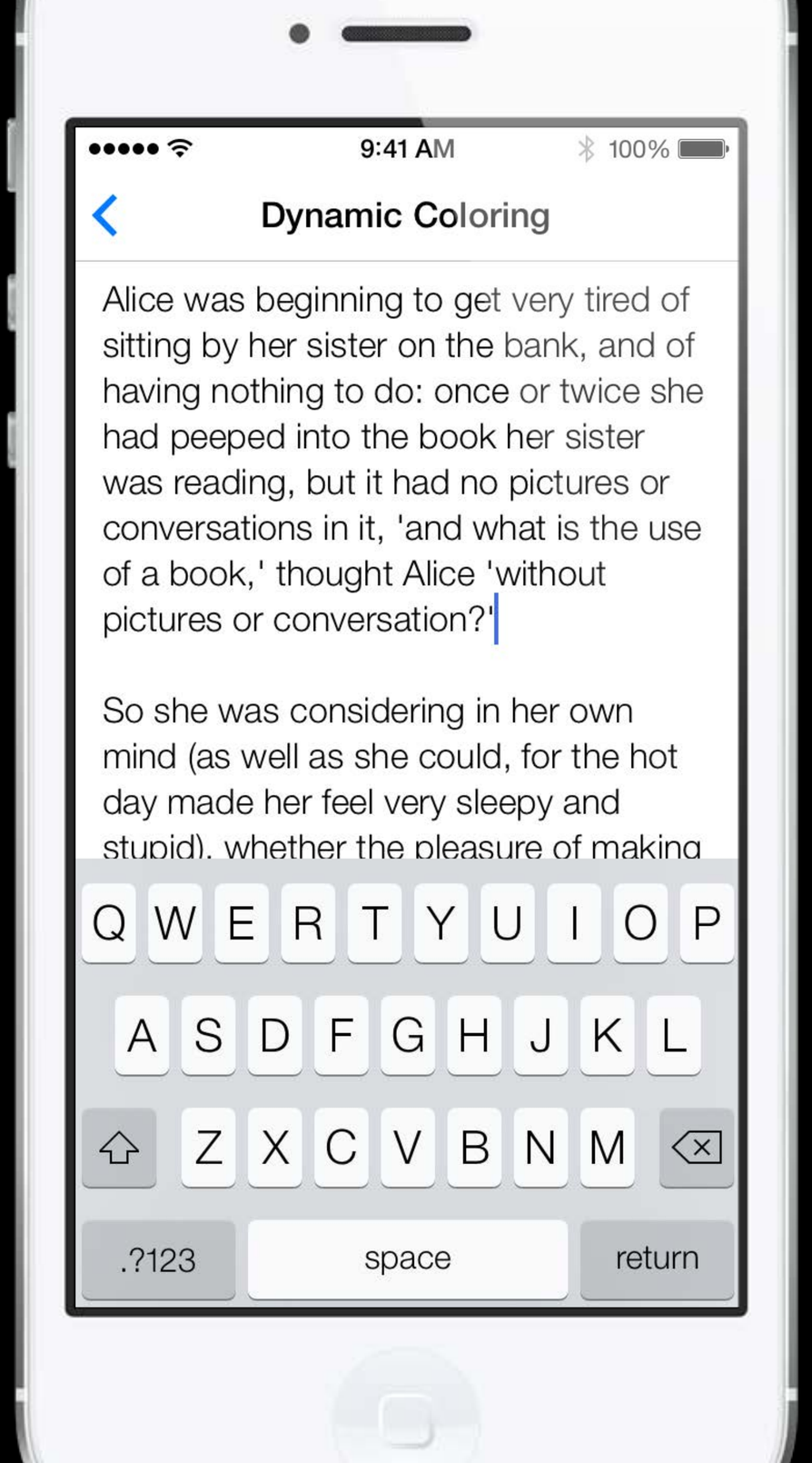
- Use attributed string methods to modify



Text Kit and Rich Text

Anatomy of an update

- Use attributed string methods to modify
- Bracket edits to batch updates

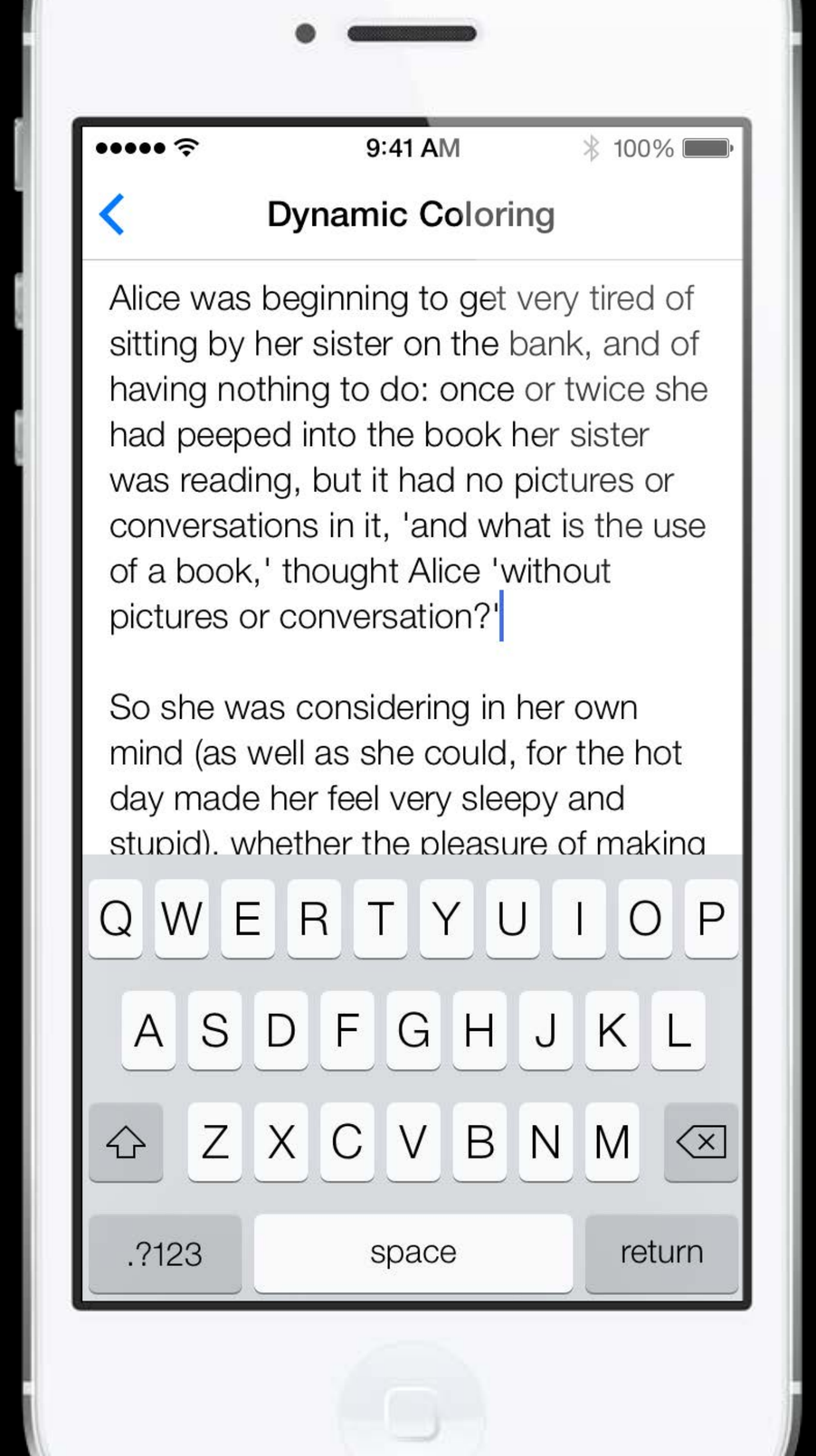


Text Kit and Rich Text

Anatomy of an update

- Use attributed string methods to modify
- Bracket edits to batch updates

```
[tv.textStorage beginEditing];
```



Text Kit and Rich Text

Anatomy of an update

- Use attributed string methods to modify
- Bracket edits to batch updates

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[self markWord:@”Alice” inTextStorage:tv];
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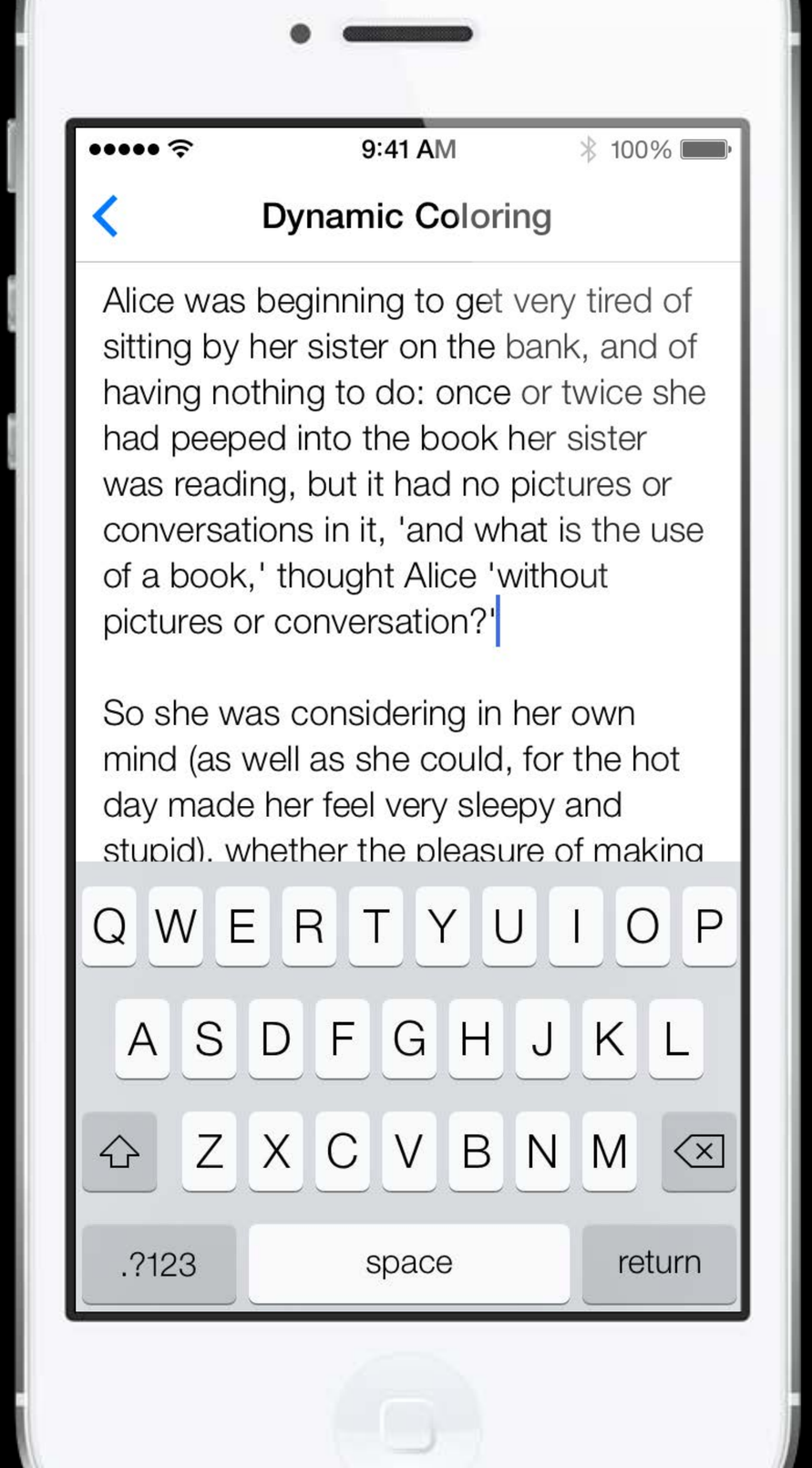

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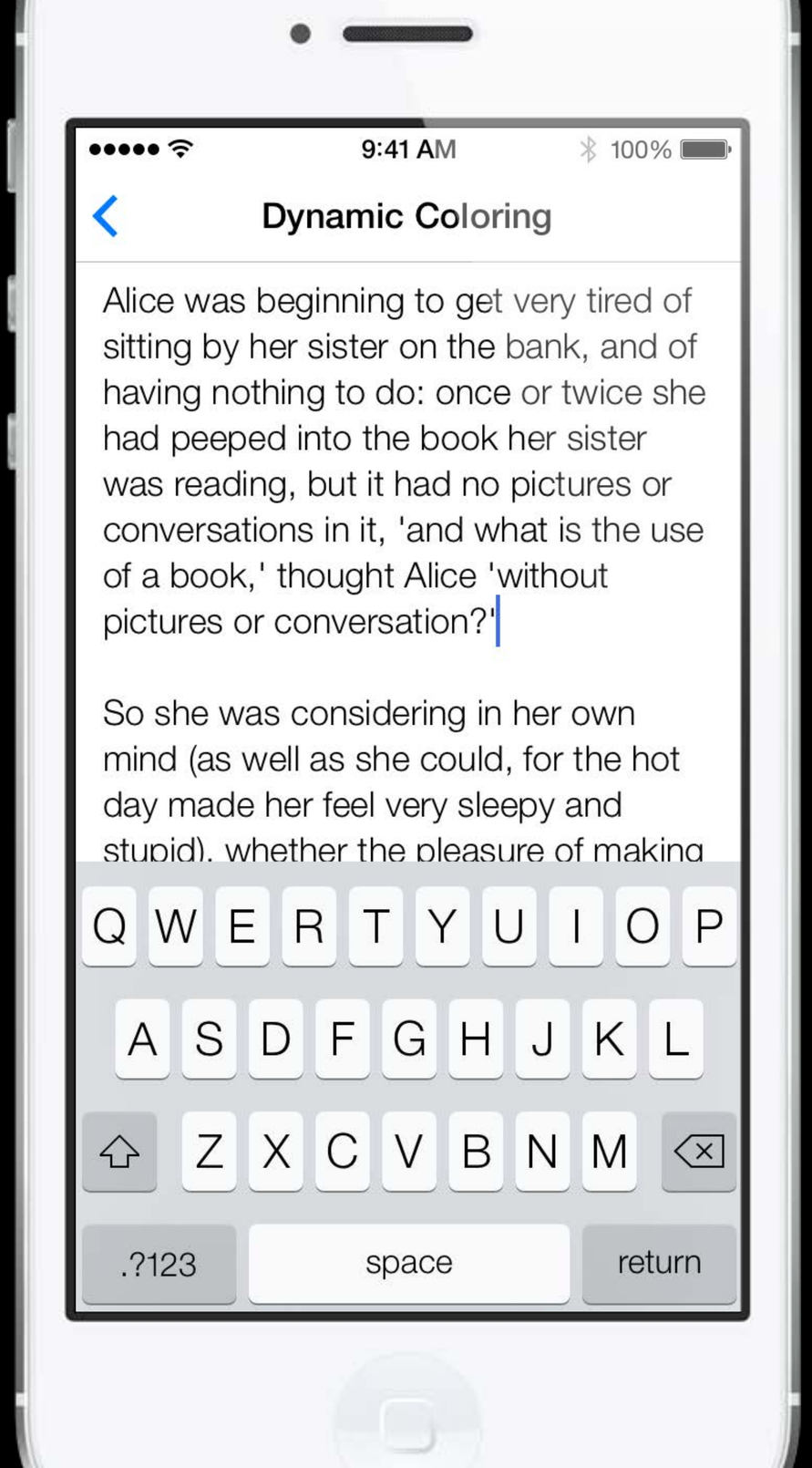

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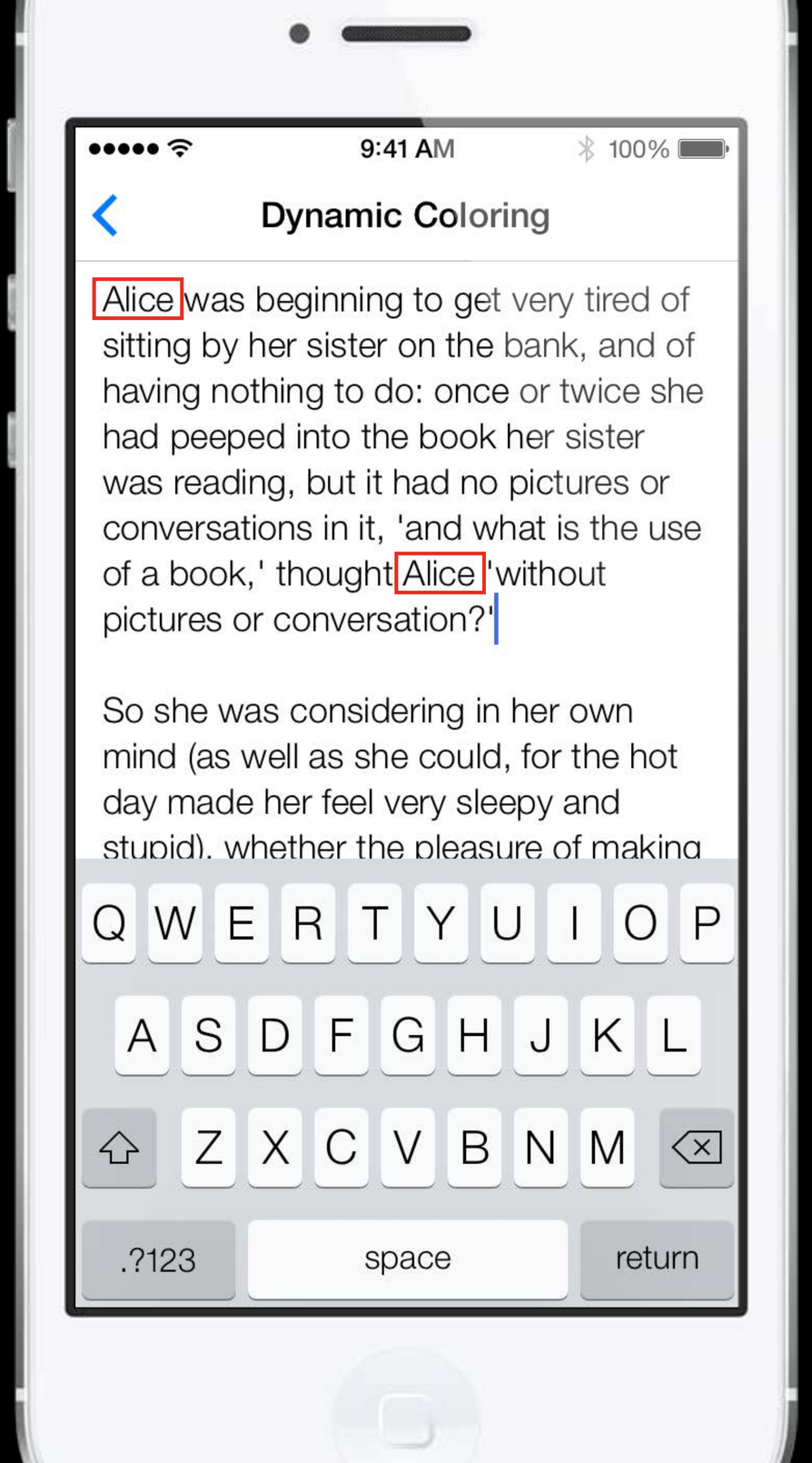

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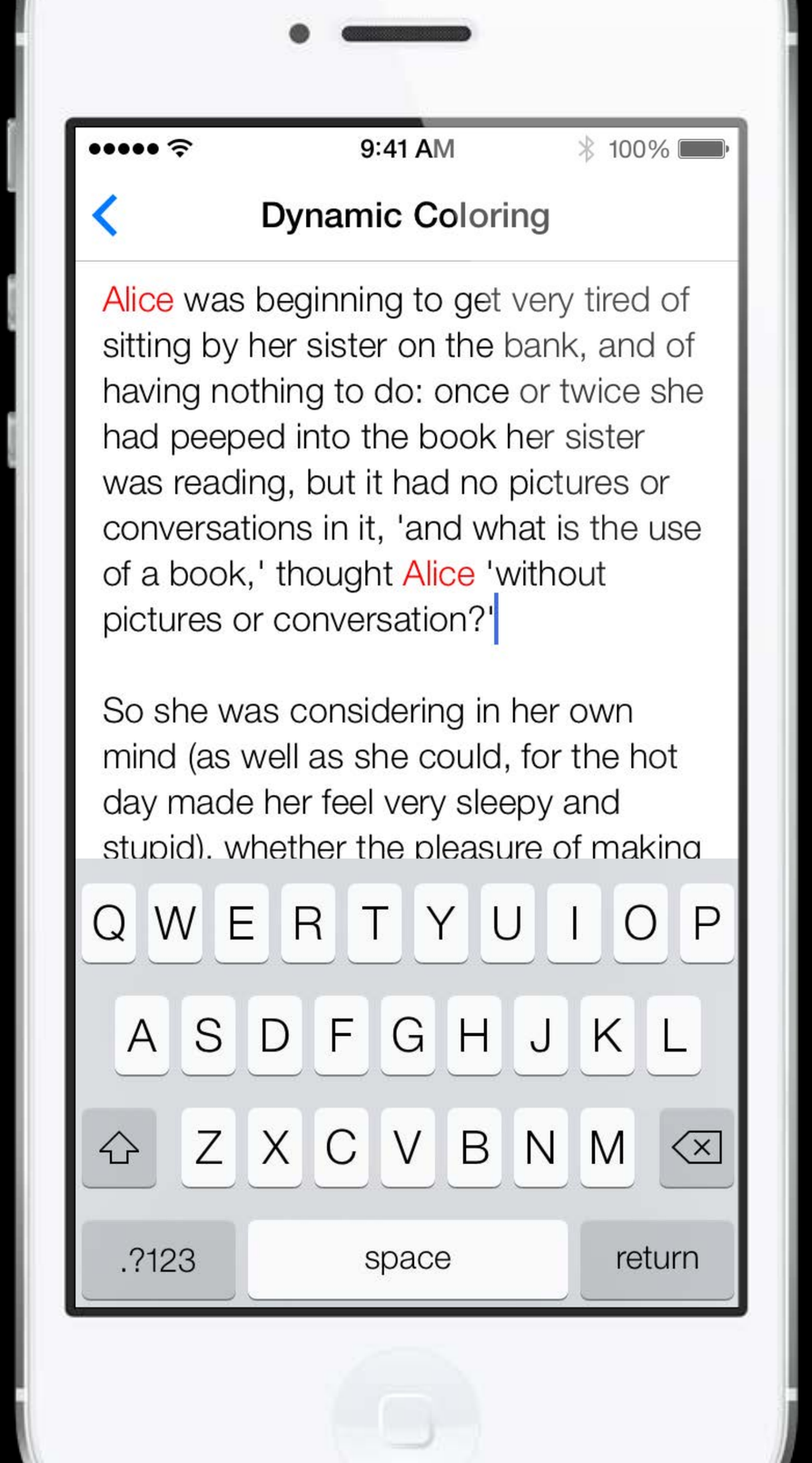

Rich Text Editing

Subclassing NSTextStorage

- Why?

Rich Text Editing

Subclassing NSTextStorage

- Why?
- Example: Change text attributes while typing

Rich Text Editing

Subclassing NSTextStorage

- Why?
- Example: Change text attributes while typing

@somebody

Rich Text Editing

Subclassing NSTextStorage

- Why?
- Example: Change text attributes while typing

@somebody: nice layout!

Rich Text Editing

Subclassing NSTextStorage

Rich Text Editing

Subclassing NSTextStorage

- Class cluster

Rich Text Editing

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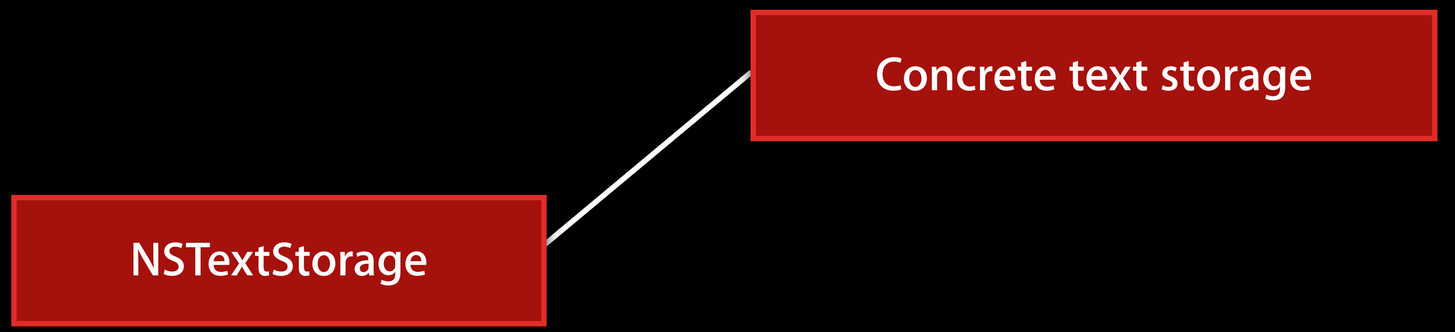

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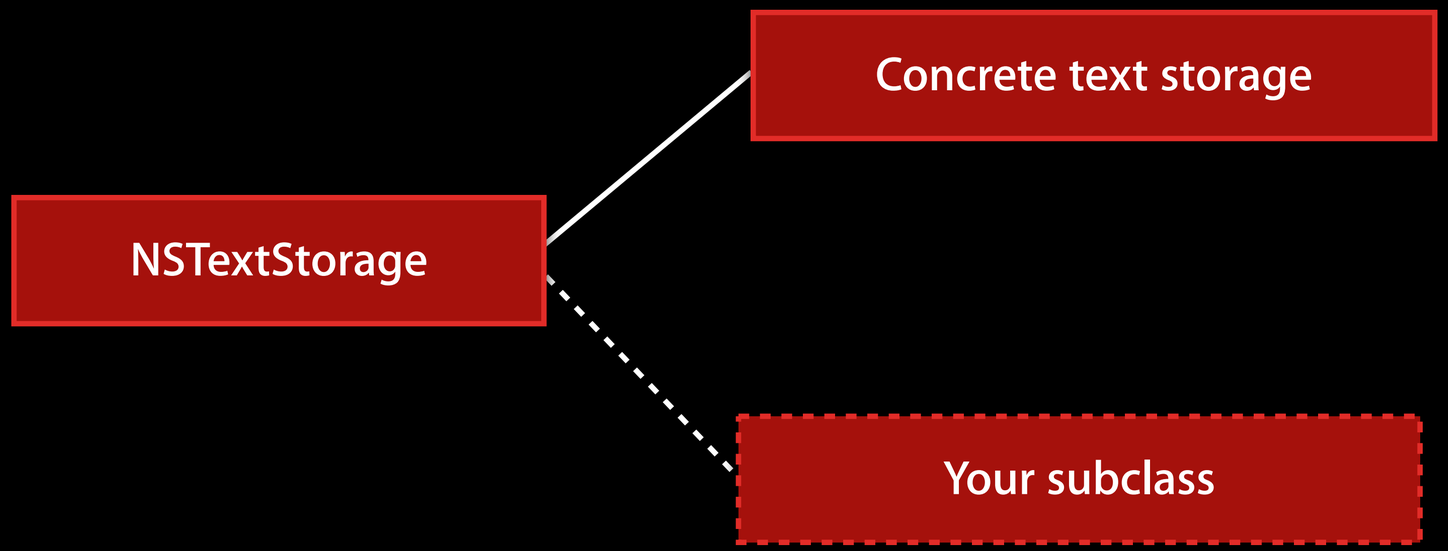

Rich Text Editing

Subclassing NSTextStorage

- Class cluster
- Override primitive methods

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-attributesAtIndex:effectiveRange:
-replaceCharactersInRange:withString:
-setAttributes:range:
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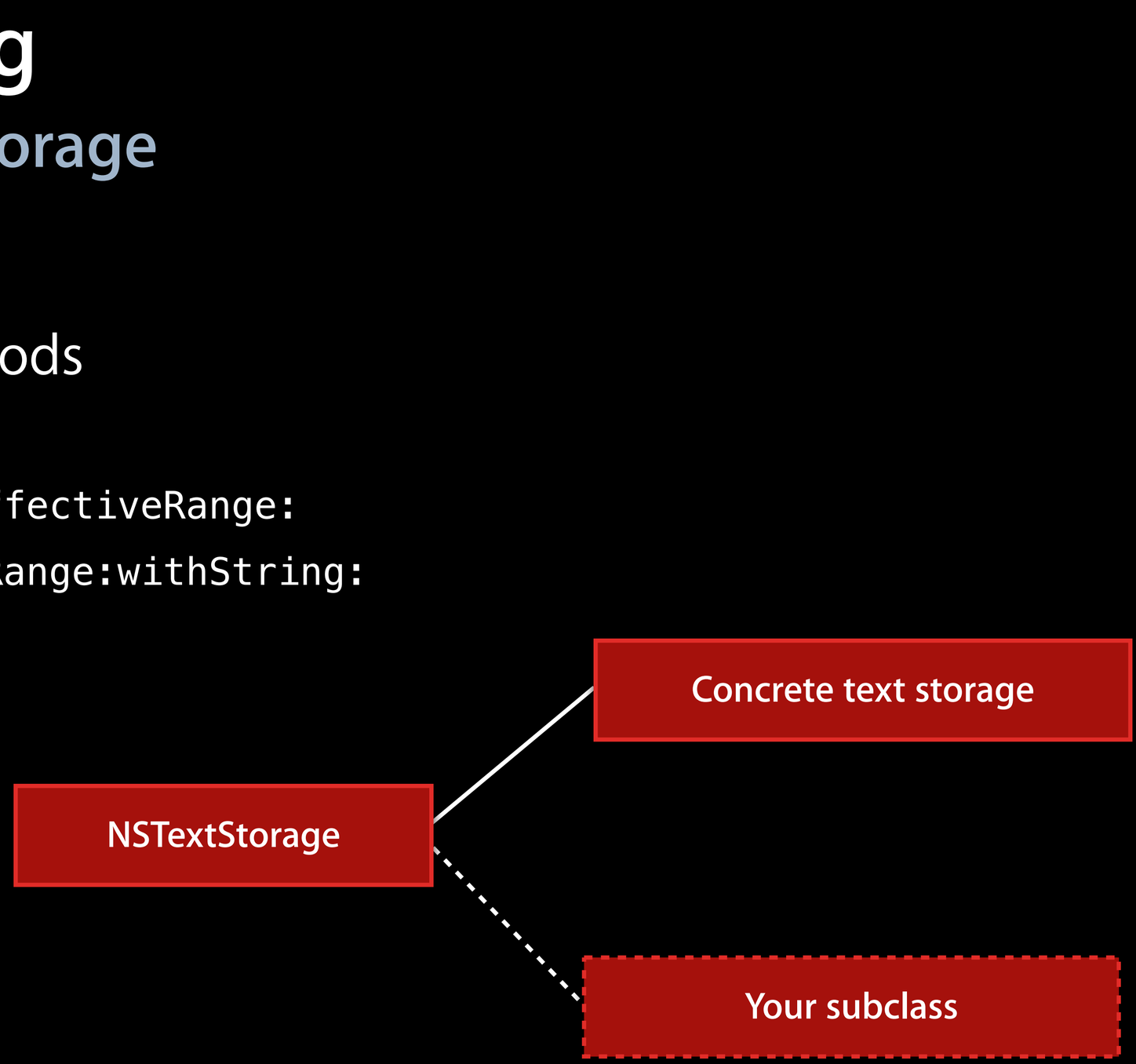

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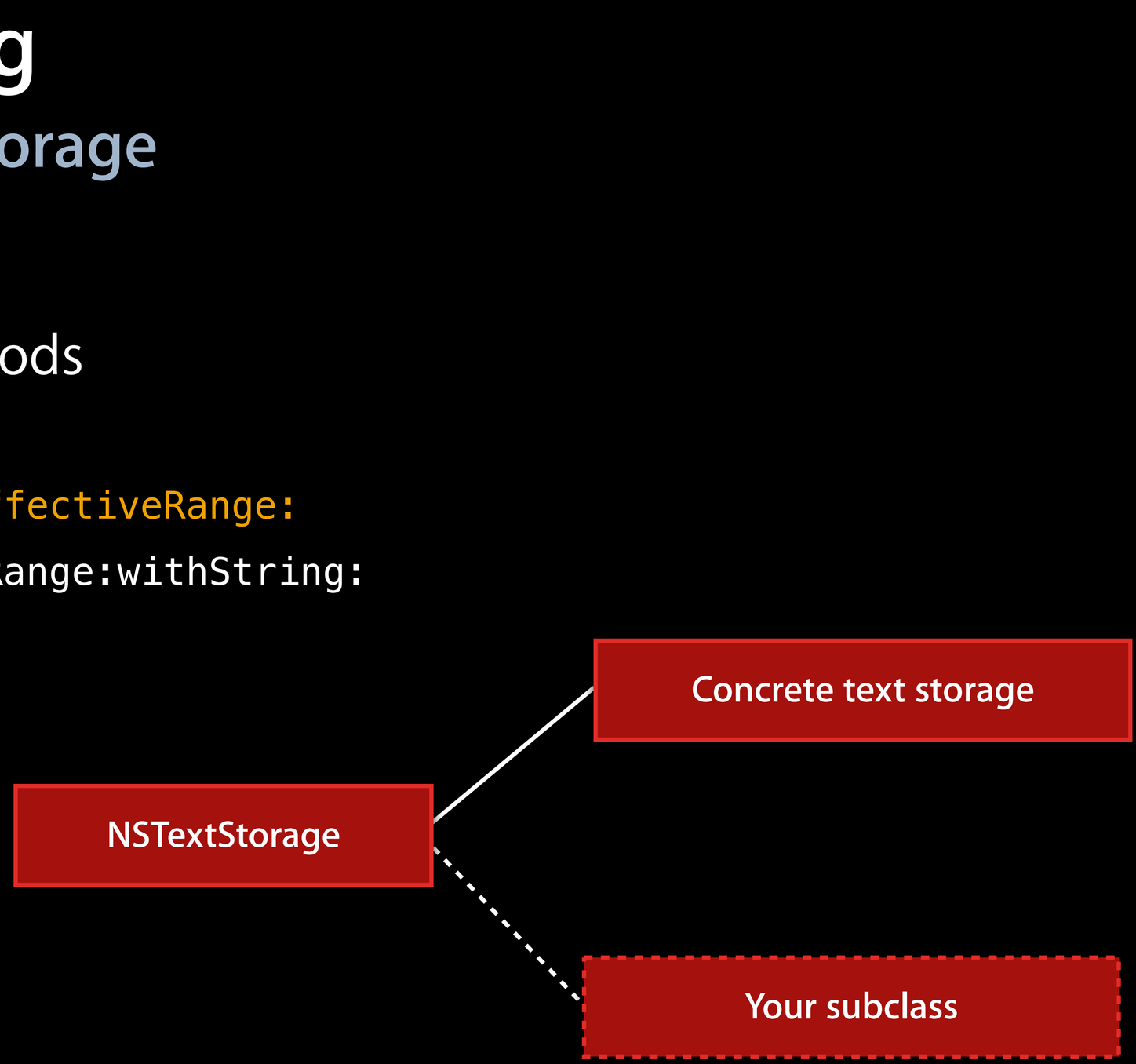

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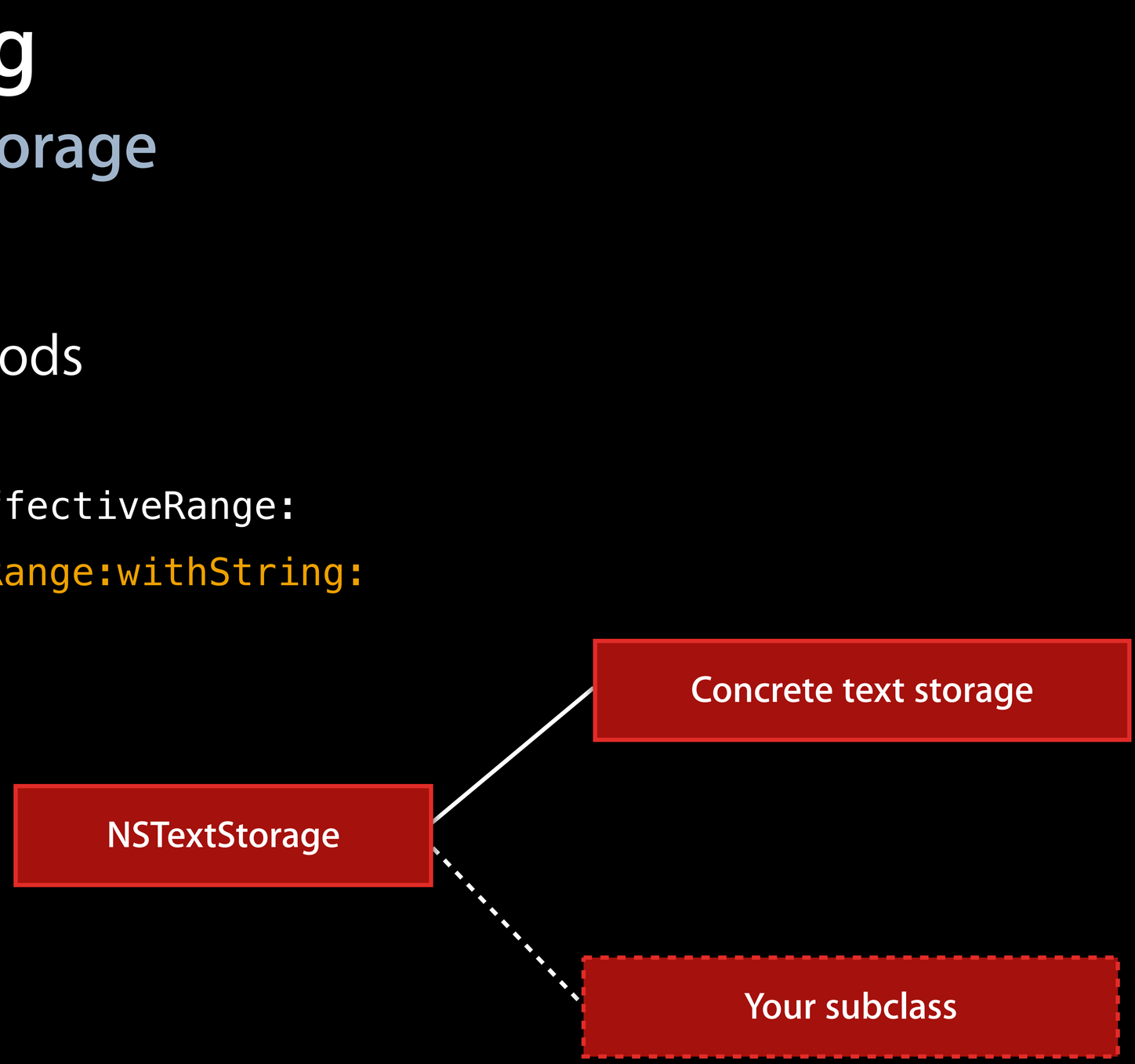


Demo

Dynamic attributes and interaction

Text Kit and Data

Demo

Text Kit and Data

Demo

- Assembling the text system

Text Kit and Data

Demo

- Assembling the text system
- Subclassing NSTextStorage

Text Kit and Data

Demo

- Assembling the text system
- Subclassing NSTextStorage
- Interactive content modification

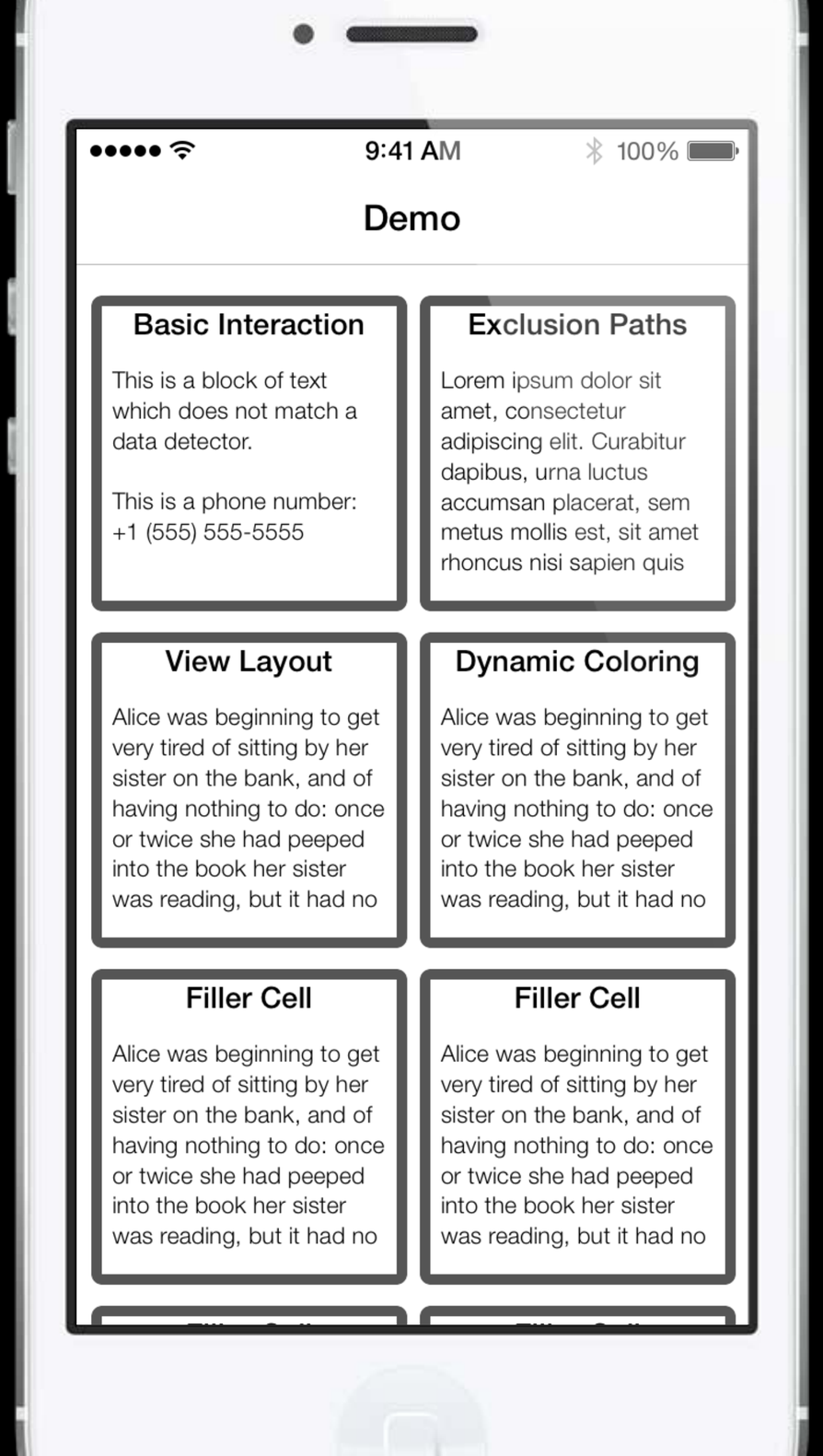
Wrapping It Up

Knowledge absorption

Text Kit

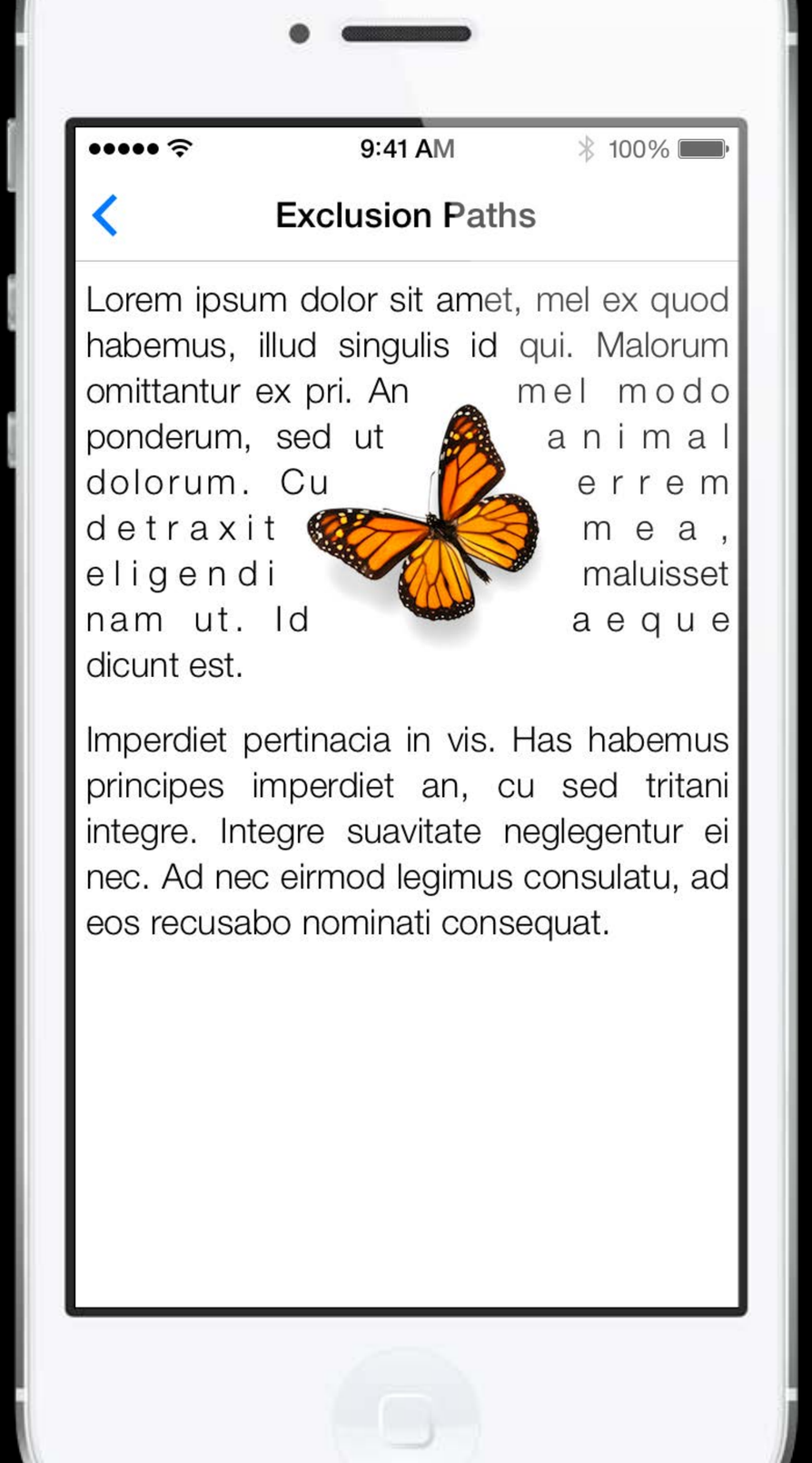
Text Kit

- Highly capable first-class citizen of UIKit



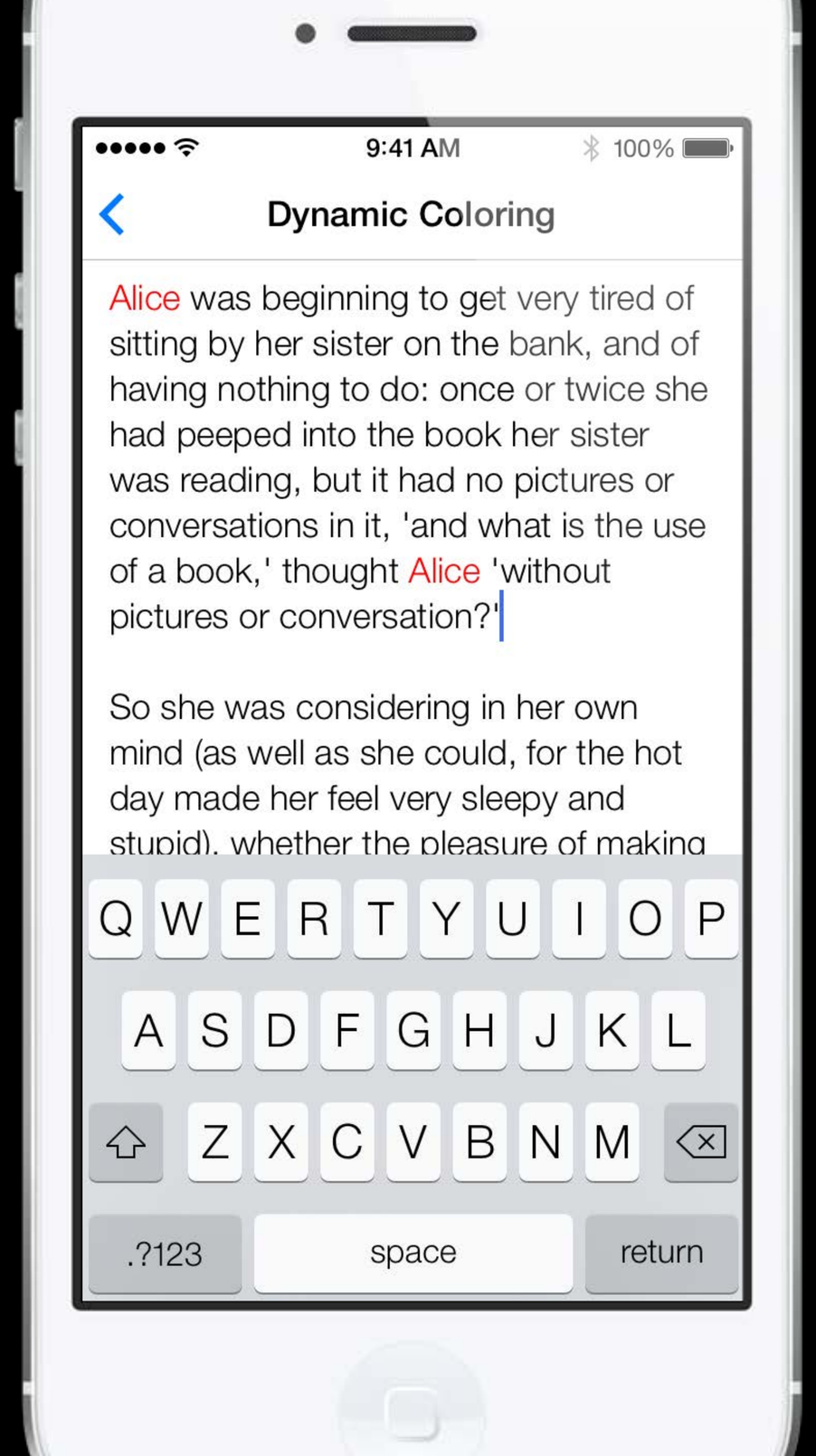
Text Kit

- Highly capable first-class citizen of UIKit
- Powerful



Text Kit

- Highly capable first-class citizen of UIKit
- Powerful
- Customizable and extensible



More Information

Jake Behrens
App Frameworks Evangelist
behrens@apple.com

Documentation
iOS Human Interface Guidelines
http://developer.apple.com/library/ios/#documentation/userexperience

Apple Developer Forums
http://devforums.apple.com

Related Sessions

Advanced Text Layouts and Effects with Text Kit	Mission Thursday 2:00PM	
Using Fonts with Text Kit	Presidio Friday 9:00AM	
What’s New in Safari and WebKit for Web Developers	Mission Tuesday 9:00AM	

Labs

Text Kit and Core Text Lab	Frameworks Lab B Wednesday 4:30PM
Text Kit and Core Text Lab	Frameworks Lab A Thursday 4:30PM

WWDC2013