Advanced Collection Views and Building Custom Layouts

Session 219

Luke the Hiesterman
iOS Frameworks

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

What You Will Learn

What You Will Learn

- Deeper architectural understanding

What You Will Learn

- Deeper architectural understanding
- Go far with `UICollectionViewFlowLayout`

What You Will Learn

- Deeper architectural understanding
- Go far with `UICollectionViewFlowLayout`
- Build your own layout

Concepts and Architecture

Views in a Collection View

Views in a Collection View

- Cells

Views in a Collection View

- Cells
- Supplementary Views

Views in a Collection View

- Cells
- Supplementary Views
- Decoration Views

Supplementary vs. Decoration Views

Supplementary vs. Decoration Views

Supplementary vs. Decoration Views

- Supplementary views are data driven

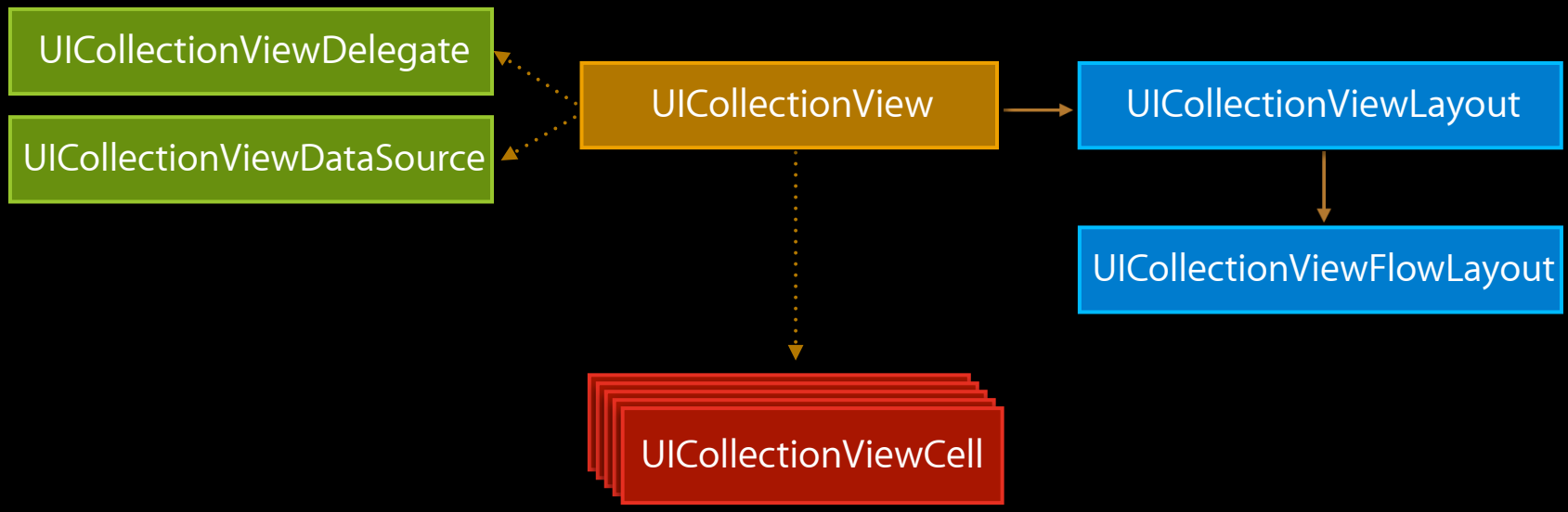
Supplementary vs. Decoration Views

Supplementary vs. Decoration Views

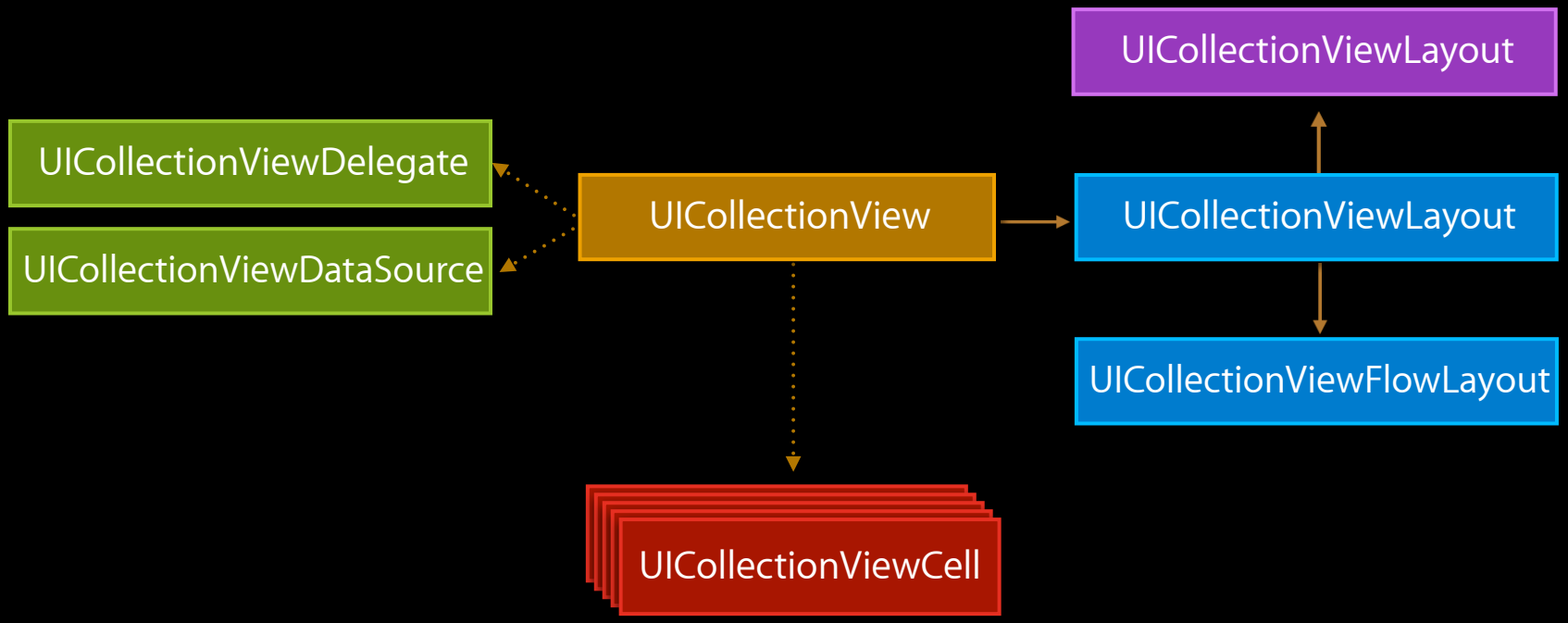
- Supplementary views are data driven
- Decoration views are layout driven

UICollectionViewLayoutAttributes

UICollectionViewLayoutAttributes



UICollectionViewLayoutAttributes



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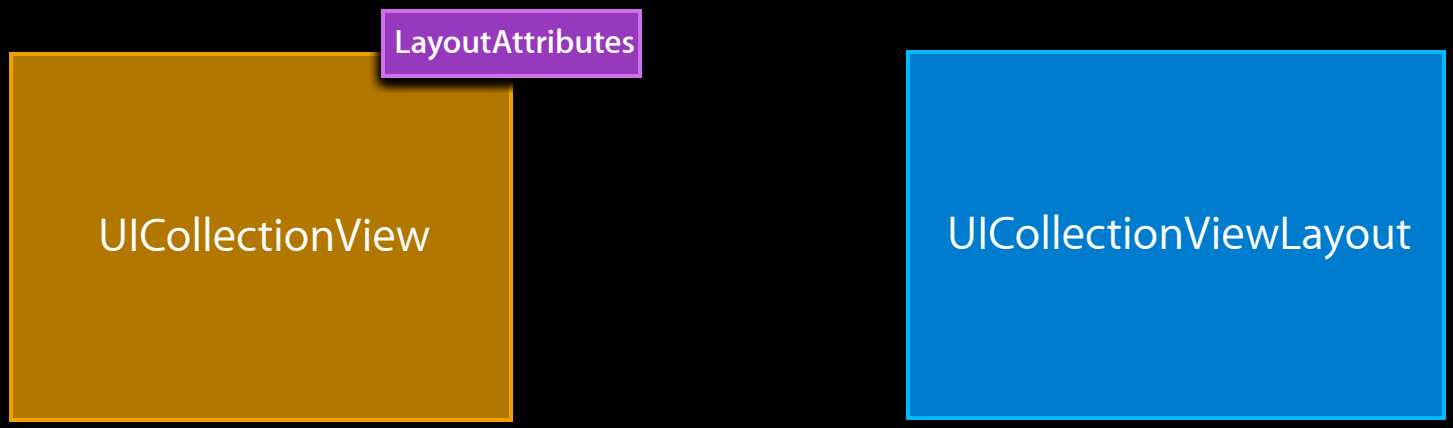

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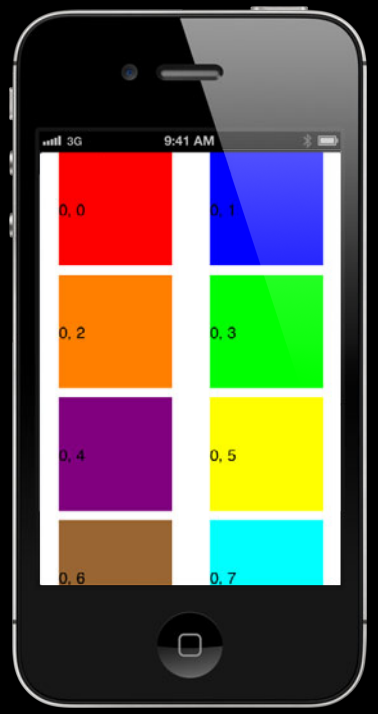
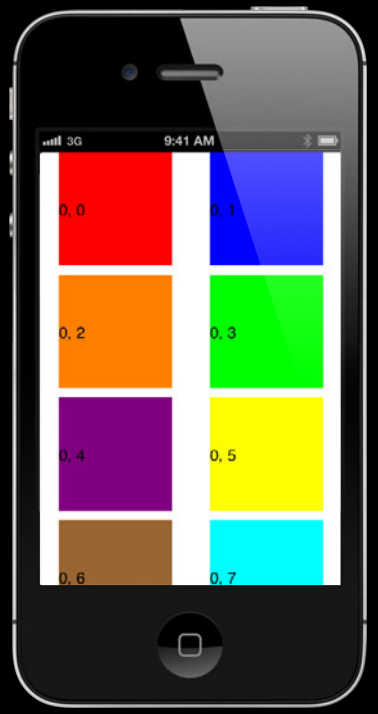


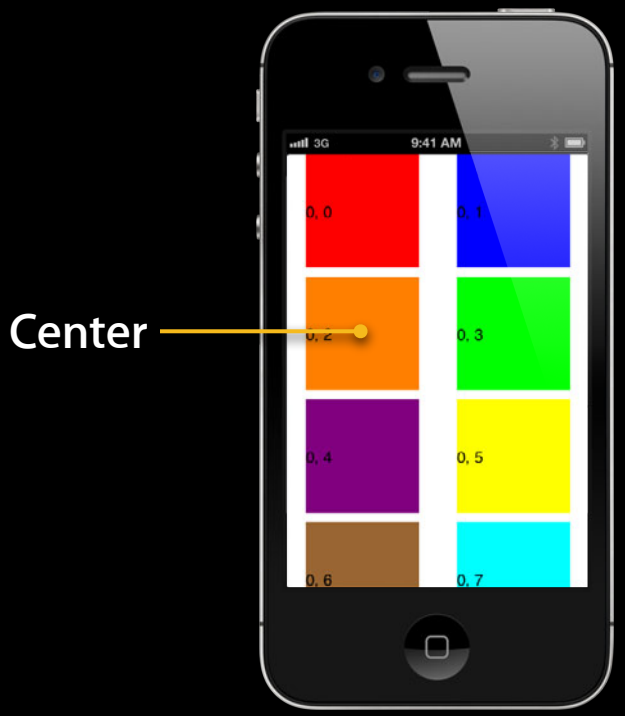
UICollectionViewLayoutAttributes

```
center and size
```



UICollectionViewLayoutAttributes

`center and size`



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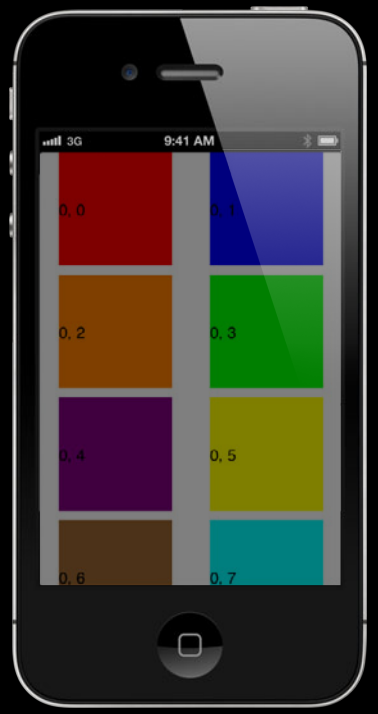
Size



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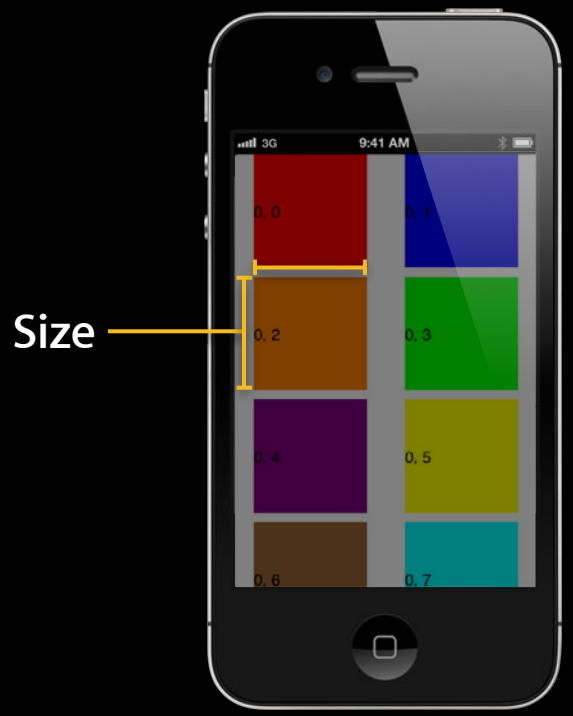

UICollectionViewLayoutAttributes

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UICollectionViewLayoutAttributes

```
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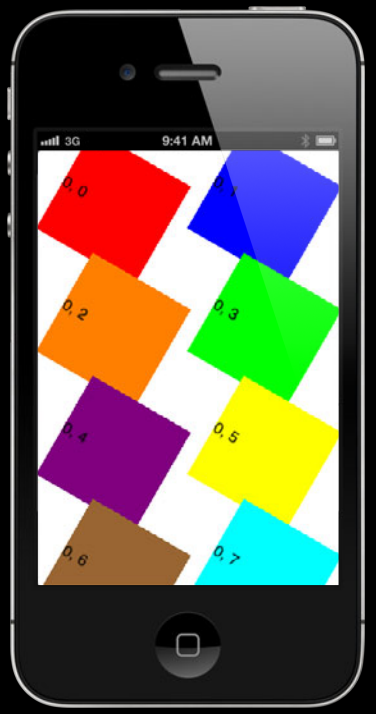

UICollectionViewLayoutAttributes

center and size

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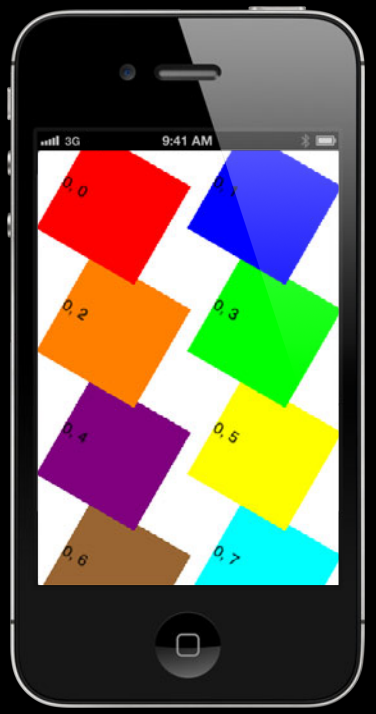
zIndex



Layout Delegation Pattern

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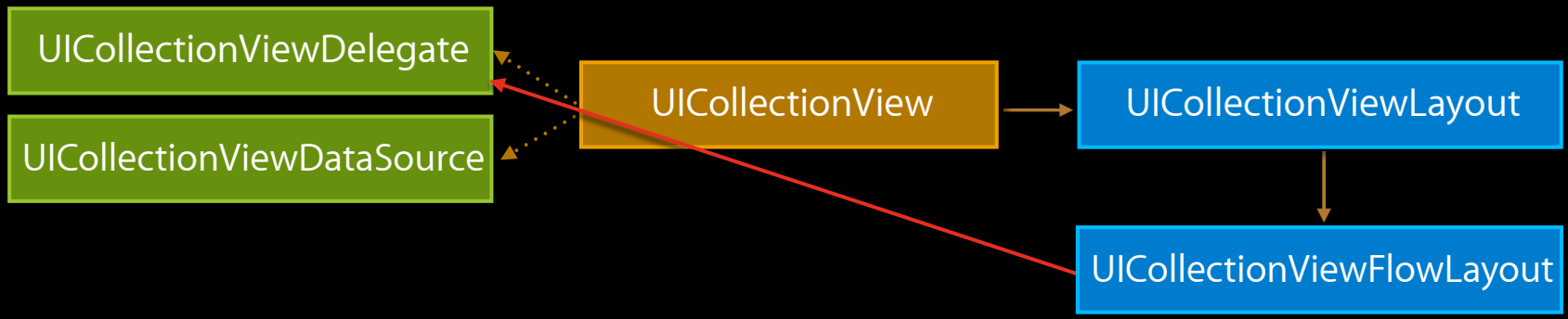

The Extensible Delegate

Not your granddaddy's protocol

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```
UICollectionViewDelegate : UIScrollViewDelegate
```

The Extensible Delegate

Not your granddaddy's protocol

```
UICollectionViewDelegate : UIScrollViewDelegate
UICollectionViewDelegateFlowLayout
```

The Extensible Delegate

Not your granddaddy's protocol

```
UICollectionViewDelegate : UIScrollViewDelegate
UICollectionViewDelegateFlowLayout
... MyExtendedDelegate
```

Changing the Layout

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- Change == layout invalidation

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- Invalidate with `-invalidateLayout`

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Changing the Layout

- Change == layout invalidation
- Invalidate with `-invalidateLayout`
- Implicit invalidations with `performBatchUpdates:completion:`
- Layout can dynamically invalidate with bounds changes
  - `-shouldInvalidateForBoundsChange:`

Advanced UICollectionViewFlowLayout

What You Can Do With

`UICollectionViewFlowLayout`

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`UICollectionViewFlowLayout`

- Any variation on a line-based breaking layout

Reasons to Subclass

`UICollectionViewFlowLayout`

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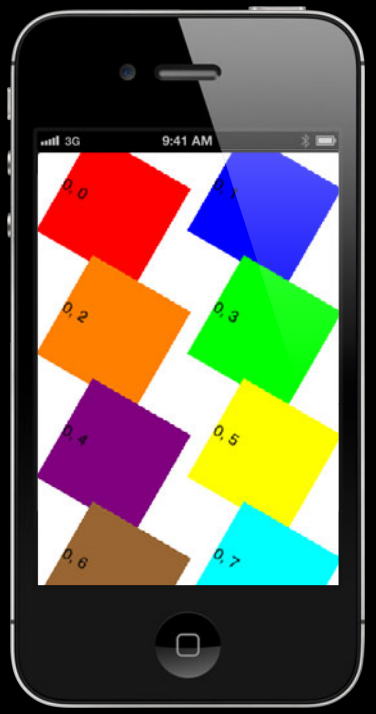

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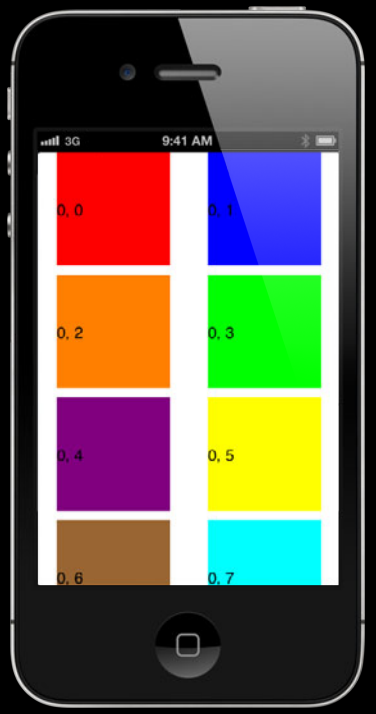

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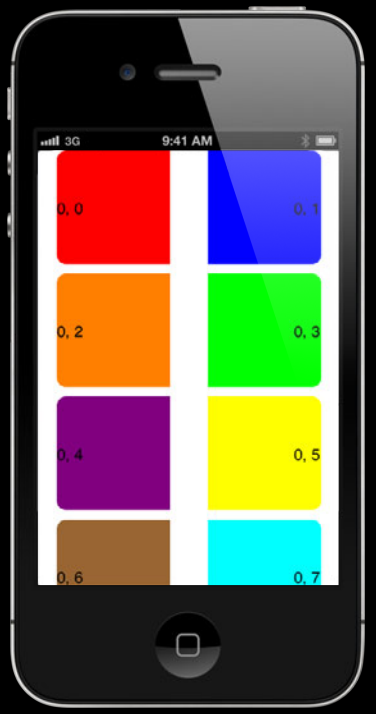

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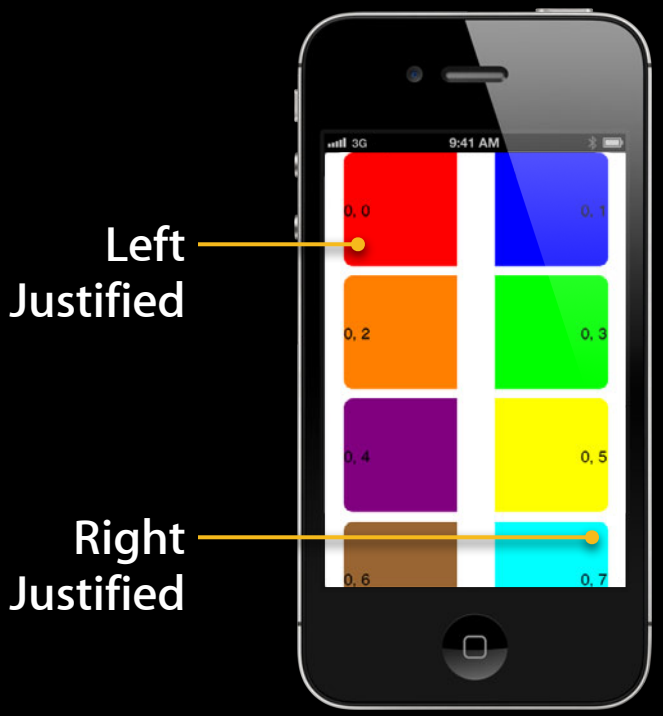

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- Add gesture support

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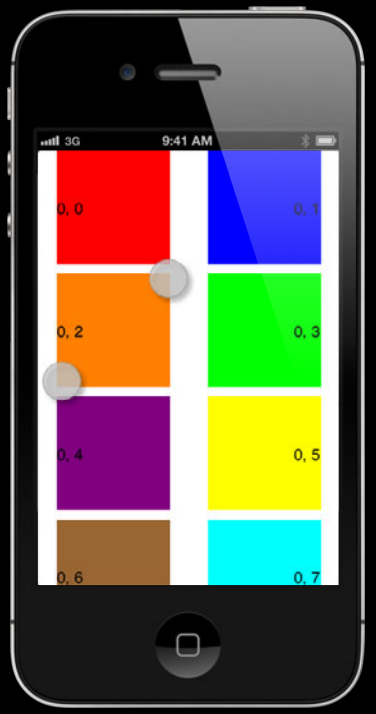

Reasons to Subclass

`UICollectionViewFlowLayout`

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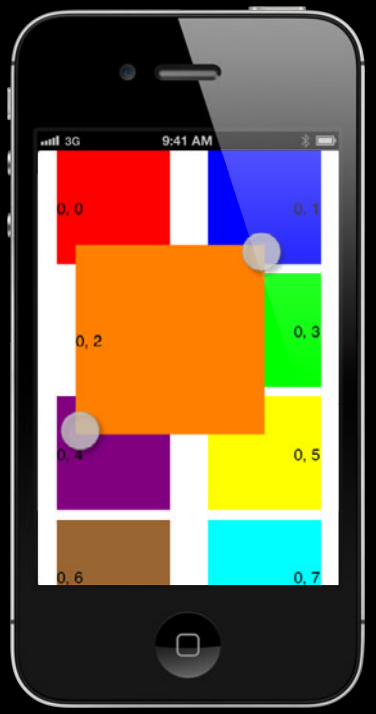


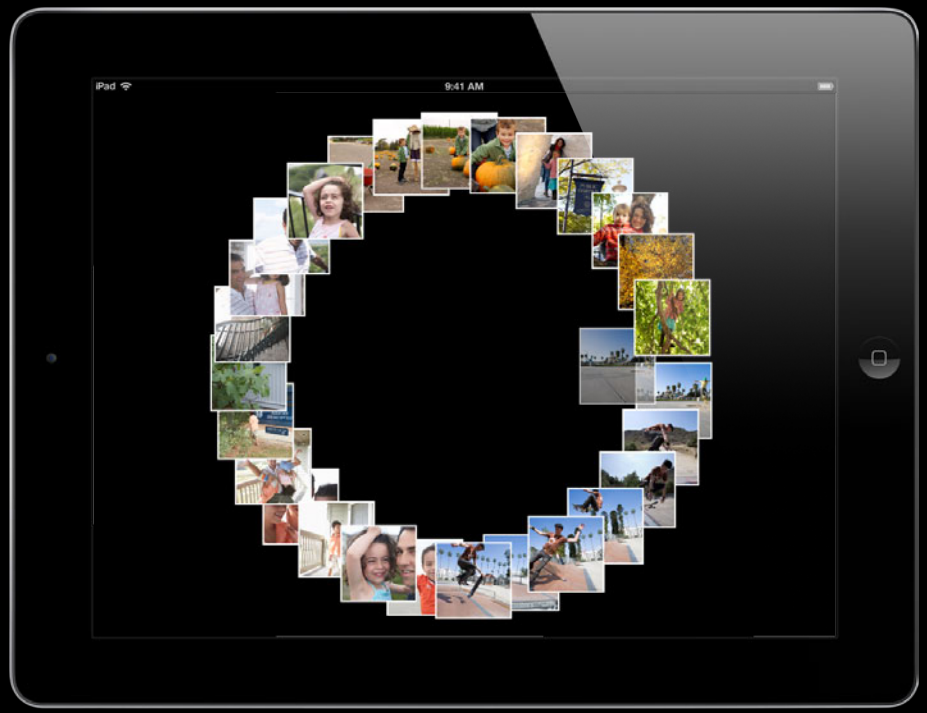
Reasons to Subclass

`UICollectionViewFlowLayout`

- Add new kinds of views
- Tweak layout attributes
- Add new layout attributes
- Add gesture support
- Customize insert and delete animations

Reasons to Subclass

UICollectionViewFlowLayout



Adding Extra Views

```
- (NSArray*)layoutAttributesForElementsInRect:(CGRect)rect
{
     NSMutableArray* attributes = [[super
     layoutAttributesForElementsInRect:rect] mutableCopy];


}
```

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```
- (NSArray*)layoutAttributesForElementsInRect:(CGRect)rect
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     [attributes addObject:[self myAdditionalElementAttributes];

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Adding Extra Views

```
- (NSArray*)layoutAttributesForElementsInRect:(CGRect)rect
{
     NSMutableArray* attributes = [[super
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     [attributes addObject:[self myAdditionalElementAttributes];
     return attributes;
}
```

Demo

Pinch resizing gesture

Mathieu Martin
iOS Frameworks

Writing Custom Layouts

Going Fully Custom

Deciding when it's time

Going Fully Custom

Deciding when it's time

- Changing all cell positions

Going Fully Custom

Deciding when it's time

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- Essentially, what you want looks nothing like a grid

Going Fully Custom

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Overriding `UICollectionViewLayout`

Required overrides

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Required overrides

```
-collectionViewContentSize
```

Overriding `UICollectionViewLayout`

Required overrides

```
-collectionViewContentSize
-layoutAttributesForElementsInRect:
```

Overriding `UICollectionViewLayout`

Required overrides

```
-collectionViewContentSize
-layoutAttributesForElementsInRect:
-layoutAttributesForItemAtIndexPath:
```

Overriding `UICollectionViewLayout`

Required overrides

```
-collectionViewContentSize
-layoutAttributesForElementsInRect:
-layoutAttributesForItemAtIndexPath:
-layoutAttributesForSupplementaryViewOfKind:atIndexPath:
```

Overriding `UICollectionViewLayout`

Required overrides

```
-collectionViewContentSize
-layoutAttributesForElementsInRect:
-layoutAttributesForItemAtIndexPath:
-layoutAttributesForSupplementaryViewOfKind:atIndexPath:
-layoutAttributesForDecorationViewWithReuseIdentifier:atIndexPath:
```

Order of Operations

Know when your hooks get called

Order of Operations

Know when your hooks get called

```
-prepareLayout
```

Order of Operations

Know when your hooks get called

- `-prepareLayout`
- `-collectionViewContentSize`

Order of Operations

Know when your hooks get called

```
-prepareLayout
-collectionViewContentSize
-layoutAttributesForElementsInRect
```

Order of Operations

Know when your hooks get called

- `-prepareLayout`
- `-collectionViewContentSize`
- `-layoutAttributesForElementsInRect`
- All other calls

Order of Operations

Know when your hooks get called

- `-prepareLayout`
- `-collectionViewContentSize`
- `-layoutAttributesForElementsInRect`

- All other calls
  - `-invalidateLayout`

Order of Operations

Know when your hooks get called

`-prepareLayout`

`-collectionViewContentSize`

`-layoutAttributesForElementsInRect`

- All other calls

`-invalidateLayout`

`-prepareLayout`

Order of Operations

Know when your hooks get called

- `-prepareLayout`
- `-collectionViewContentSize`
- `-layoutAttributesForElementsInRect`

- All other calls
  - `-invalidateLayout`
  - `-prepareLayout`
- ... the cycle continues

Demo

Custom layouts

Dr. Olivier Gutknecht
iOS Frameworks

Recap

In Review

In Review

- `UICollectionViewFlowLayout` is both subclassable and powerful

In Review

- `UICollectionViewFlowLayout` is both subclassable and powerful
- `UICollectionView` supports arbitrary layouts built by you

Apple Evangelists

Jake Behrens
UI Frameworks Evangelist
behrens@apple.com

Related Sessions

Introducing Collection Views	Marina Thursday 9:00AM

Labs

Multithreading Lab	Essentials Lab A Thursday 2:00PM

WWDC2012

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