

# Mysteries of Auto Layout, Part 2

Session 219

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# The Mysteries of Auto Layout

## Part 1 — Morning

- Maintainable Layouts
- Changing Constraints
- View Sizing
- Self-Sizing Table View Cells
- Priorities
- Alignment

## Part 2 — Afternoon

- The Layout Cycle
- Legacy Layout
- Constraint Creation
- Constraining Negative Space
- Unsatisfiable Constraints
- Resolving Ambiguity

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- Legacy Layout
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# The Layout Cycle

Mystery #7

# Inside the Black Box

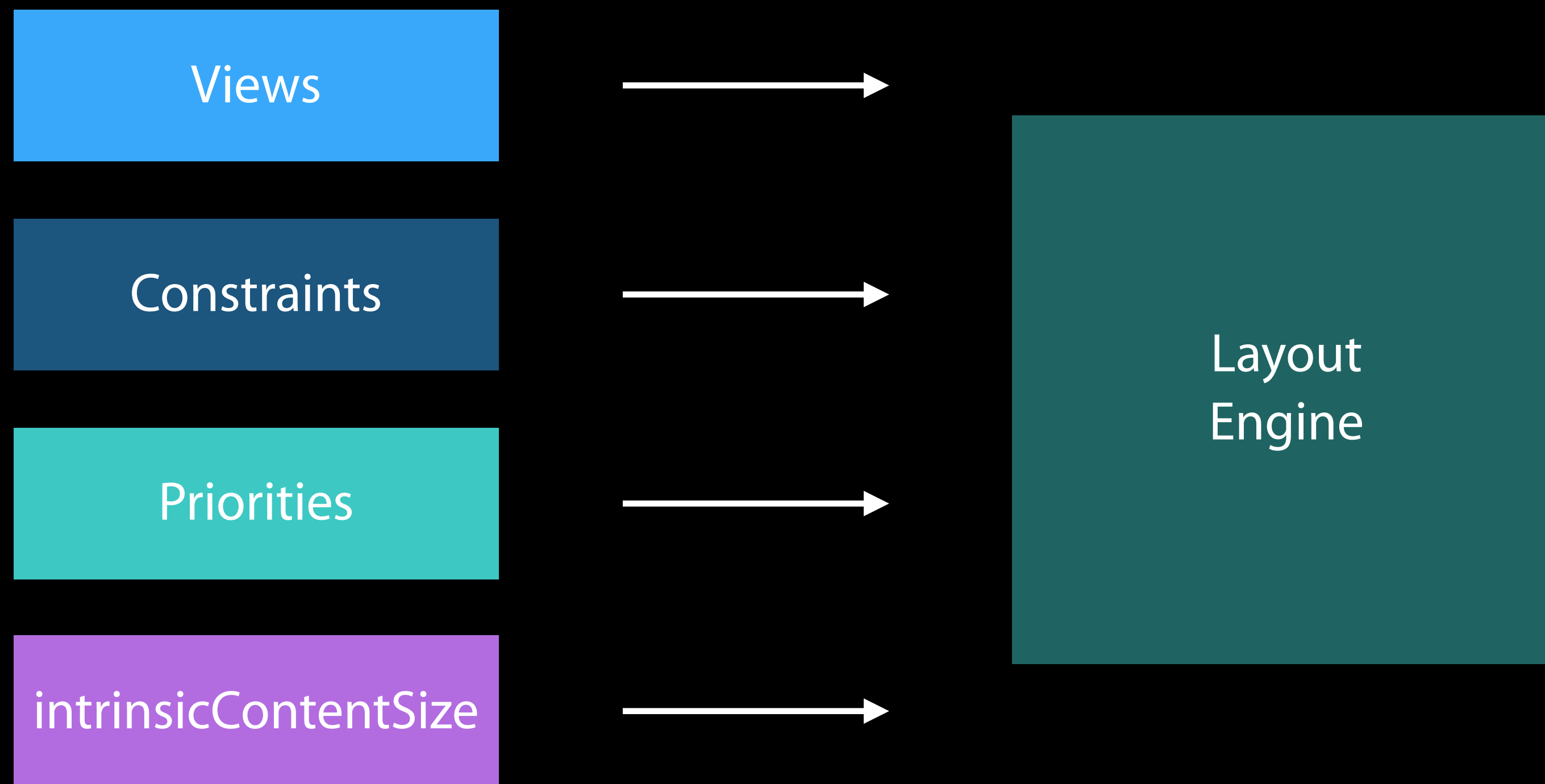
Views

Constraints

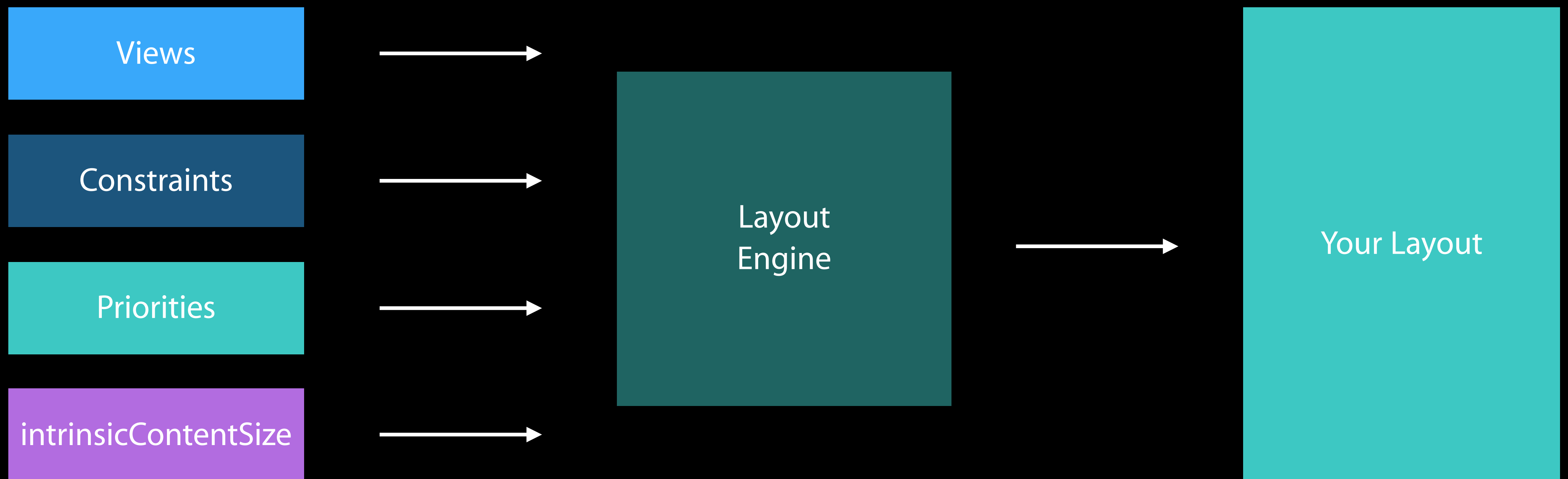
Priorities

`intrinsicContentSize`

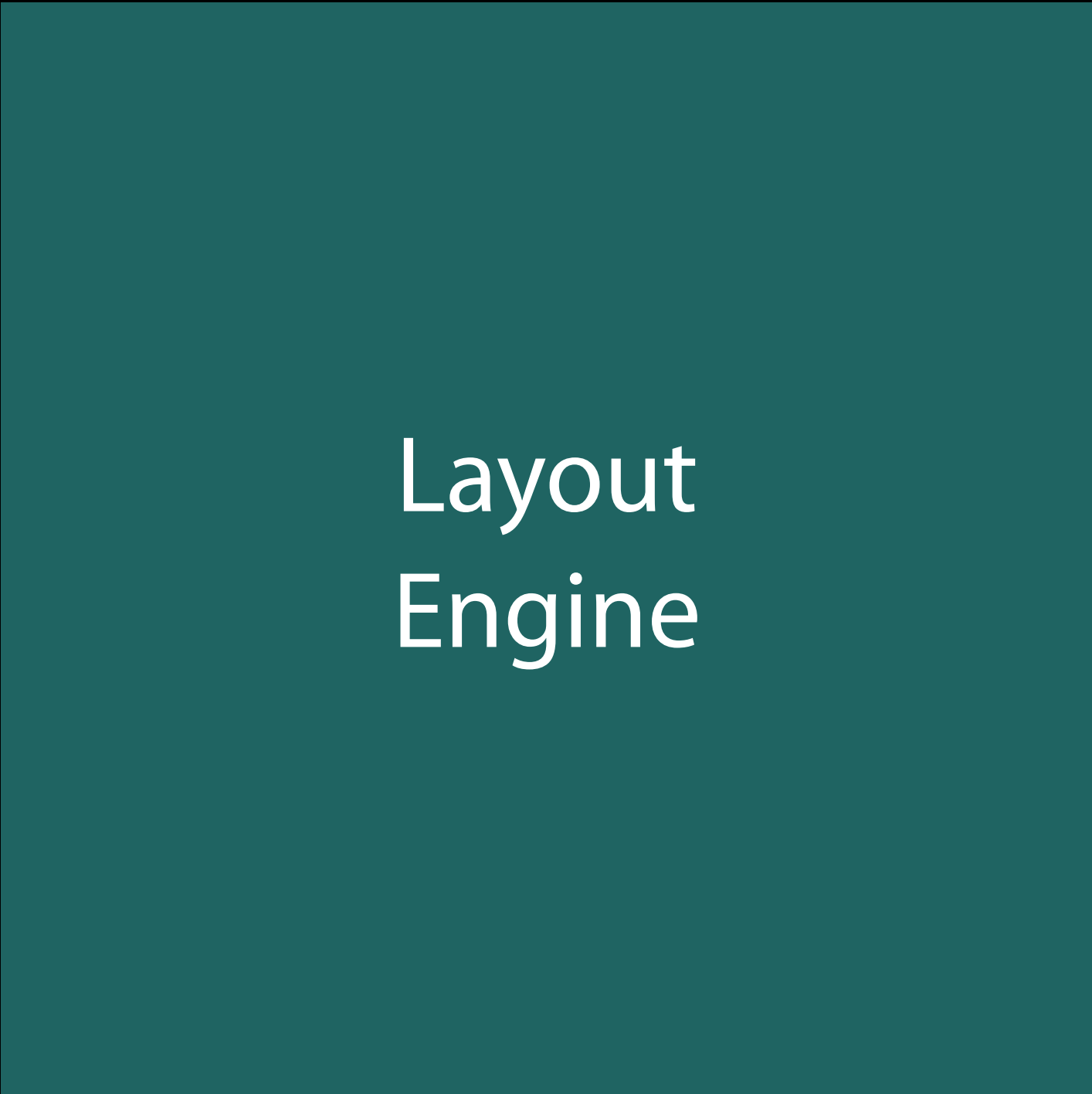
# Inside the Black Box



# Inside the Black Box



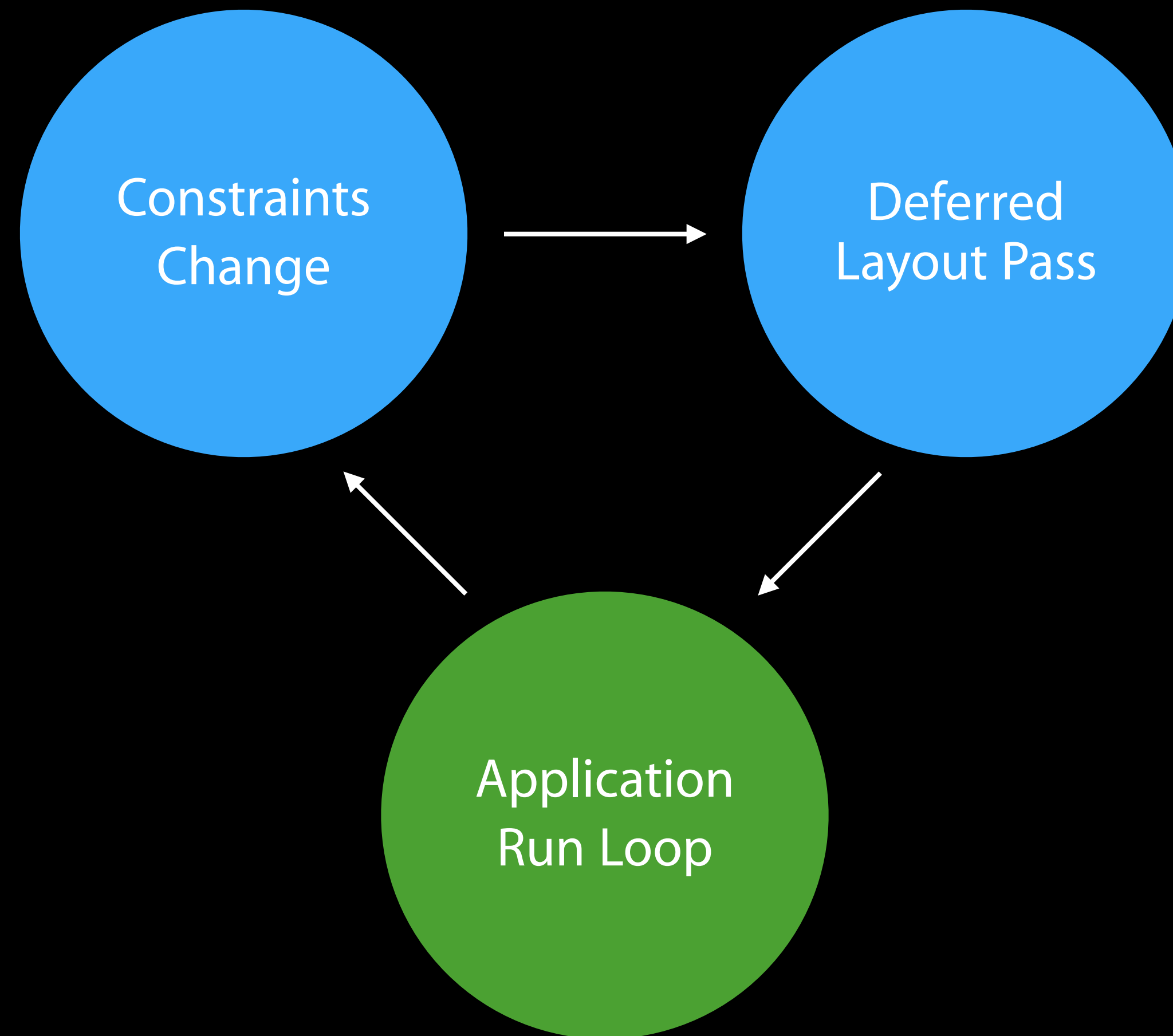
# Inside the Black Box



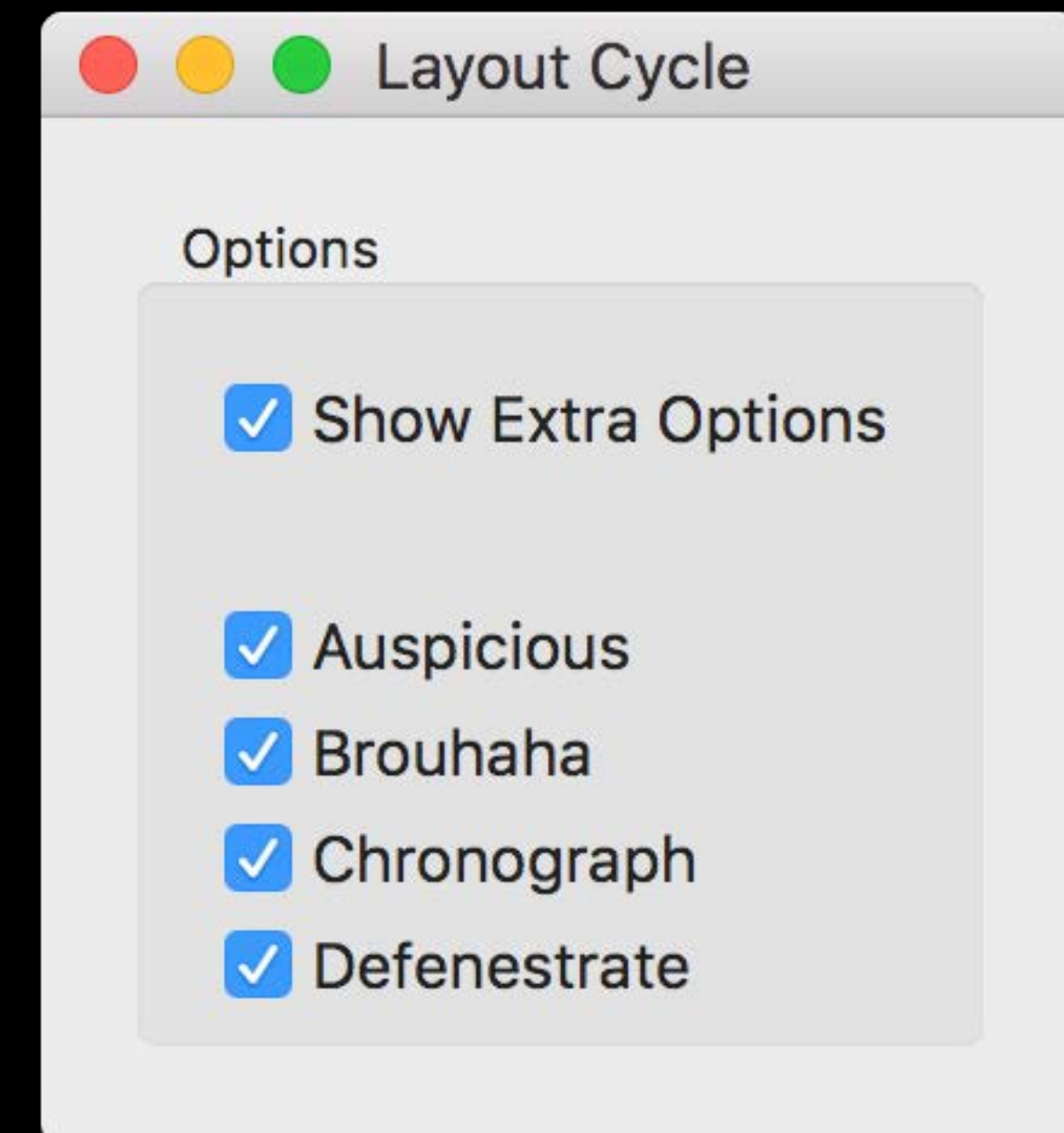
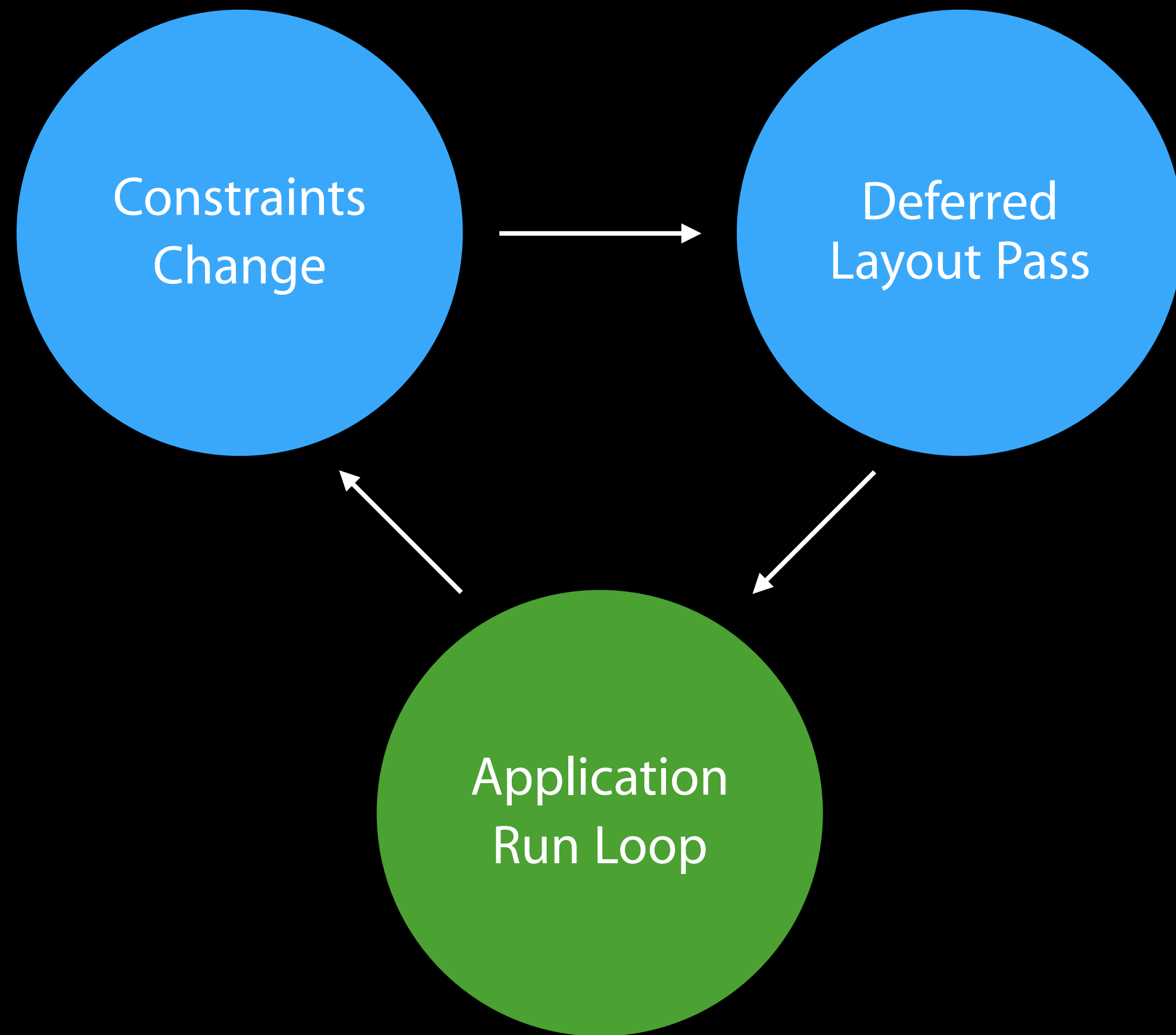
Layout  
Engine



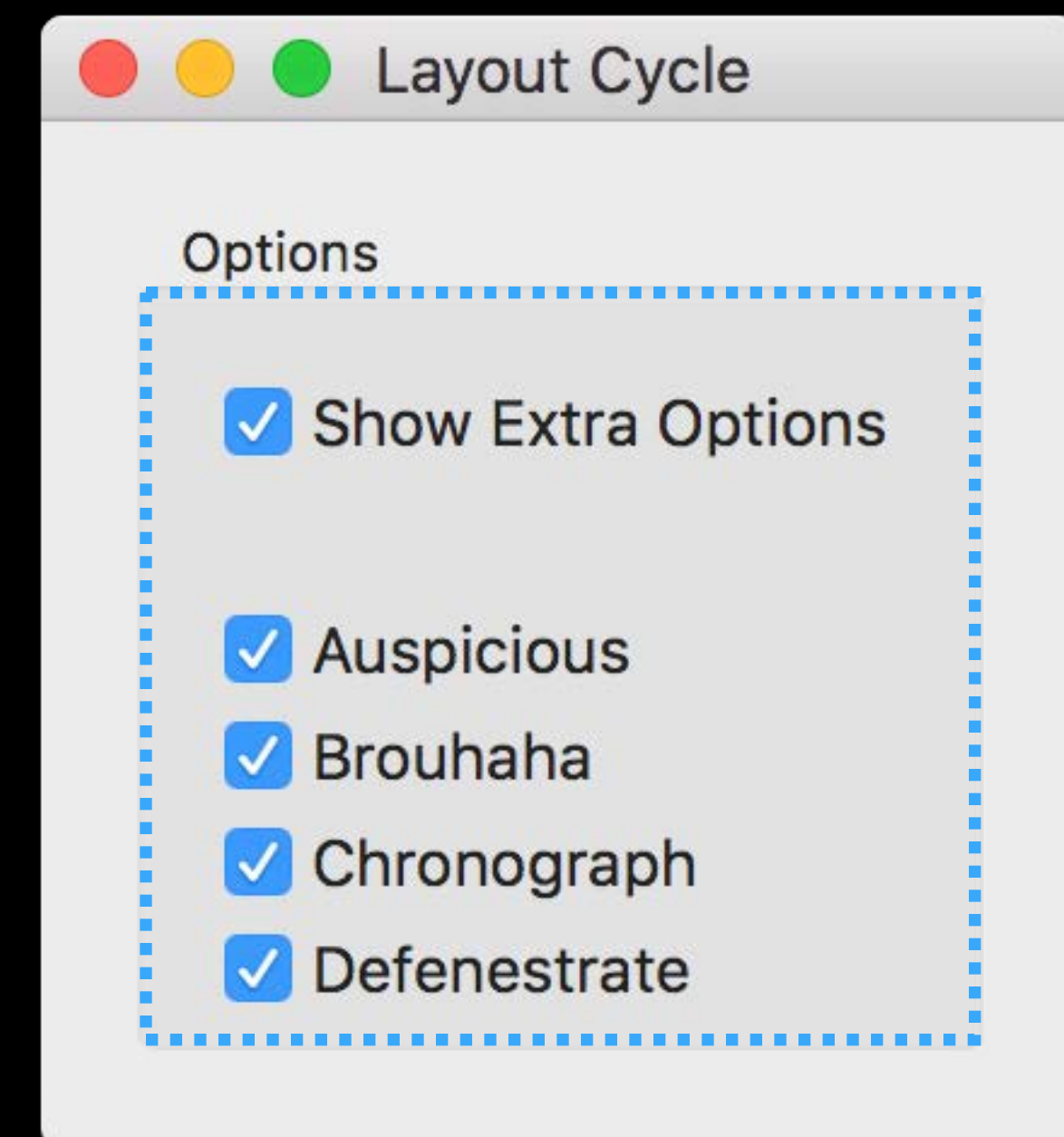
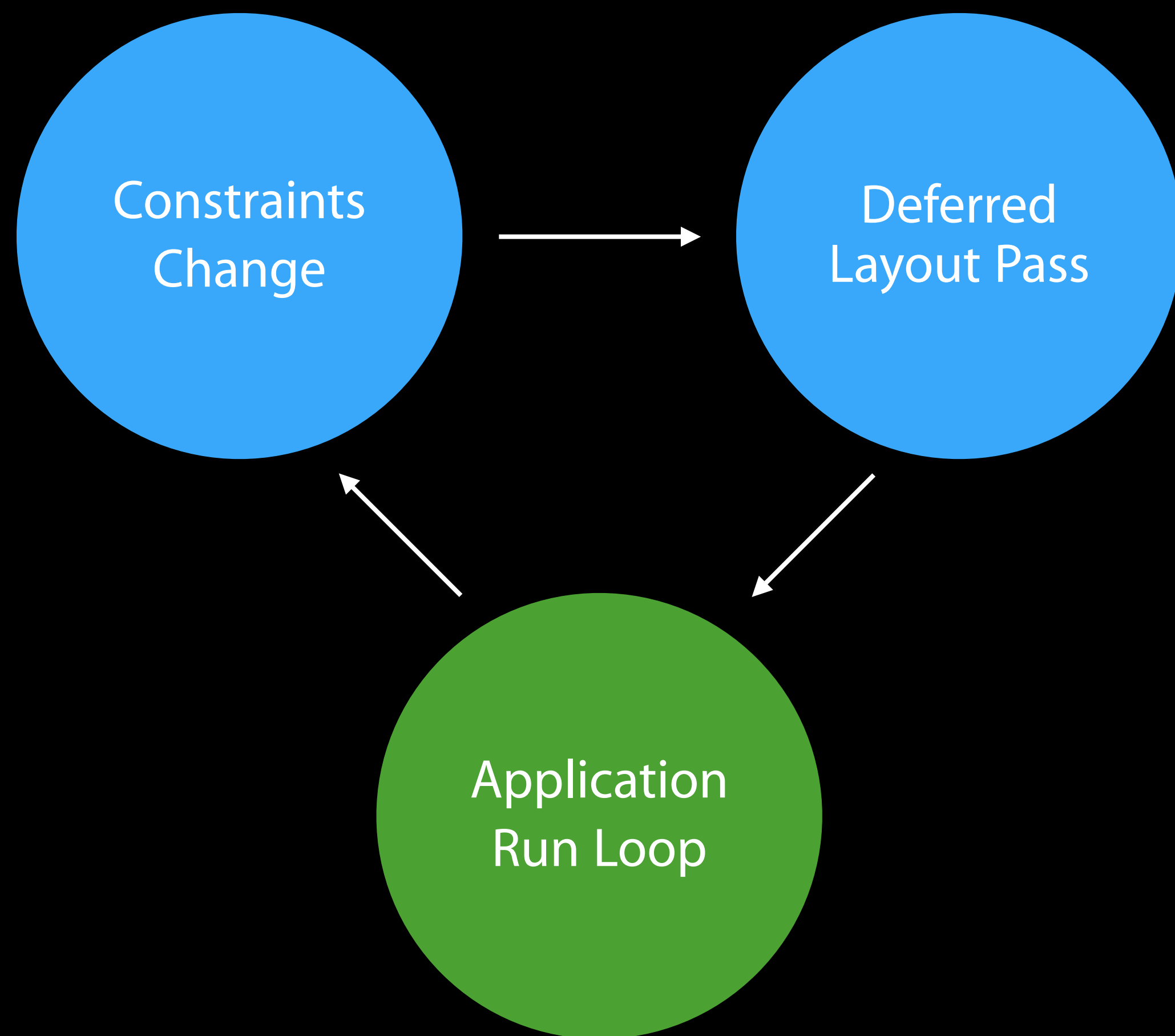
# The Layout Cycle



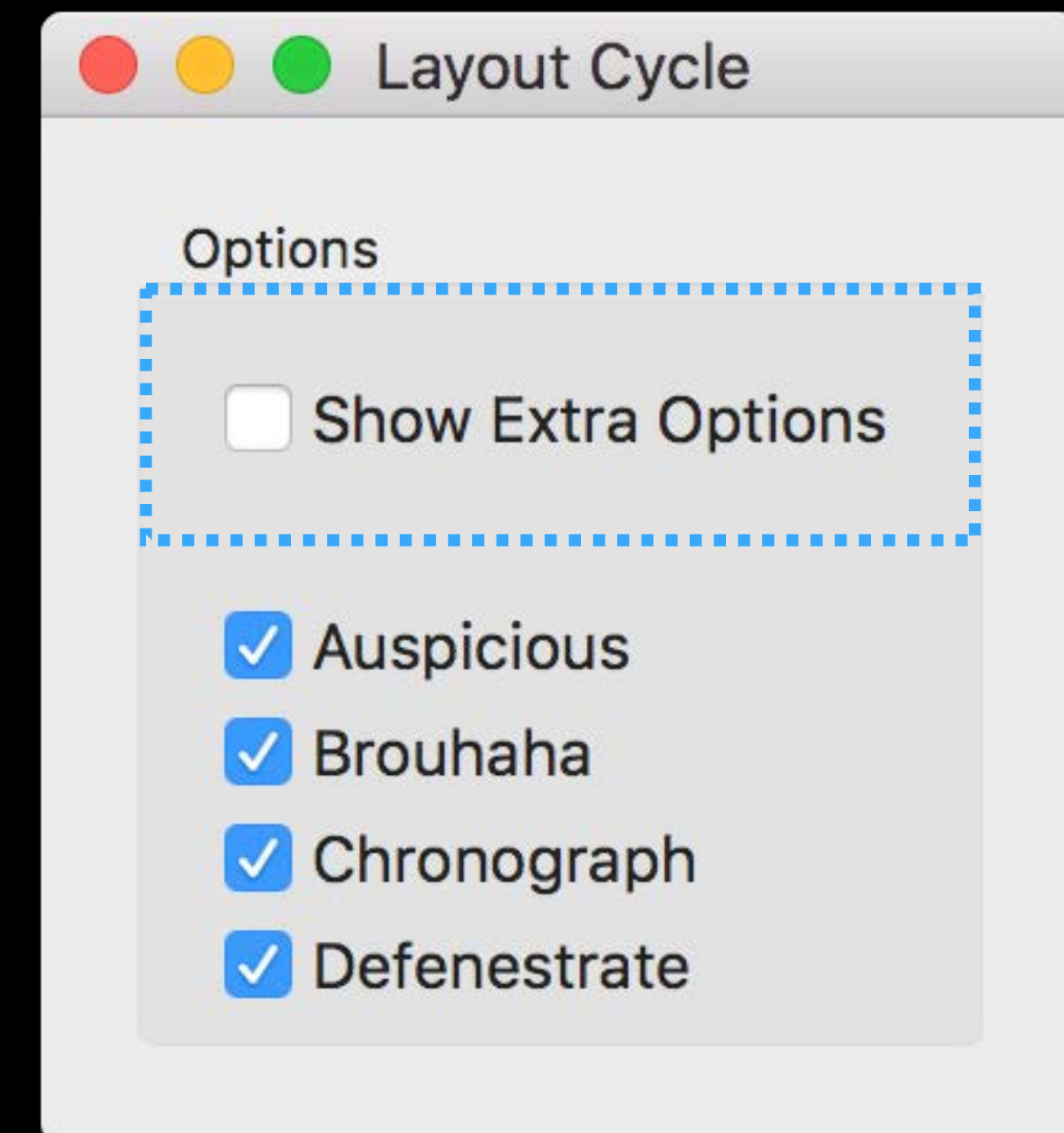
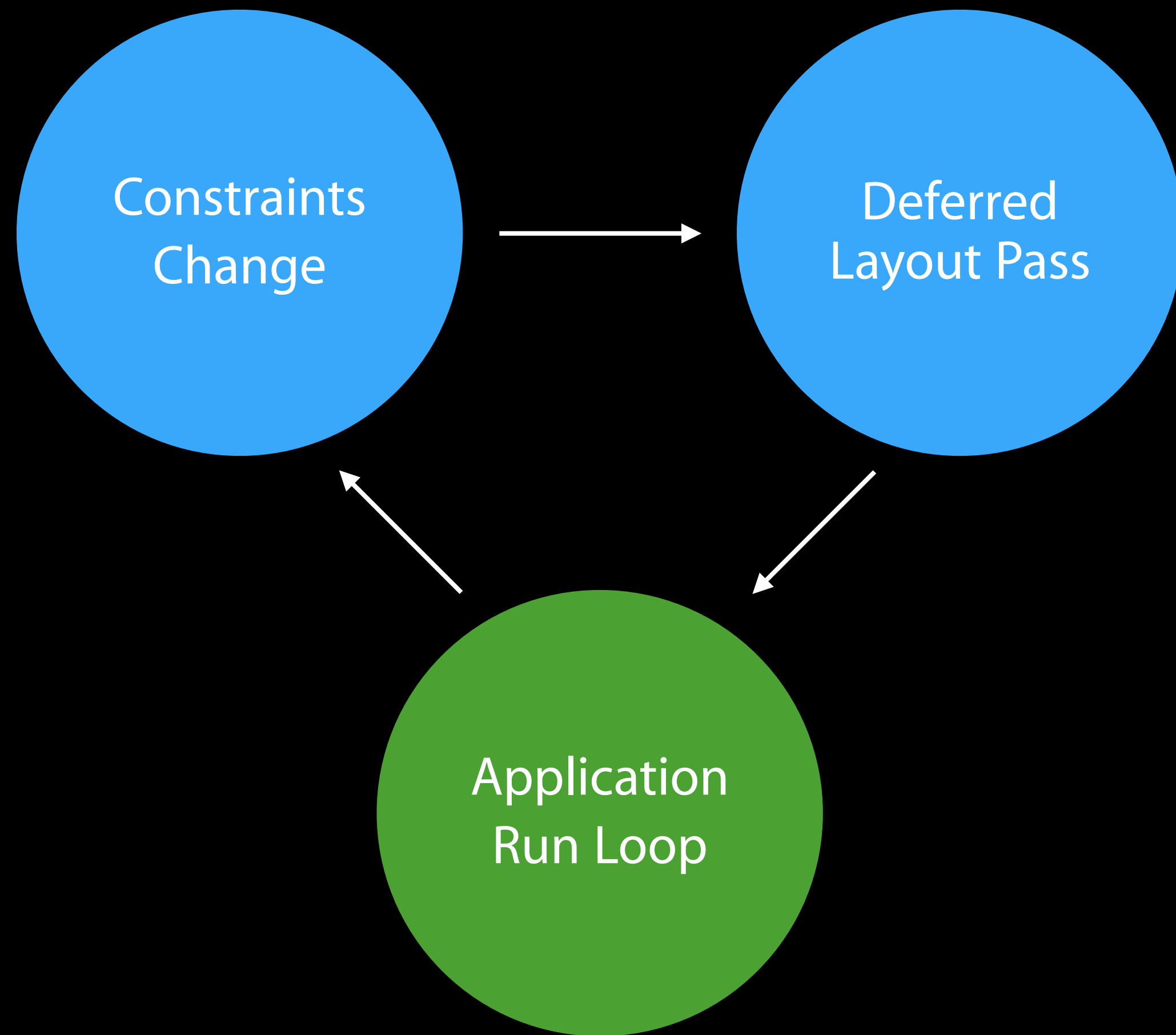
# The Layout Cycle



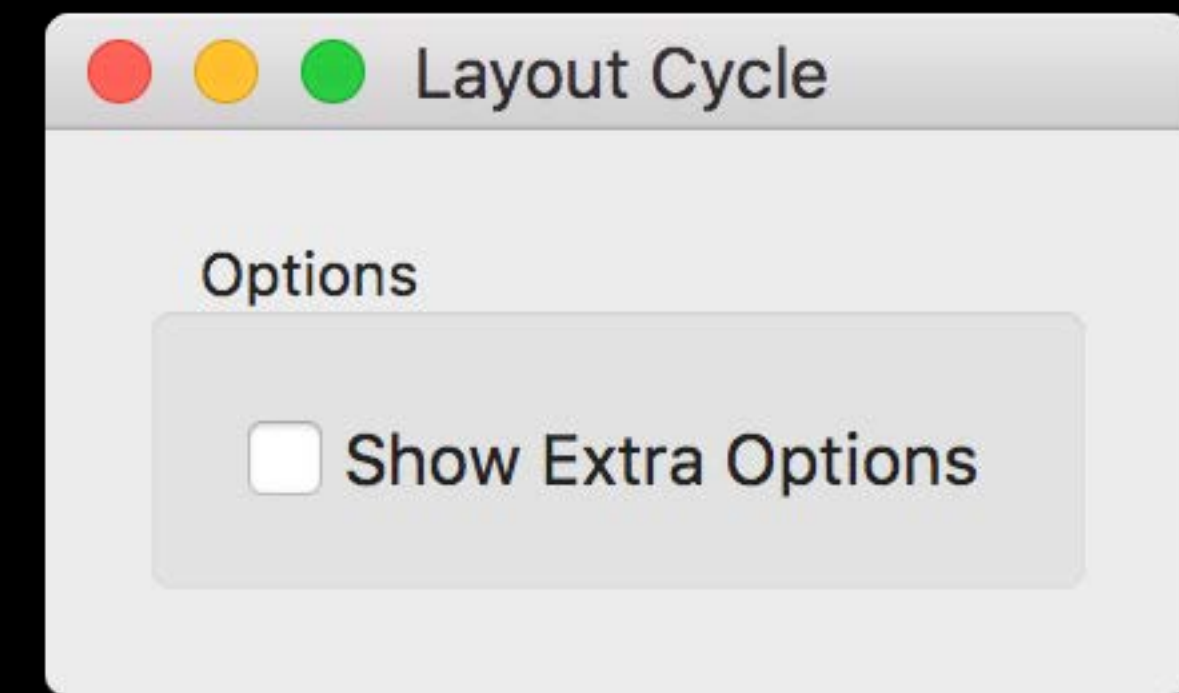
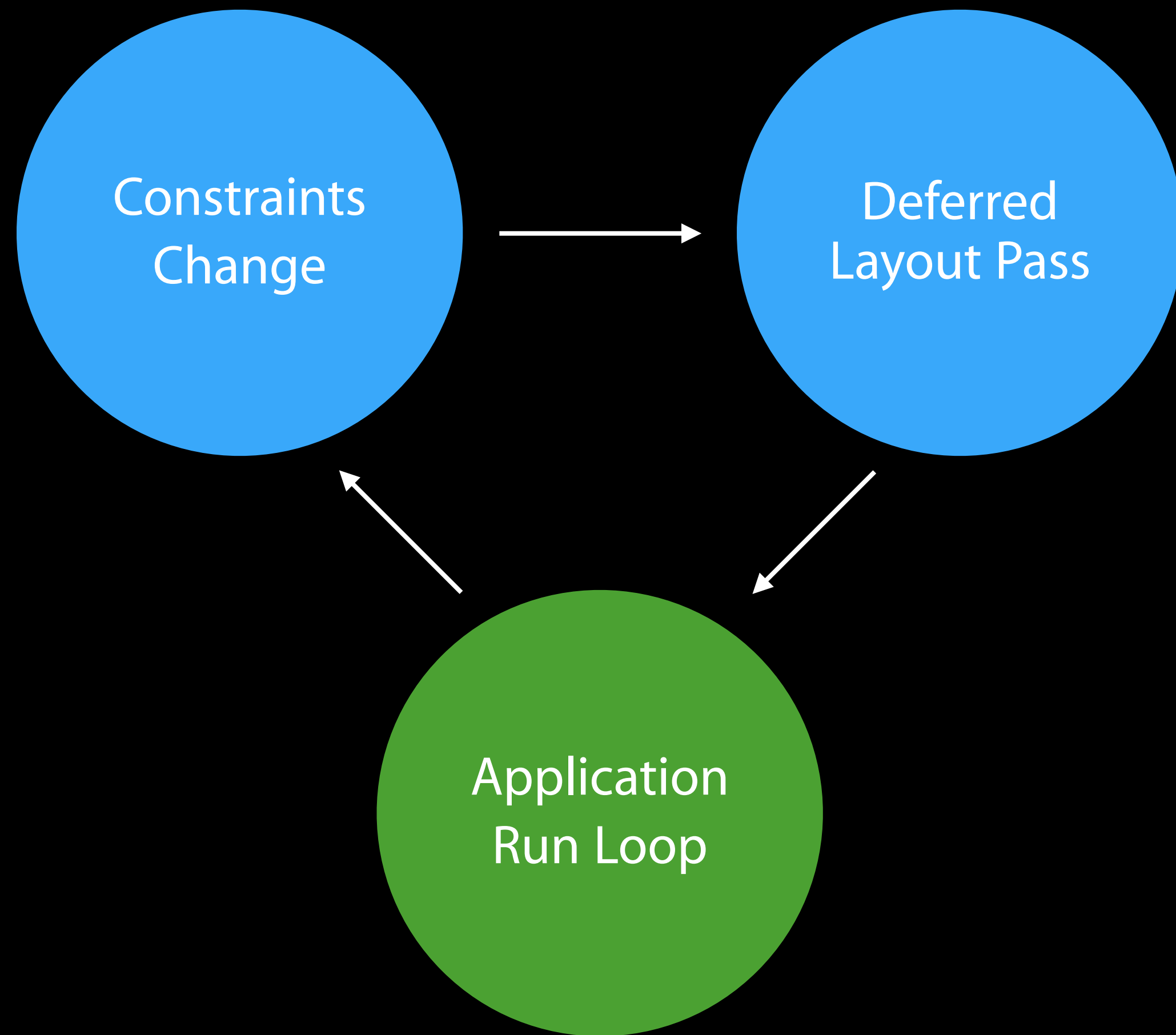
# The Layout Cycle



# The Layout Cycle



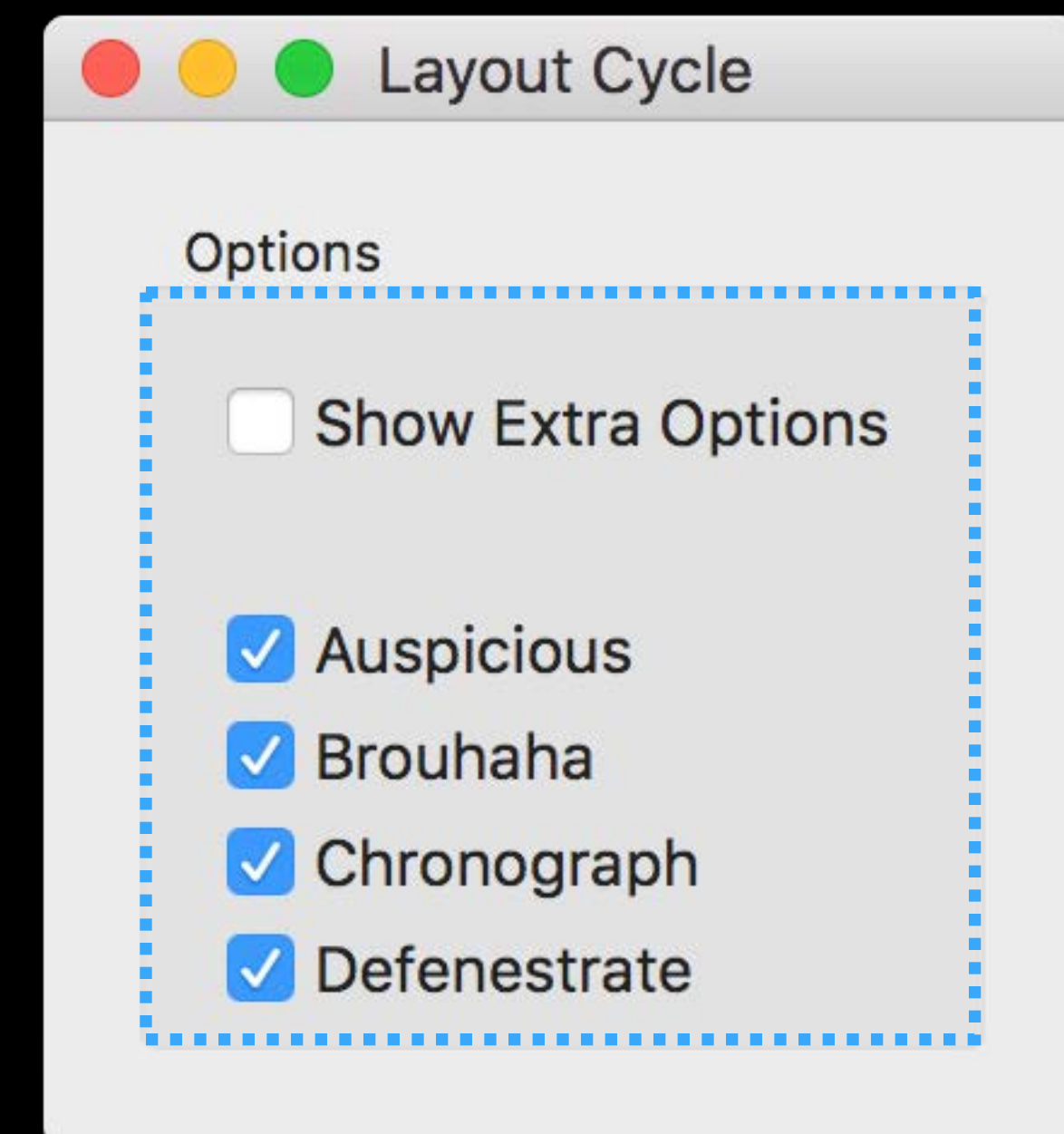
# The Layout Cycle



# Constraint Changes

Changes to constraint expressions

- Activating or deactivating
- Setting the constant or priority
- Adding or removing views



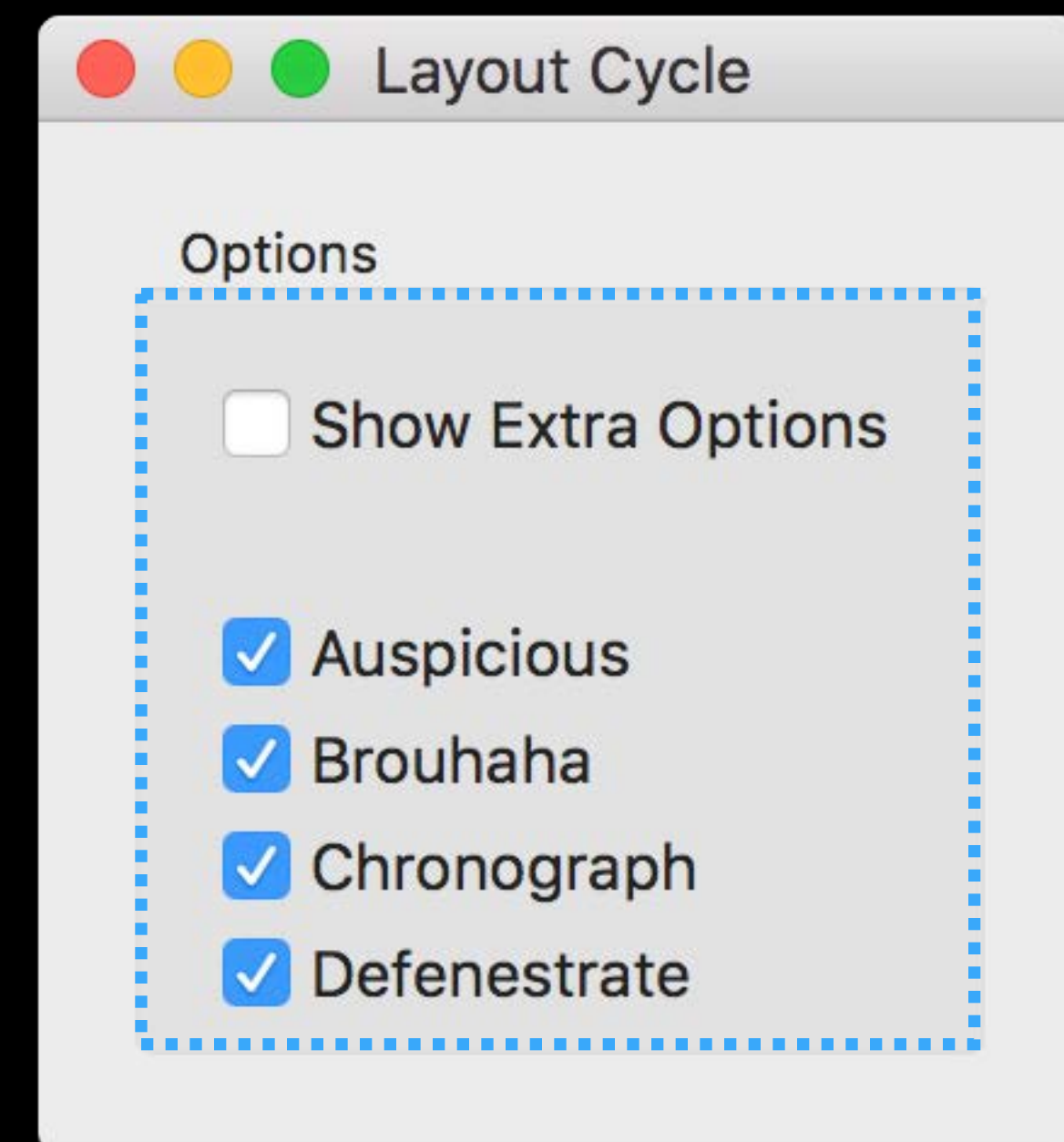
# Constraint Changes

Changes to constraint expressions

- Activating or deactivating
- Setting the constant or priority
- Adding or removing views

Engine recomputes the layout

- Engine variables receive new values
- Views call **superview.setNeedsLayout()**





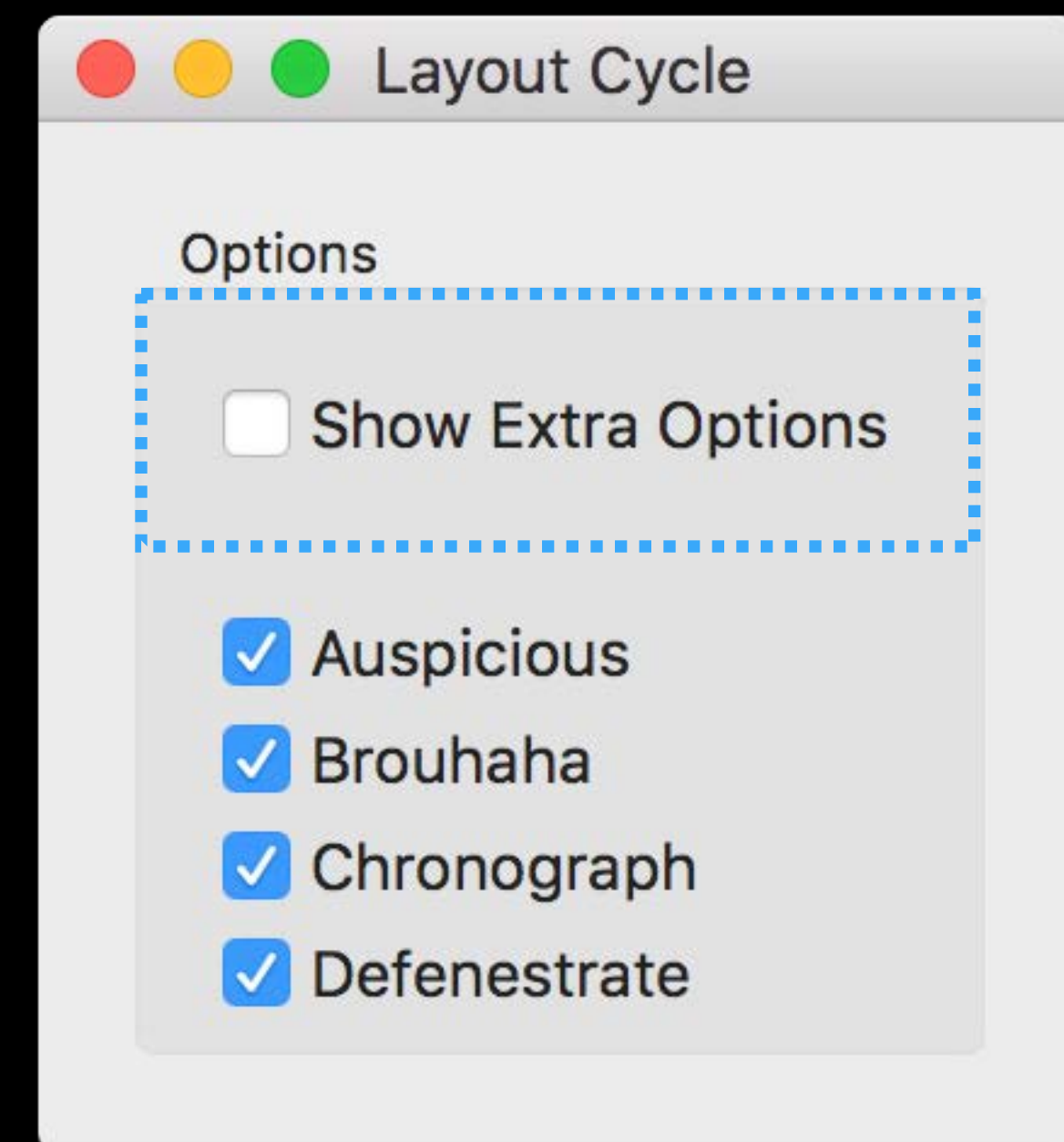
# Constraint Changes

Changes to constraint expressions

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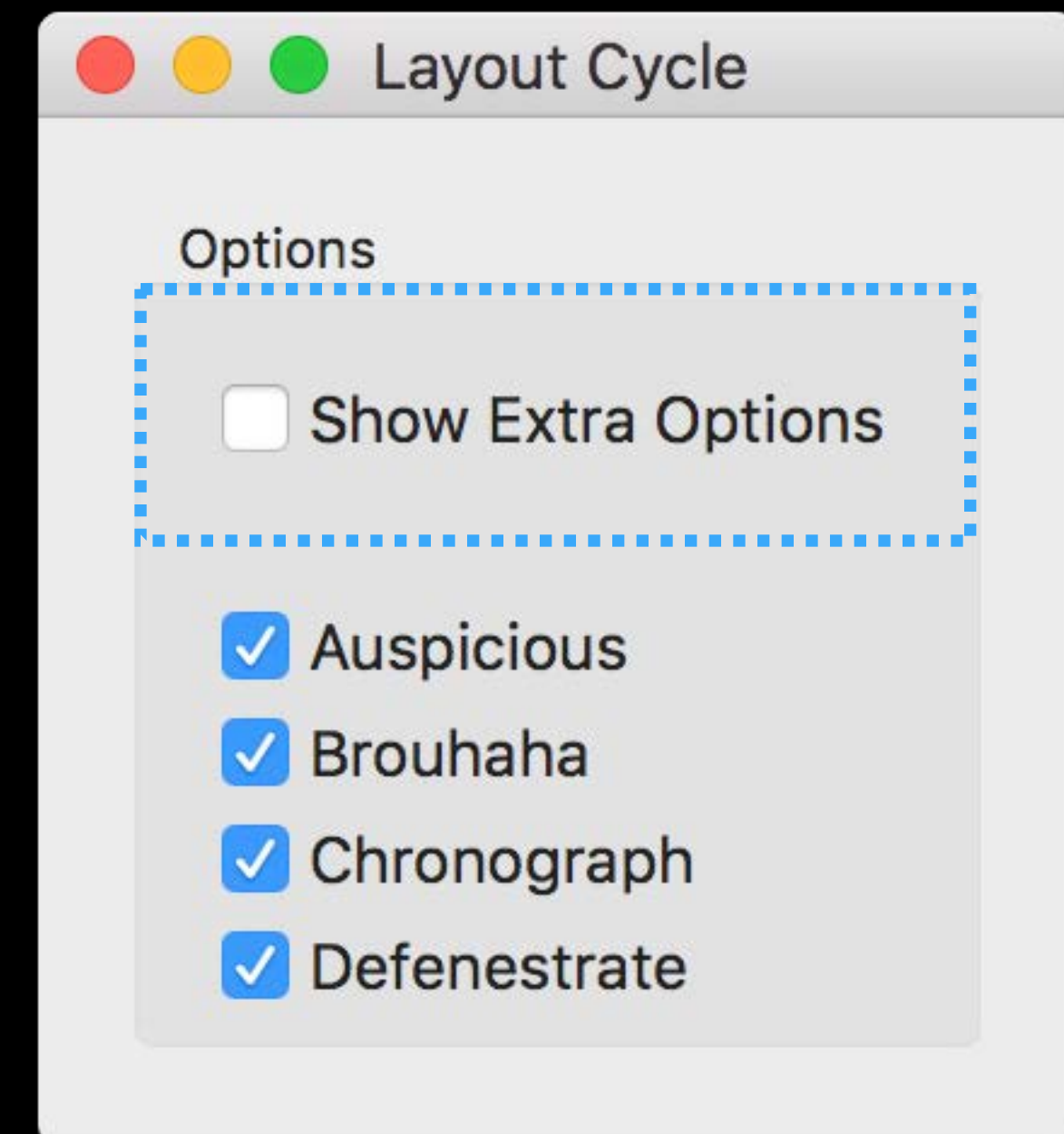
- Engine variables receive new values
- Views call **superview.setNeedsLayout()**





# Deferred Layout Pass

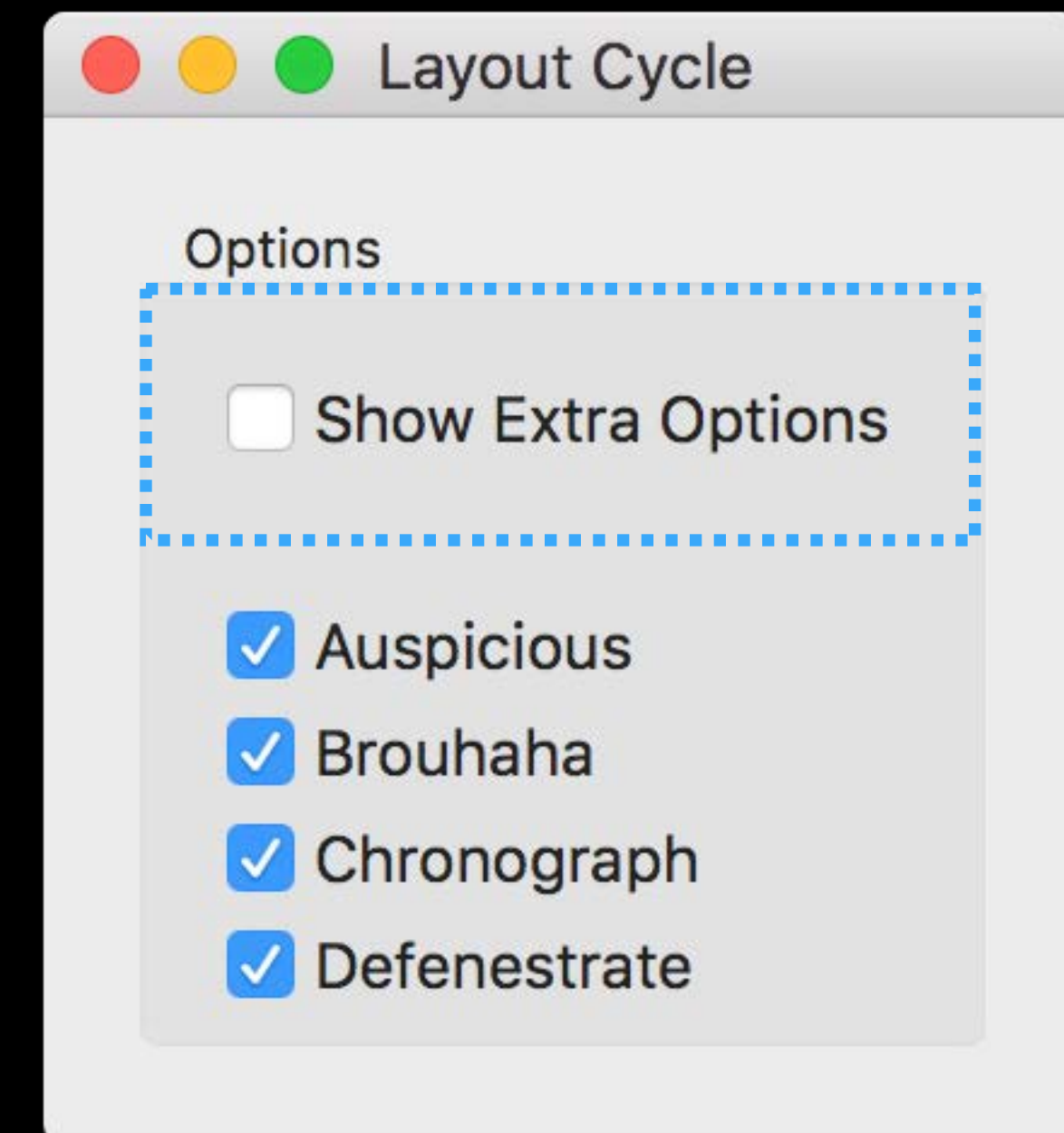
Reposition misplaced views



# Deferred Layout Pass

Reposition misplaced views

Two passes through the view hierarchy

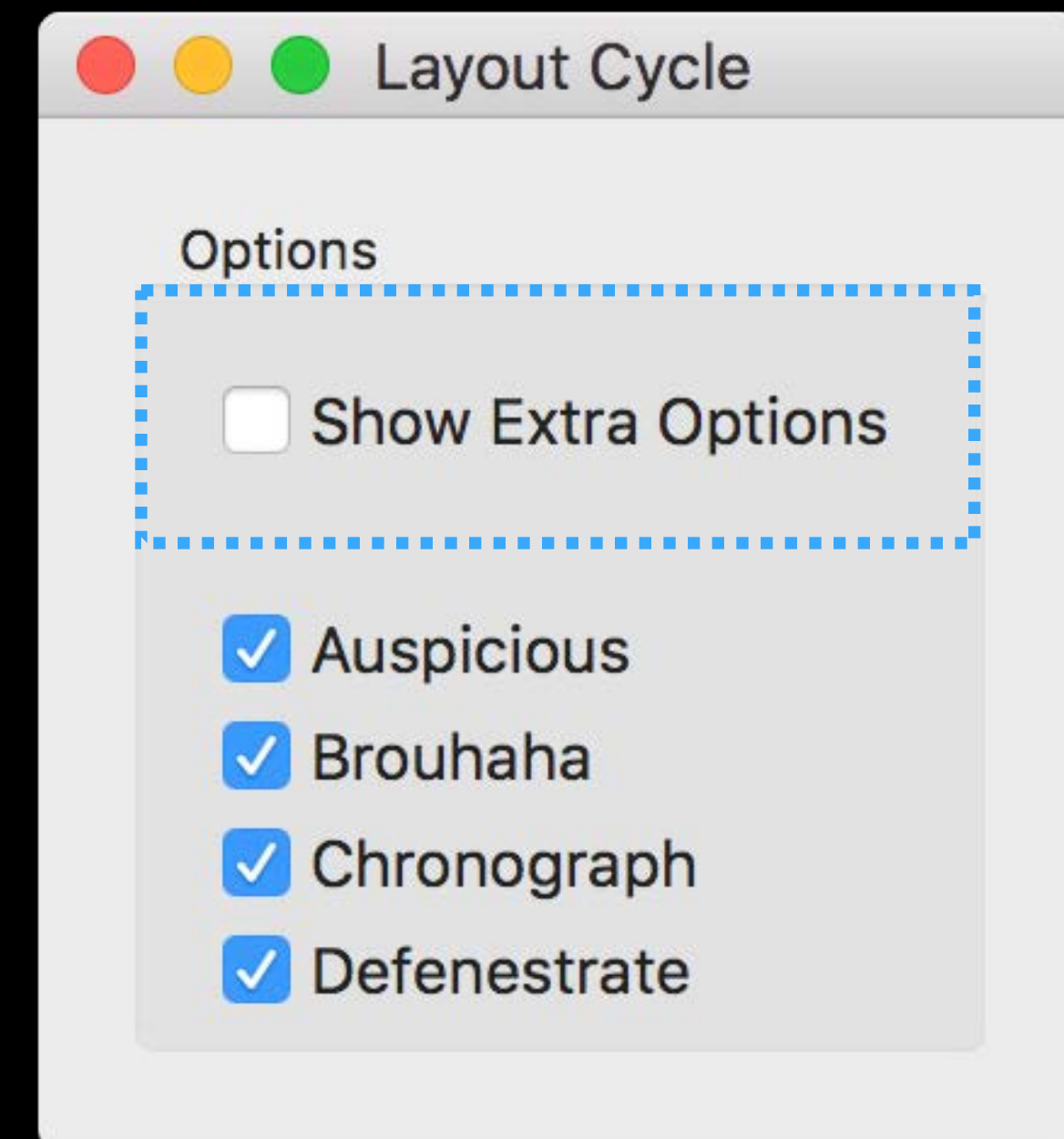


# Deferred Layout Pass

Reposition misplaced views

Two passes through the view hierarchy

- Update constraints

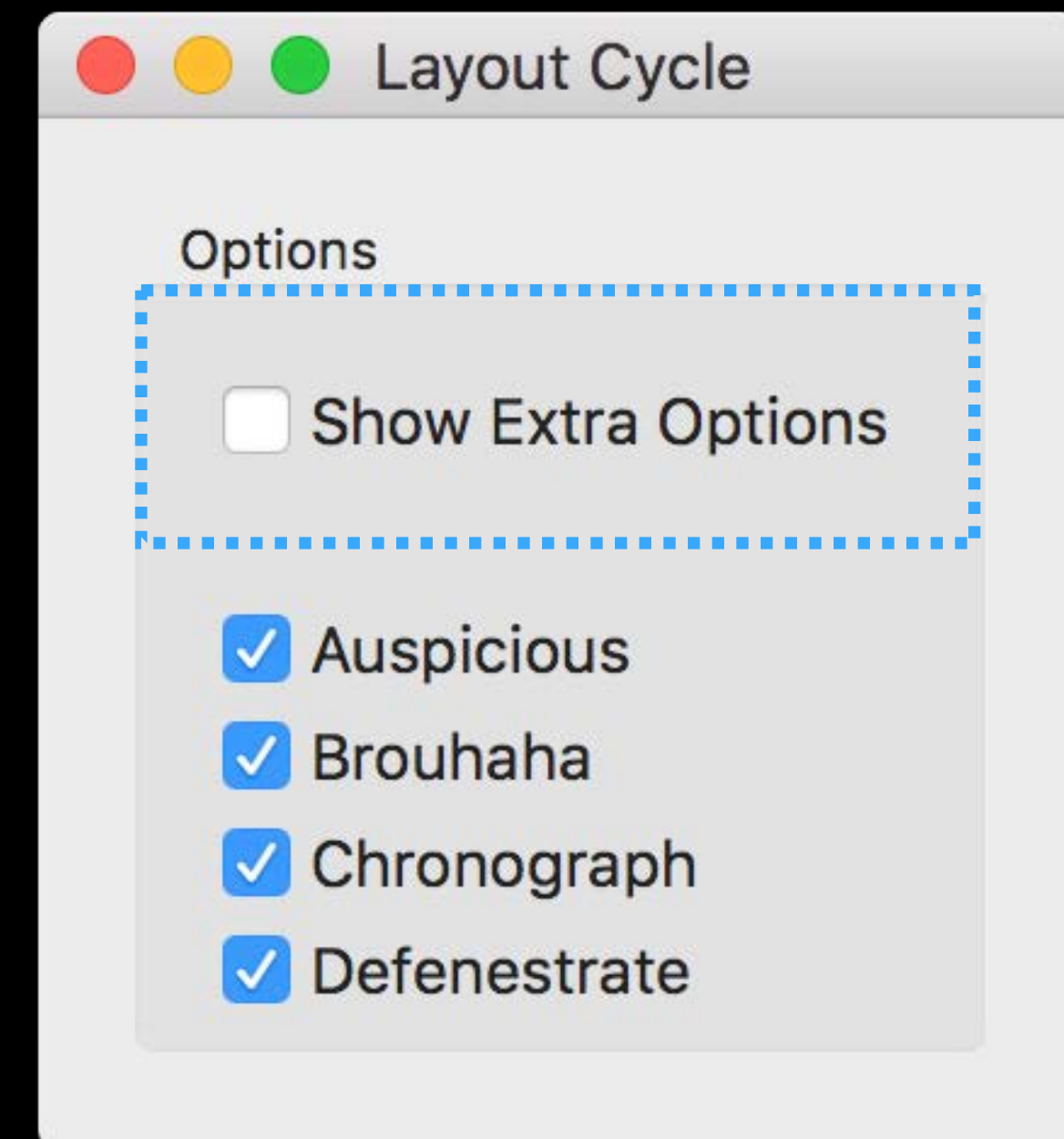


# Deferred Layout Pass

Reposition misplaced views

Two passes through the view hierarchy

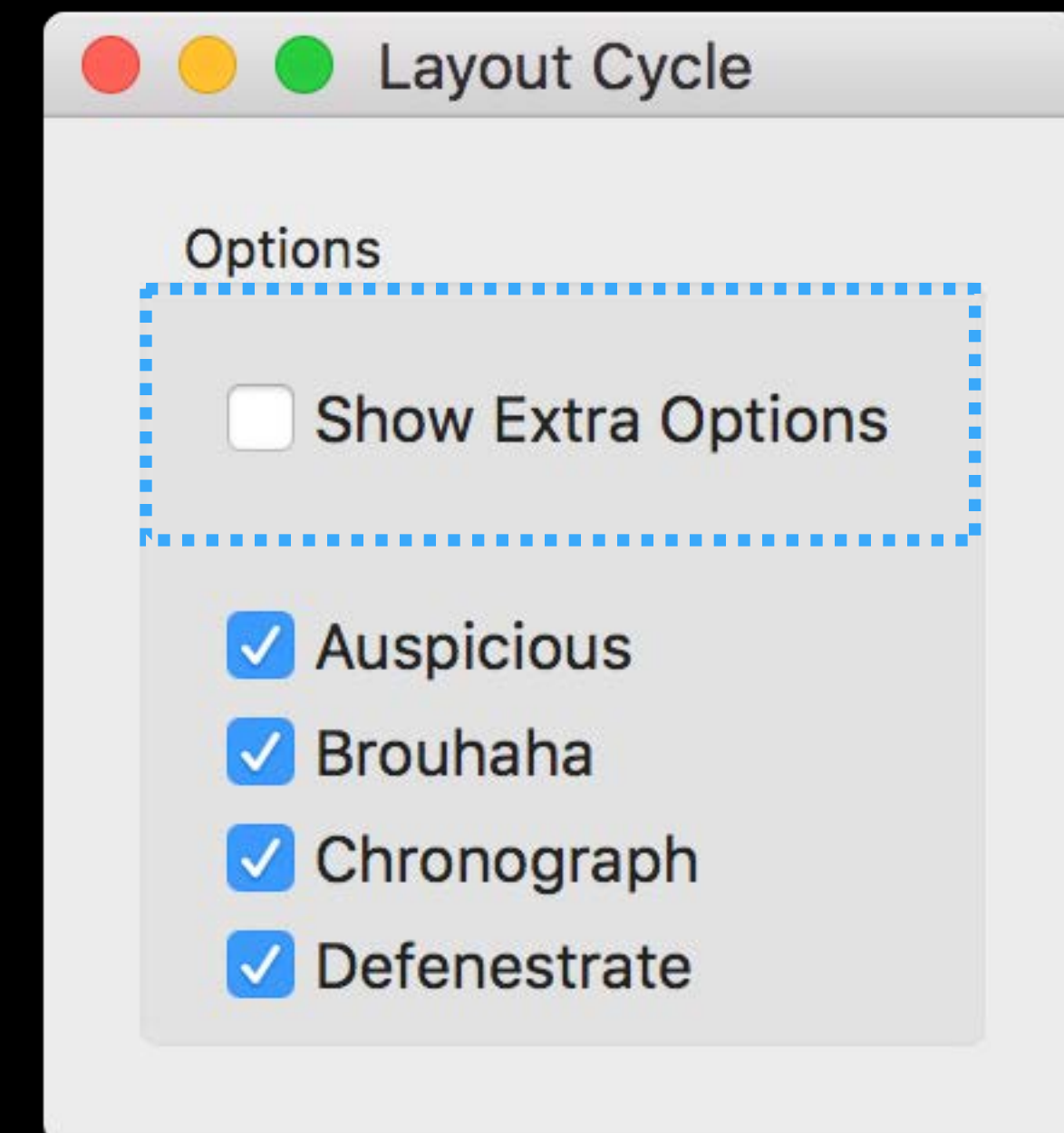
- Update constraints
- Reassign view frames



# Deferred Layout Pass

updateConstraints

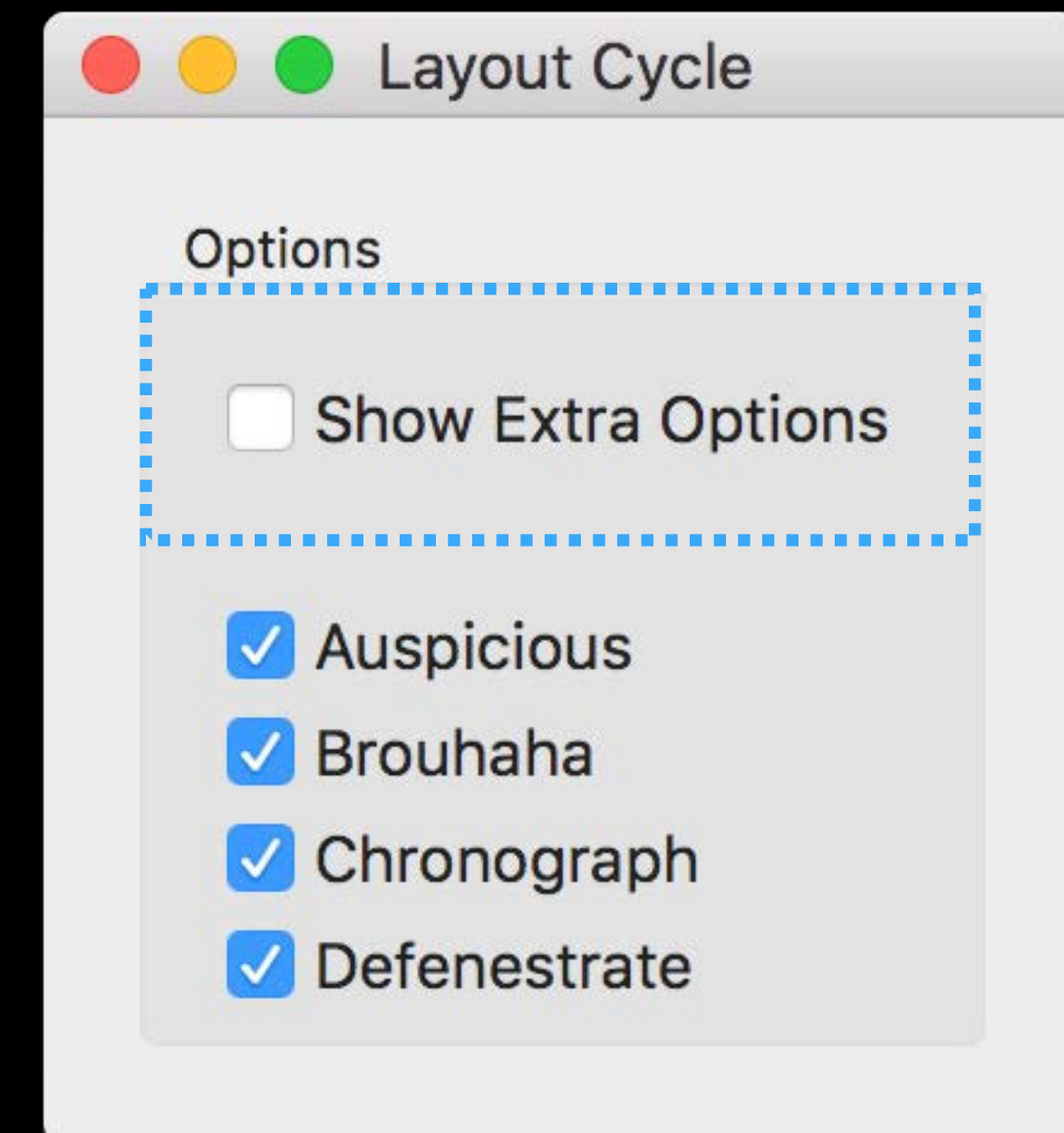
Request via `setNeedsUpdateConstraints()`



# Deferred Layout Pass

updateConstraints

Request via `setNeedsUpdateConstraints()`





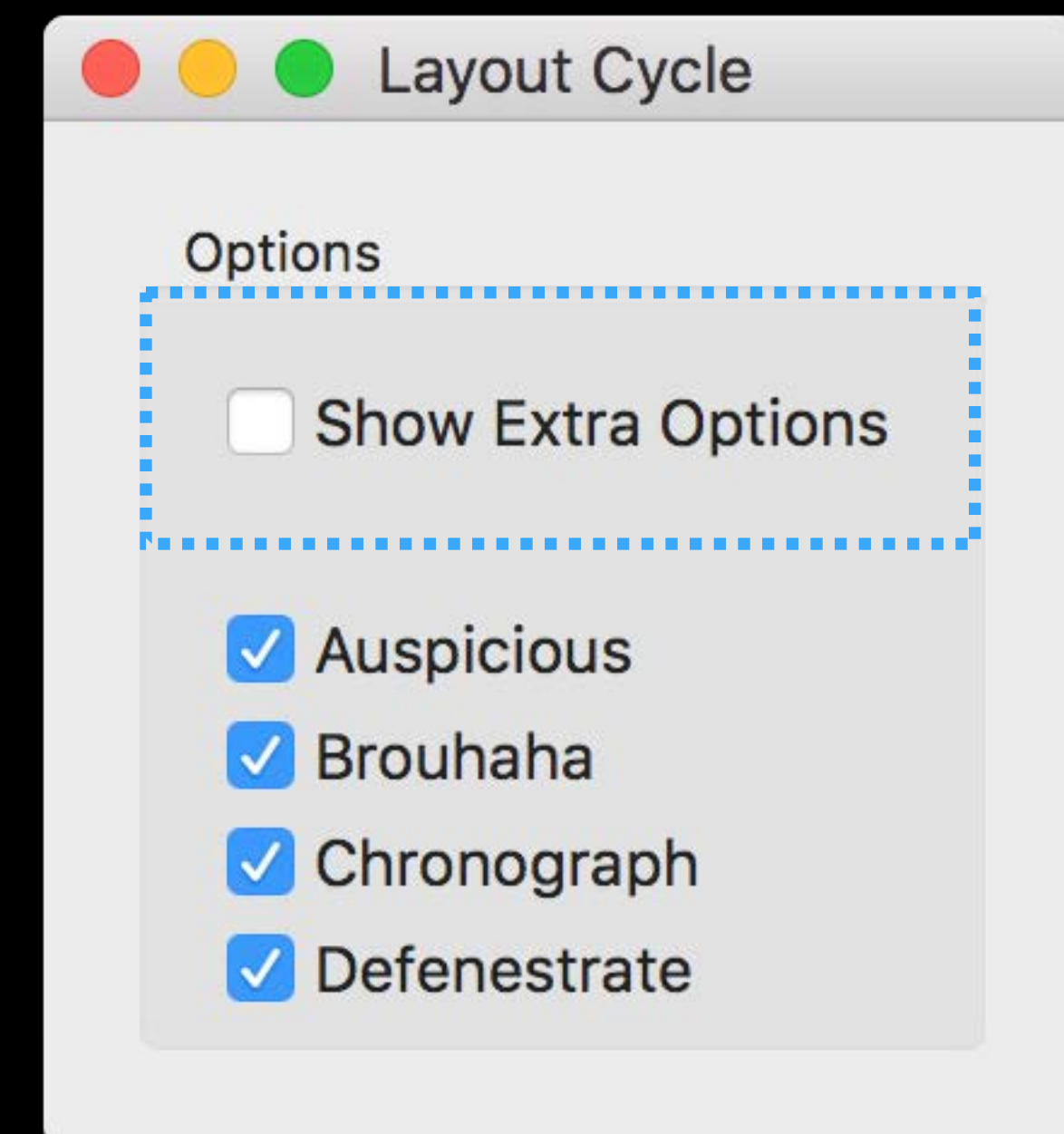
# Deferred Layout Pass

## updateConstraints

Request via `setNeedsUpdateConstraints()`

Often not needed

- Initial constraints in IB
- Separate logic is harder to follow



# Deferred Layout Pass

## updateConstraints

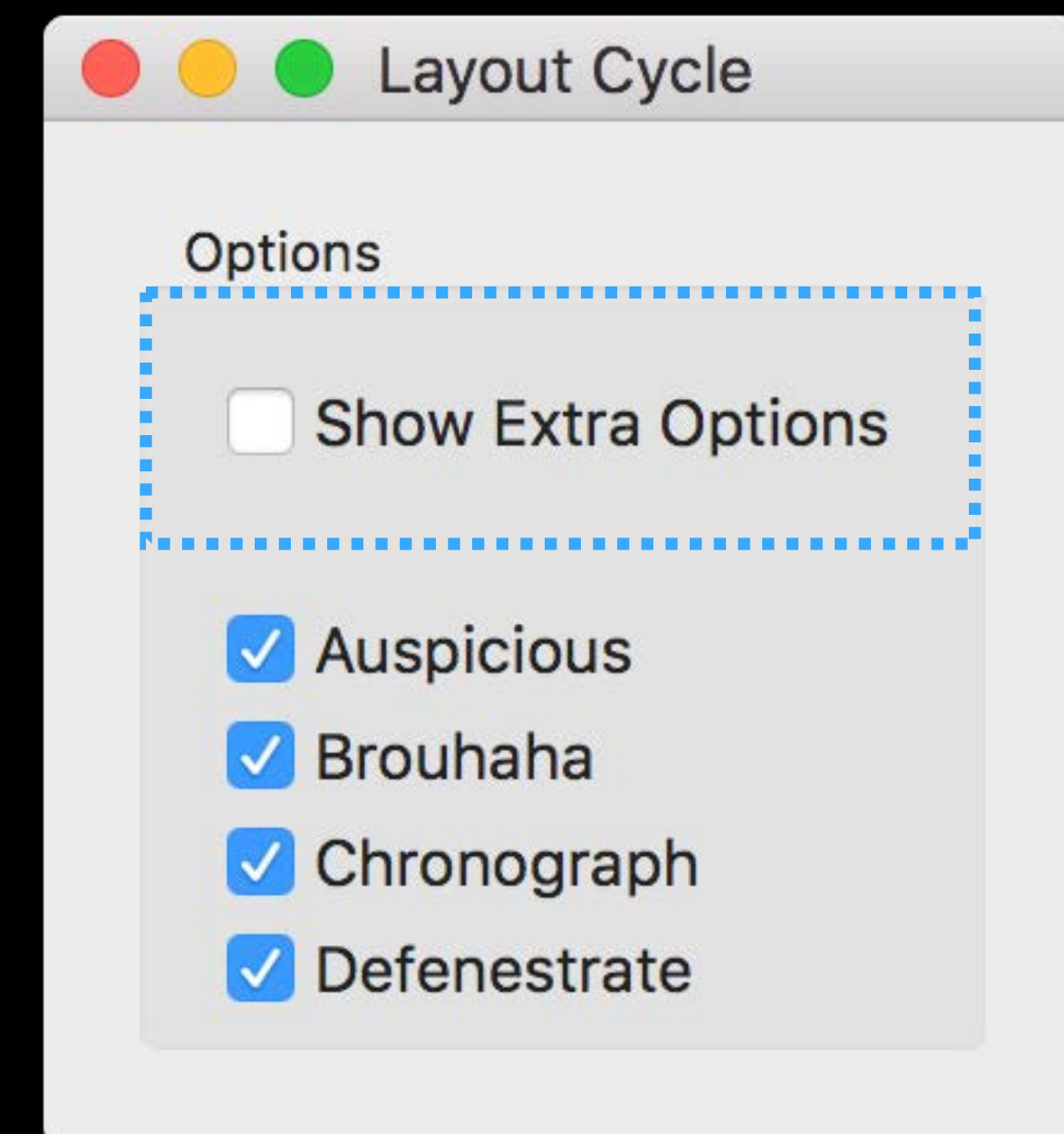
Request via `setNeedsUpdateConstraints()`

Often not needed

- Initial constraints in IB
- Separate logic is harder to follow

Implement it when

- Changing constraints in place is too slow
- A view is making redundant changes



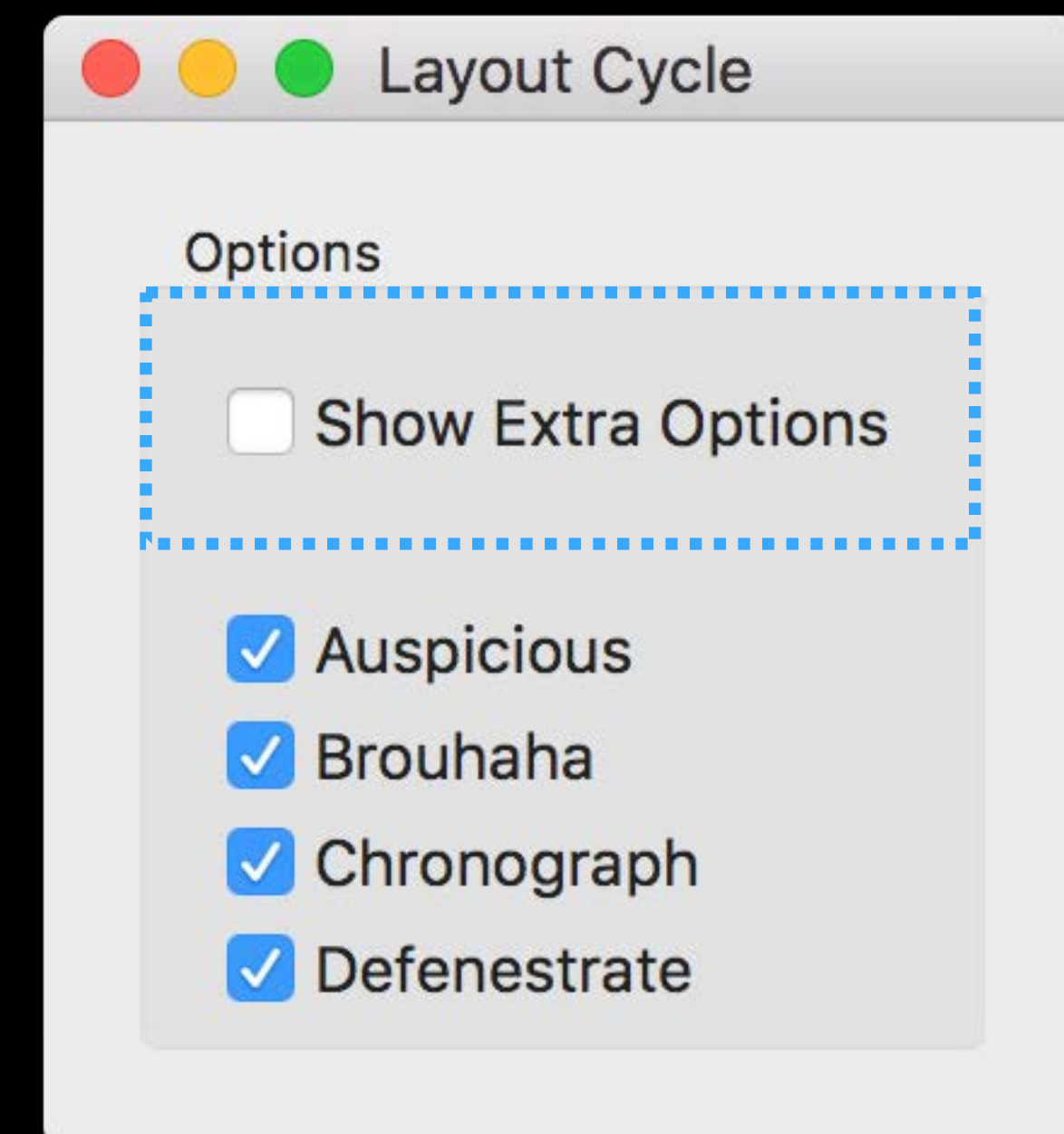


# Deferred Layout Pass

`layoutSubviews` aka `layout`

Traverse the view hierarchy, top-down

- Call `layoutSubviews()` (or `layout()` on OS X)

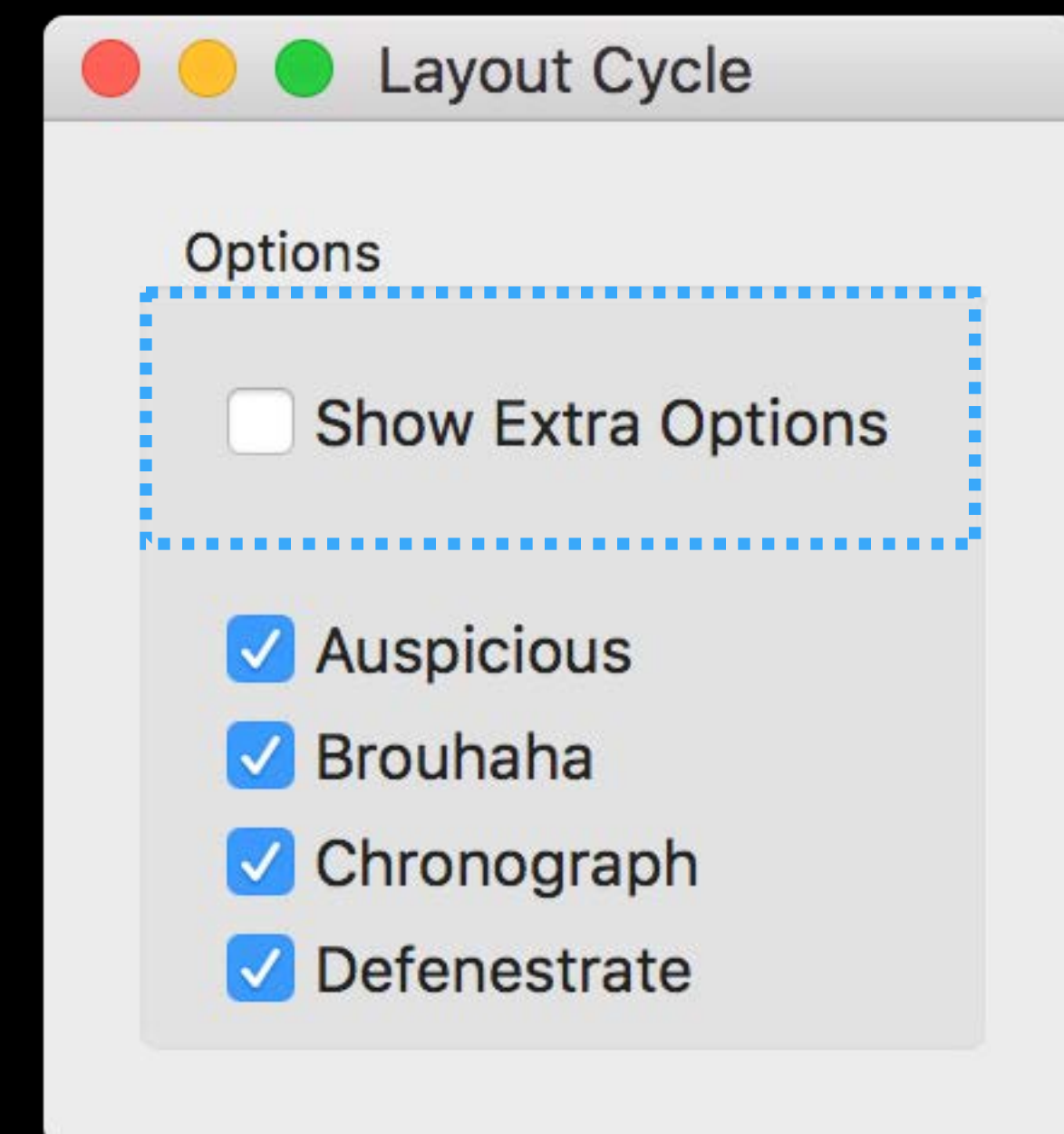


# Deferred Layout Pass

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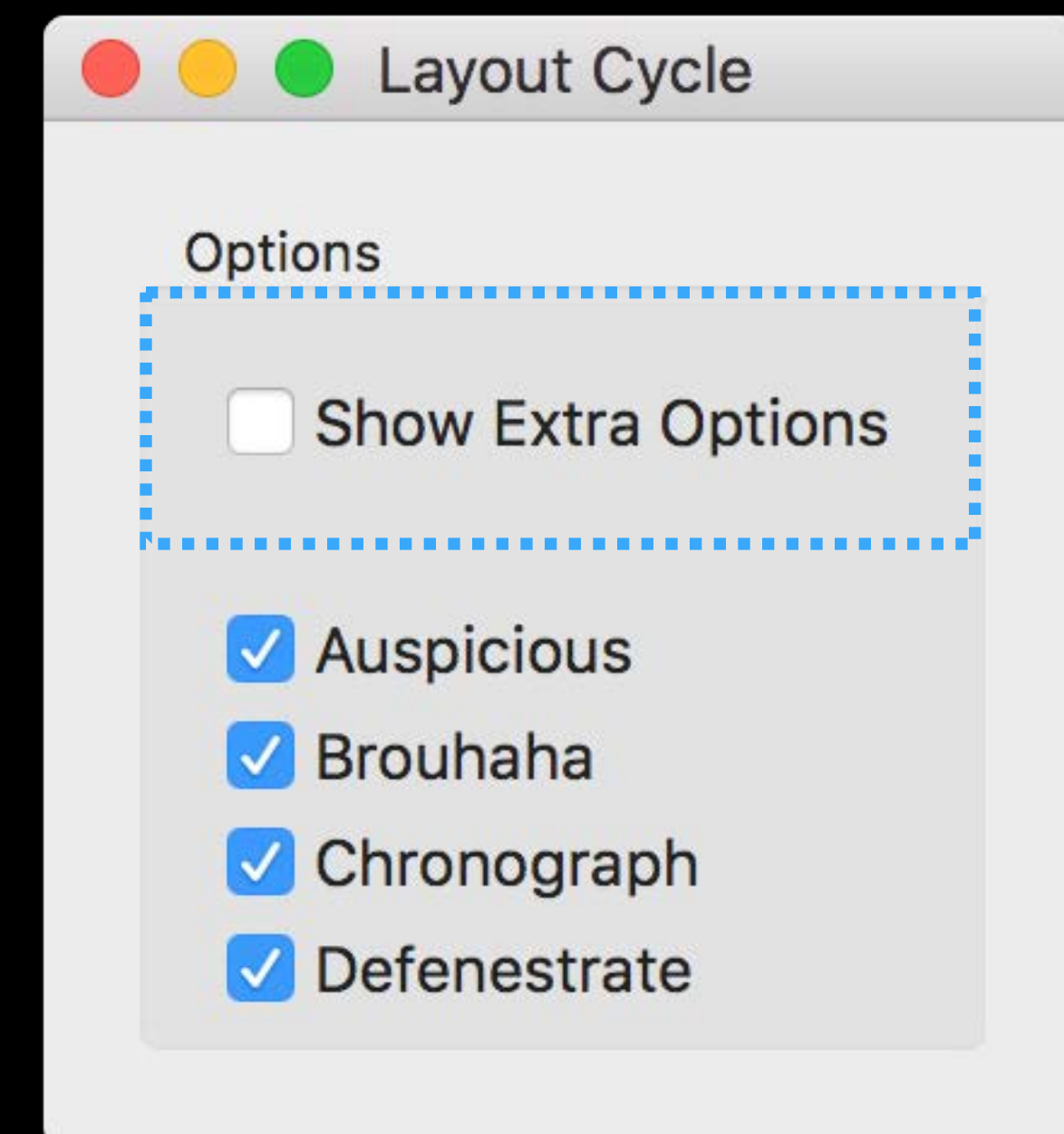
## layoutSubviews aka layout

Traverse the view hierarchy, top-down

- Call **layoutSubviews()** (or **layout()** on OS X)

Position the view's subviews

- Copy subview frames from the layout engine



# Deferred Layout Pass

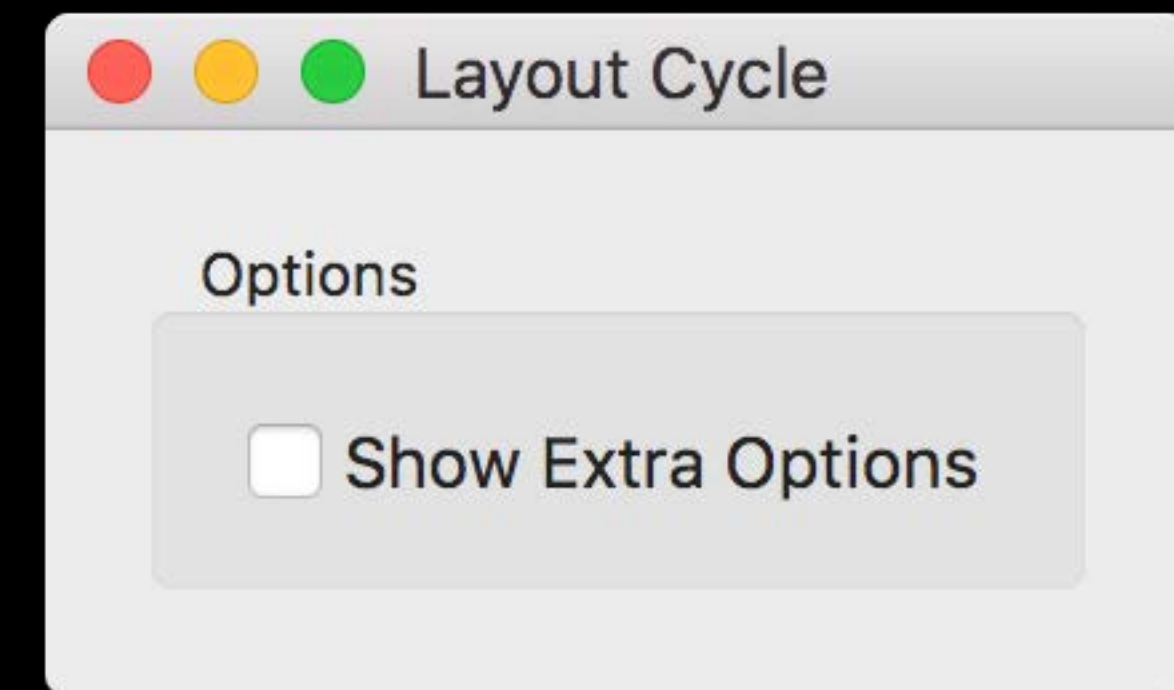
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# Deferred Layout Pass

`layoutSubviews` aka `layout`

Traverse the view hierarchy, top-down

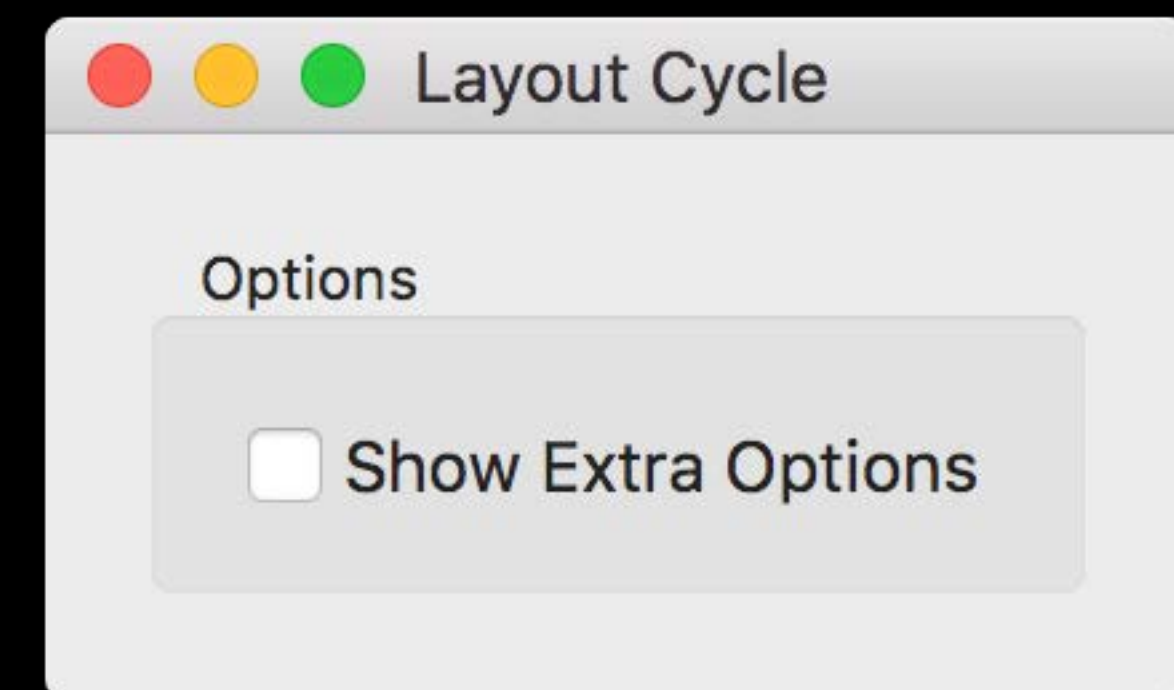
- Call `layoutSubviews()` (or `layout()` on OS X)

Position the view's subviews

- Copy subview frames from the layout engine

Override `layoutSubviews()` for custom layout

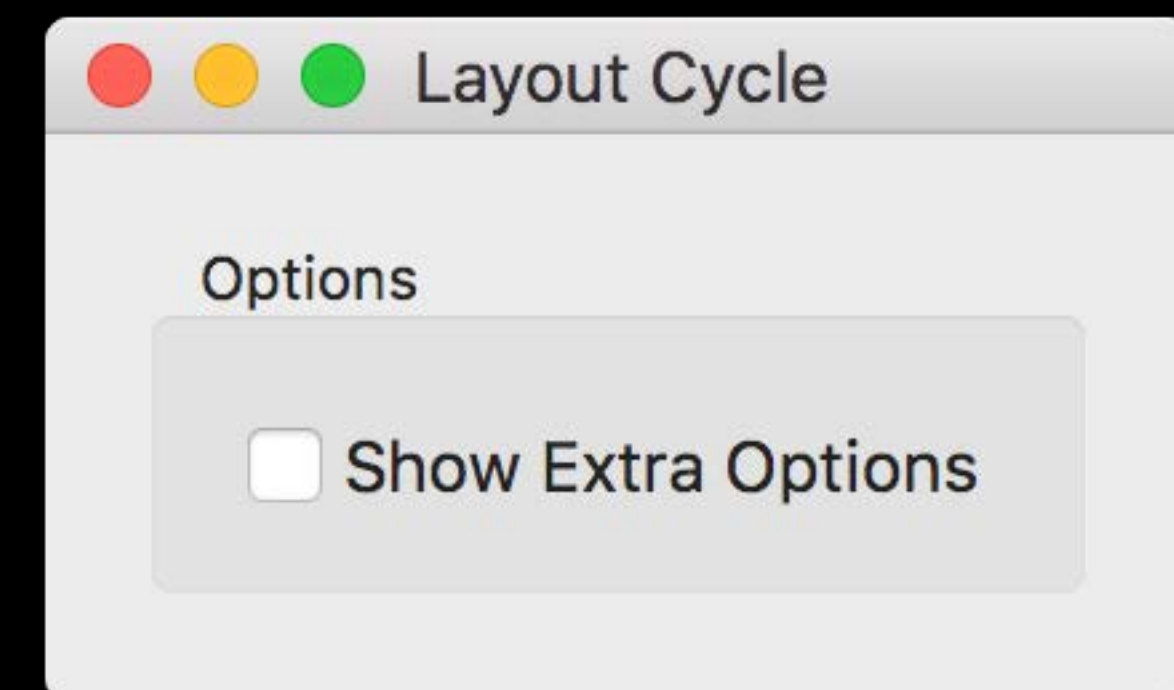
- ... but be careful!



# Deferred Layout Pass

## Overriding `layoutSubviews`

Override when constraints are insufficient

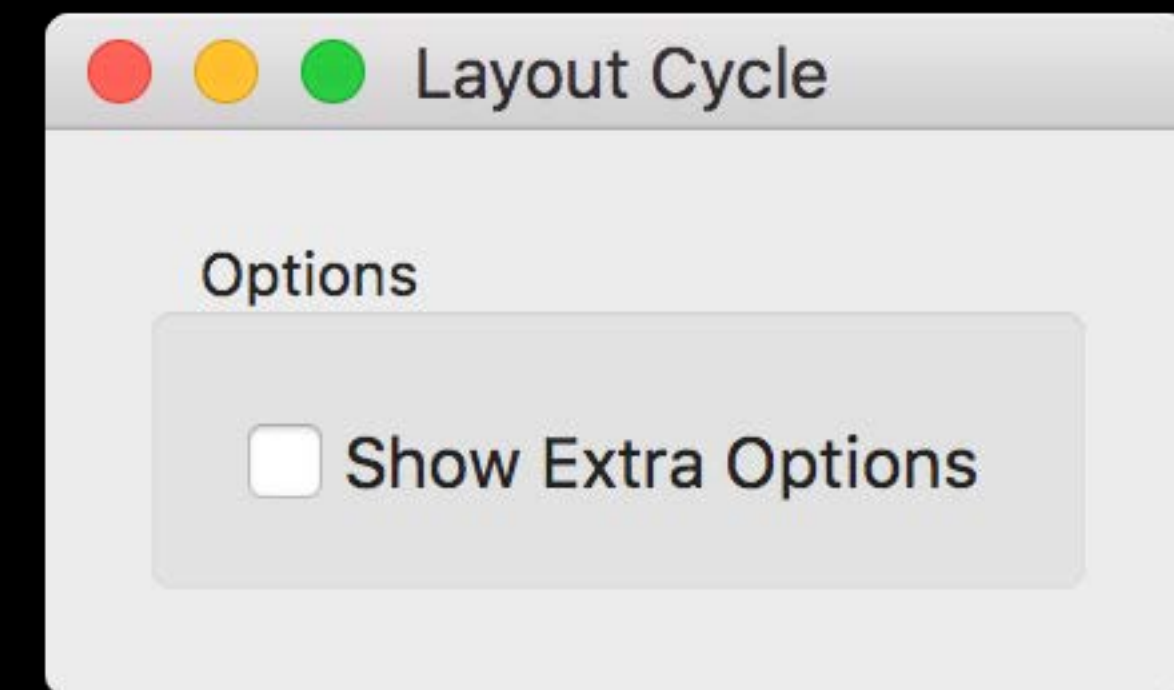


# Deferred Layout Pass

## Overriding `layoutSubviews`

Override when constraints are insufficient

Some views have already been laid out





# Deferred Layout Pass

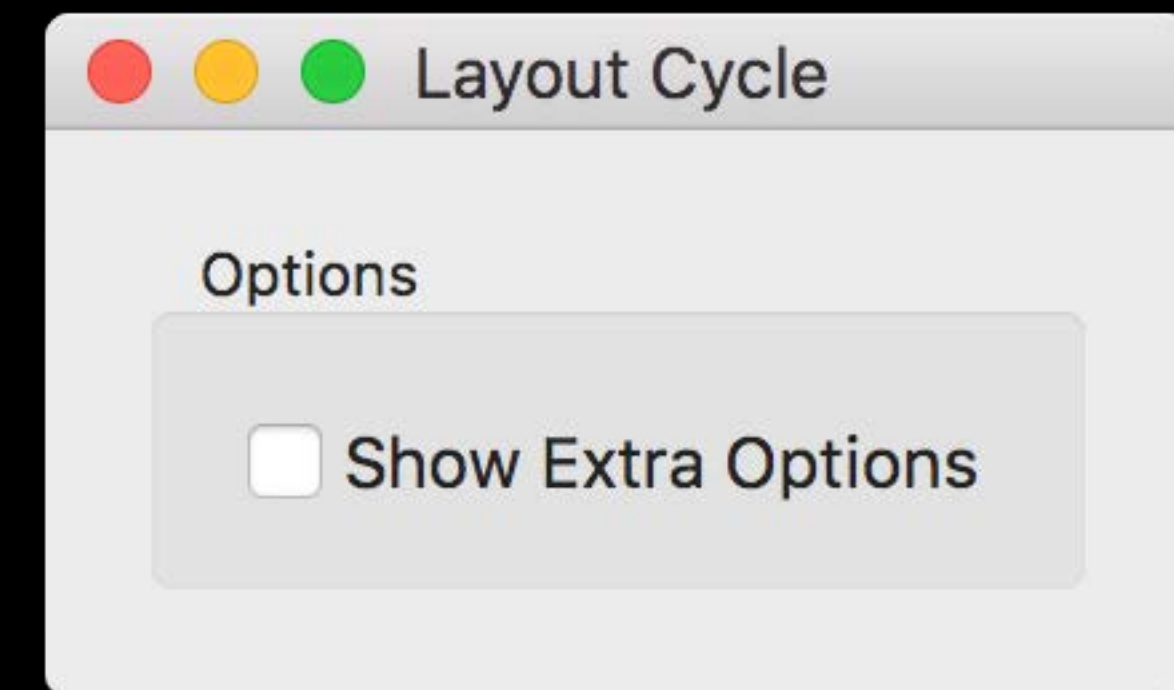
## Overriding `layoutSubviews`

Override when constraints are insufficient

Some views have already been laid out

DO

- Invoke **`super.layoutSubviews()`**
- Invalidate layout within your subtree





# Deferred Layout Pass

## Overriding `layoutSubviews`

Override when constraints are insufficient

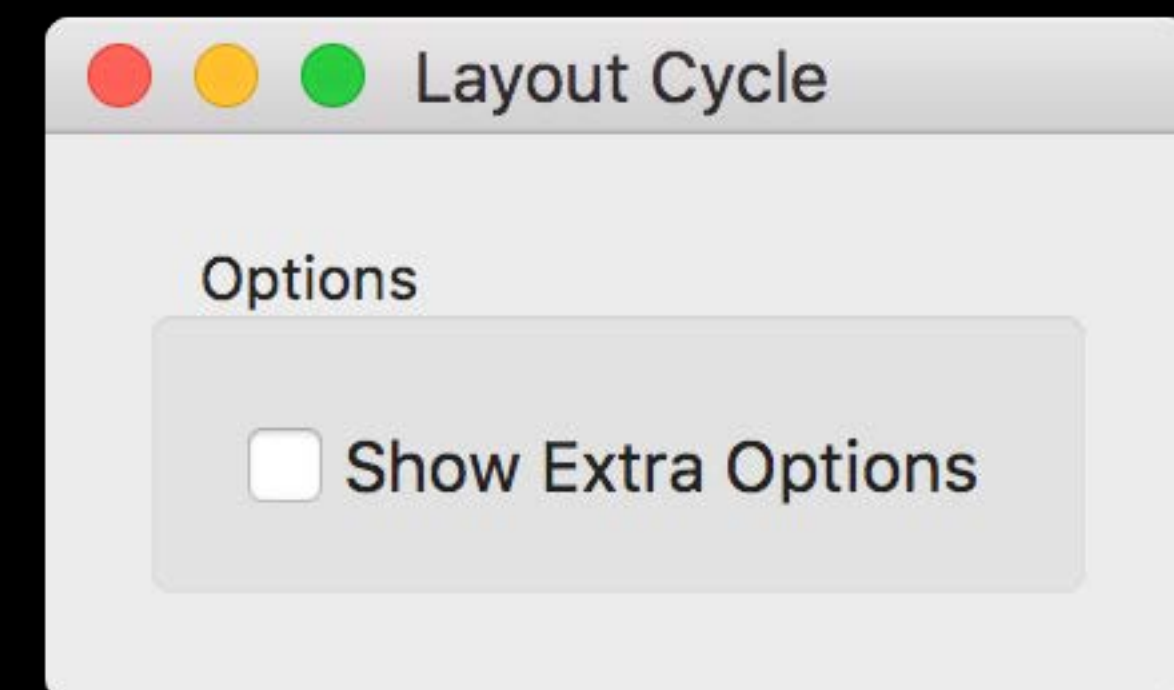
Some views have already been laid out

DO

- Invoke **`super.layoutSubviews()`**
- Invalidate layout within your subtree

DON'T

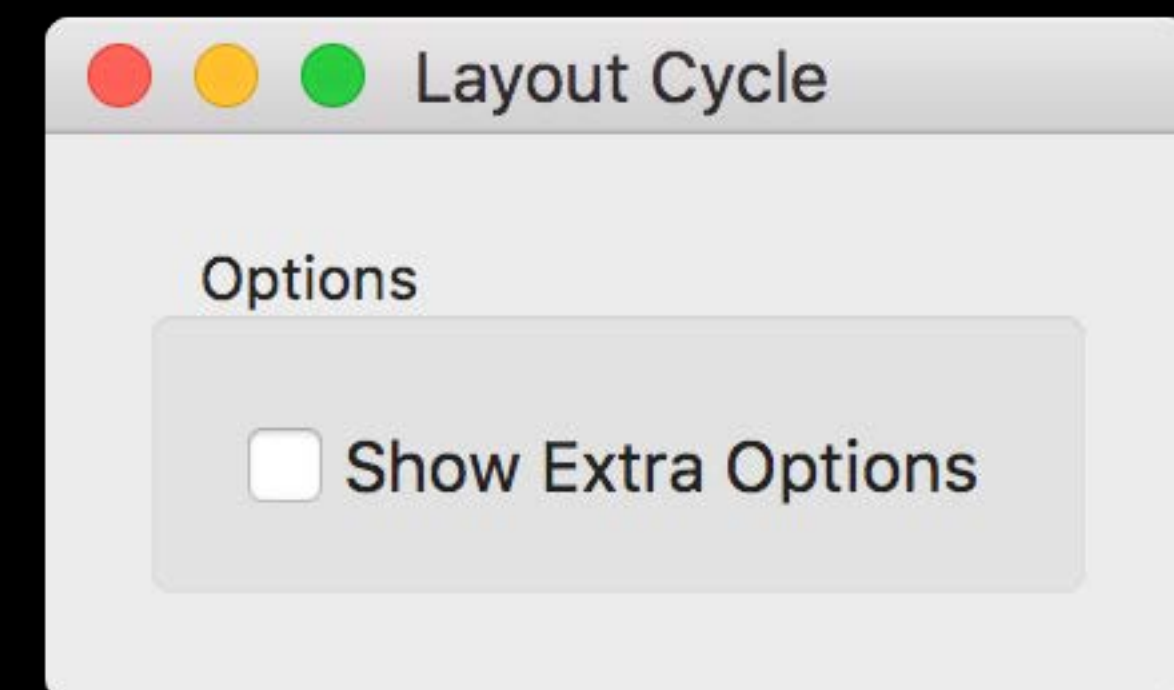
- Call **`setNeedsUpdateConstraints()`**
- Invalidate layout outside your subtree
- Modify constraints indiscriminately



# The Layout Cycle

Remember

- Don't expect frames to change immediately
- Proceed with caution when overriding `layoutSubviews()`



# Interacting with Legacy Layout

Mystery #8

# Interacting with Legacy Layout

Positioning by frame versus constraints

# Interacting with Legacy Layout

Positioning by frame versus constraints

Sometimes you need to set the frame

- e.g., if you're overriding `layoutSubviews()`

# Interacting with Legacy Layout

Positioning by frame versus constraints

Sometimes you need to set the frame

- e.g., if you're overriding `layoutSubviews()`

```
var translatesAutoresizingMaskIntoConstraints: Bool
```

# translatesAutoresizingMaskIntoConstraints

Setting the frame automatically generates constraints

# translatesAutoresizingMaskIntoConstraints

Setting the frame automatically generates constraints

- Set the frame with gleeful abandon!



# translatesAutoresizingMaskIntoConstraints

Setting the frame automatically generates constraints

- Set the frame with gleeful abandon!
- Constraints implement the resizeMode

# translatesAutoresizingMaskIntoConstraints

Setting the frame automatically generates constraints

- Set the frame with gleeful abandon!
- Constraints implement the resizeMode
- Other views can be constrained to it

# translatesAutoresizingMaskIntoConstraints

Setting the frame automatically generates constraints

- Set the frame with gleeful abandon!
- Constraints implement the autoresizingMask
- Other views can be constrained to it

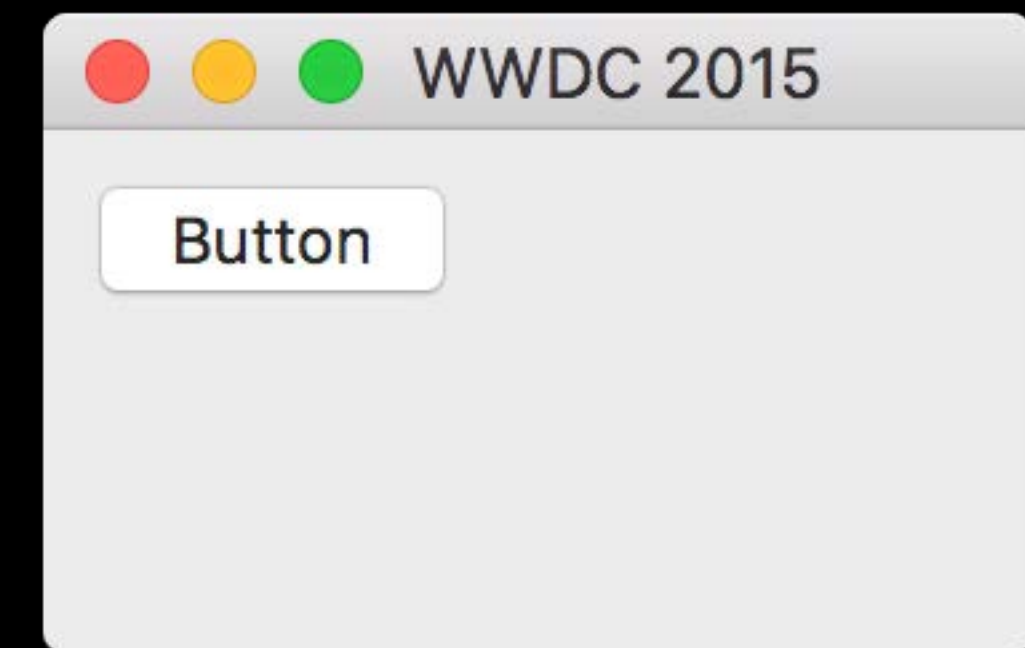
Set to false when using constraints

- Beware—defaults to true for programmatically created views

# translatesAutoresizingMaskIntoConstraints

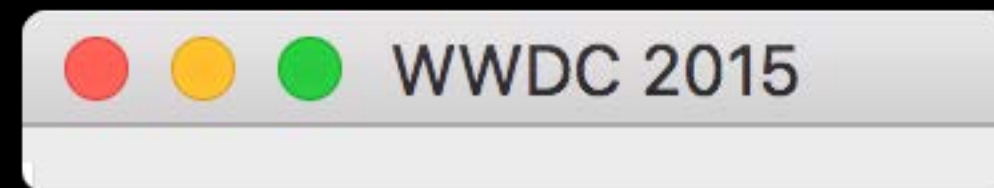
Do not forget to turn this off!

```
override func viewDidLoad() {  
    super.viewDidLoad()  
  
    let b = NSButton()  
    b.bezelStyle = .RoundedBezelStyle  
  
    view.addSubview(b)  
  
    NSLayoutConstraint(item:b, attribute:.Top, relatedBy:.Equal, toItem:view,  
        attribute:.Top, multiplier:1, constant:10).active = true  
    NSLayoutConstraint(item:b, attribute:.Leading, relatedBy:.Equal,  
        toItem:view, attribute:.Leading, multiplier:1, constant:  
        10).active = true  
}
```



# translatesAutoresizingMaskIntoConstraints

Do not forget to turn this off!



# translatesAutoresizingMaskIntoConstraints

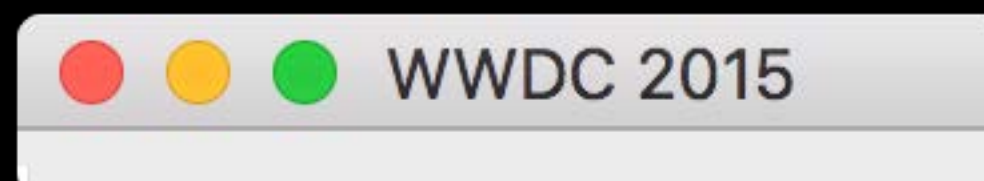
Do not forget to turn this off!

2015-05-08 09:41:27.668 WWDC 2015[4107:226949] Unable to simultaneously satisfy constraints:

```
(  
    "<NSAutoresizingMaskLayoutConstraint:0x6100000810e0 h=--& v=--& H:|-(0)-  
[UIButton:0x618000140160'Button'] (Names: '|':NSView:0x618000120460 )>",  
    "<NSLayoutConstraint:0x6180000828a0 H:|-(10)-[UIButton:  
0x618000140160'Button'] (LTR) (Names: '|':NSView:0x618000120460 )>"  
)
```

Will attempt to recover by breaking constraint

```
<NSLayoutConstraint:0x6000000825d0 H:|-(10)-[UIButton:0x600000140c60'Button']  
(LTR) (Names: '|':NSView:0x6000001203c0 )>
```



# translatesAutoresizingMaskIntoConstraints

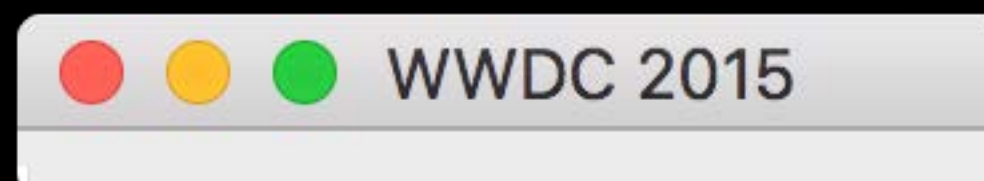
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[UIButton:0x618000140160'Button'] (Names: '|':NSView:0x618000120460 )>",  
    "<NSLayoutConstraint:0x6180000828a0 H: |(10)-[UIButton:  
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)
```

Will attempt to recover by breaking constraint

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<NSLayoutConstraint:0x6000000825d0 H: |(10)-[UIButton:0x600000140c60'Button']  
(LTR) (Names: '|':NSView:0x6000001203c0 )>
```



# translatesAutoresizingMaskIntoConstraints

Do not forget to turn this off!

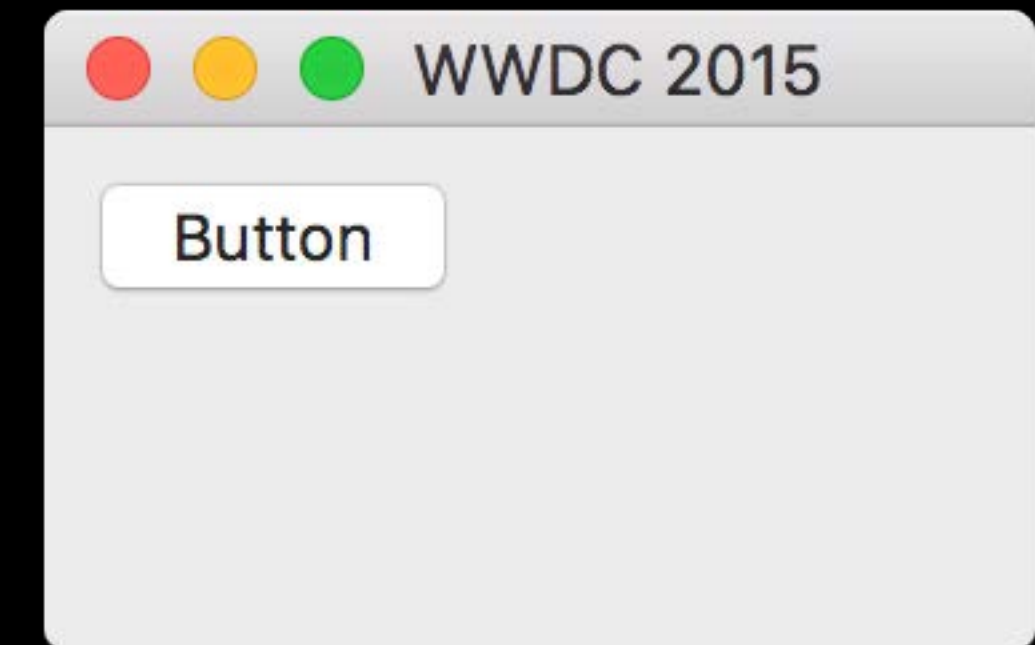
```
override func viewDidLoad() {  
    super.viewDidLoad()  
  
    let b = UIButton()  
    b.bezelStyle = .RoundedBezelStyle  
    b.translatesAutoresizingMaskIntoConstraints = false  
    view.addSubview(b)  
  
    NSLayoutConstraint(item:b, attribute:.Top, relatedBy:.Equal, toItem:view,  
        attribute:.Top, multiplier:1, constant:10).active = true  
    NSLayoutConstraint(item:b, attribute:.Leading, relatedBy:.Equal,  
        toItem:view, attribute:.Leading, multiplier:1, constant:  
        10).active = true  
}
```



# translatesAutoresizingMaskIntoConstraints

Do not forget to turn this off!

```
override func viewDidLoad() {  
    super.viewDidLoad()  
  
    let b = NSButton()  
    b.bezelStyle = .RoundedBezelStyle  
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        attribute:.Top, multiplier:1, constant:10).active = true  
    NSLayoutConstraint(item:b, attribute:.Leading, relatedBy:.Equal,  
        toItem:view, attribute:.Leading, multiplier:1, constant:  
        10).active = true  
}
```



# translatesAutoresizingMaskIntoConstraints

Remember

- Use when setting the frame directly
- Otherwise, don't forget to turn this off!

# Constraint Creation

Mystery #9

# Layout Constraint Creation

```
override func viewDidLoad() {  
    super.viewDidLoad()  
  
    let b = UIButton()  
    b.bezelStyle = .RoundedBezelStyle  
    b.translatesAutoresizingMaskIntoConstraints = false  
    view.addSubview(b)  
  
    NSLayoutConstraint(item:b, attribute:.Top, relatedBy:.Equal, toItem:view,  
        attribute:.Top, multiplier:1, constant:10).active = true  
    NSLayoutConstraint(item:b, attribute:.Leading, relatedBy:.Equal,  
        toItem:view, attribute:.Leading, multiplier:1, constant:10)  
        .active = true  
}
```

# Layout Constraint Creation

```
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    NSLayoutConstraint(item:b, attribute:.Top, relatedBy:.Equal, toItem:view,  
        attribute:.Top, multiplier:1, constant:10).active = true  
    NSLayoutConstraint(item:b, attribute:.Leading, relatedBy:.Equal,  
        toItem:view, attribute:.Leading, multiplier:1, constant:10)  
        .active = true  
}
```

# Layout Constraint Creation

```
NSLayoutConstraint(item:b, attribute:.Top, relatedBy:.Equal, toItem:view,  
    attribute:.Top, multiplier:1, constant:10)  
NSLayoutConstraint(item:b, attribute:.Leading, relatedBy:.Equal,  
    toItem:view, attribute:.Leading, multiplier:1, constant:10)
```

# Layout Constraint Creation

NEW

## Layout anchors

```
NSLayoutConstraint(item:b, attribute:.Top, relatedBy:.Equal, toItem:view,  
    attribute:.Top, multiplier:1, constant:10)
```

```
NSLayoutConstraint(item:b, attribute:.Leading, relatedBy:.Equal,  
    toItem:view, attribute:.Leading, multiplier:1, constant:10)
```

```
b.topAnchor.constraintEqualToAnchor(view.topAnchor, constant:10)
```

```
b.leadingAnchor.constraintEqualToAnchor(view.leadingAnchor, constant:10)
```

# Layout Constraint Creation

NEW

## Layout anchors

```
[NSLayoutConstraint constraintWithItem:b attribute:NSLayoutAttributeTop  
    relatedBy:NSLayoutRelationEqual toItem:self.view  
    attribute:NSLayoutAttributeTop multiplier:1 constant:10];
```

```
[NSLayoutConstraint constraintWithItem:b  
    attribute:NSLayoutAttributeLeading relatedBy:NSLayoutRelationEqual  
    toItem:self.view attribute:NSLayoutAttributeLeading multiplier:1  
    constant:10];
```

```
[b.topAnchor constraintEqualToAnchor:self.view.topAnchor constant:10];
```

```
[b.leadingAnchor constraintEqualToAnchor:self.view.leadingAnchor constant:10];
```



# Layout Constraint Creation

Layout anchors

NEW

# Layout Constraint Creation

NEW

Layout anchors

Cannot set a location equal to a constant

```
[v1.leadingAnchor constraintEqualToConstant:100];  
// Error: may not respond to method
```

# Layout Constraint Creation

NEW

## Layout anchors

Cannot set a location equal to a constant

```
[v1.leadingAnchor constraintEqualToConstant:100];  
// Error: may not respond to method
```

Cannot relate a location to a size

```
[v1.leadingAnchor constraintEqualToAnchor:v2.widthAnchor];  
// Error: incompatible pointer type
```

# Constraining Negative Space

Mystery #10

# Constraining Negative Space

Equal spacing between buttons

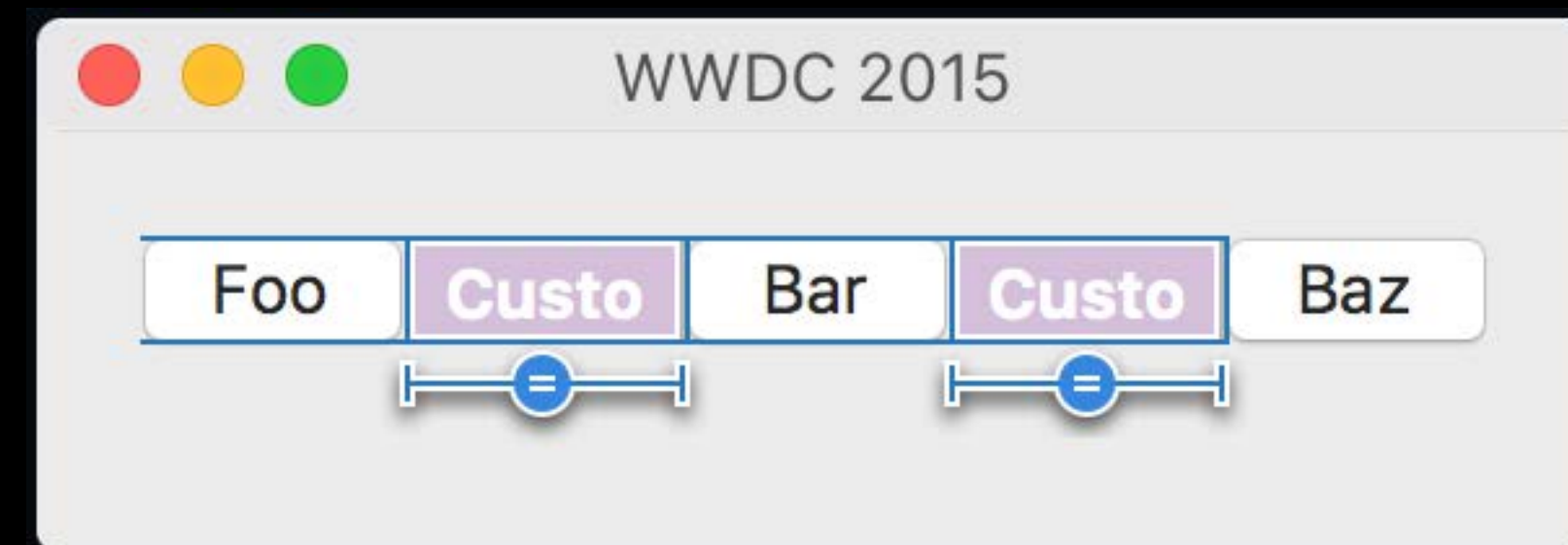


Centering a group

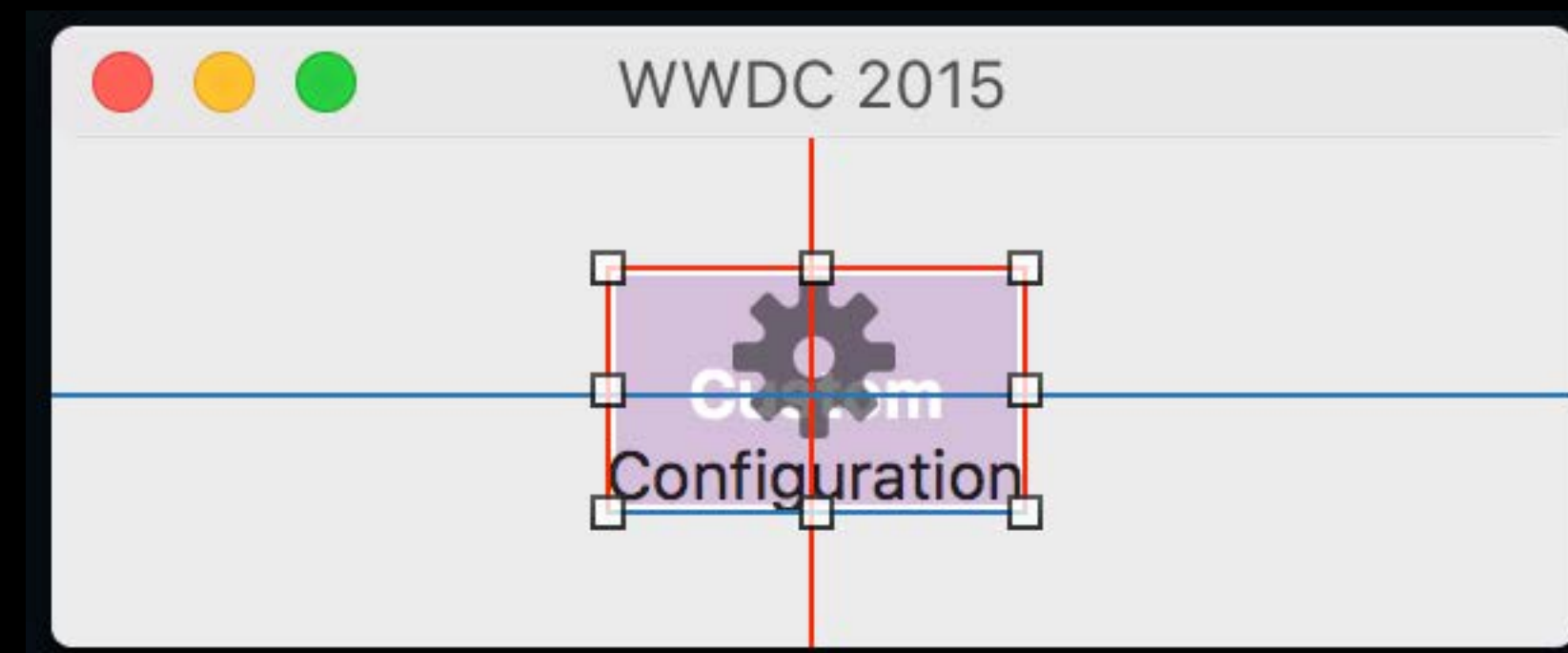


# Constraining Negative Space

Equal spacing between buttons



Centering a group



# NSLayoutGuide / UILayoutGuide

NEW

**UILayoutGuide** represents a rectangle in the layout engine

Constrain just like a view

```
let guide = UILayoutGuide()  
view.addLayoutGuide(guide)
```

# NSLayoutGuide / UILayoutGuide

NEW

Layout anchors are not available for margins

UIView now exposes **layoutMarginsGuide**

```
var layoutMarginsGuide: UILayoutGuide
```



# Debugging Your Layout

Mysteries of Auto Layout, part 2

Kasia Wawer iOS Keyboards Engineer

Has This Ever Happened to You?

# Has This Ever Happened to You?

Layout spec



Quiz question

[Send Answer](#)

# Has This Ever Happened to You?

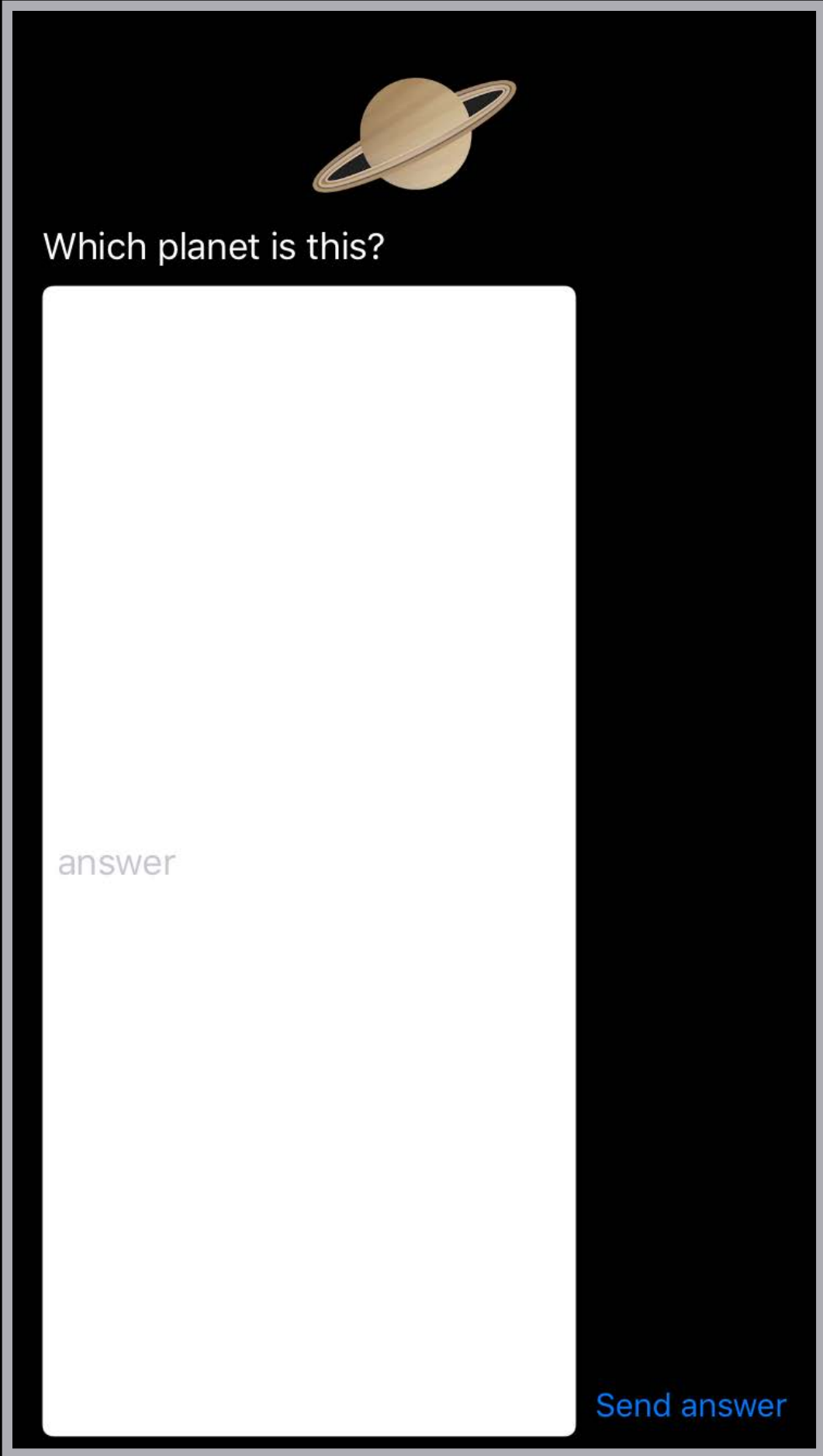
Layout spec



Build and run



(Not so much)



# Has This Ever Happened to You?

2015-05-25 16:01:39.543 DebuggingAutoLayout[12208:1048406] Unable to simultaneously satisfy constraints.

Probably at least one of the constraints in the following list is one you don't want.

```
(
  "<UILayoutSupportConstraint:0x7ffe9ad11a80 V:[_UILayoutGuide:0x7ffe9ad10650(20)]>",
  "<UILayoutSupportConstraint:0x7ffe9ad10ba0 V:|-(0)-[_UILayoutGuide:0x7ffe9ad10650] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth' saturn.width == 1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905460 'imageHorizontal' saturn.leading == UIView:0x7ffe9c81b720.leadingMargin (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905aa0 'verticalLayout' V:[_UILayoutGuide:0x7ffe9ad10650]-(NSSpace(8))-[saturn] (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905b40 'verticalLayout' V:[saturn]-(NSSpace(8))-[UILabel:0x7ffe9c903d10'Which planet is this?'] (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c906050 'labelToTop' V:|-(100)-[UILabel:0x7ffe9c903d10'Which planet is this?'] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9c905920 'imageMiddle' saturn.centerX == UIView:0x7ffe9c81b720.centerX (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9aca0130 'UIView-Encapsulated-Layout-Width' H:[UIView:0x7ffe9c81b720(375)]>"
)
```

Will attempt to recover by breaking constraint

```
<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth' saturn.width == 1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>
```

# Unsatisfiable Constraints

Mystery #11

# Understanding the Log

```
(
  "<_UILayoutSupportConstraint:0x7ffe9ad11a80 V:[_UILayoutGuide:
0x7ffe9ad10650(20)]>",
  "<_UILayoutSupportConstraint:0x7ffe9ad10ba0 V:|-(0)-[_UILayoutGuide:
0x7ffe9ad10650] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905460 'imageHorizontal' saturn.leading
== UIView:0x7ffe9c81b720.leadingMargin (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7fedd3423ae0 'imageHorizontal' UIView:
0x7fedd3607b90.trailingMargin == saturn.trailing>", (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905aa0 'verticalLayout' V:
[_UILayoutGuide:0x7ffe9ad10650]-(NSSpace(8))-[saturn] (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905b40 'verticalLayout' V:[saturn]-
(NSSpace(8))-[UILabel:0x7ffe9c903d10'Which planet is this?'] (Names:
saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c906050 'labelToTop' V:|-(100)-[UILabel:
0x7ffe9c903d10'Which planet is this?'] (Names: '|':UIView:0x7ffe9c81b720
)>",
  "<NSLayoutConstraint:0x7ffe9aca0130 'UIView-Encapsulated-Layout-Width'
H:[UIView:0x7ffe9c81b720(375)]>"
)
```

Will attempt to recover by breaking constraint

```
<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>
```



Which planet is this?

answer

Send answer

# Understanding the Log

```
(
  "<_UILayoutSupportConstraint:0x7ffe9ad11a80 V:[_UILayoutGuide:
0x7ffe9ad10650(20)]>",
  "<_UILayoutSupportConstraint:0x7ffe9ad10ba0 V:|-(0)-[_UILayoutGuide:
0x7ffe9ad10650] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905460 'imageHorizontal' saturn.leading
== UIView:0x7ffe9c81b720.leadingMargin (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7fedd3423ae0 'imageHorizontal' UIView:
0x7fedd3607b90.trailingMargin == saturn.trailing>", (Names: saturn:
0x7ffe9acb8cb0 )>",
  Will attempt to recover by breaking constraint
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905b40 'verticalLayout' V:[saturn]-
(NSSpace(8))-UILabel:0x7ffe9c903d10'Which planet is this?'] (Names:
saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c906050 'labelToTop' V:|-(100)-UILabel:
0x7ffe9c903d10'Which planet is this?'] (Names: '|':UIView:0x7ffe9c81b720
)>",
  "<NSLayoutConstraint:0x7ffe9aca0130 'UIView-Encapsulated-Layout-Width'
H:[UIView:0x7ffe9c81b720(375)]>"
)
```

```
Will attempt to recover by breaking constraint
<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>
```



Which planet is this?

answer

Send answer

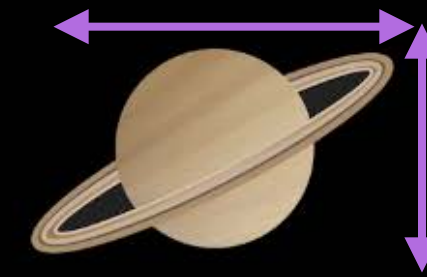


# Understanding the Log

```
(
  "<_UILayoutSupportConstraint:0x7ffe9ad11a80 V:[_UILayoutGuide:
0x7ffe9ad10650(20)]>",
  "<_UILayoutSupportConstraint:0x7ffe9ad10ba0 V:|-(0)-[_UILayoutGuide:
0x7ffe9ad10650] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905460 'imageHorizontal' saturn.leading
== UIView:0x7ffe9c81b720.leadingMargin (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7fedd3423ae0 'imageHorizontal' UIView:
0x7fedd3607b90.trailingMargin == saturn.trailing>", (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905aa0 'verticalLayout' V:
[_UILayoutGuide:0x7ffe9ad10650]-(NSSpace(8))-[saturn] (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905b40 'verticalLayout' V:[saturn]-
(NSSpace(8))-[UILabel:0x7ffe9c903d10'Which planet is this?'] (Names:
saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c906050 'labelToTop' V:|-(100)-[UILabel:
0x7ffe9c903d10'Which planet is this?'] (Names: '|':UIView:0x7ffe9c81b720
)>",
  "<NSLayoutConstraint:0x7ffe9aca0130 'UIView-Encapsulated-Layout-Width'
H:[UIView:0x7ffe9c81b720(375)]>"
)
```

Will attempt to recover by breaking constraint

```
<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>
```



Which planet is this?

answer

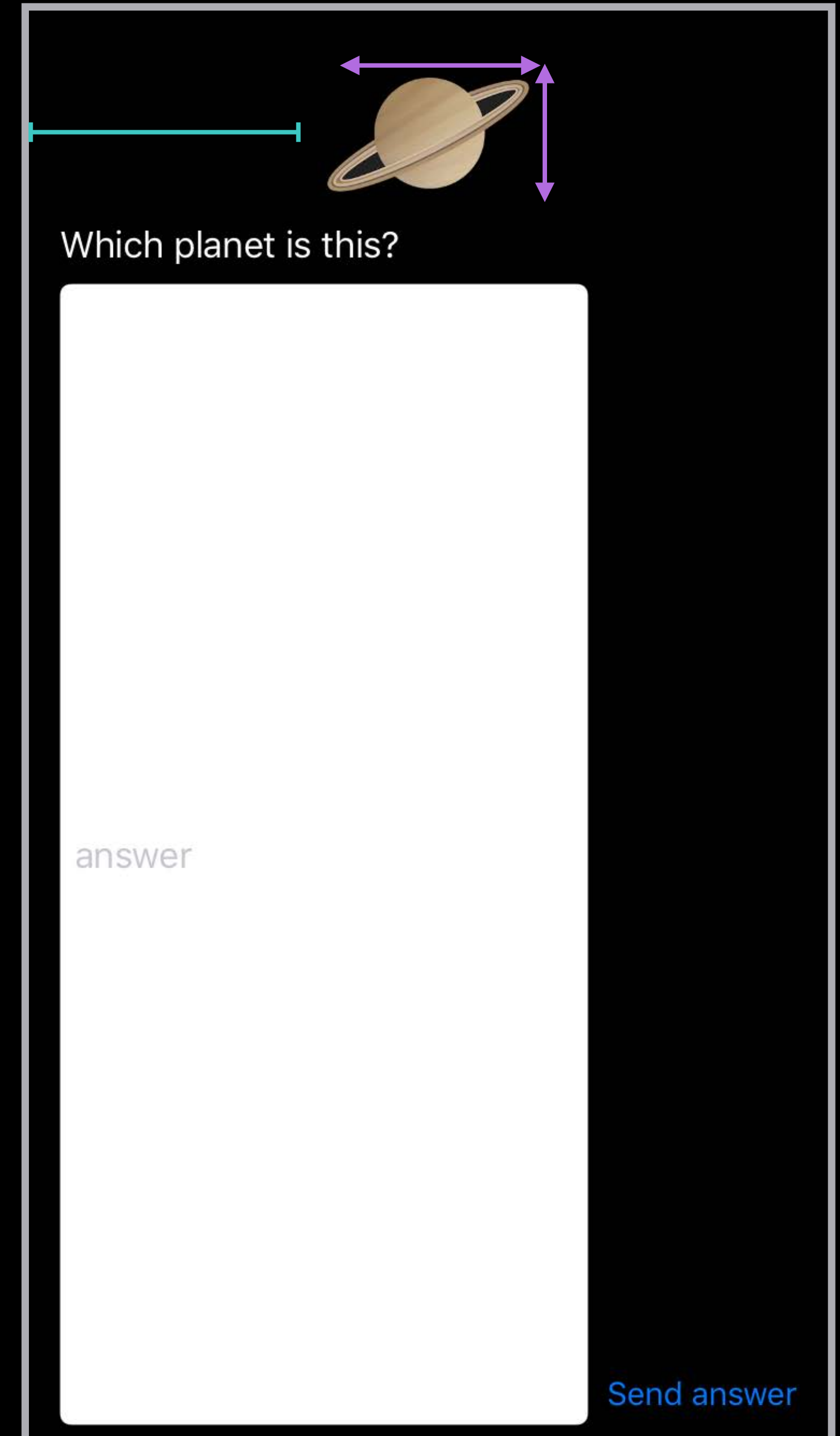
Send answer

# Understanding the Log

```
(
  "<_UILayoutSupportConstraint:0x7ffe9ad11a80 V:[_UILayoutGuide:
0x7ffe9ad10650(20)]>",
  "<_UILayoutSupportConstraint:0x7ffe9ad10ba0 V:|-(0)-[_UILayoutGuide:
0x7ffe9ad10650] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905460 'imageHorizontal' saturn.leading
== UIView:0x7ffe9c81b720.leadingMargin (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7fedd3423ae0 'imageHorizontal' UIView:
0x7fedd3607b90.trailingMargin == saturn.trailing>", (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905aa0 'verticalLayout' V:
[_UILayoutGuide:0x7ffe9ad10650]-(NSSpace(8))-[saturn] (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905b40 'verticalLayout' V:[saturn]-
(NSSpace(8))-[UILabel:0x7ffe9c903d10'Which planet is this?'] (Names:
saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c906050 'labelToTop' V:|-(100)-[UILabel:
0x7ffe9c903d10'Which planet is this?'] (Names: '|':UIView:0x7ffe9c81b720
)>",
  "<NSLayoutConstraint:0x7ffe9aca0130 'UIView-Encapsulated-Layout-Width'
H:[UIView:0x7ffe9c81b720(375)]>"
)
```

Will attempt to recover by breaking constraint

```
<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>
```

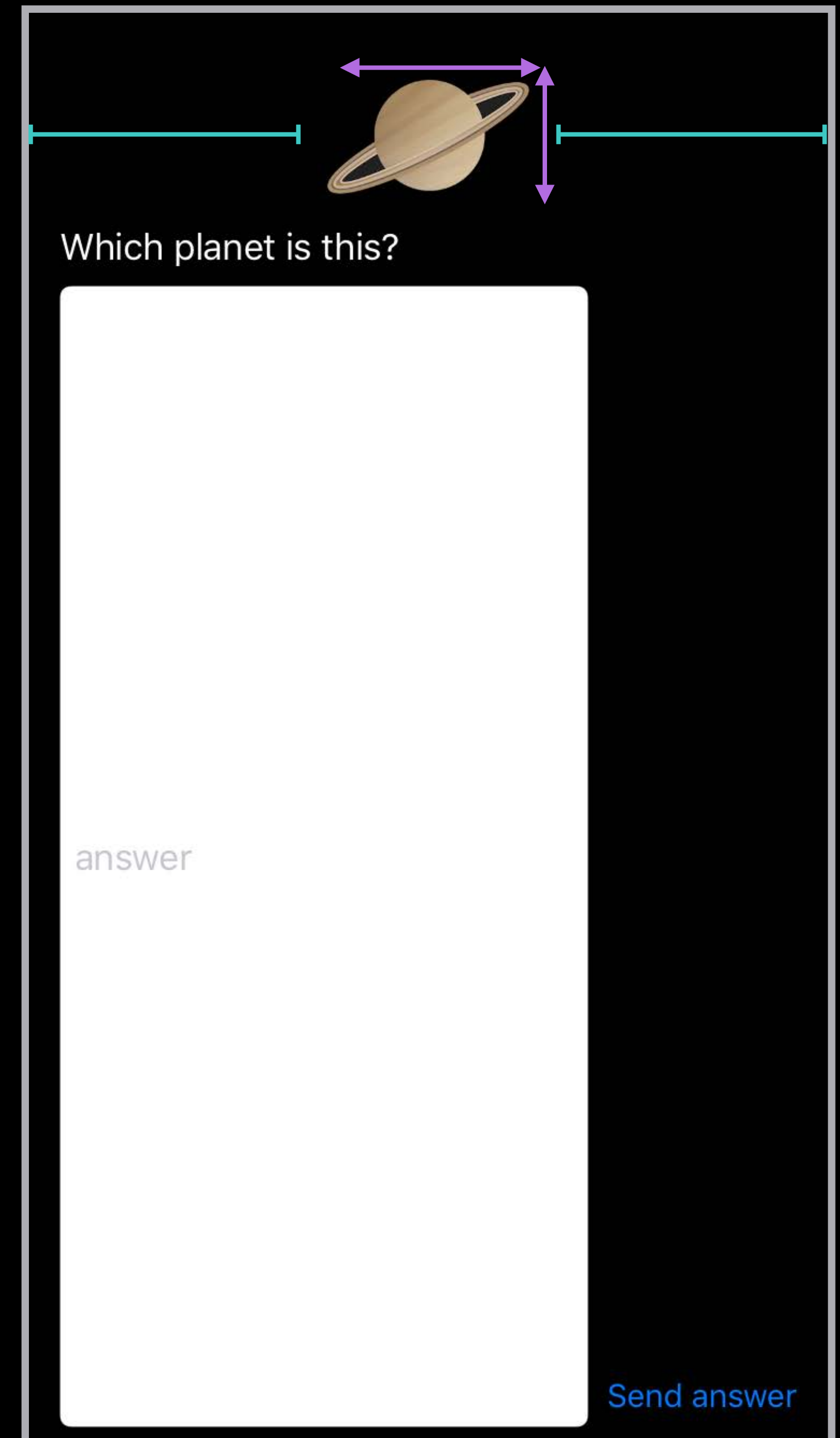


# Understanding the Log

```
(
  "<_UILayoutSupportConstraint:0x7ffe9ad11a80 V:[_UILayoutGuide:
0x7ffe9ad10650(20)]>",
  "<_UILayoutSupportConstraint:0x7ffe9ad10ba0 V:|-(0)-[_UILayoutGuide:
0x7ffe9ad10650] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905460 'imageHorizontal' saturn.leading
== UIView:0x7ffe9c81b720.leadingMargin (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7fedd3423ae0 'imageHorizontal' UIView:
0x7fedd3607b90.trailingMargin == saturn.trailing>", (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905aa0 'verticalLayout' V:
[_UILayoutGuide:0x7ffe9ad10650]-(NSSpace(8))-[saturn] (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905b40 'verticalLayout' V:[saturn]-
(NSSpace(8))-[UILabel:0x7ffe9c903d10'Which planet is this?'] (Names:
saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c906050 'labelToTop' V:|-(100)-[UILabel:
0x7ffe9c903d10'Which planet is this?'] (Names: '|':UIView:0x7ffe9c81b720
)>",
  "<NSLayoutConstraint:0x7ffe9aca0130 'UIView-Encapsulated-Layout-Width'
H:[UIView:0x7ffe9c81b720(375)]>"
)
```

Will attempt to recover by breaking constraint

```
<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>
```



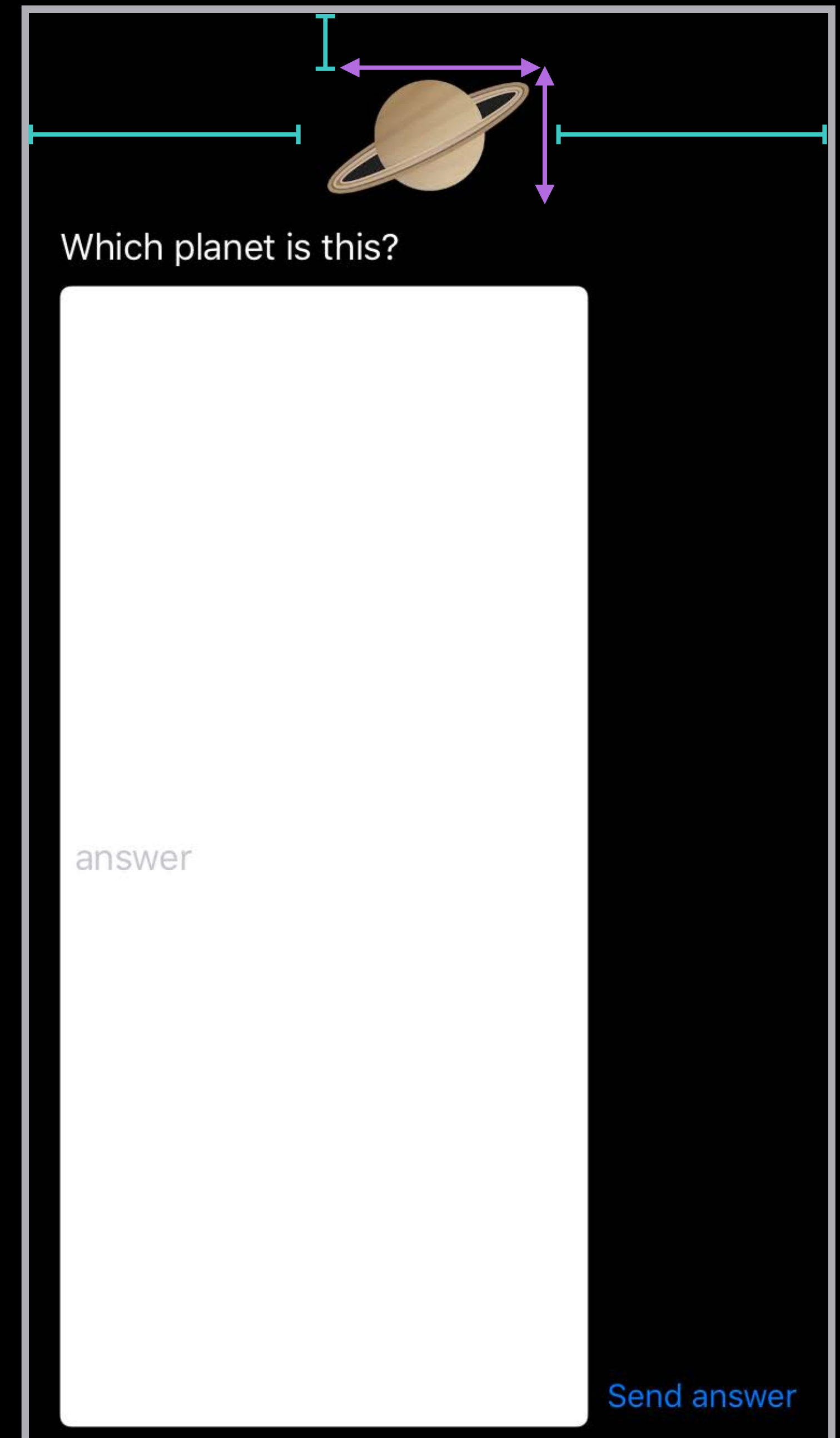


# Understanding the Log

```
(
  "<_UILayoutSupportConstraint:0x7ffe9ad11a80 V:[_UILayoutGuide:
0x7ffe9ad10650(20)]>",
  "<_UILayoutSupportConstraint:0x7ffe9ad10ba0 V:|-(0)-[_UILayoutGuide:
0x7ffe9ad10650] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905460 'imageHorizontal' saturn.leading
== UIView:0x7ffe9c81b720.leadingMargin (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7fedd3423ae0 'imageHorizontal' UIView:
0x7fedd3607b90.trailingMargin == saturn.trailing>", (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905aa0 'verticalLayout' V:
[_UILayoutGuide:0x7ffe9ad10650]-(NSSpace(8))-[saturn] (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905b40 'verticalLayout' V:[saturn]-
(NSSpace(8))-[UILabel:0x7ffe9c903d10'Which planet is this?'] (Names:
saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c906050 'labelToTop' V:|-(100)-[UILabel:
0x7ffe9c903d10'Which planet is this?'] (Names: '|':UIView:0x7ffe9c81b720
)>",
  "<NSLayoutConstraint:0x7ffe9aca0130 'UIView-Encapsulated-Layout-Width'
H:[UIView:0x7ffe9c81b720(375)]>"
)
```

Will attempt to recover by breaking constraint

```
<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>
```

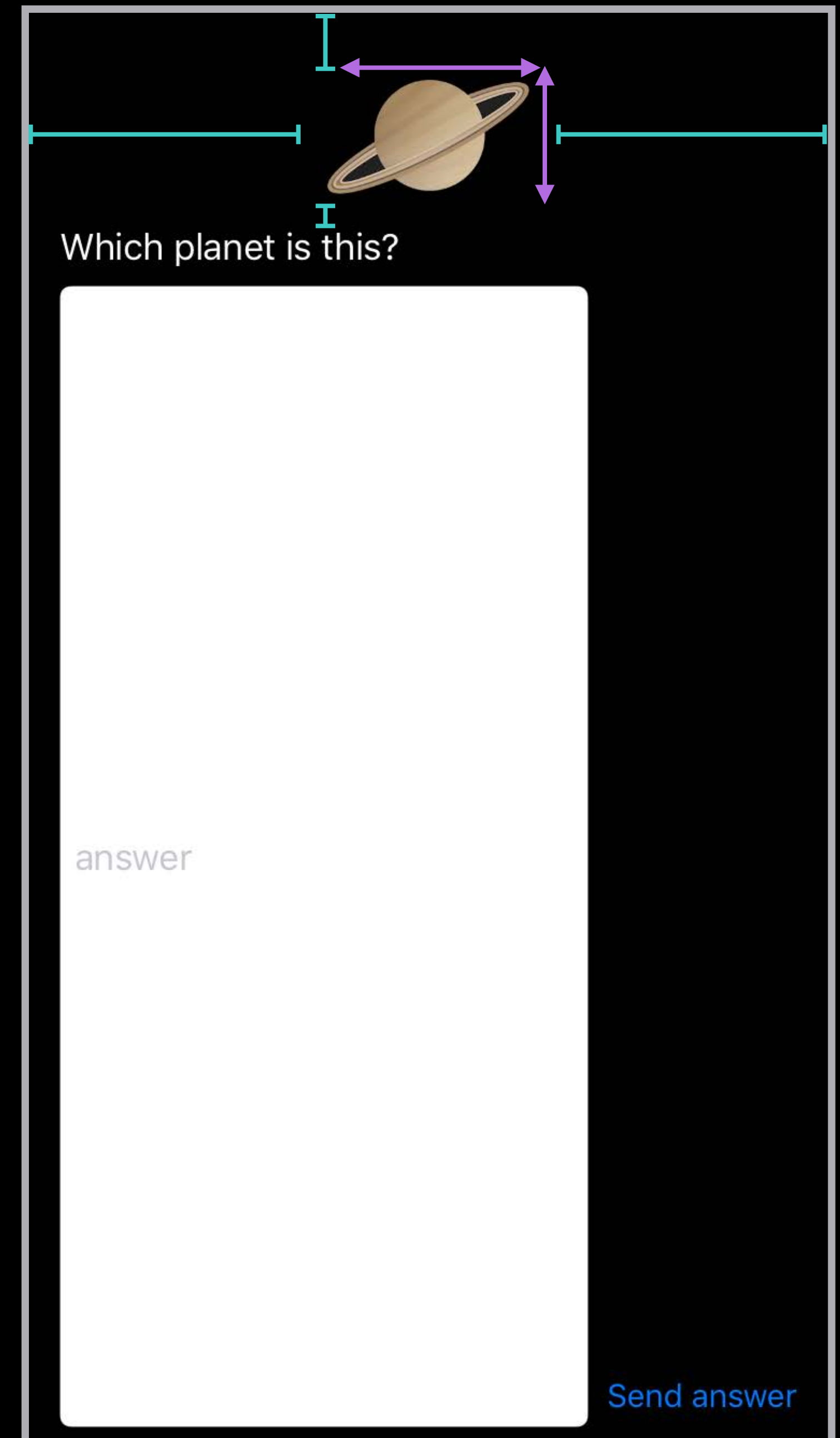


# Understanding the Log

```
(
  "<_UILayoutSupportConstraint:0x7ffe9ad11a80 V:[_UILayoutGuide:
0x7ffe9ad10650(20)]>",
  "<_UILayoutSupportConstraint:0x7ffe9ad10ba0 V:|-(0)-[_UILayoutGuide:
0x7ffe9ad10650] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905460 'imageHorizontal' saturn.leading
== UIView:0x7ffe9c81b720.leadingMargin (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7fedd3423ae0 'imageHorizontal' UIView:
0x7fedd3607b90.trailingMargin == saturn.trailing>", (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905aa0 'verticalLayout' V:
[_UILayoutGuide:0x7ffe9ad10650]-(NSSpace(8))-[saturn] (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905b40 'verticalLayout' V:[saturn]-
(NSSpace(8))-[UILabel:0x7ffe9c903d10'Which planet is this?'] (Names:
saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c906050 'labelToTop' V:|-(100)-[UILabel:
0x7ffe9c903d10'Which planet is this?'] (Names: '|':UIView:0x7ffe9c81b720
)>",
  "<NSLayoutConstraint:0x7ffe9aca0130 'UIView-Encapsulated-Layout-Width'
H:[UIView:0x7ffe9c81b720(375)]>"
)
```

Will attempt to recover by breaking constraint

```
<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>
```

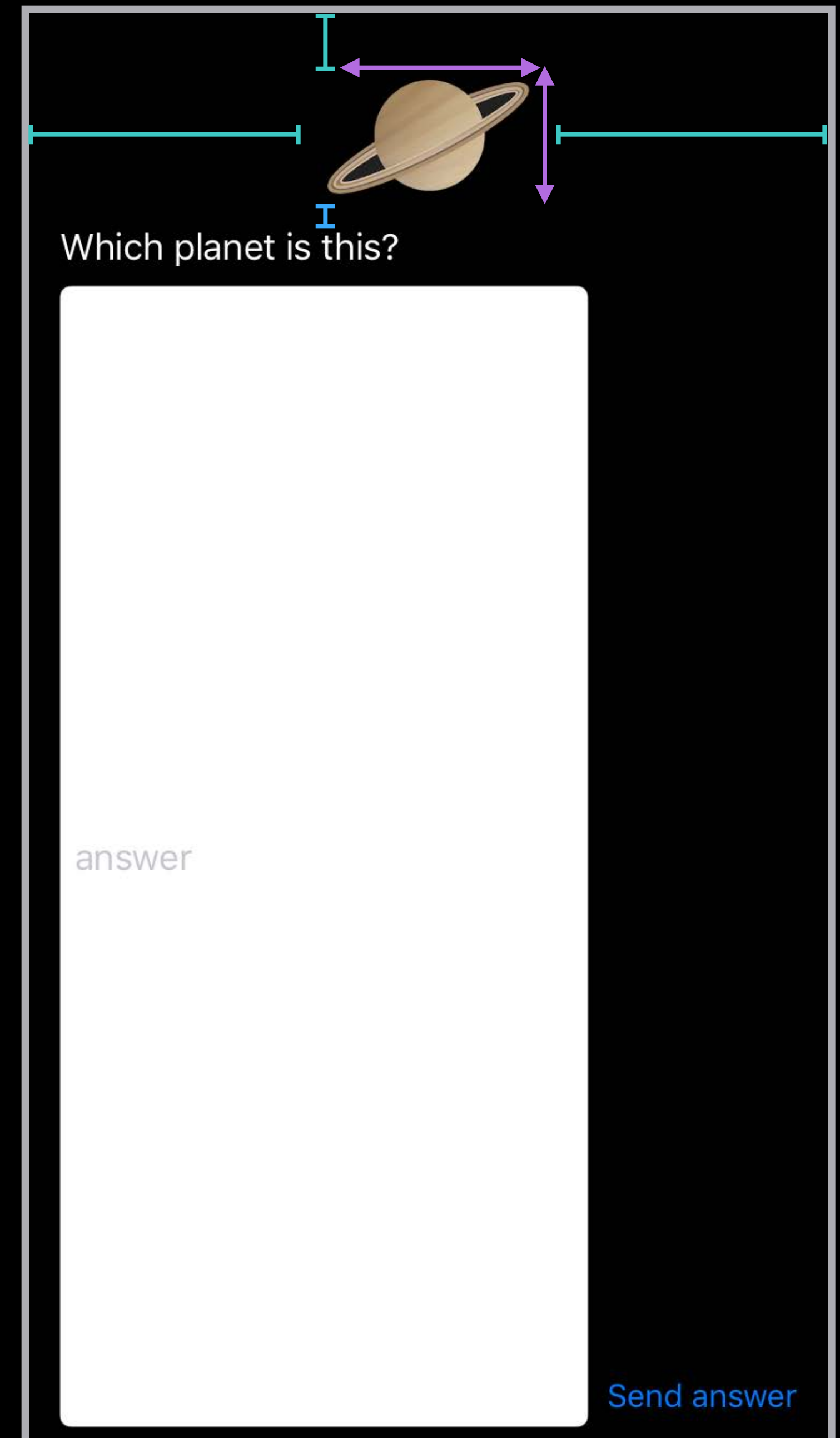


# Understanding the Log

```
(
  "<_UILayoutSupportConstraint:0x7ffe9ad11a80 V:[_UILayoutGuide:
0x7ffe9ad10650(20)]>",
  "<_UILayoutSupportConstraint:0x7ffe9ad10ba0 V:|-(0)-[_UILayoutGuide:
0x7ffe9ad10650] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905460 'imageHorizontal' saturn.leading
== UIView:0x7ffe9c81b720.leadingMargin (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7fedd3423ae0 'imageHorizontal' UIView:
0x7fedd3607b90.trailingMargin == saturn.trailing>", (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905aa0 'verticalLayout' V:
[_UILayoutGuide:0x7ffe9ad10650]-(NSSpace(8))-[saturn] (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905b40 'verticalLayout' V:[saturn]-
(NSSpace(8))-[UILabel:0x7ffe9c903d10'Which planet is this?'] (Names:
saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c906050 'labelToTop' V:|-(100)-[UILabel:
0x7ffe9c903d10'Which planet is this?'] (Names: '|':UIView:0x7ffe9c81b720
)>",
  "<NSLayoutConstraint:0x7ffe9aca0130 'UIView-Encapsulated-Layout-Width'
H:[UIView:0x7ffe9c81b720(375)]>"
)
```

Will attempt to recover by breaking constraint

```
<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>
```



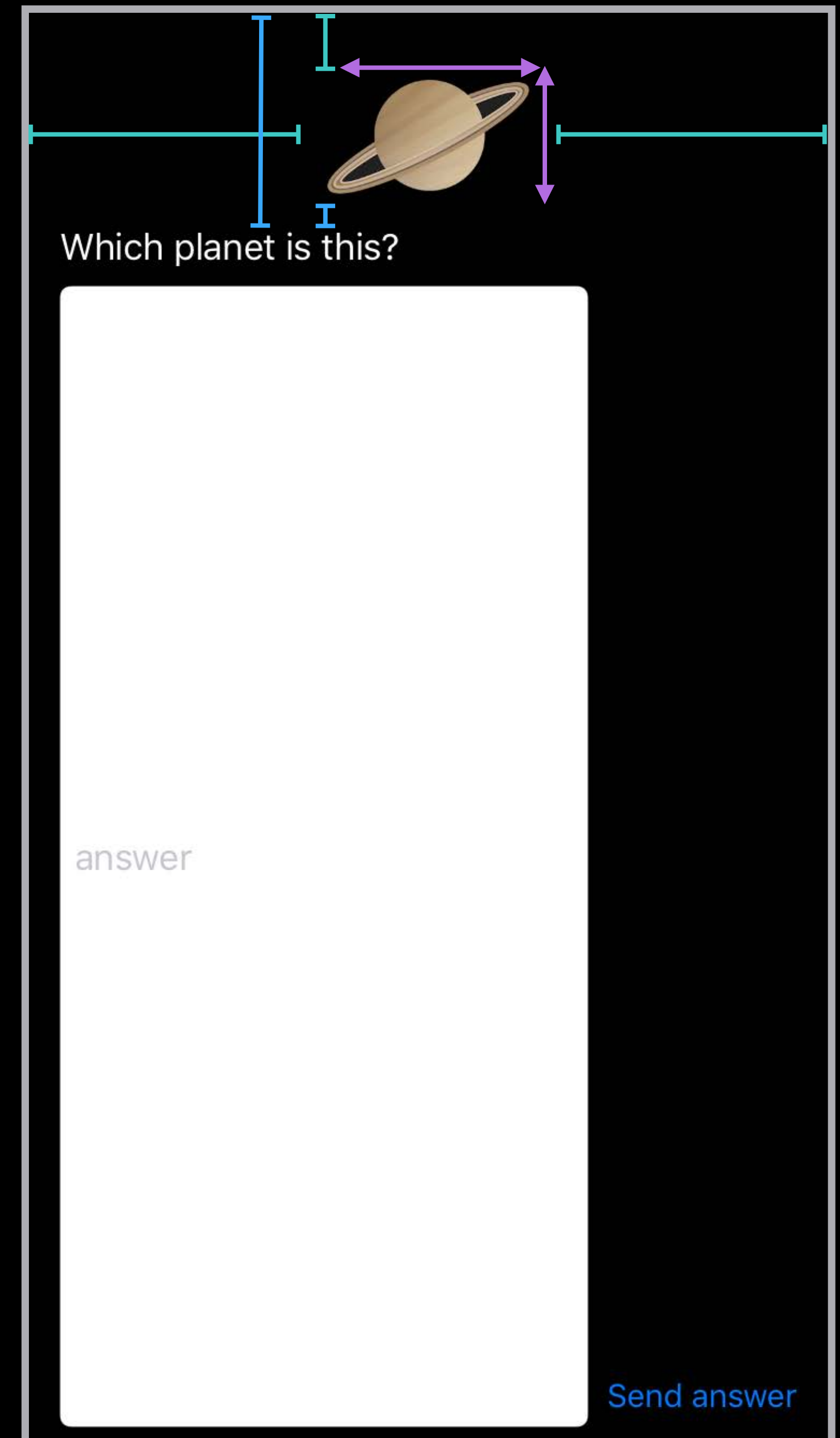


# Understanding the Log

```
(
  "<_UILayoutSupportConstraint:0x7ffe9ad11a80 V:[_UILayoutGuide:
0x7ffe9ad10650(20)]>",
  "<_UILayoutSupportConstraint:0x7ffe9ad10ba0 V:|-(0)-[_UILayoutGuide:
0x7ffe9ad10650] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905460 'imageHorizontal' saturn.leading
== UIView:0x7ffe9c81b720.leadingMargin (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7fedd3423ae0 'imageHorizontal' UIView:
0x7fedd3607b90.trailingMargin == saturn.trailing>", (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905aa0 'verticalLayout' V:
[_UILayoutGuide:0x7ffe9ad10650]-(NSSpace(8))-[saturn] (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905b40 'verticalLayout' V:[saturn]-
(NSSpace(8))-[UILabel:0x7ffe9c903d10'Which planet is this?'] (Names:
saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c906050 'labelToTop' V:|-(100)-[UILabel:
0x7ffe9c903d10'Which planet is this?'] (Names: '|':UIView:0x7ffe9c81b720
)>",
  "<NSLayoutConstraint:0x7ffe9aca0130 'UIView-Encapsulated-Layout-Width'
H:[UIView:0x7ffe9c81b720(375)]>"
)
```

Will attempt to recover by breaking constraint

```
<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>
```

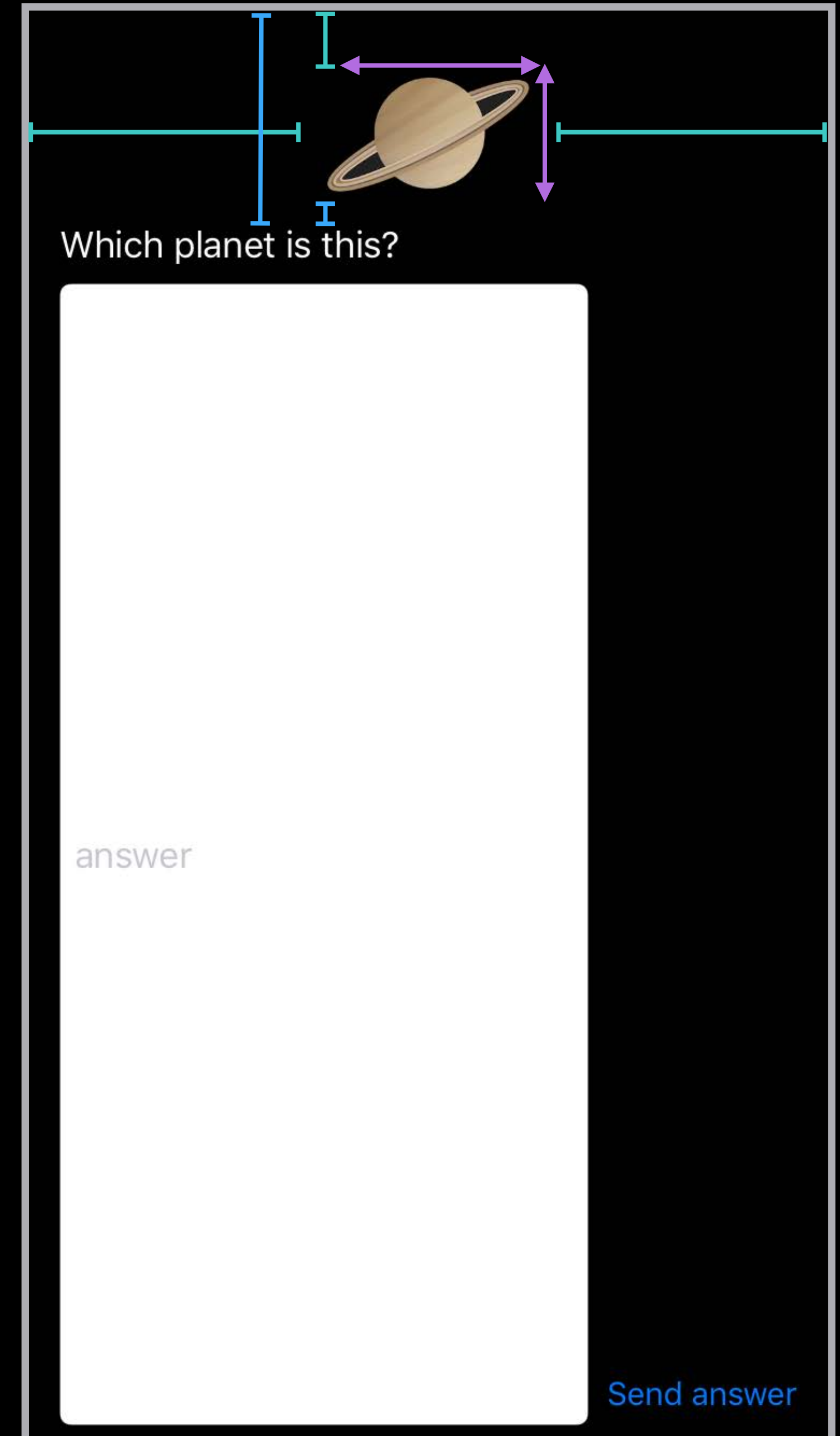


# Understanding the Log

```
(
  "<_UILayoutSupportConstraint:0x7ffe9ad11a80 V:[_UILayoutGuide:
0x7ffe9ad10650(20)]>",
  "<_UILayoutSupportConstraint:0x7ffe9ad10ba0 V:|-(0)-[_UILayoutGuide:
0x7ffe9ad10650] (Names: '|':UIView:0x7ffe9c81b720 )>",
  "<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905460 'imageHorizontal' saturn.leading
== UIView:0x7ffe9c81b720.leadingMargin (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7fedd3423ae0 'imageHorizontal' UIView:
0x7fedd3607b90.trailingMargin == saturn.trailing>", (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905aa0 'verticalLayout' V:
[_UILayoutGuide:0x7ffe9ad10650]-(NSSpace(8))-[saturn] (Names: saturn:
0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c905b40 'verticalLayout' V:[saturn]-
(NSSpace(8))-[UILabel:0x7ffe9c903d10'Which planet is this?'] (Names:
saturn:0x7ffe9acb8cb0 )>",
  "<NSLayoutConstraint:0x7ffe9c906050 'labelToTop' V:|-(100)-[UILabel:
0x7ffe9c903d10'Which planet is this?'] (Names: '|':UIView:0x7ffe9c81b720
)>",
  "<NSLayoutConstraint:0x7ffe9aca0130 'UIView-Encapsulated-Layout-Width'
H:[UIView:0x7ffe9c81b720(375)]>"
)
```

Will attempt to recover by breaking constraint

```
<NSLayoutConstraint:0x7ffe9acbef60 'saturnWidth ' saturn.width ==
1.5*saturn.height (Names: saturn:0x7ffe9acb8cb0 )>
```





# Understanding the Log

Make it easier with identifiers

```
"<_UILayoutSupportConstraint:0x14630d40 V:[_UILayoutGuide:0x14538610(0)]>",  
"<_UILayoutSupportConstraint:0x14627b90 V:|-(0)-[_UILayoutGuide:0x14538610]  
(Names: '|':UIView:0x14538470 )>",  
"<NSLayoutConstraint:0x146778d0 UIImageView:0x146707c0.height ==  
0.6*UIView:0x145831a0.height>",  
"<NSLayoutConstraint:0x14677930 UILabel:0x14670f70'Photo caption'.centerY  
<= UIView:0x145831a0.centerY>",  
"<NSLayoutConstraint:0x146774e0 V:[_UILayoutGuide:0x14580ff0]-(NSSpace(8))-  
[UIImageView:0x146707c0]>",  
"<NSLayoutConstraint:0x14677550 V:[UIImageView:0x146707c0]-(NSSpace(8))-  
[UILabel:0x14670f70'Photo caption']>"
```

# Understanding the Log

Make it easier with identifiers

```
"<_UILayoutSupportConstraint:0x14630d40 V:[_UILayoutGuide:0x14538610(0)]>",  
"<_UILayoutSupportConstraint:0x14627b90 V:|-(0)-[_UILayoutGuide:0x14538610]  
(Names: '|':UIView:0x14538470 )>",  
"<NSLayoutConstraint:0x1464b4d0 'photoHeight' UIImageView:0x14644300.height  
== 0.6*UIView:0x14538470.height>",  
"<NSLayoutConstraint:0x1464b530 'captionToCenterY' Caption for  
photo.centerY <= UIView:0x14538470.centerY (Names: Caption for photo:  
0x14644ab0 )>",  
"<NSLayoutConstraint:0x1464b0e0 'topVerticalArray' V:[_UILayoutGuide:  
0x14538610]-(NSSpace(8))-[UIImageView:0x14644300]>",  
"<NSLayoutConstraint:0x1464b150 'topVerticalArray' V:[UIImageView:  
0x14644300]-(NSSpace(8))-[Caption for photo] (Names: Caption for photo:  
0x14644ab0 )>"
```

# Understanding the Log

Adding identifiers

# Understanding the Log

Adding identifiers

Use constraint identifiers

# Understanding the Log

## Adding identifiers

Use constraint identifiers

Explicit constraints

```
labelToTop.identifier = @"labelToTop";
```

# Understanding the Log

## Adding identifiers

Use constraint identifiers

Explicit constraints

```
labelToTop.identifier = @"labelToTop";
```

Constraints using VFL

```
for (NSLayoutConstraint *constraint in verticalLayout)
{
    constraint.identifier = @"verticalLayout";
}
```

# Understanding the Log

## Adding identifiers

Use constraint identifiers

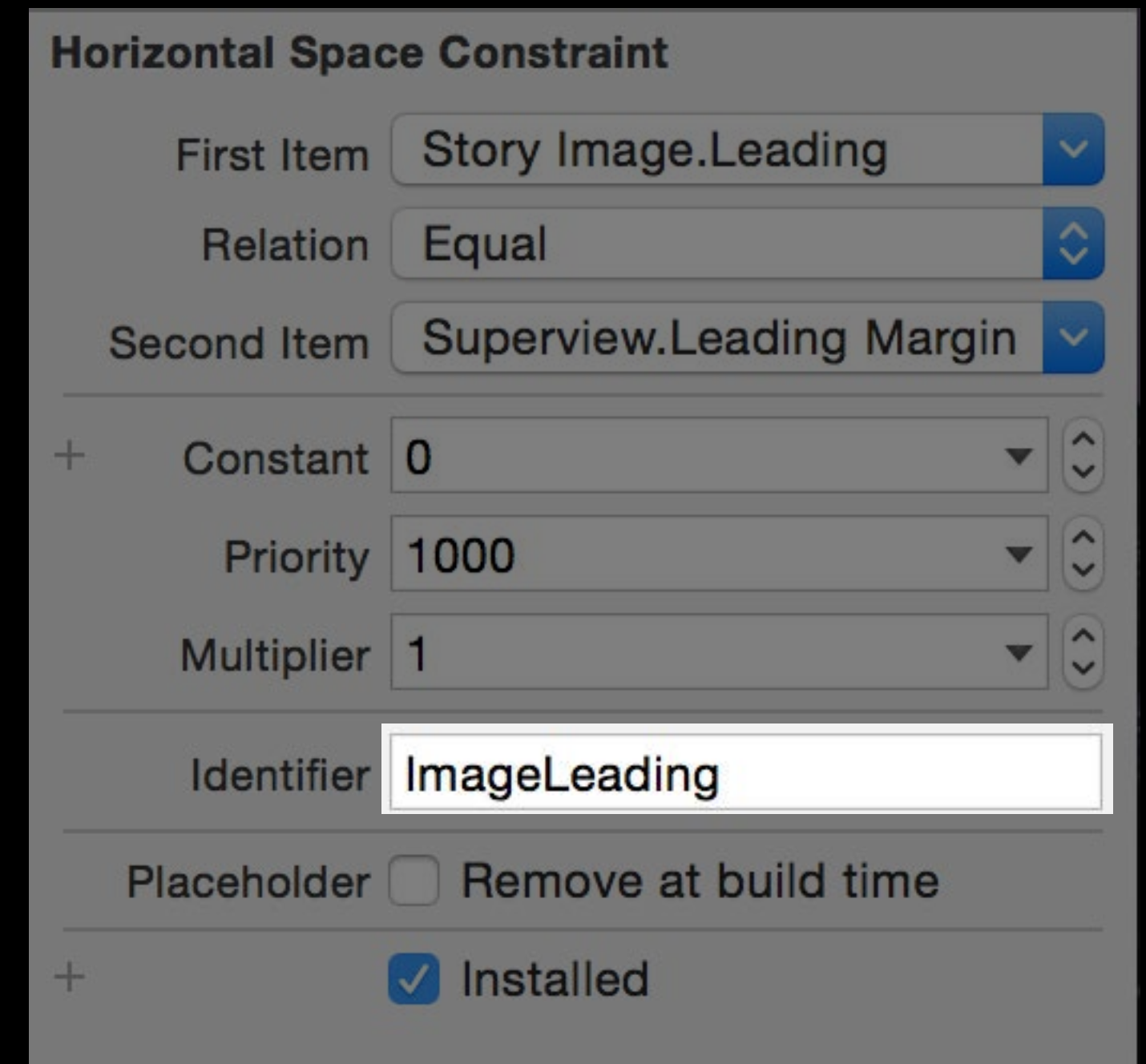
Explicit constraints

```
labelToTop.identifier = @"labelToTop";
```

Constraints using VFL

```
for (NSLayoutConstraint *constraint in verticalLayout)
{
    constraint.identifier = @"verticalLayout";
}
```

Constraints in Interface Builder



The screenshot shows the 'Horizontal Space Constraint' settings in Interface Builder. The 'First Item' is 'Story Image.Leading' and the 'Second Item' is 'Superview.Leading Margin'. The 'Relation' is set to 'Equal'. The 'Constant' is 0, 'Priority' is 1000, and 'Multiplier' is 1. The 'Identifier' field is filled with 'ImageLeading'. At the bottom, there is a 'Placeholder' checkbox (unchecked) with the text 'Remove at build time', and a status bar showing a checkmark and the word 'Installed'.

Horizontal Space Constraint	
First Item	Story Image.Leading
Relation	Equal
Second Item	Superview.Leading Margin
Constant	0
Priority	1000
Multiplier	1
Identifier	ImageLeading
Placeholder	<input type="checkbox"/> Remove at build time
+ <input checked="" type="checkbox"/> Installed	

# Understanding the Log

Tips



# Understanding the Log

## Tips

Set accessibility identifiers

- Identifies views in logs

# Understanding the Log

## Tips

Set accessibility identifiers

- Identifies views in logs

Set identifiers on layout guides

# Understanding the Log

## Tips

Set accessibility identifiers

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Set identifiers on layout guides

Add as you go

# Understanding the Log

## Tips

Set accessibility identifiers

- Identifies views in logs

Set identifiers on layout guides

Add as you go

View one axis at a time

- `constraintsAffectingLayoutForAxis:` on iOS
- `constraintsAffectingLayoutForOrientation:` on OS X

*Demo*

Unsatisfiable constraints

# Understanding the Log

# Understanding the Log

Start from the bottom

# Understanding the Log

Start from the bottom

Check `translateAutoresizingMaskIntoConstraints`



# Understanding the Log

Start from the bottom

Check `translateAutoresizingMaskIntoConstraints`

Set identifiers

# Understanding the Log

Start from the bottom

Check  `translatesAutoresizingMaskIntoConstraints`

Set identifiers

Use  `constraintsAffectingLayoutForAxis:`

# Resolving Ambiguity

Mystery #12

# Ambiguous Layouts

Why doesn't my layout look right?

# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

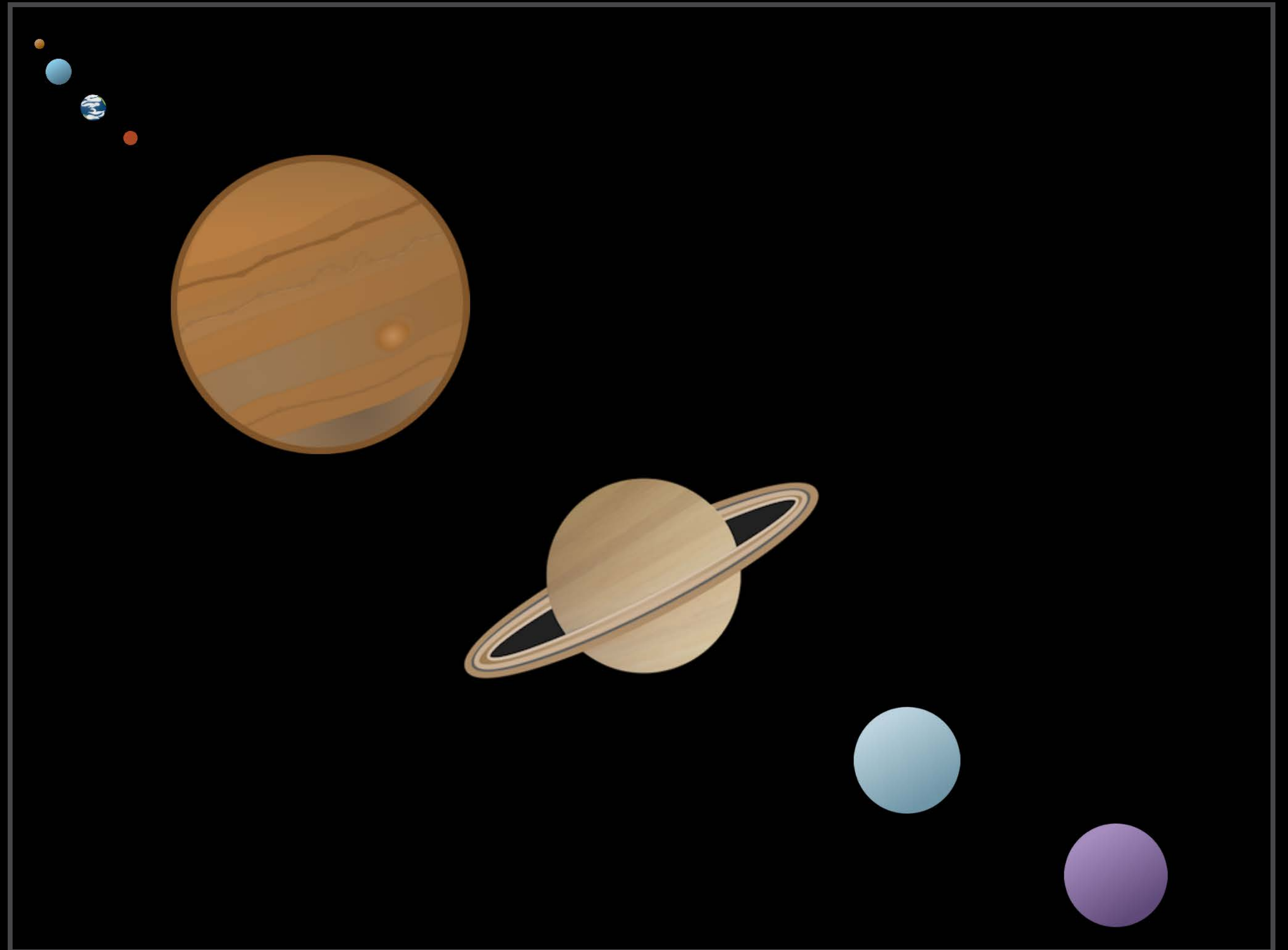
- Too few constraints

# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints

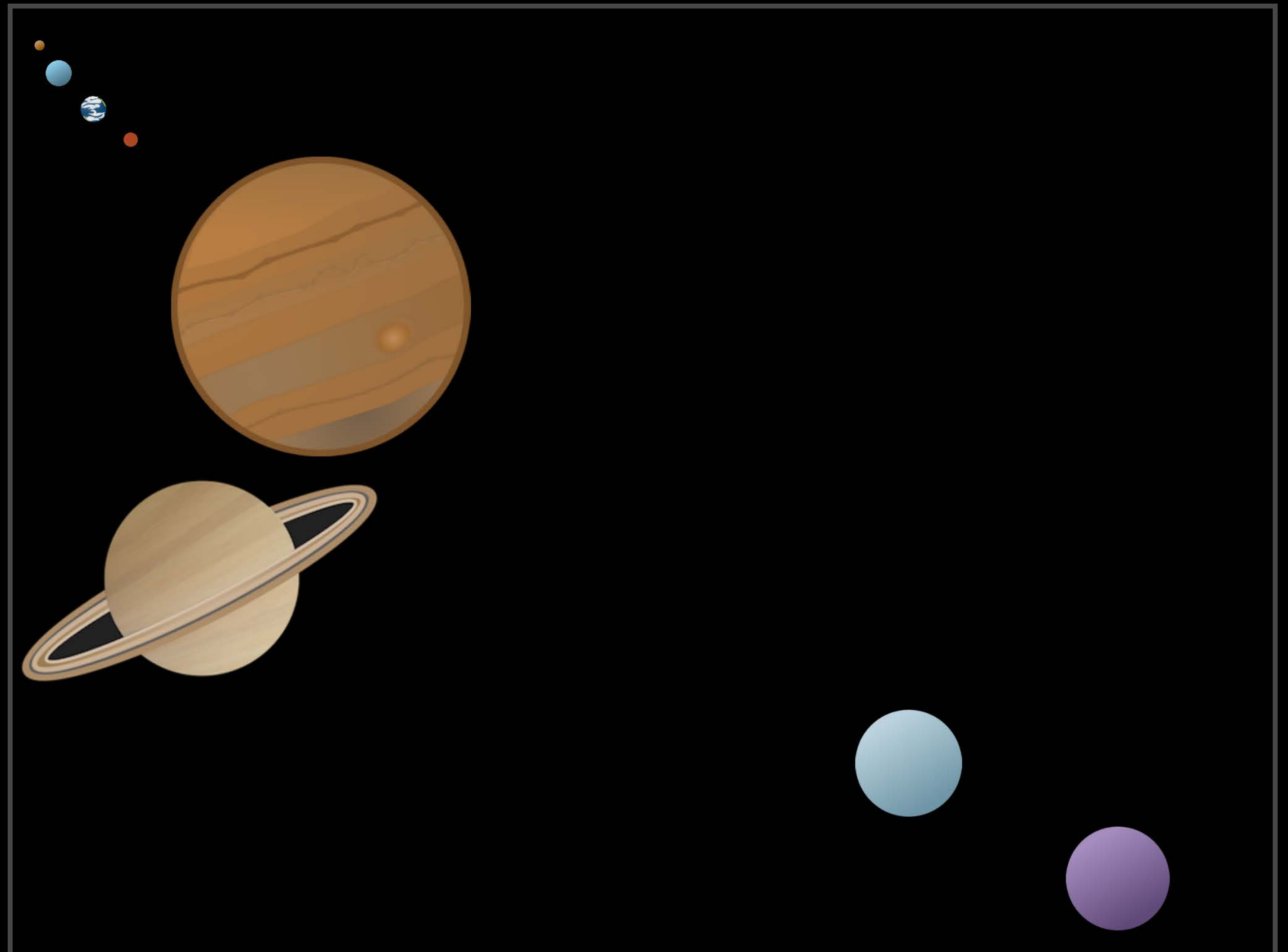


# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints

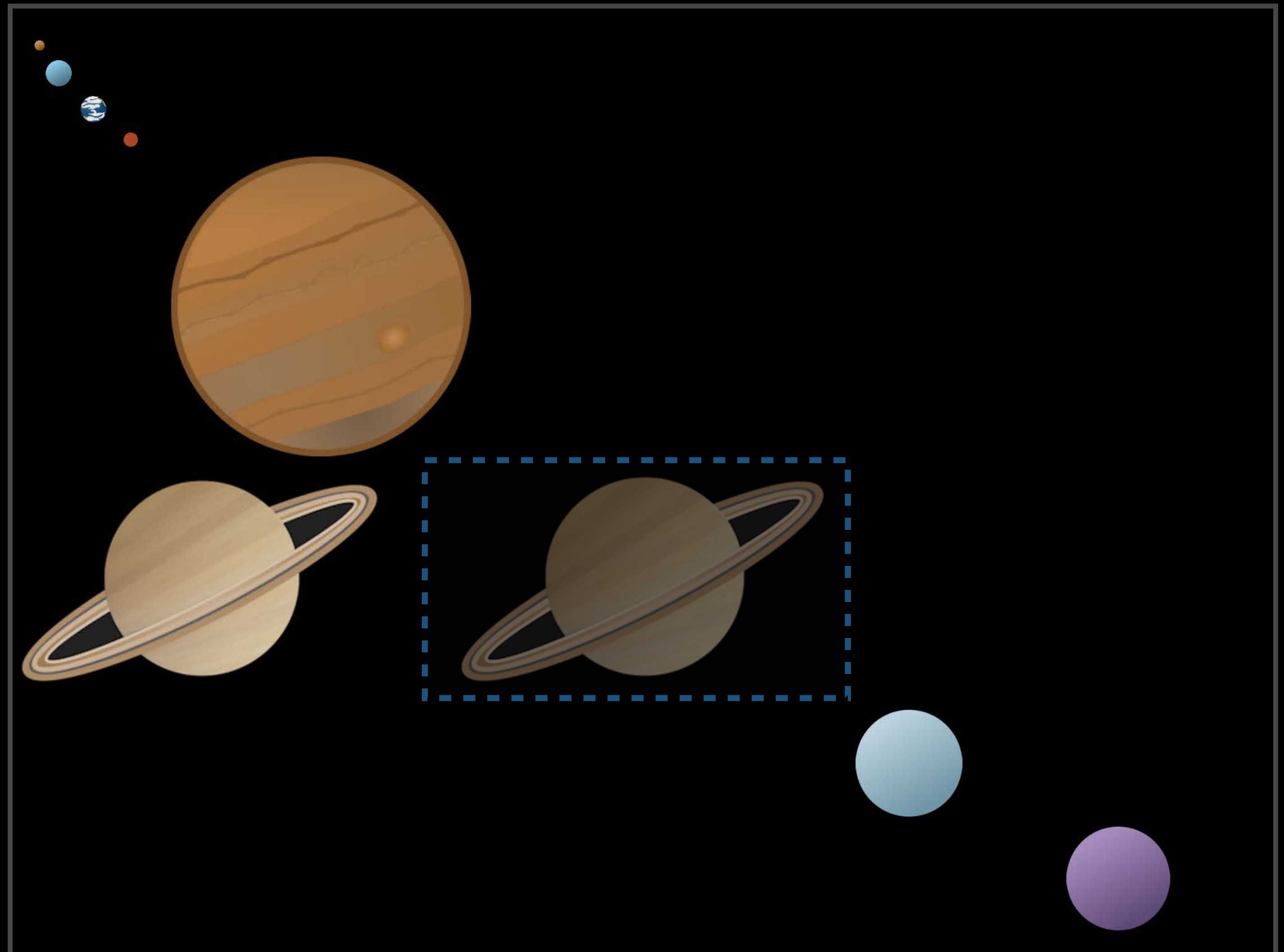


# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints



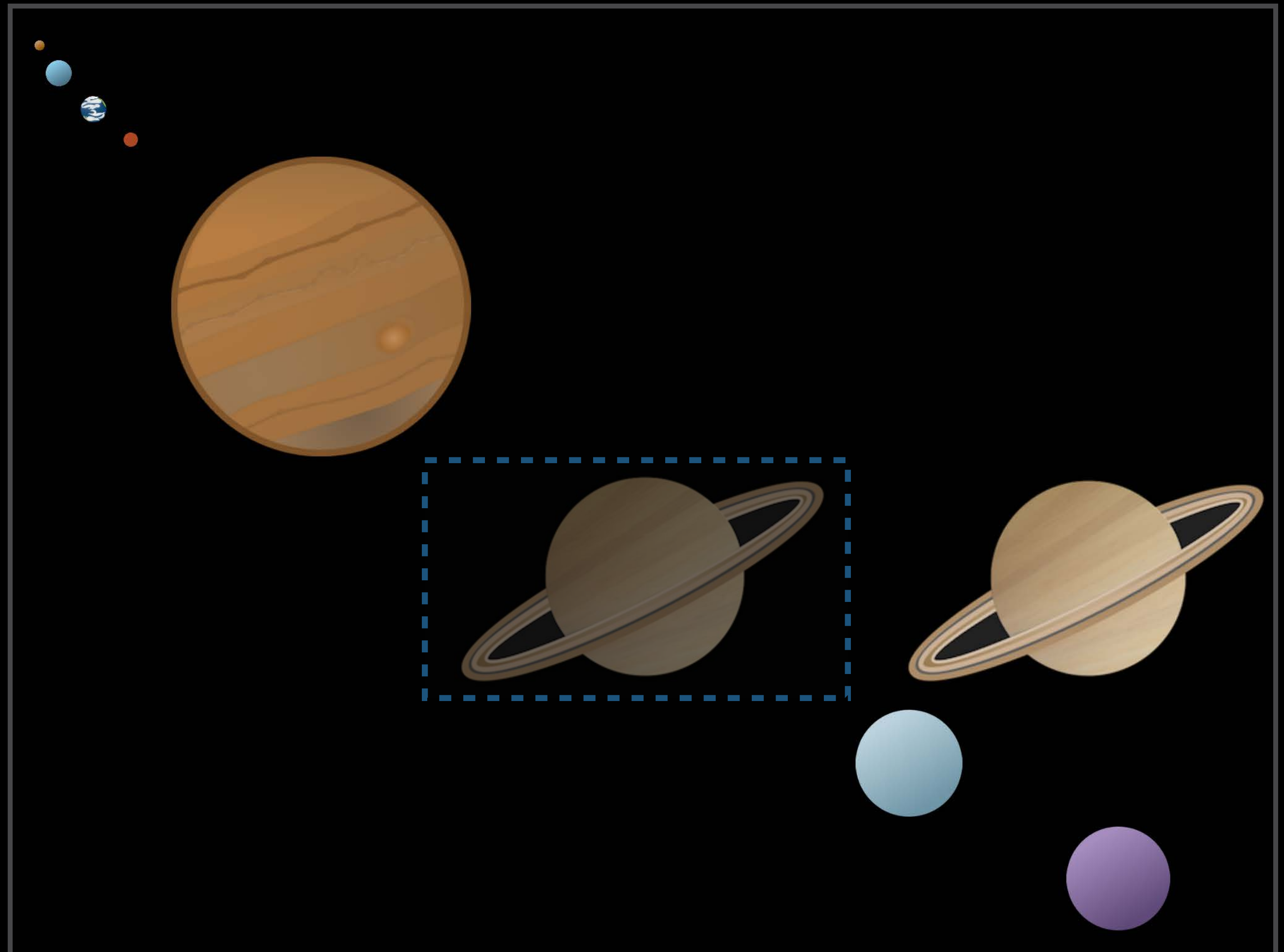


# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints



# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities



Which planet is this?

answer

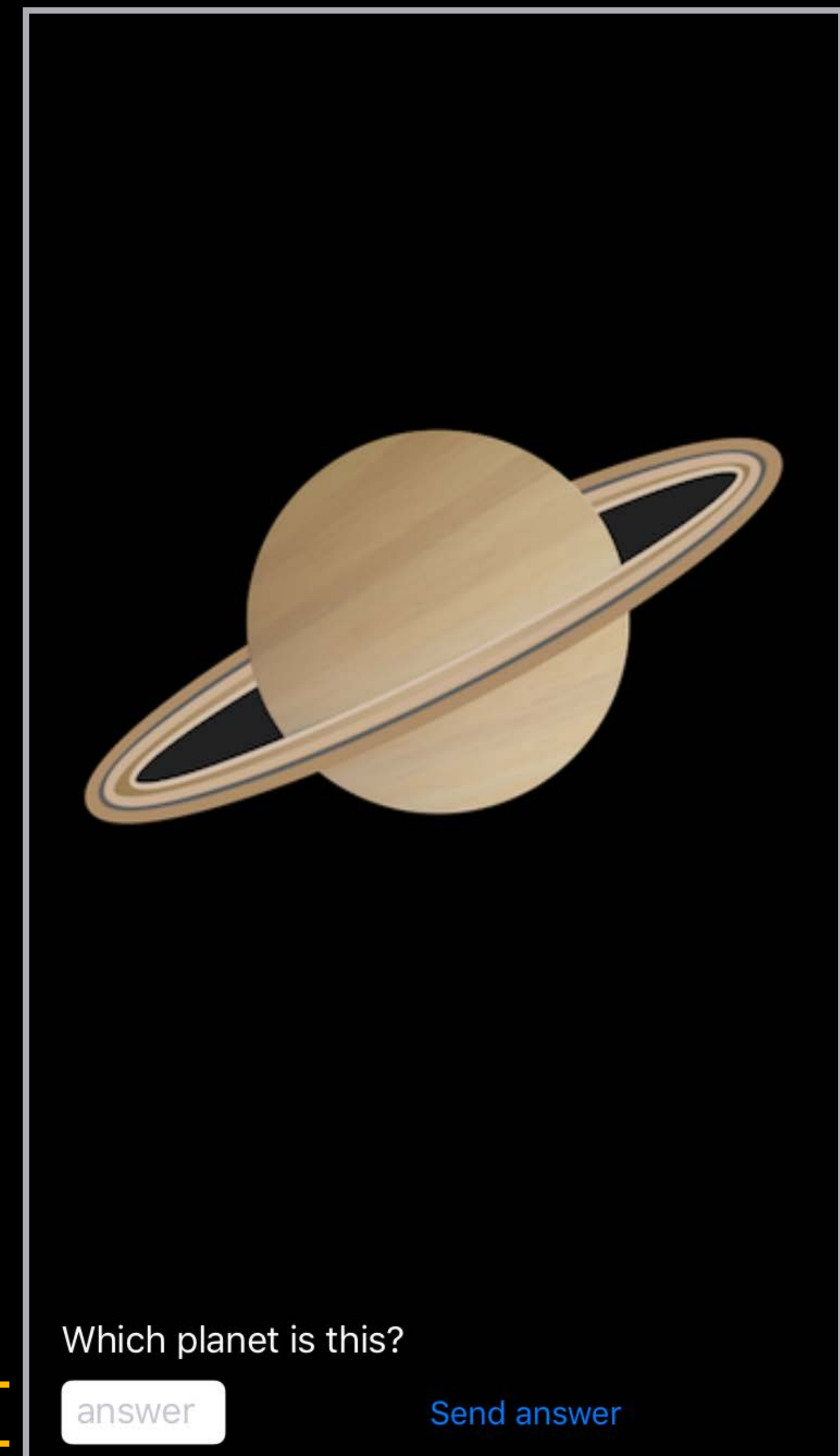
[Send answer](#)

# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities



# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities



Which planet is this?

answer

[Send answer](#)

# Ambiguous Layouts

Why doesn't my layout look right

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Which planet is this?

[Send answer](#)

# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities

answer

[Send answer](#)

# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities

answer

[Send answer](#)



# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities

Content hugging priorities

answer

[Send answer](#)

Both:

`contentHuggingPriority = 250`

`compressionResistancePriority = 750`



# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities

Content hugging priorities

answer

[Send answer](#)

Both:

`contentHuggingPriority = 250`

`compressionResistancePriority = 750`

# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities

Content hugging priorities

answer

[Send answer](#)

Button:

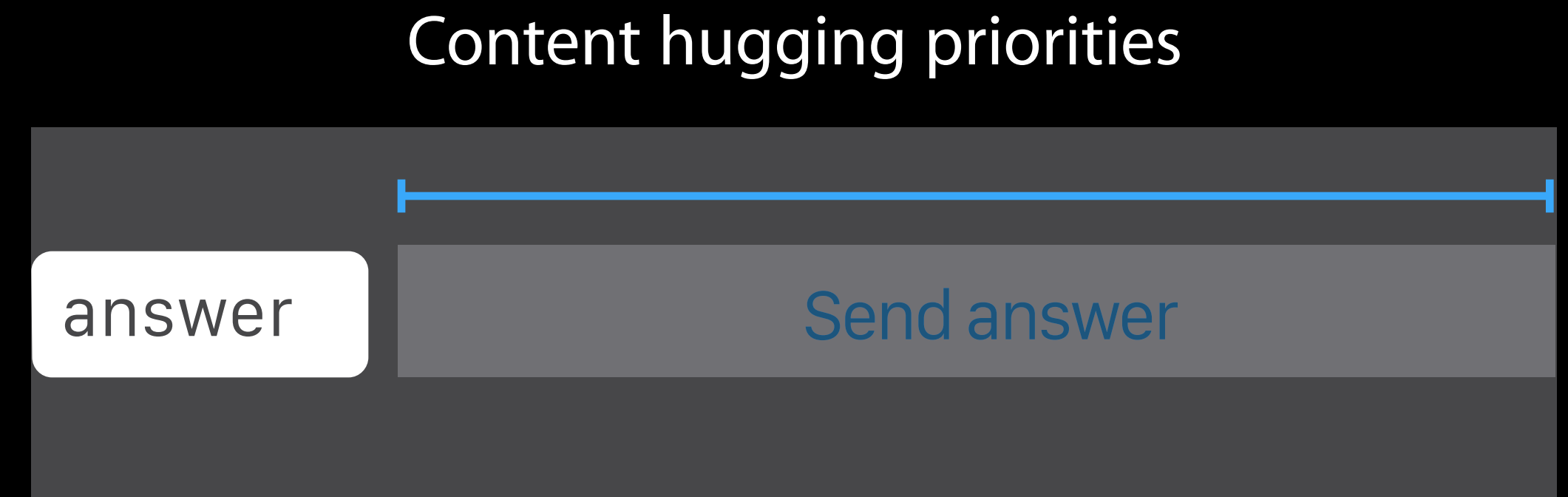
`contentHuggingPriority = 249`

# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities



Button:

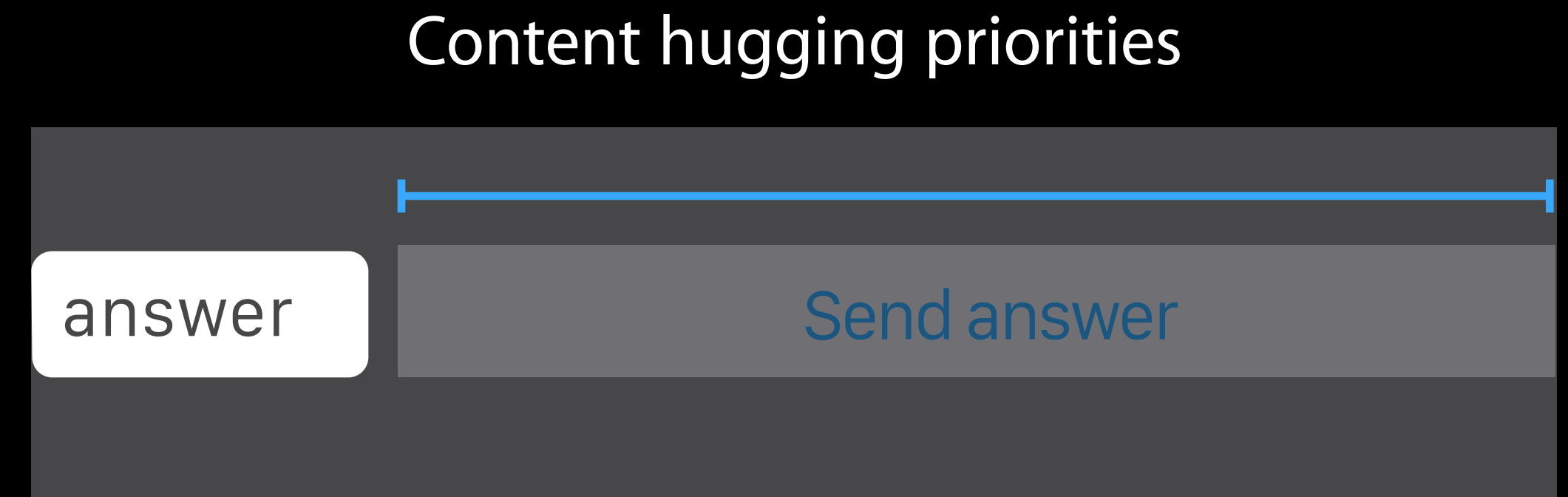
`contentHuggingPriority = 249`

# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities



Button:

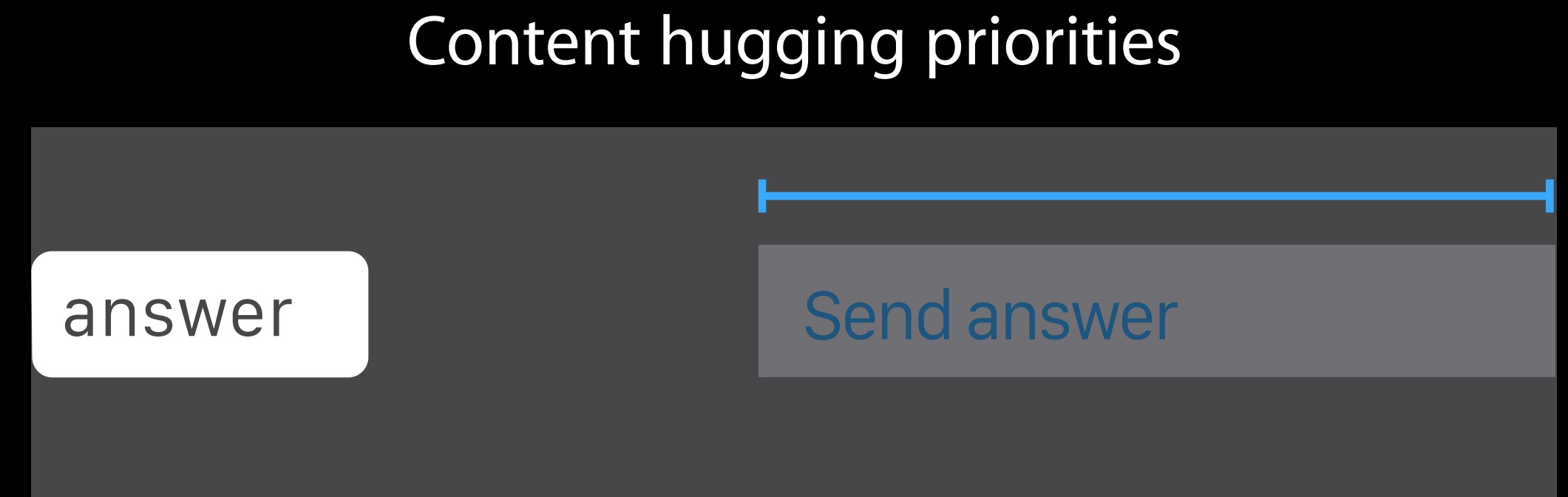
`contentHuggingPriority = 251`

# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities



Button:

`contentHuggingPriority = 251`

# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities

Content hugging priorities



Button:

`contentHuggingPriority = 251`

# Ambiguous Layouts

Why doesn't my layout look right?

Possible causes

- Too few constraints
- Conflicting priorities

Content hugging priorities

answer

Send answer

Button:

`contentHuggingPriority = 251`

# Resolving Ambiguity

Diagnostic tools



# Resolving Ambiguity

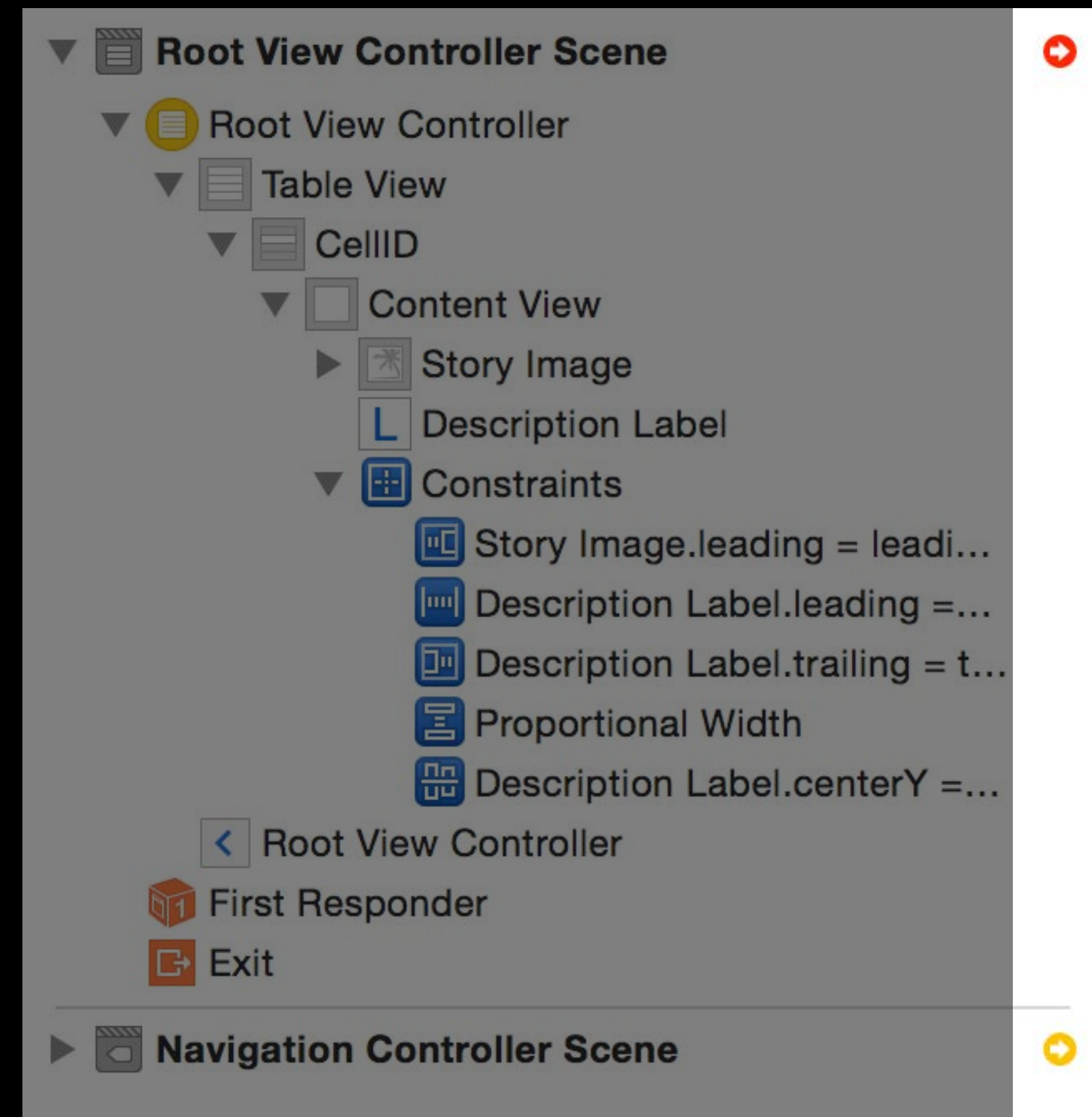
Diagnostic tools

Red and yellow icons in IB

# Resolving Ambiguity

## D diagnostic tools

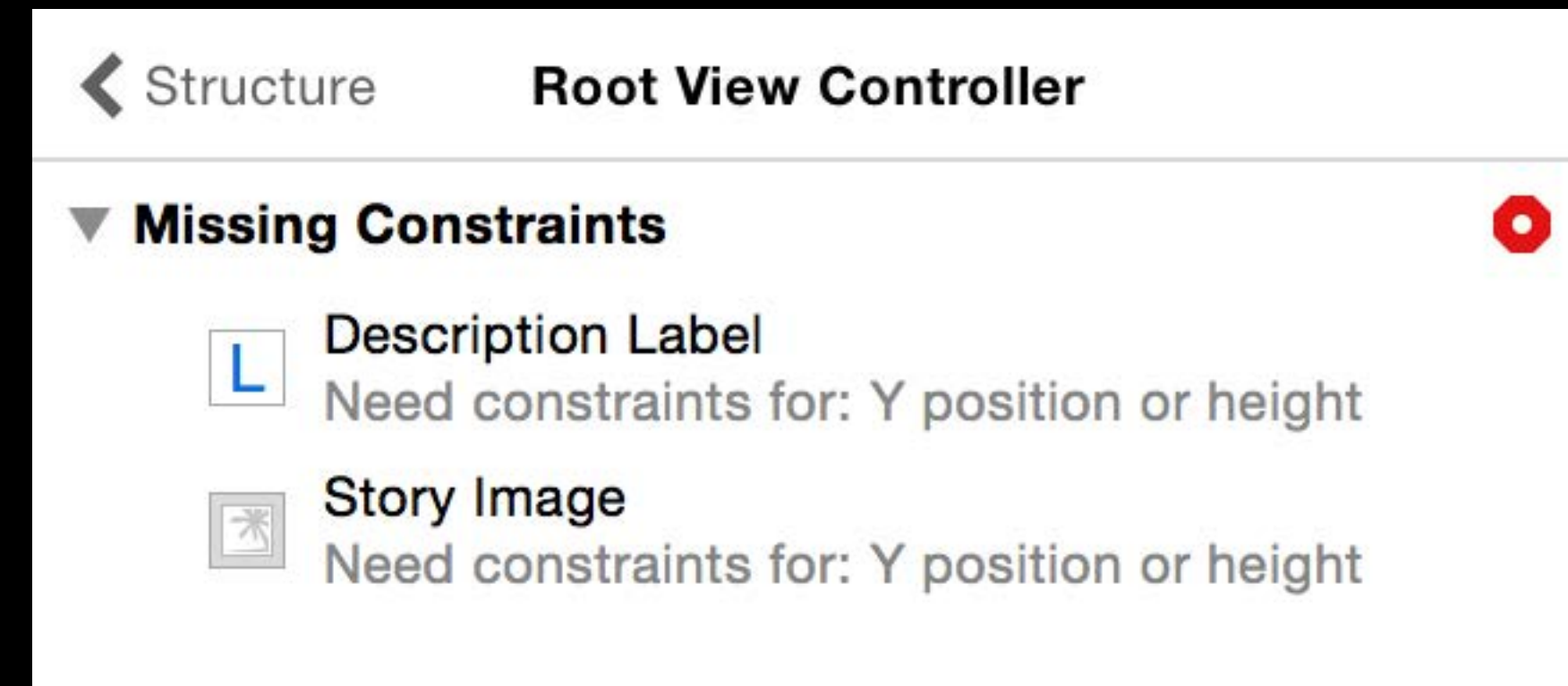
Red and yellow icons in IB



# Resolving Ambiguity

## Diagnostic tools

Red and yellow icons in IB



# Resolving Ambiguity

## D diagnostic tools

Red and yellow icons in IB  
\_autoLayoutTrace

```
(lldb) po [self.view _autoLayoutTrace]
```

```
UIWindow:0x7fe7434a3fe0
```

```
| •UIView:0x7fe7434a8140  
| | * _UILayoutGuide:0x7fe7434a84f0  
| | * _UILayoutGuide:0x7fe7434a90d0  
| | *Mercury:0x7fe7434a7790  
| | *Venus:0x7fe743639380  
| | *Earth:0x7fe74363aae0  
| | *Mars:0x7fe74363bed0  
| | *Jupiter:0x7fe74363ce30  
| | *Saturn:0x7fe74363e220- AMBIGUOUS LAYOUT for Saturn.minX{id: 165}  
| | *Uranus:0x7fe74363f690  
| | *Neptune:0x7fe743640d60
```

Legend:

```
* - is laid out with auto layout  
+ - is laid out manually, but is represented in the layout engine  
because translatesAutoresizingMaskIntoConstraints = YES  
• - layout engine host
```

```
(lldb)
```



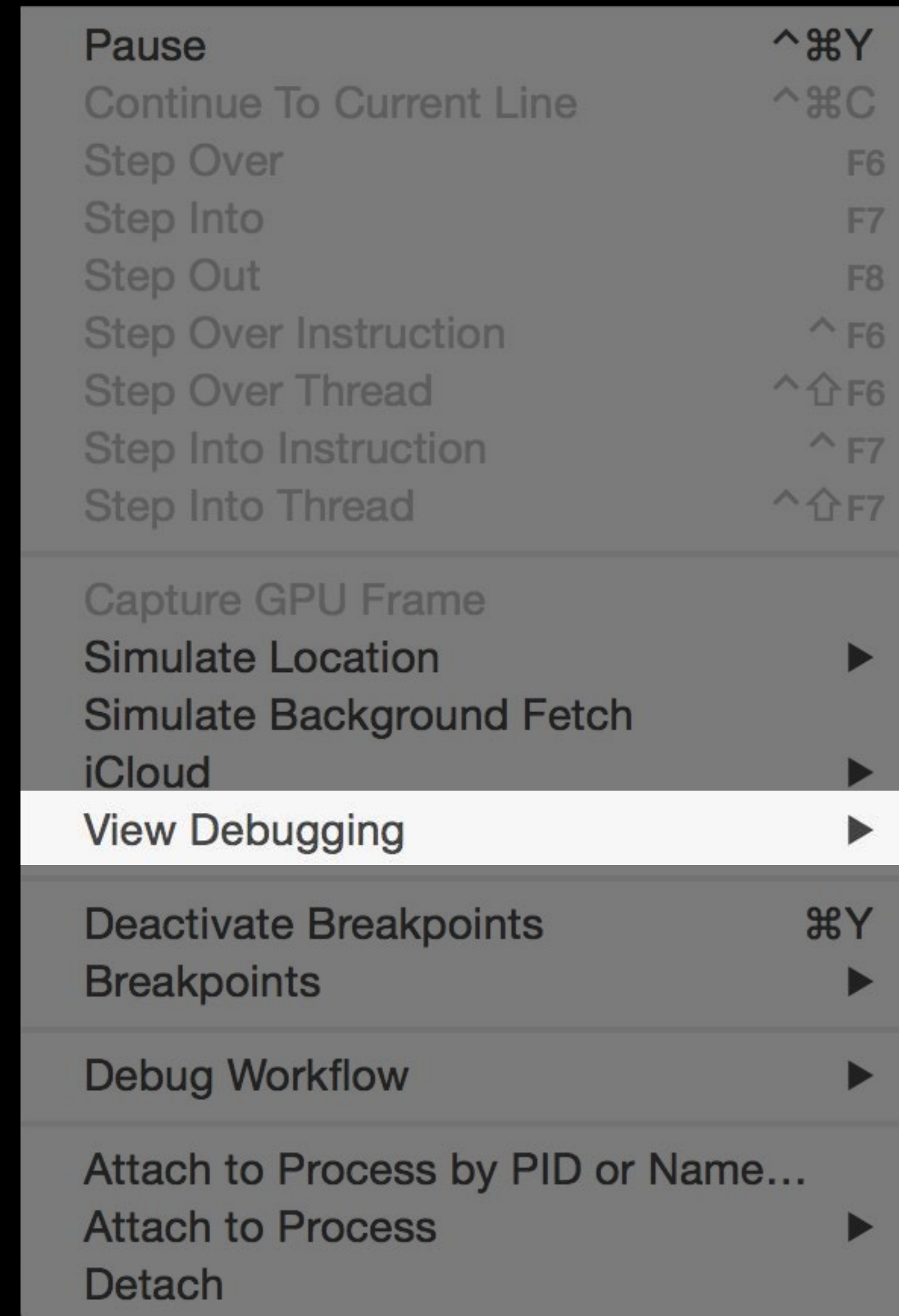
# Resolving Ambiguity

## D diagnostic tools

Red and yellow icons in IB

`_autoLayoutTrace`

Select Debug > View Debugging



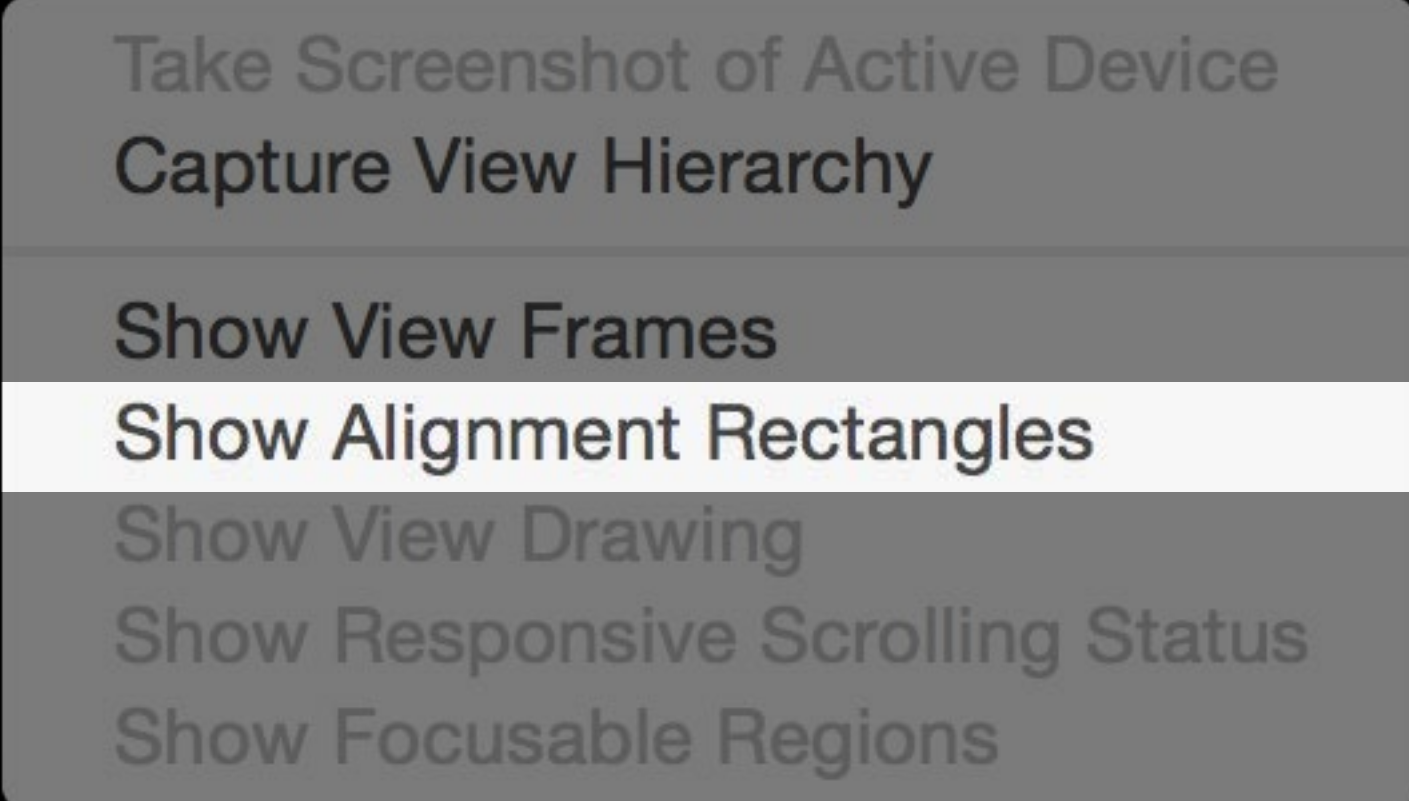
# Resolving Ambiguity

## Dagnostic tools

Red and yellow icons in IB

`_autoLayoutTrace`

Select Debug > View Debugging

A screenshot of the 'View Debugging' menu in Xcode. The menu is displayed as a dark gray list with white text. The option 'Show Alignment Rectangles' is highlighted with a white background. Other options include 'Take Screenshot of Active Device', 'Capture View Hierarchy', 'Show View Frames', 'Show View Drawing', 'Show Responsive Scrolling Status', and 'Show Focusable Regions'.

- Take Screenshot of Active Device
- Capture View Hierarchy
- Show View Frames
- Show Alignment Rectangles
- Show View Drawing
- Show Responsive Scrolling Status
- Show Focusable Regions


# Resolving Ambiguity

## Diagnostic tools

Red and yellow icons in IB

`_autoLayoutTrace`

Select Debug > View Debugging



Which planet is this?

answer

Send answer

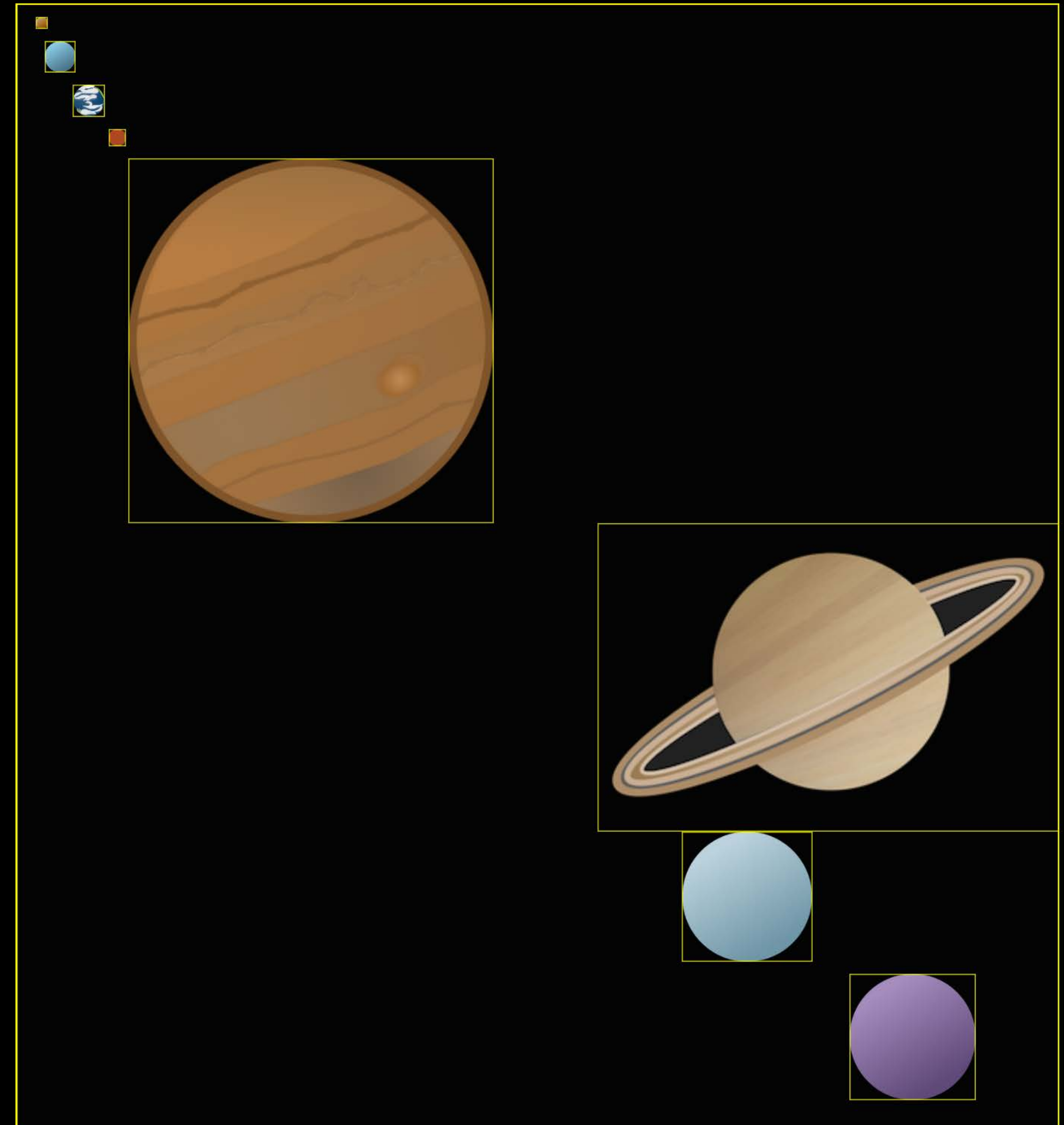
# Resolving Ambiguity

## Dagnostic tools

Red and yellow icons in IB

`_autoLayoutTrace`

Select Debug > View Debugging





# Resolving Ambiguity

## D diagnostic tools

Red and yellow icons in IB

`_autoLayoutTrace`

Select Debug > View Debugging

Look in the view debugger



# Resolving Ambiguity

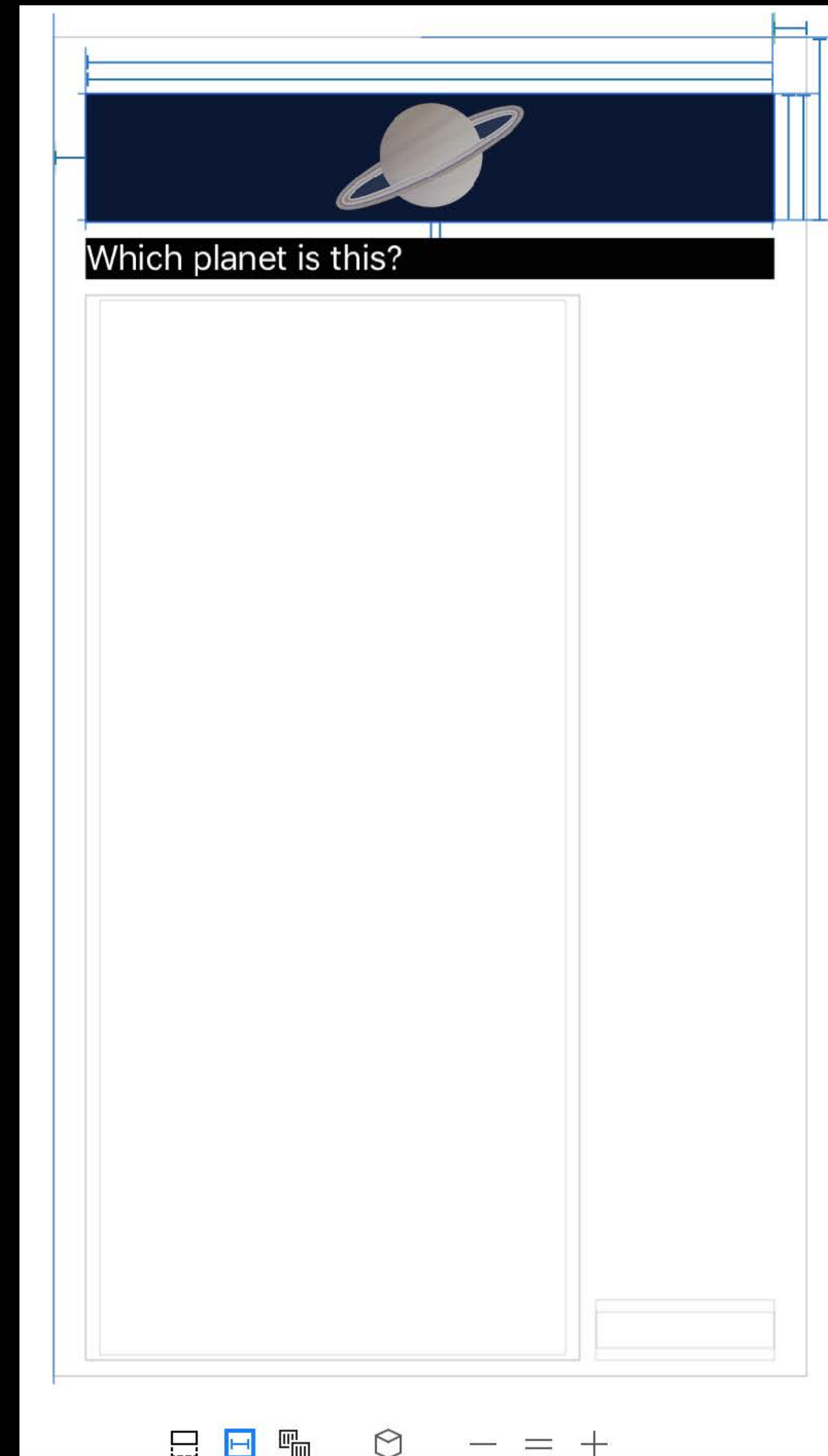
## Dagnostic tools

Red and yellow icons in IB

`_autoLayoutTrace`

Select Debug > View Debugging

Look in the view debugger



# Resolving Ambiguity

## D diagnostic tools

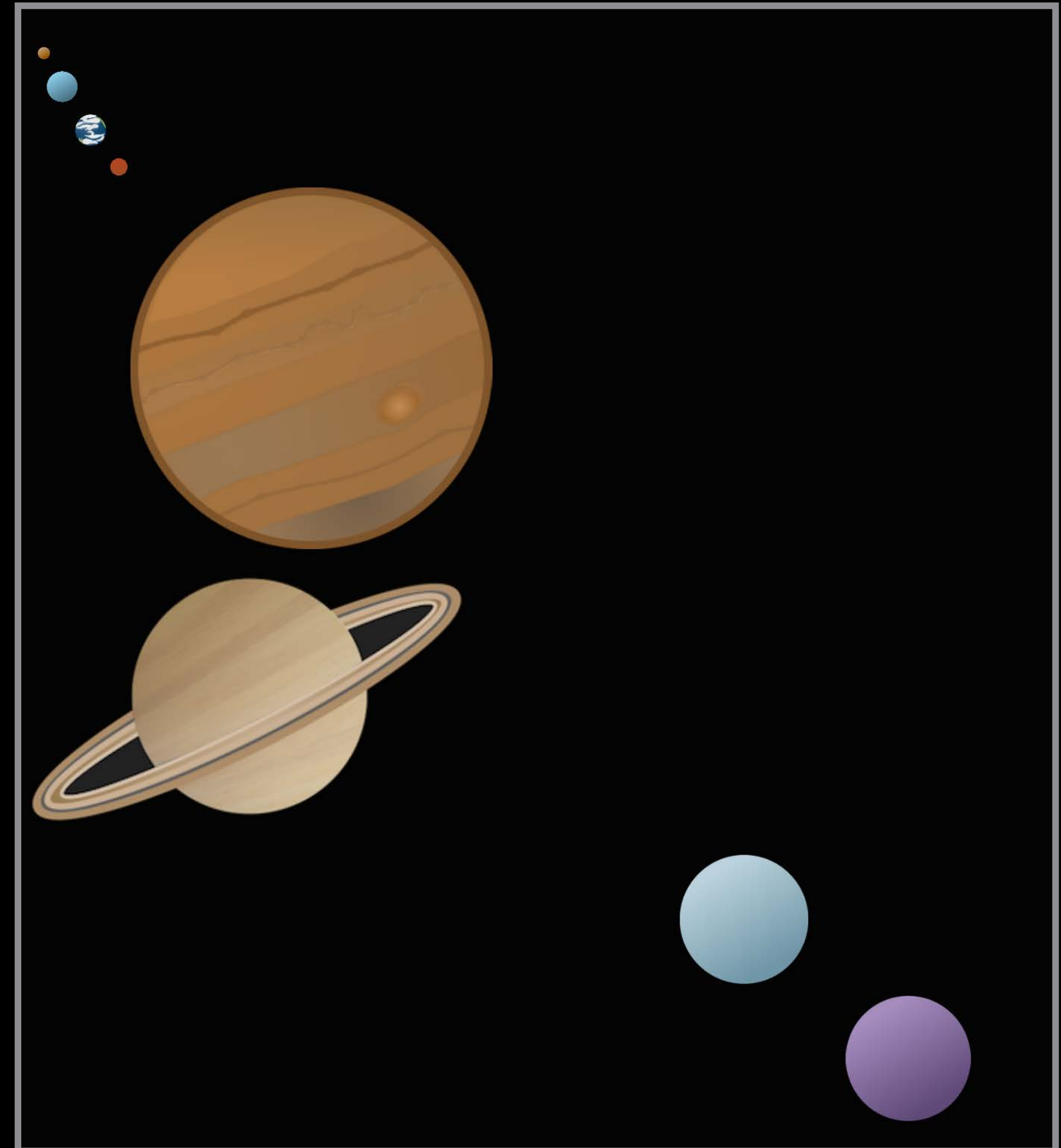
Red and yellow icons in IB

`_autoLayoutTrace`

Select Debug > View Debugging

Look in the view debugger

`exerciseAmbiguityInLayout`



# Resolving Ambiguity

## D diagnostic tools

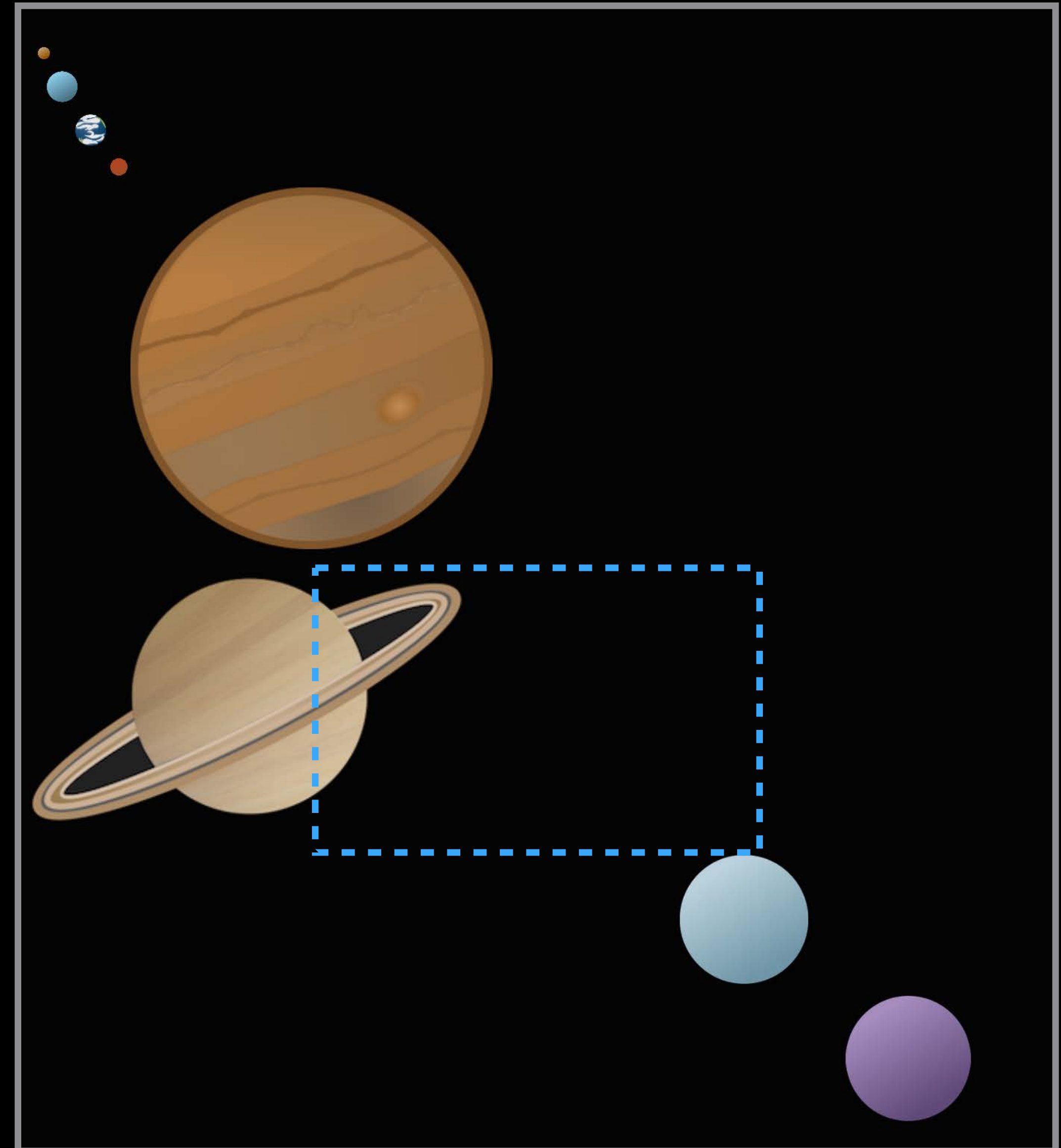
Red and yellow icons in IB

`_autoLayoutTrace`

Select Debug > View Debugging

Look in the view debugger

`exerciseAmbiguityInLayout`



# Resolving Ambiguity

## D diagnostic tools

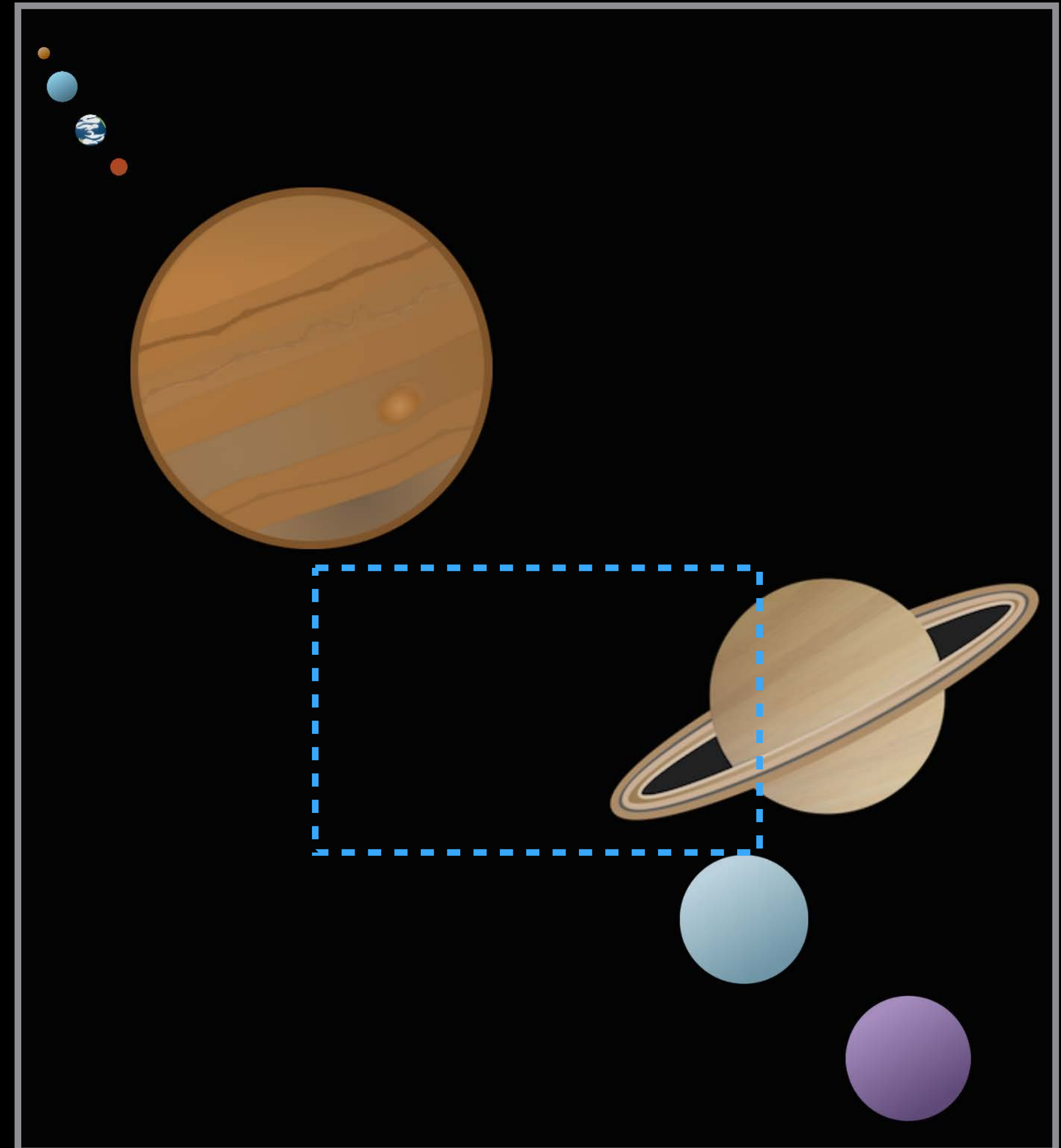
Red and yellow icons in IB

`_autoLayoutTrace`

Select Debug > View Debugging

Look in the view debugger

`exerciseAmbiguityInLayout`



*Demo*

Ambiguous layouts

# Debugging Your Layout

# Debugging Your Layout

Think about what information the engine needs



# Debugging Your Layout

Think about what information the engine needs

Use the logs when constraints are unsatisfiable

# Debugging Your Layout

Think about what information the engine needs

Use the logs when constraints are unsatisfiable

- Add identifiers for constraints and views

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Think about what information the engine needs

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Check for ambiguity regularly

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Think about what information the engine needs

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Use tools to help resolve issues

# Debugging Your Layout

Think about what information the engine needs

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- Icons in Interface Builder

# Debugging Your Layout

Think about what information the engine needs

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- Icons in Interface Builder
- View debugger

# Debugging Your Layout

Think about what information the engine needs

Use the logs when constraints are unsatisfiable

- Add identifiers for constraints and views

Check for ambiguity regularly

Use tools to help resolve issues

- Icons in Interface Builder
- View debugger
- Methods in lldb

# Summary

## Mysteries revealed

### Part 1, Morning

- Maintainable Layouts
- Changing Constraints
- View Sizing
- Self-Sizing Table View Cells
- Priorities
- Alignment



# Summary

## Mysteries revealed

### Part 1

- Maintainable Layouts
- Changing Constraints
- View Sizing
- Self-Sizing Table View Cells
- Priorities
- Alignment

### Part 2, Afternoon

# Summary

## Mysteries revealed

### Part 1

- Maintainable Layouts
- Changing Constraints
- View Sizing
- Self-Sizing Table View Cells
- Priorities
- Alignment

### Part 2, Afternoon

- The Layout Cycle

# Summary

## Mysteries revealed

### Part 1

- Maintainable Layouts
- Changing Constraints
- View Sizing
- Self-Sizing Table View Cells
- Priorities
- Alignment

### Part 2, Afternoon

- The Layout Cycle
- Legacy Layout

# Summary

## Mysteries revealed

### Part 1

- Maintainable Layouts
- Changing Constraints
- View Sizing
- Self-Sizing Table View Cells
- Priorities
- Alignment

### Part 2, Afternoon

- The Layout Cycle
- Legacy Layout
- Constraint Creation

# Summary

## Mysteries revealed

### Part 1

- Maintainable Layouts
- Changing Constraints
- View Sizing
- Self-Sizing Table View Cells
- Priorities
- Alignment

### Part 2, Afternoon

- The Layout Cycle
- Legacy Layout
- Constraint Creation
- Constraining Negative Space

# Summary

## Mysteries revealed

### Part 1

- Maintainable Layouts
- Changing Constraints
- View Sizing
- Self-Sizing Table View Cells
- Priorities
- Alignment

### Part 2, Afternoon

- The Layout Cycle
- Legacy Layout
- Constraint Creation
- Constraining Negative Space
- Unsatisfiable Constraints

# Summary

## Mysteries revealed

### Part 1

- Maintainable Layouts
- Changing Constraints
- View Sizing
- Self-Sizing Table View Cells
- Priorities
- Alignment

### Part 2, Afternoon

- The Layout Cycle
- Legacy Layout
- Constraint Creation
- Constraining Negative Space
- Unsatisfiable Constraints
- Resolving Ambiguity

# More Information

## Documentation and Videos

Swift Language Documentation

<http://developer.apple.com/swift>

## Technical Support

Apple Developer Forums

<http://developer.apple.com/forums>

## Sample Code

AstroLayout

[http://developer.apple.com/library/  
prerelease/ios/samplecode/AstroLayout](http://developer.apple.com/library/prerelease/ios/samplecode/AstroLayout)

## General Inquiries

Paul Marcos, App Frameworks Evangelist

[pmarcos@apple.com](mailto:pmarcos@apple.com)



# Related Sessions

Mysteries of Auto Layout, Part 1	Presidio	Thursday 11:00AM
What's New in Cocoa	Presidio	Tuesday 1:30PM
What's New in UIKit Dynamics and Visual Effects	Mission	Friday 10:00AM
Cocoa Touch Best Practices	Presidio	Friday 1:30PM
What's New in Internationalization	Pacific Heights	Friday 9:00 AM
New UIKit Support for International User Interfaces	Nob Hill	Thursday 2:30PM

# Lab

---

Interface Builder and Auto Layout Lab

---

Developer Tools  
Lab C

Thursday 2:30PM

