Understanding Constraints, Relationships, and Priorities

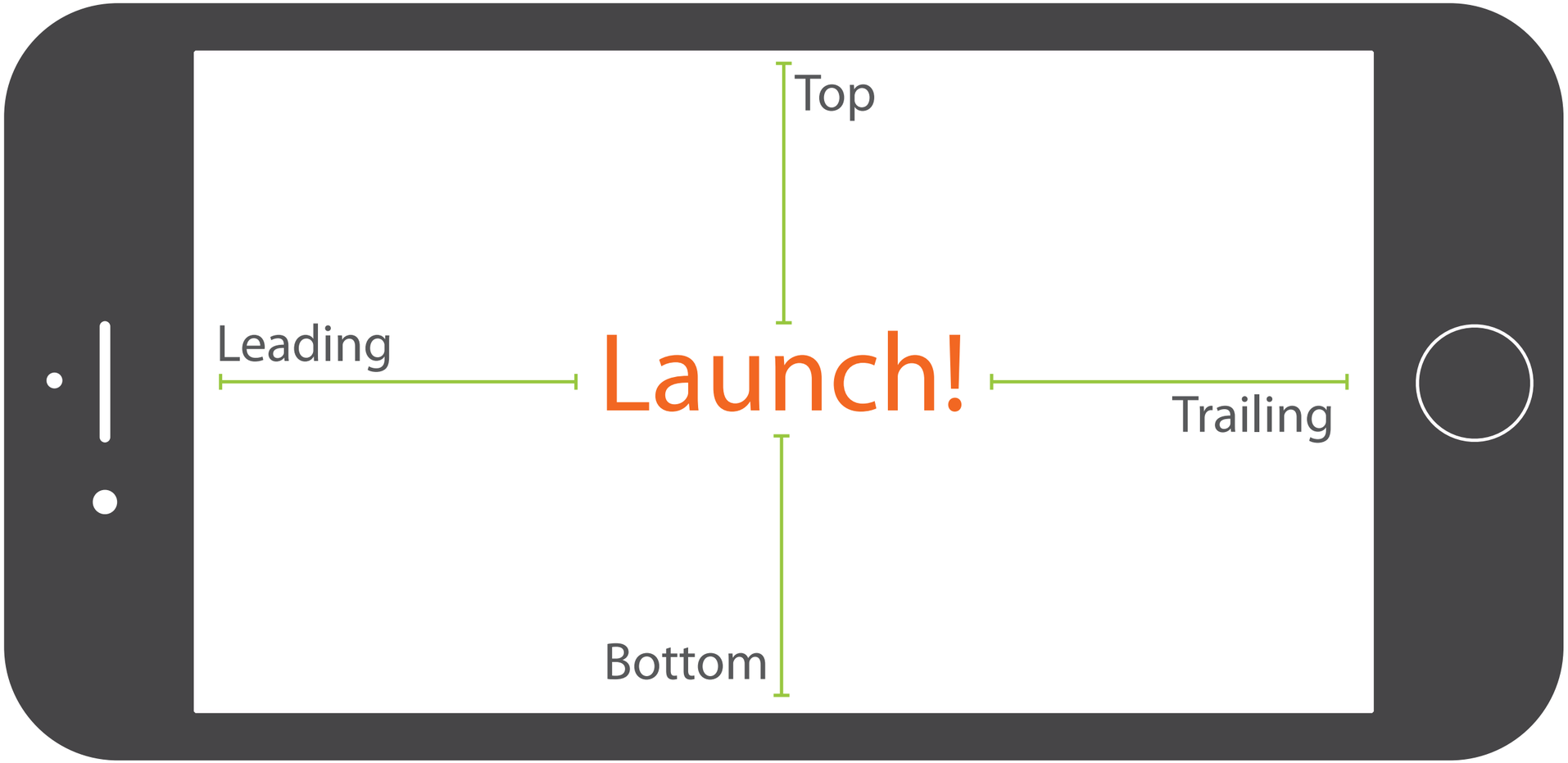
James Wilson

www.noesisingenuity.com | @jam_wils

Module Overview

- Common Constraints
- Key Components
- How to Build Constraints
- Satisfying the Constraints
- Linear Equations
- Constraint Demo

The Constraints



The Constraints

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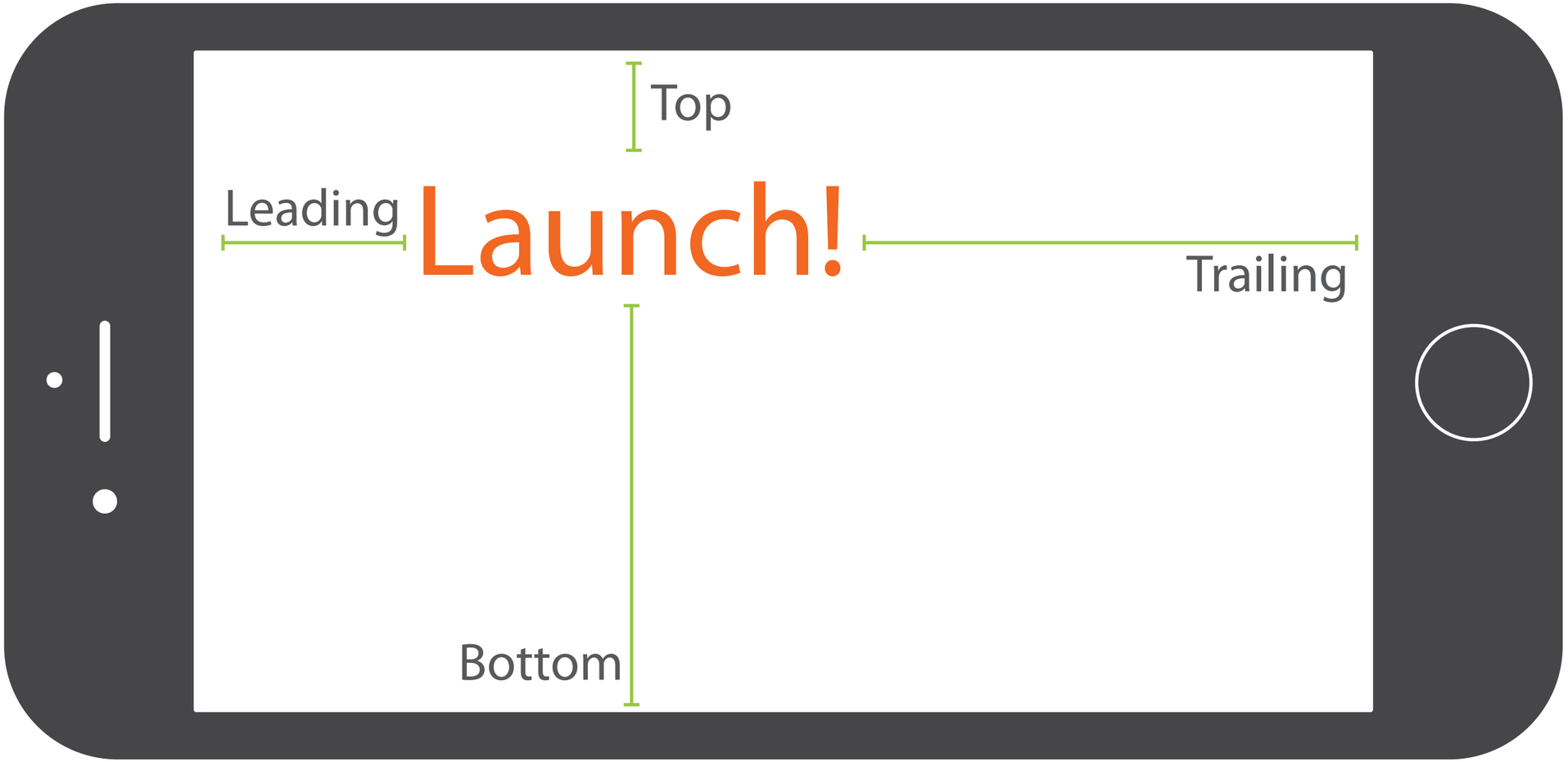
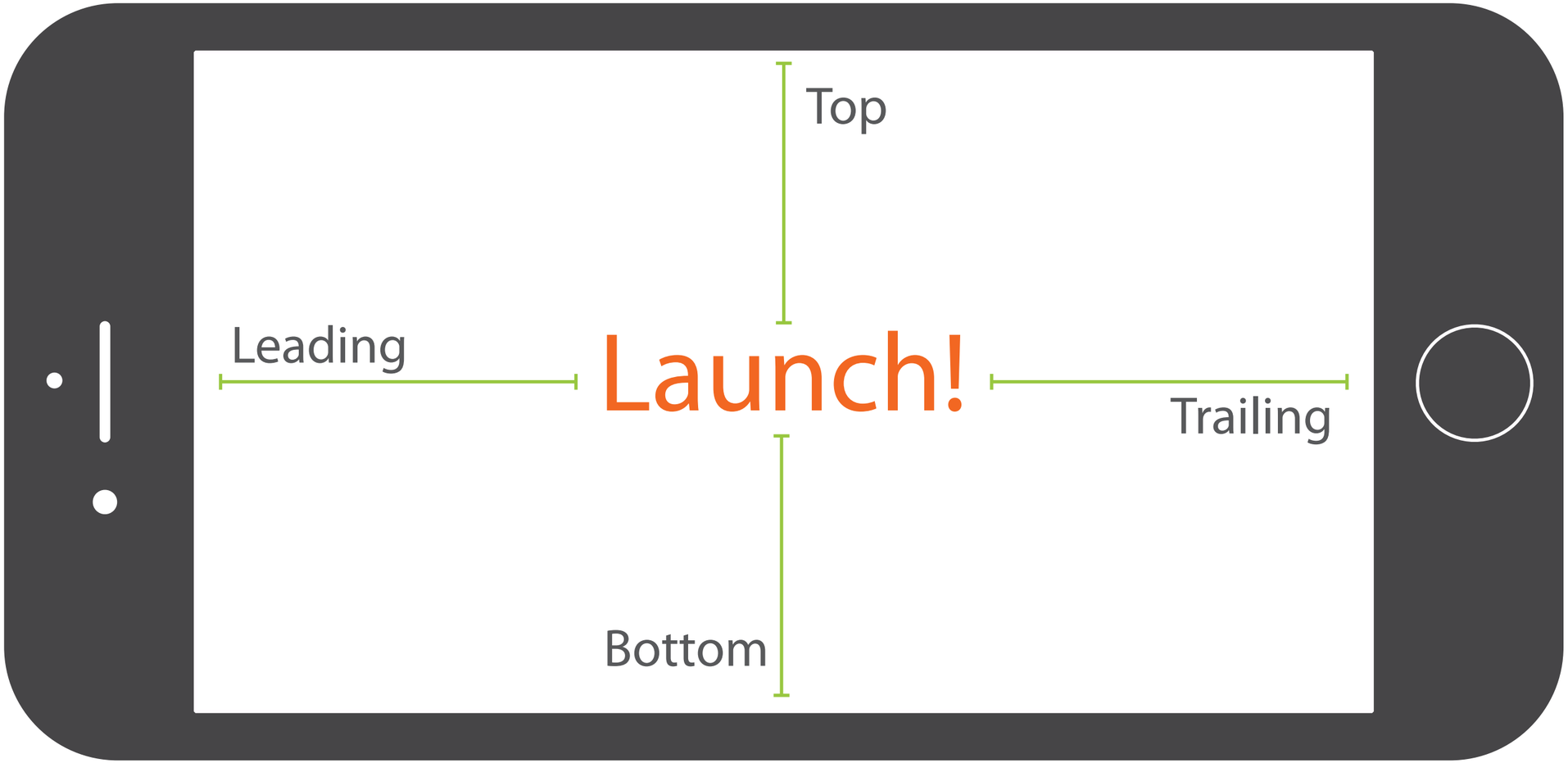
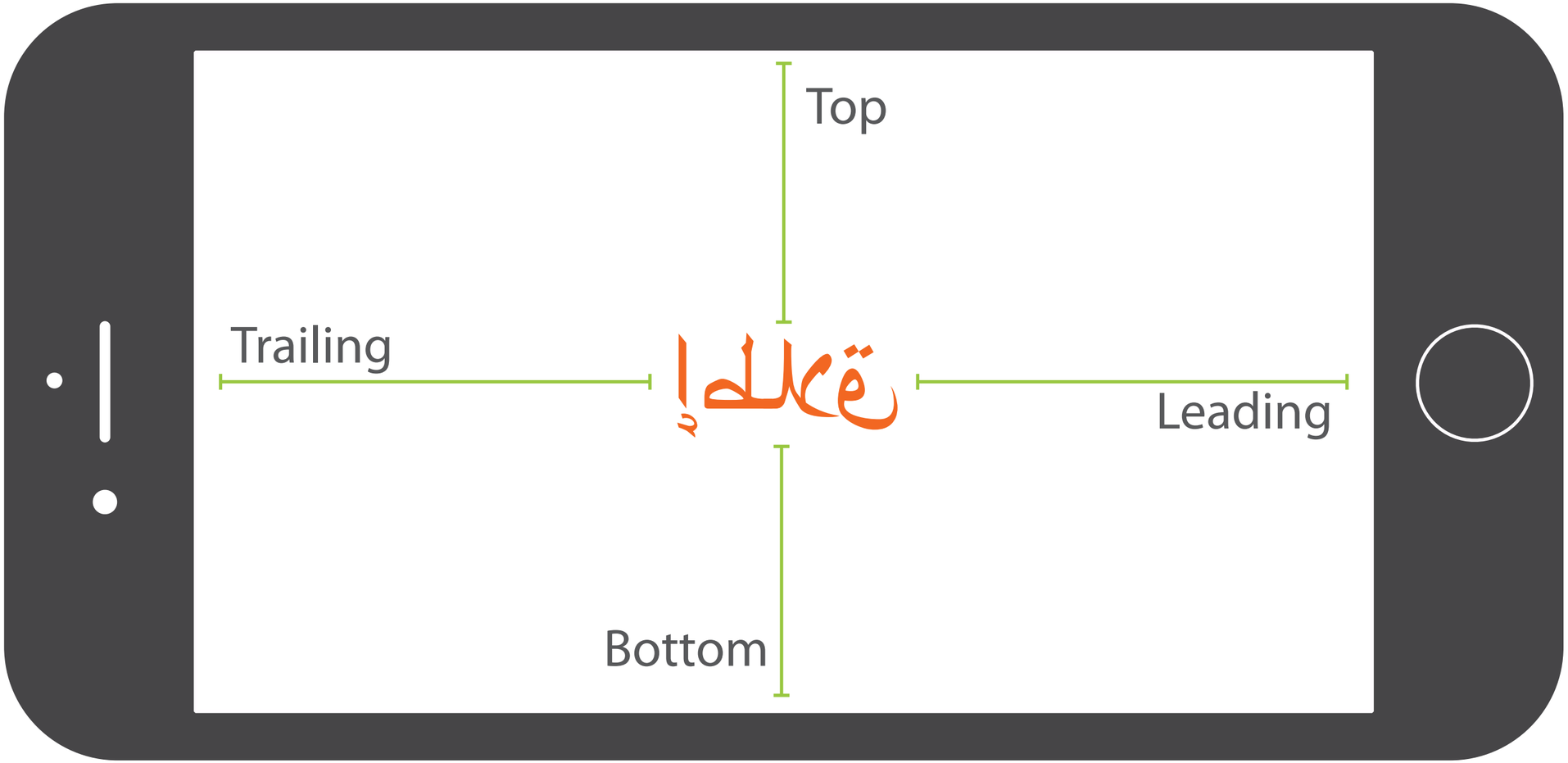


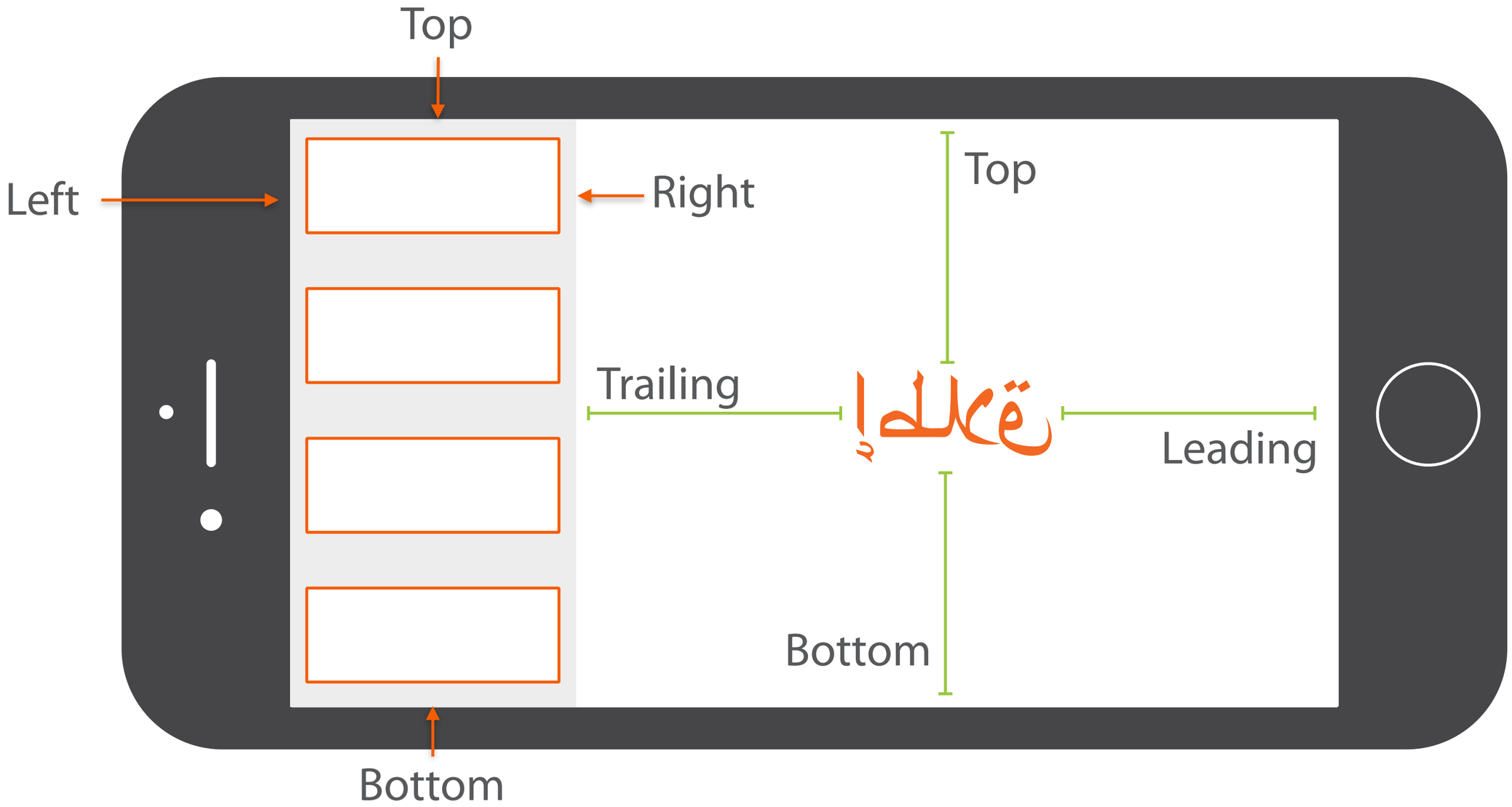
The Constraints



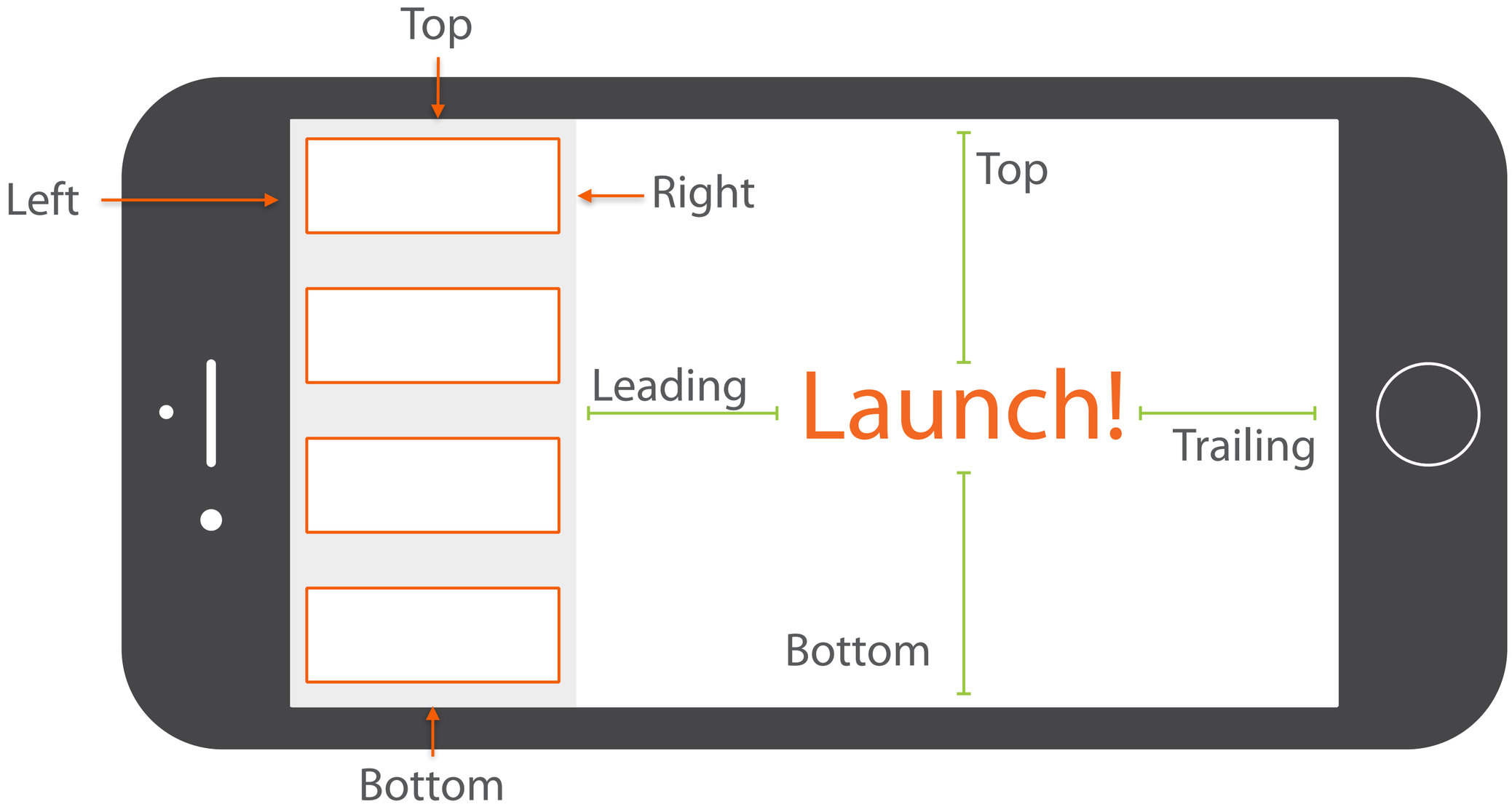
The Constraints



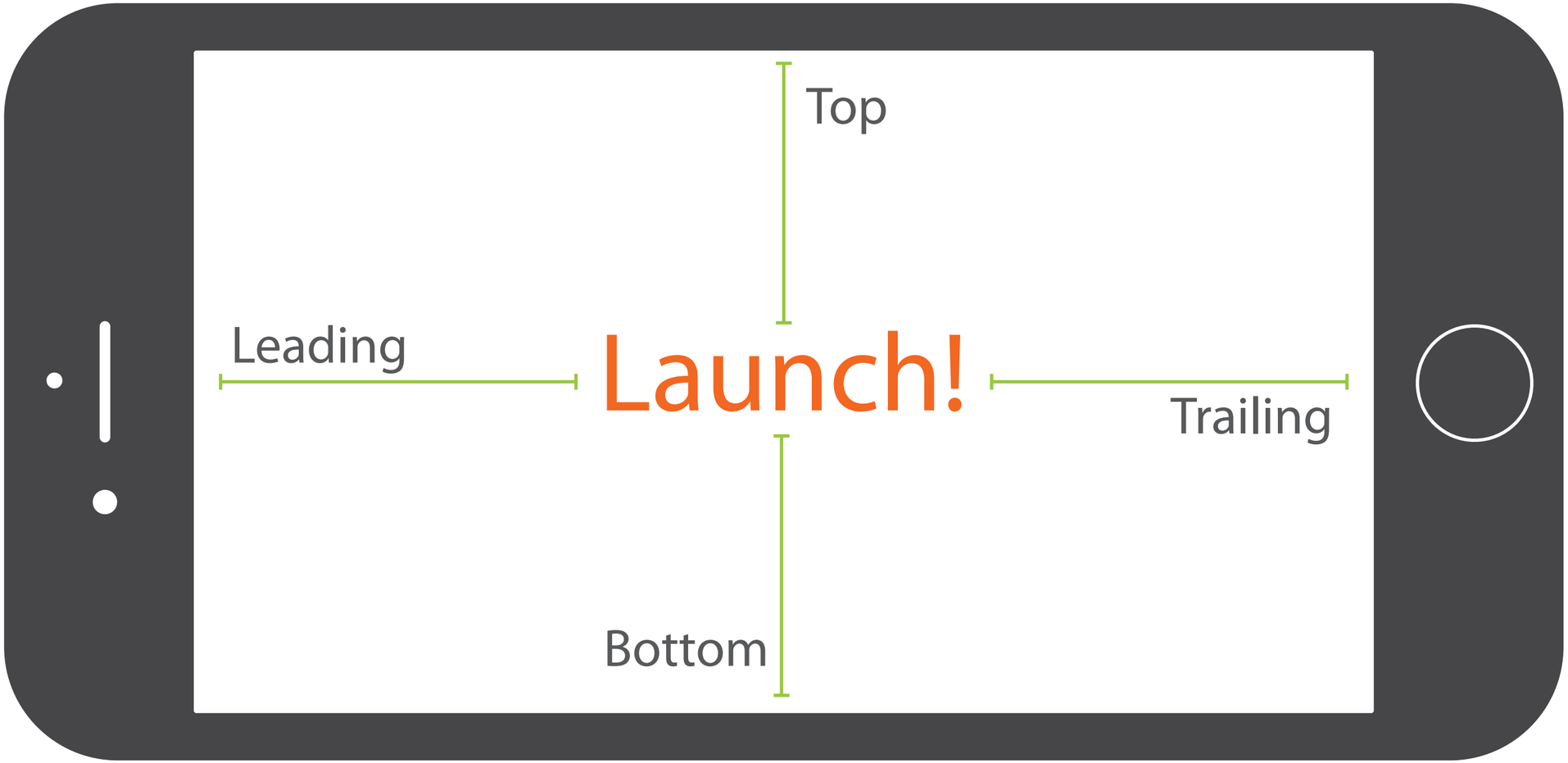
The Constraints



The Constraints



The Constraints



The Constraints

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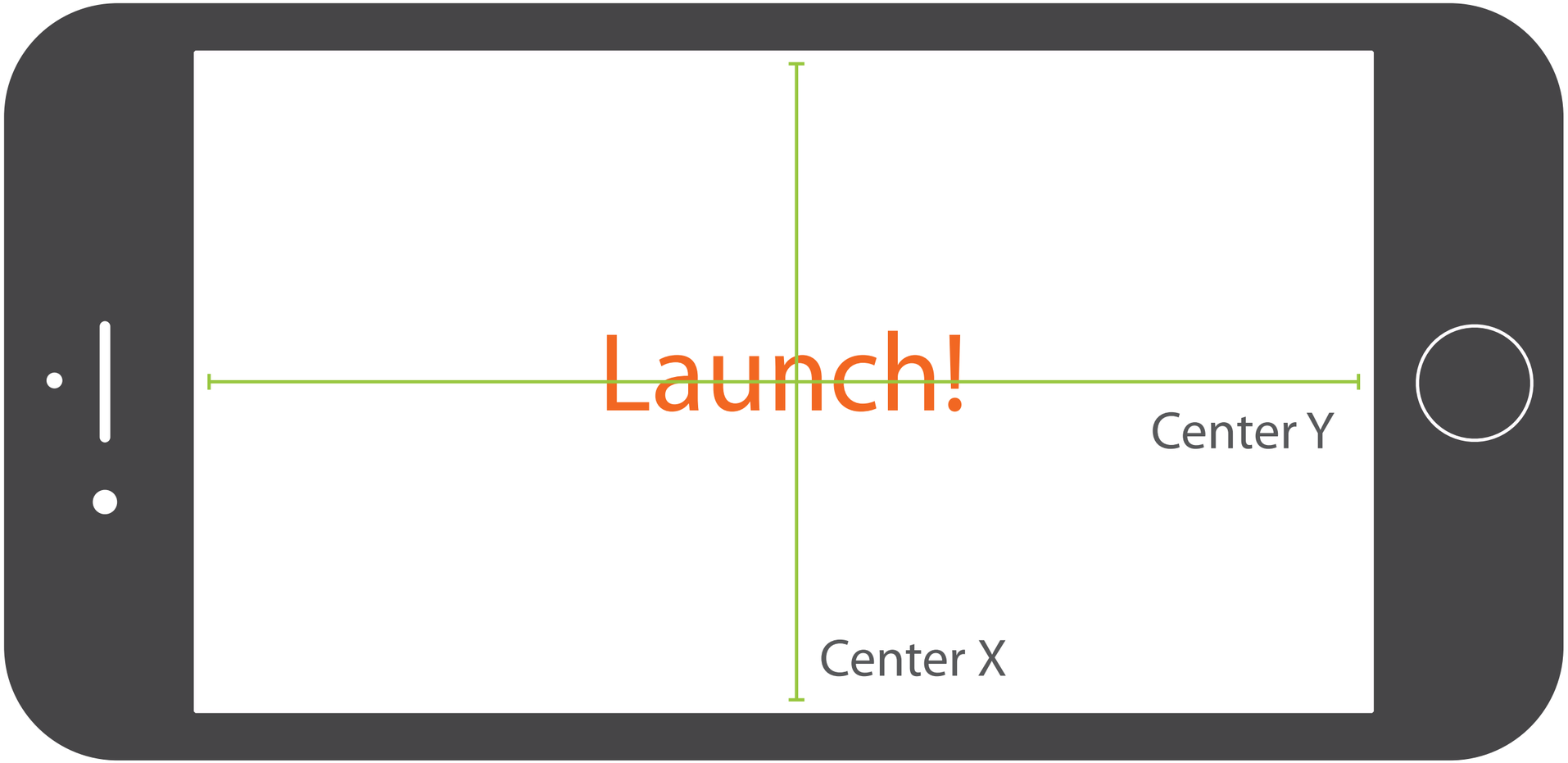
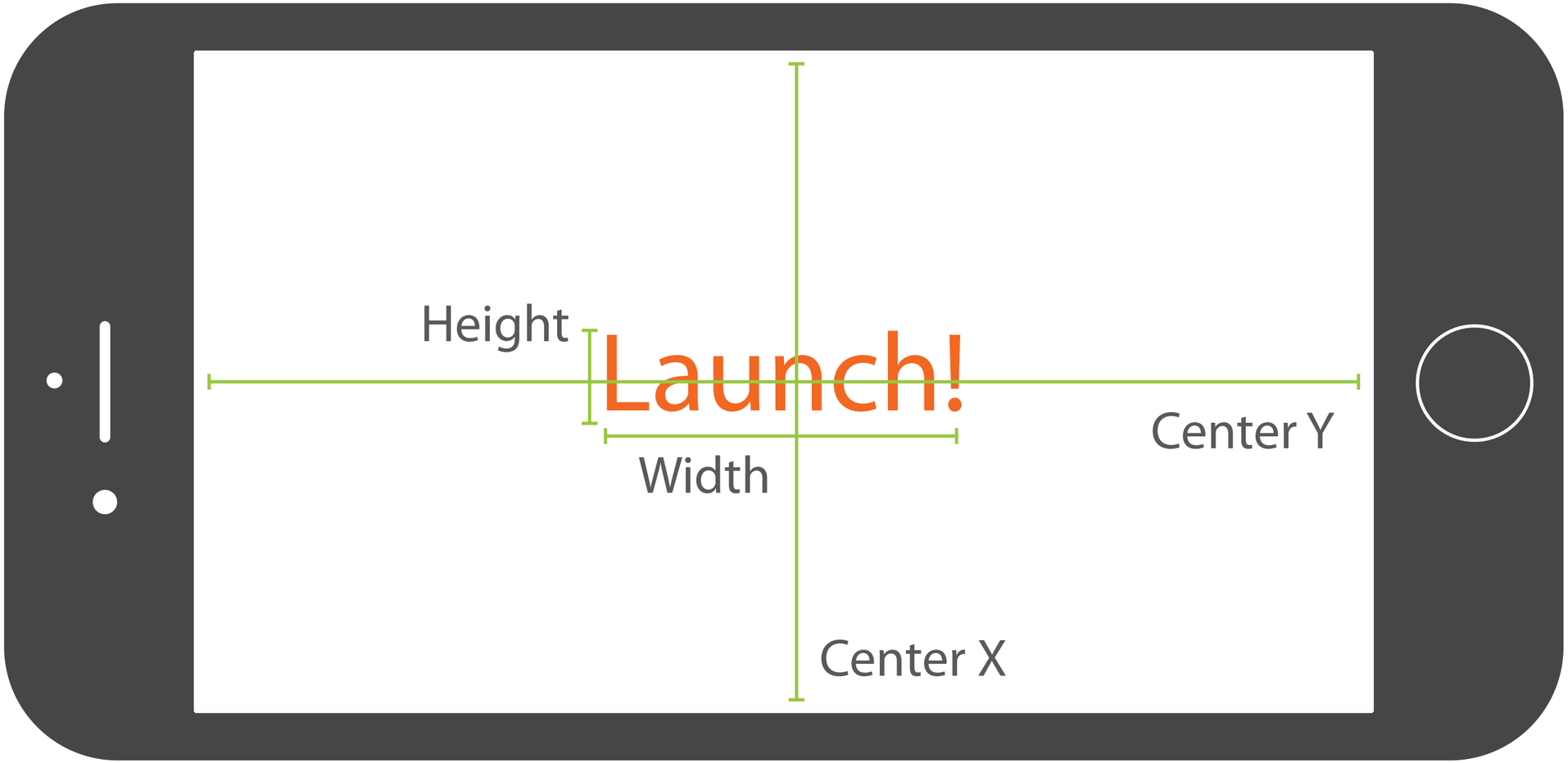
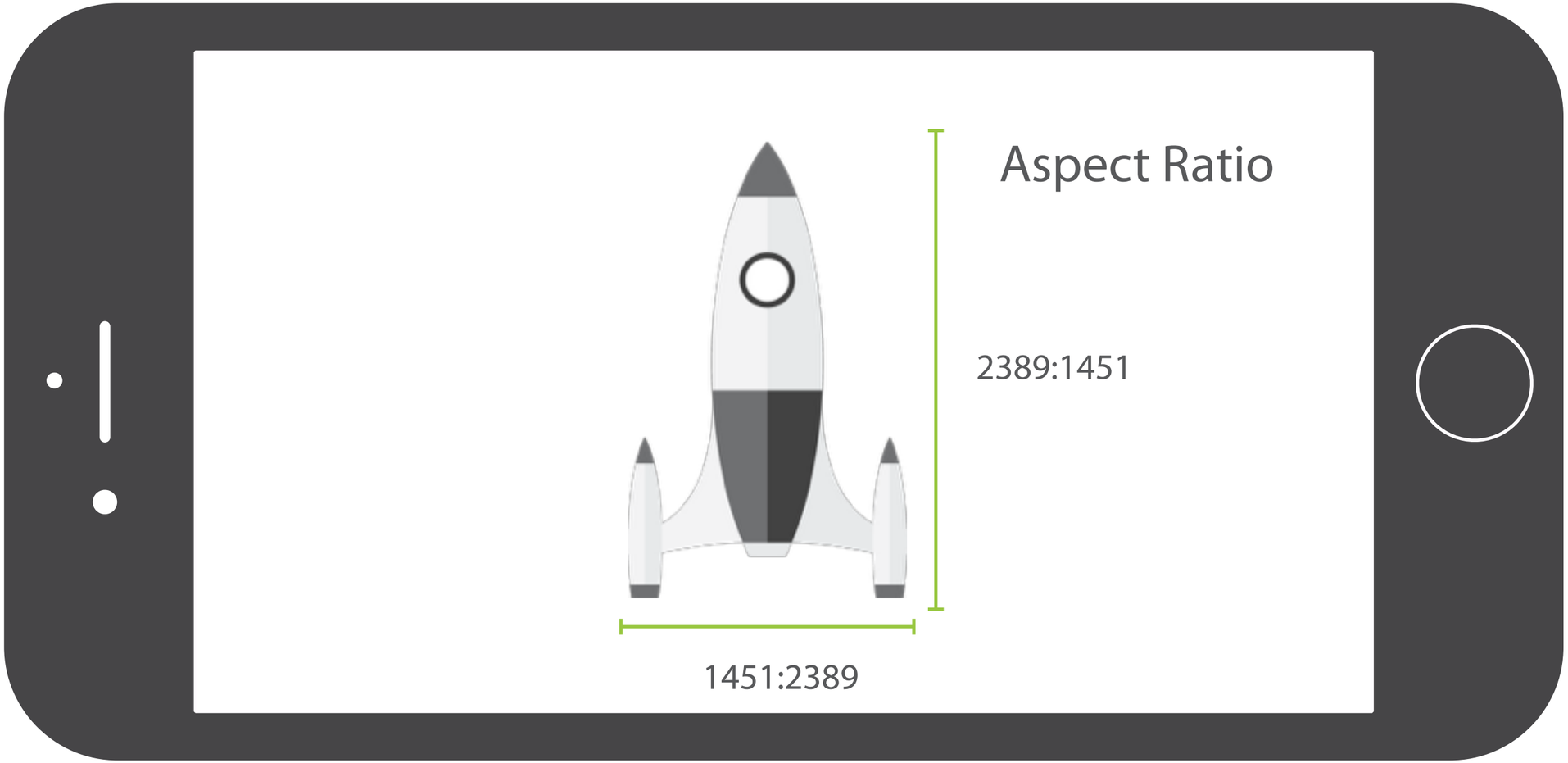


The Constraints

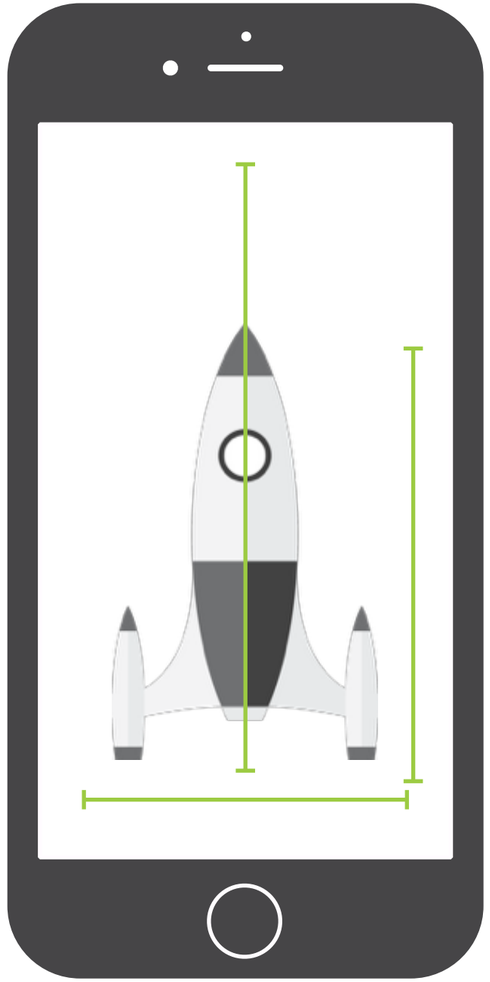


The Constraints



The Constraints

The Key Components



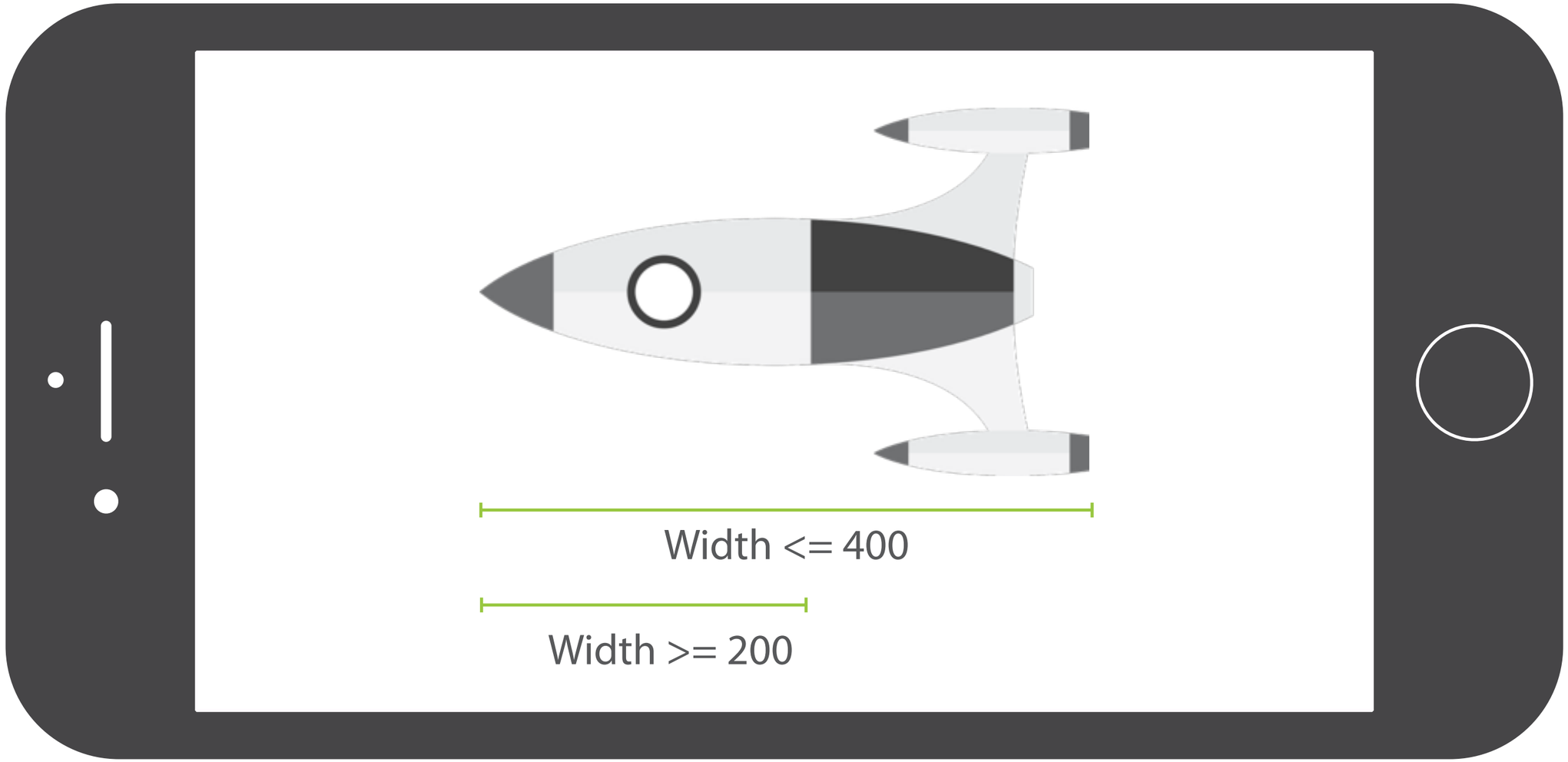
Constant

Number that defines the distance

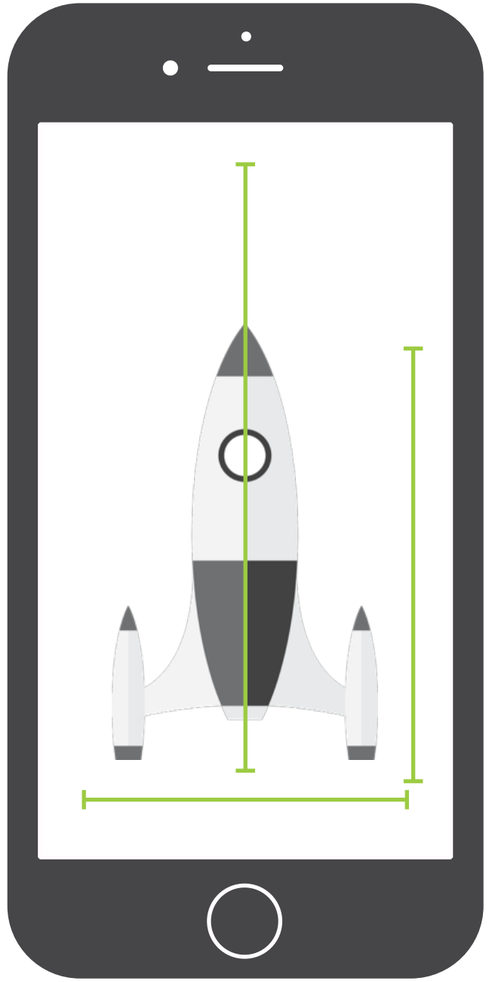
Relation

= >= <=

Relation



The Key Components



Constant

Number that defines the distance

Relation

= >= <=

Priority

Zero is the lowest priority, and 1000 is required

Building Constraints

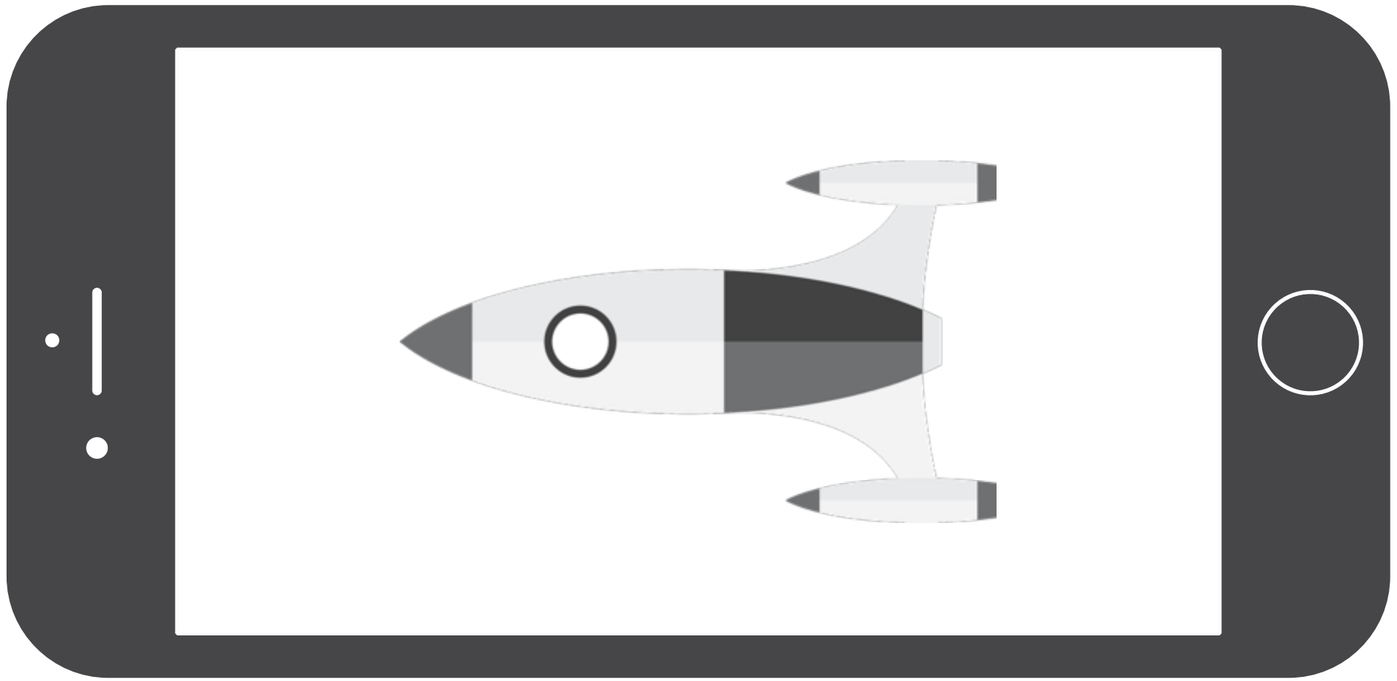
Interface Builder | Visual Format Language | NSLayoutConstraint API

V:|-(40@600)-[item1]-[item2(==item1)]-20-[item3(==item1)]-[item4(==item3)]-(>=40)-|

Your Mission

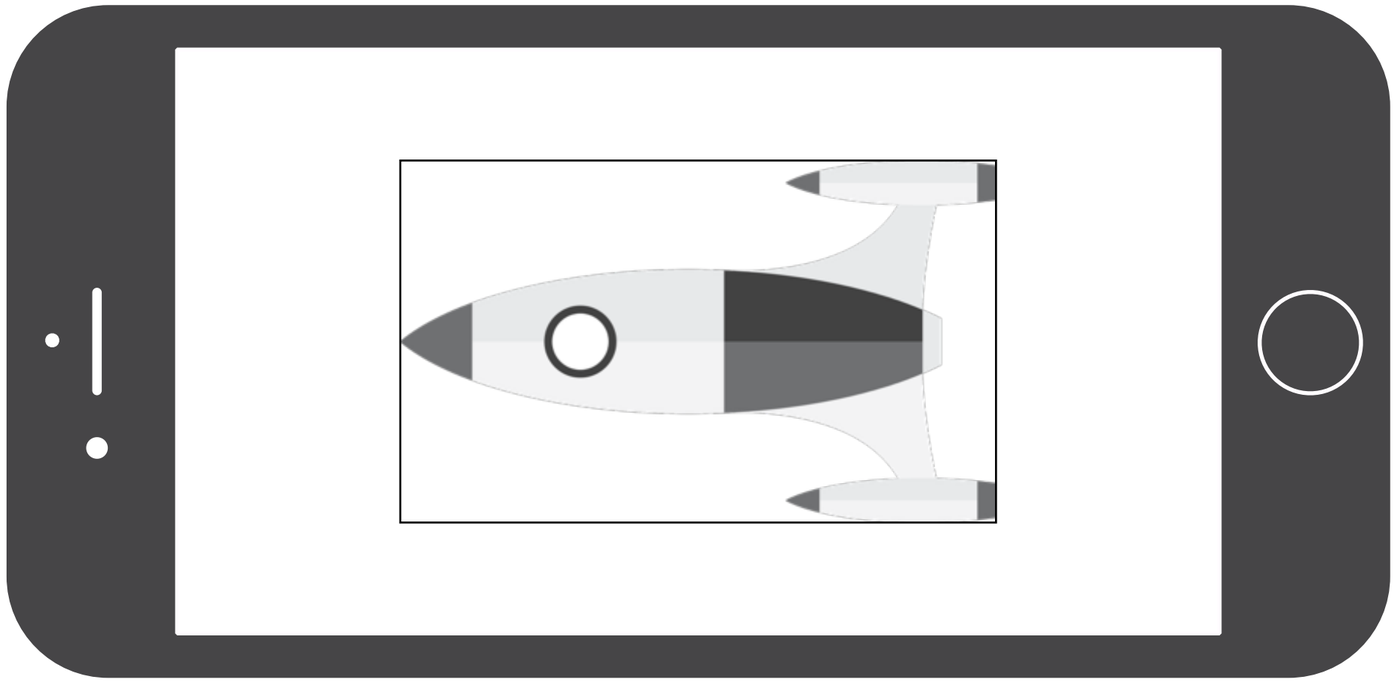
Finish the UI Design | Satisfy the Constraints |

Satisfy the Constraints



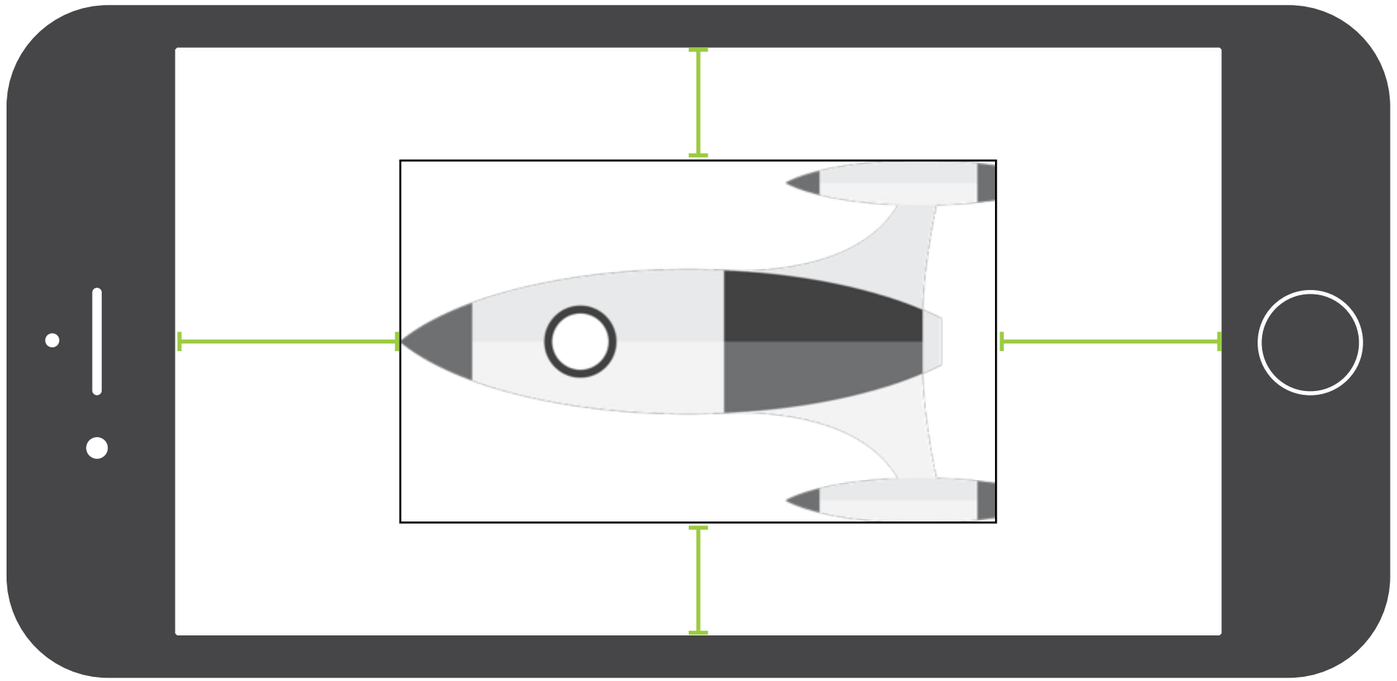
- X-Coordinate
- Y-Coordinate
- Width
- Height

Satisfy the Constraints



- X-Coordinate
- Y-Coordinate
- Width
- Height

Satisfy the Constraints



- X-Coordinate
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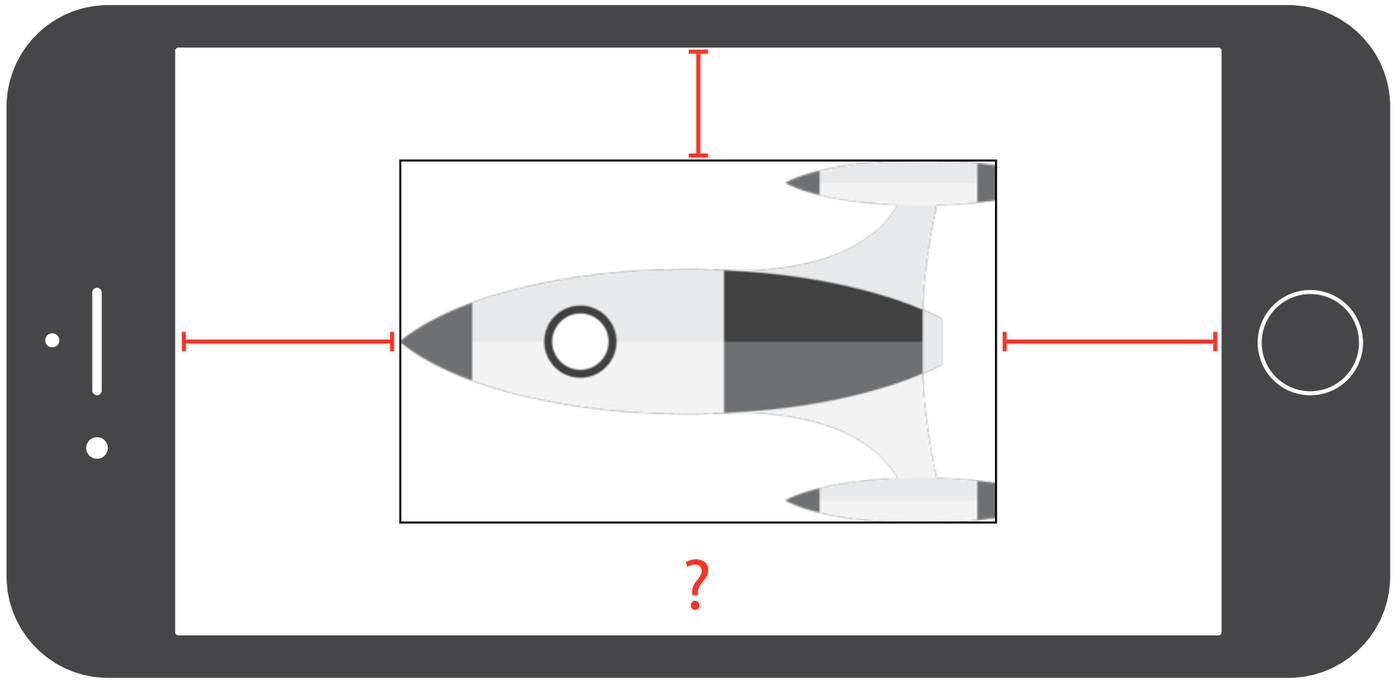
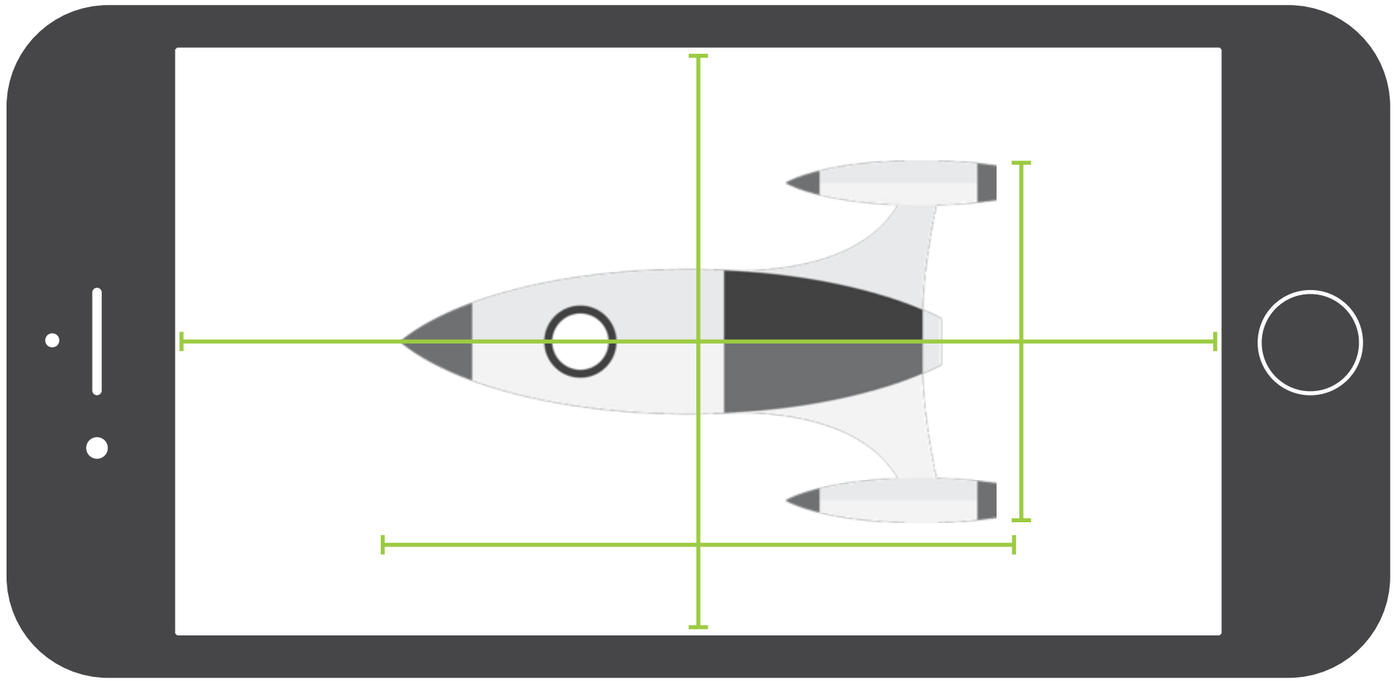
- Height

Satisfy the Constraints



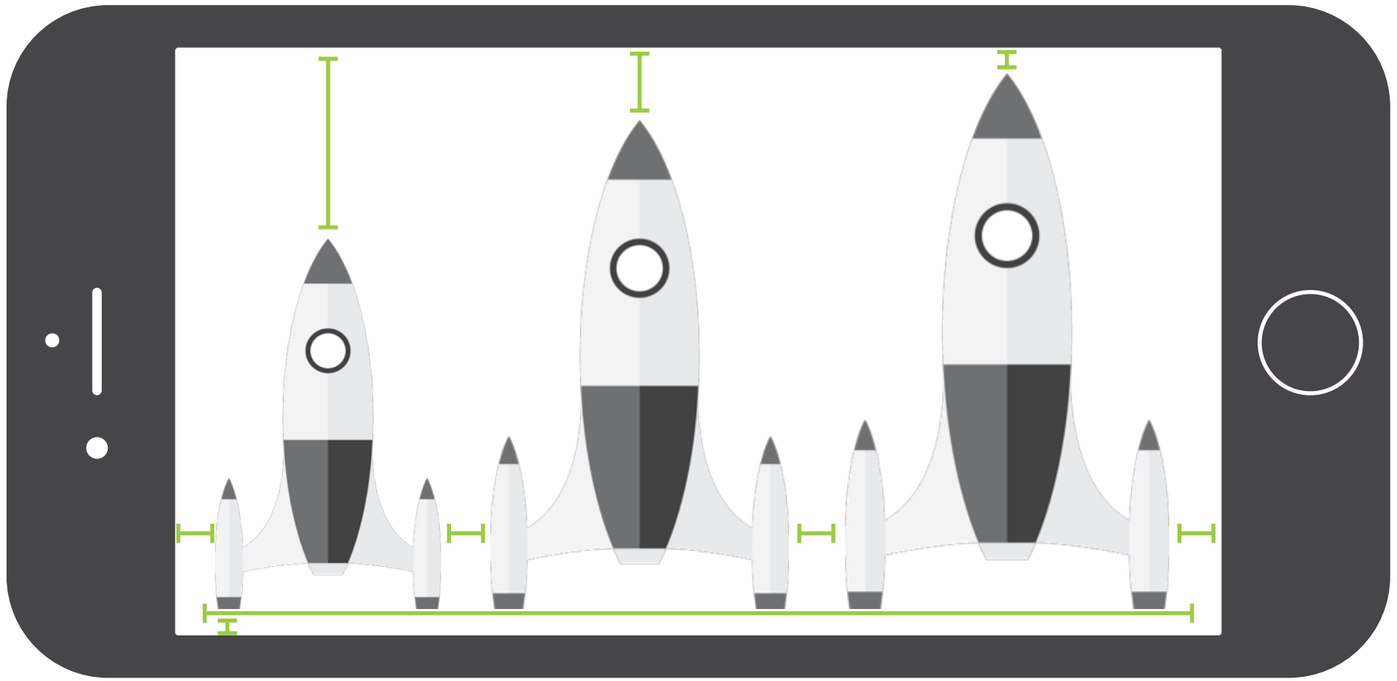
- X-Coordinate
- Y-Coordinate
- Width
- Height

Satisfy the Constraints



- X-Coordinate
- Y-Coordinate
- Width
- Height

Satisfy the Constraints



- X-Coordinate
- Y-Coordinate
- Width
- Height

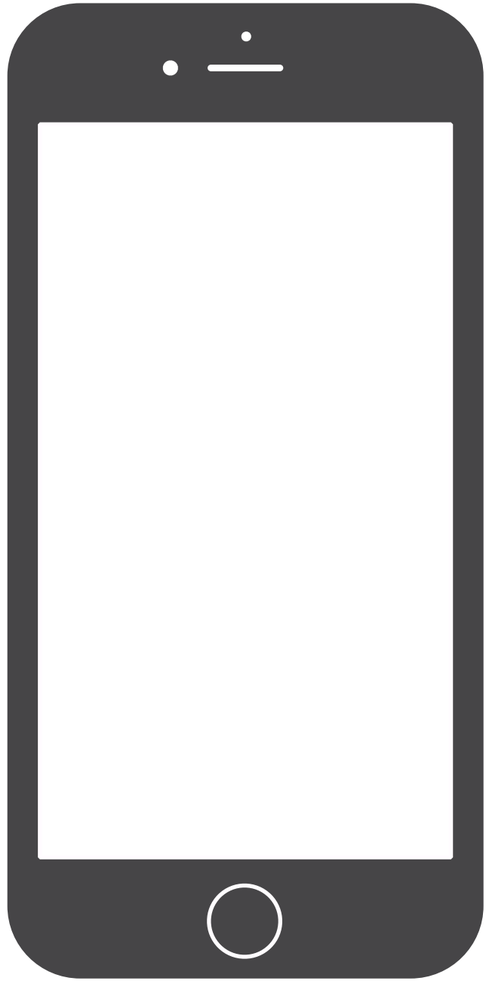
Your Mission

Finish the UI Design | Satisfy the Constraints | Think About Relationships

The Linear Equation

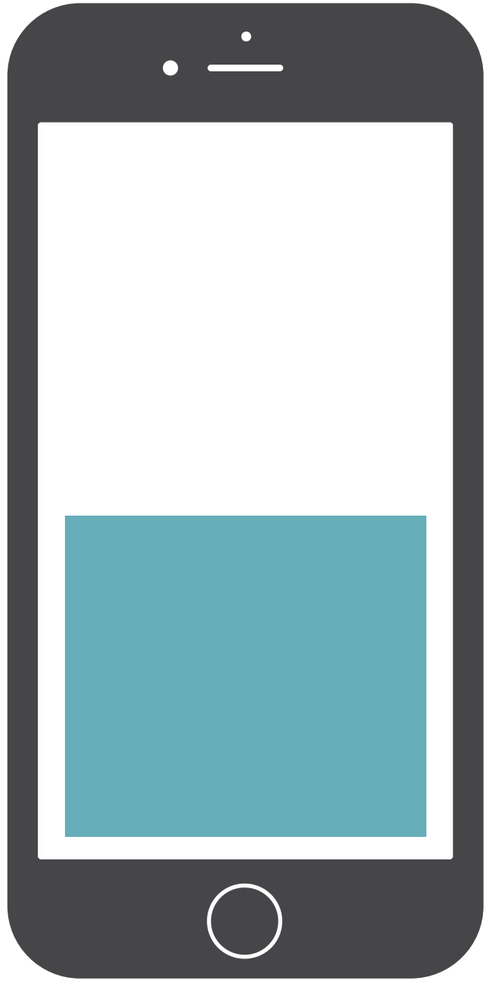
$$y = mx + b$$

The Linear Equation



$$y = m \cdot x + b$$

The Linear Equation

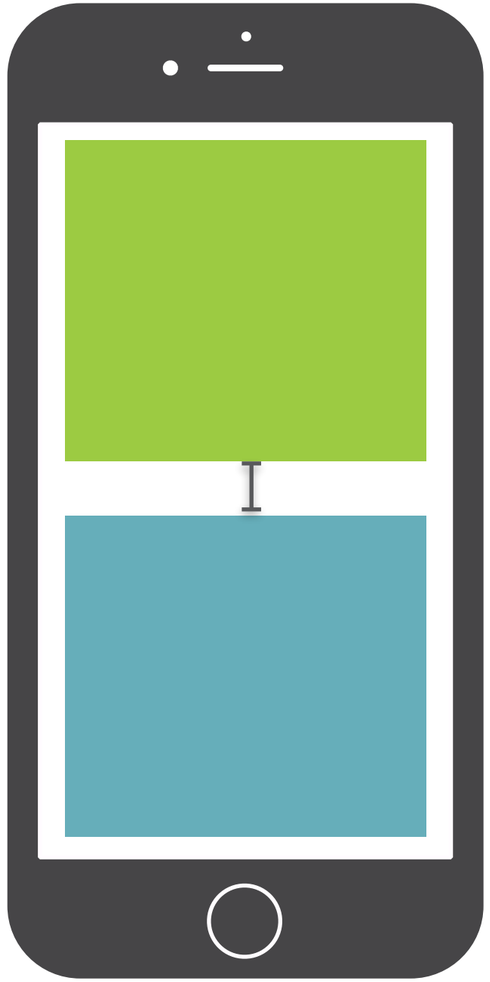


$$\text{BlueView.Top} = m \cdot x + b$$

The Linear Equation

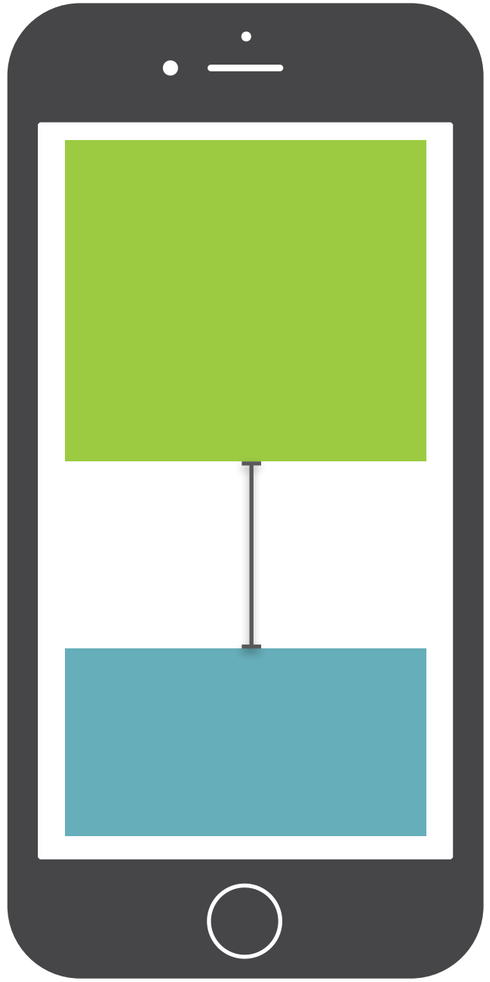
$$BlueView.Top = m \cdot GreenView.Bottom + b$$

The Linear Equation



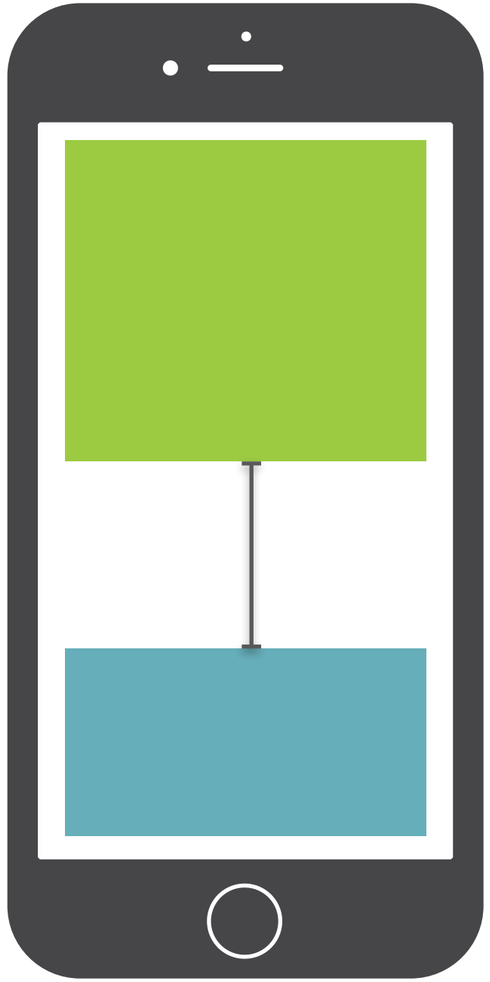
$$BlueView.Top = 1 \cdot GreenView.Bottom + 10$$

The Linear Equation



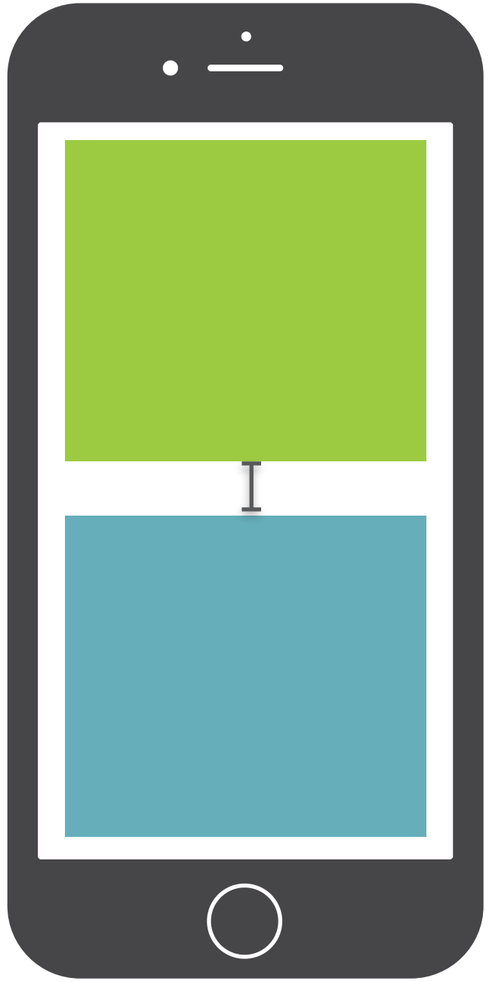
$$BlueView.Top = 1 \cdot GreenView.Bottom + 40$$

The Linear Equation



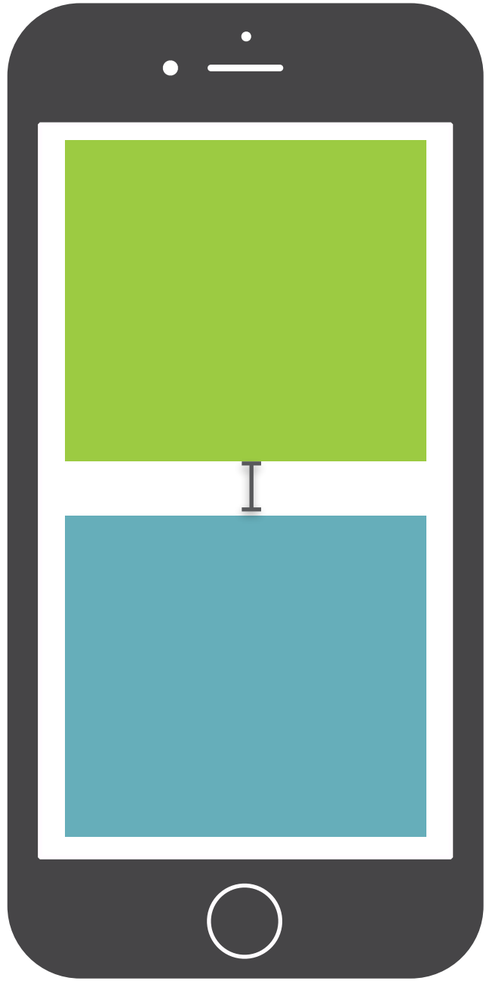
$$BlueView.Top = 2 \cdot GreenView.Bottom + 20$$

The Linear Equation



$$BlueView.Top = 2 \cdot GreenView.Bottom + 5$$

The Linear Equation



$$BlueView.Top = 2 \cdot GreenView.Bottom + 5$$

```
let constraint = NSLayoutConstraint(
  item: AnyObject,
  attribute: NSLayoutAttribute,
  relatedBy: NSLayoutRelation,
  toItem: AnyObject?,
  attribute: NSLayoutAttribute,
  multiplier: CGFloat,
  constant: CGFloat
)
```

$$\text{BlueView.Top} = 2 \cdot \text{GreenView.Bottom} + 5$$

```
let constraint = NSLayoutConstraint(
  item: AnyObject,
  attribute: NSLayoutAttribute,
  relatedBy: NSLayoutRelation,
  toItem: AnyObject?,
  attribute: NSLayoutAttribute,
  multiplier: CGFloat,
  constant: CGFloat
)
```

$$\text{BlueView.Top} = 2 \cdot \text{GreenView.Bottom} + 5$$

```
let constraint = NSLayoutConstraint(
   item: BlueView,
   attribute: NSLayoutAttribute,
   relatedBy: NSLayoutRelation,
   toItem: AnyObject?,
   attribute: NSLayoutAttribute,
   multiplier: CGFloat,
   constant: CGFloat
)
```

.Top = 2 · GreenView.Bottom + 5

```
let constraint = NSLayoutConstraint(
   item: BlueView,
   attribute: NSLayoutAttribute.Top,
   relatedBy: NSLayoutRelation,
   toItem: AnyObject?,
   attribute: NSLayoutAttribute,
   multiplier: CGFloat,
   constant: CGFloat
)
```

$$= 2 \cdot \text{GreenView.Bottom} + 5$$

```
let constraint = NSLayoutConstraint(
   item: BlueView,
   attribute: NSLayoutAttribute.Top,
   relatedBy: NSLayoutRelation.Equal,
   toItem: AnyObject?,
   attribute: NSLayoutAttribute,
   multiplier: CGFloat,
   constant: CGFloat
)
```

$$2 \cdot \text{GreenView.Bottom} + 5$$

```
let constraint = NSLayoutConstraint(
   item: BlueView,
   attribute: NSLayoutAttribute.Top,
   relatedBy: NSLayoutRelation.Equal,
   toItem: GreenView,
   attribute: NSLayoutAttribute,
   multiplier: CGFloat,
   constant: CGFloat
)
```

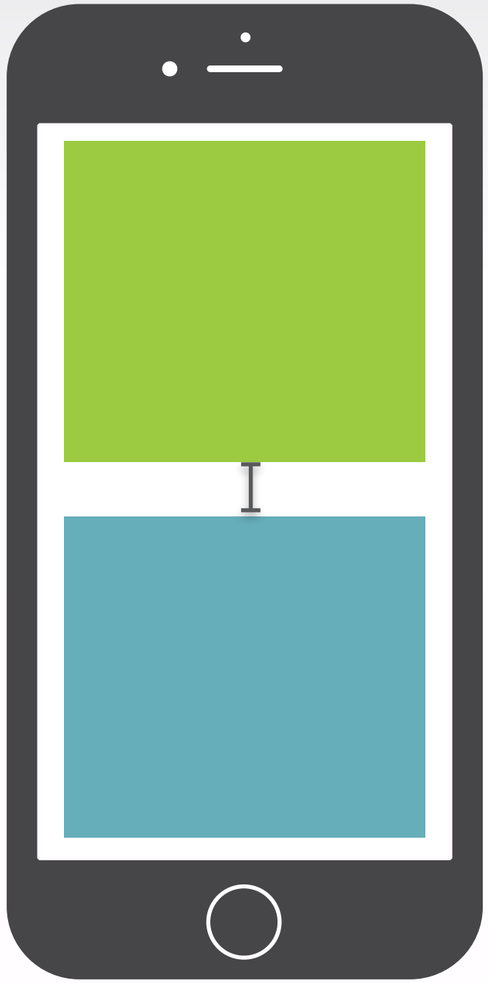
```
2 ·                    .Bottom + 5
```

```
let constraint = NSLayoutConstraint(
   item: BlueView,
   attribute: NSLayoutAttribute.Top,
   relatedBy: NSLayoutRelation.Equal,
   toItem: GreenView,
   attribute: NSLayoutAttribute.Bottom,
   multiplier: CGFloat,
   constant: CGFloat
)
```

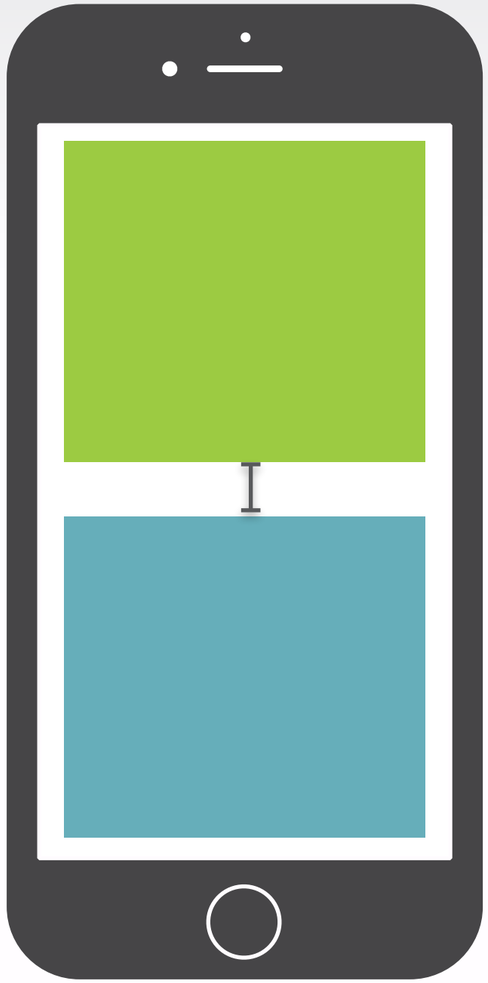
$$2 \cdot \qquad + 5$$

```
let constraint = NSLayoutConstraint(
   item: BlueView,
   attribute: NSLayoutAttribute.Top,
   relatedBy: NSLayoutRelation.Equal,
   toItem: GreenView,
   attribute: NSLayoutAttribute.Bottom,
   multiplier: 2,
   constant: 5
)
```

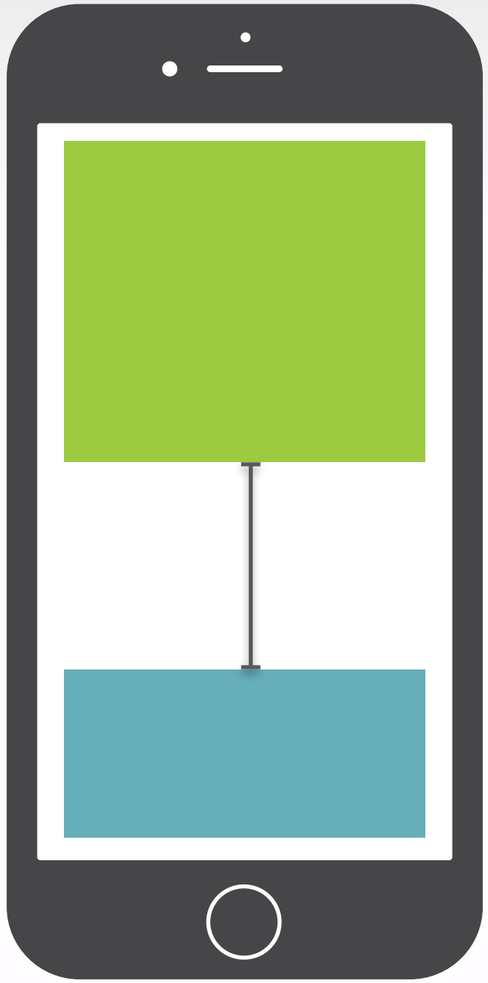
```
let constraint = NSLayoutConstraint(
   item: BlueView,
   attribute: NSLayoutAttribute.Top,
   relatedBy: NSLayoutRelation.Equal,
   toItem: GreenView,
   attribute: NSLayoutAttribute.Bottom,
   multiplier: 2,
   constant: 5
)
```



```
let constraint = NSLayoutConstraint(
    item: BlueView,
    attribute: NSLayoutAttribute.Top,
    relatedBy: NSLayoutRelation.Equal,
    toItem: GreenView,
    attribute: NSLayoutAttribute.Bottom,
    multiplier: 2,
    constant: 5
)
```



```
let constraint = NSLayoutConstraint(
    item: BlueView,
    attribute: NSLayoutAttribute.Top,
    relatedBy: NSLayoutRelation.Equal,
    toItem: GreenView,
    attribute: NSLayoutAttribute.Bottom,
    multiplier: 2,
    constant: 5
)
```



```
let constraint = NSLayoutConstraint(
    item: BlueView,
    attribute: NSLayoutAttribute.Top,
    relatedBy: NSLayoutRelation.Equal,
    toItem: GreenView,
    attribute: NSLayoutAttribute.Bottom,
    multiplier: 1,
    constant: 40
)
```

Summary

Various Constraints

Constants, Priorities, and Relations

Satisfying the Constraints

Constraint's Linear Equation

Constraint Demo