UIViews
and
UIViewControllers

UIView

Definition: An object that renders a rectangular area on the screen and manages the content in that area.

Three primary jobs:

1. **Drawing and animation**: responsible for drawing themselves using UIKit, Core Graphics, and/or OpenGL ES
2. **Layout and subview management**
   - Views can have zero or more child **subviews**
   - Each view manages its own default size and position in relation to parent view
   - Parent view can define size and position of subviews as needed
3. **Event handling**: touch events and responder chain events

UIView Subclasses

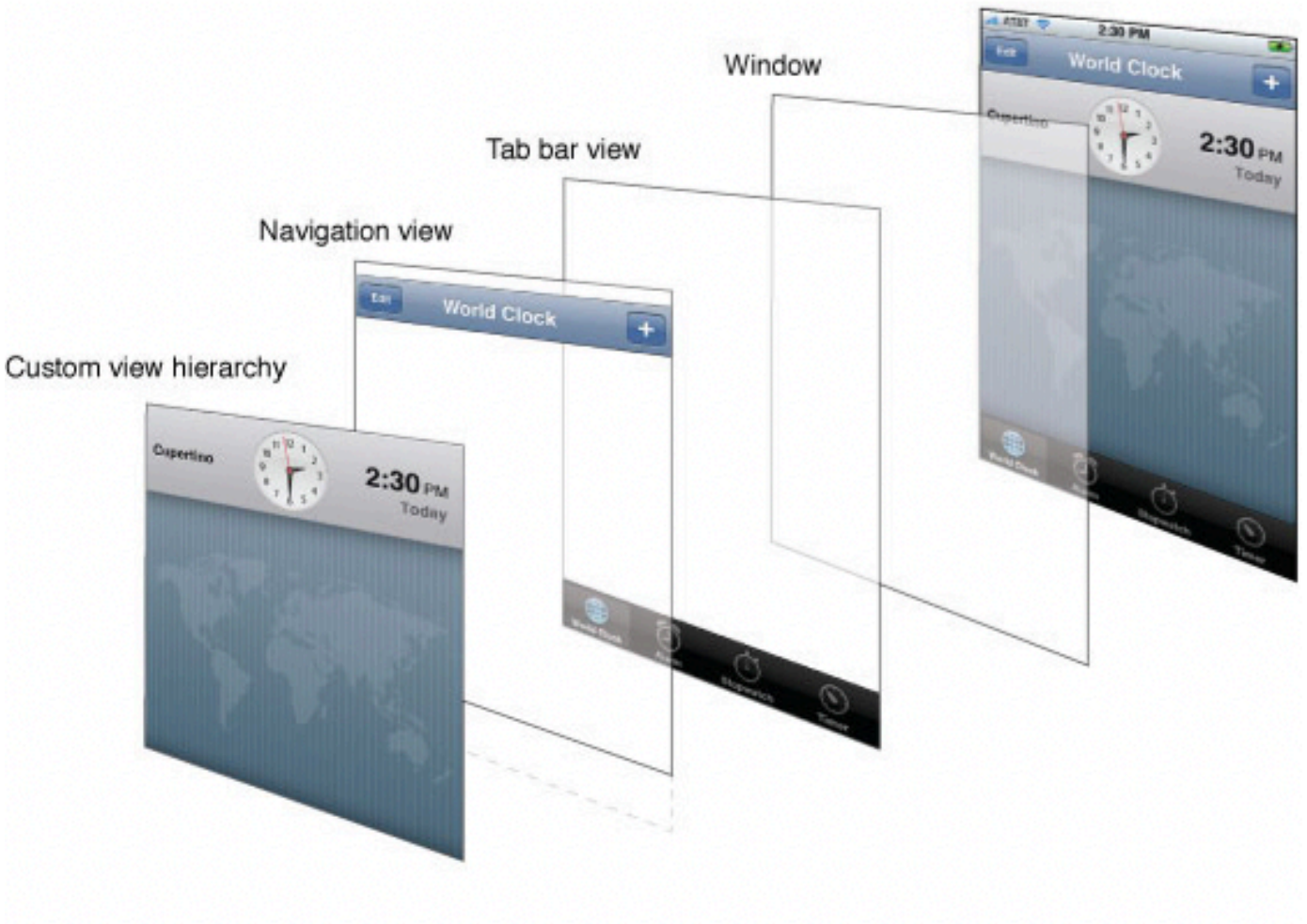
UIKit contains set of standard UIView subclasses:

- UILabel
- UIButton
- UIImageView
- UITableView
- UITextField
- UIPickerView
- Many, many others...

View Hierarchy

- Views can embed other views and create sophisticated visual hierarchies
- This creates a **parent-child relationship** between the view being embedded (known as the **subview**) and the parent view doing the embedding (known as the **superview**)
- A **parent view** may contain **any number** of subviews
- Each subview has **only one superview**
- The Interface Builder Document Outline lets you visually navigate the view hierarchy for a given view controller

View Hierarchy



View Draw Cycle

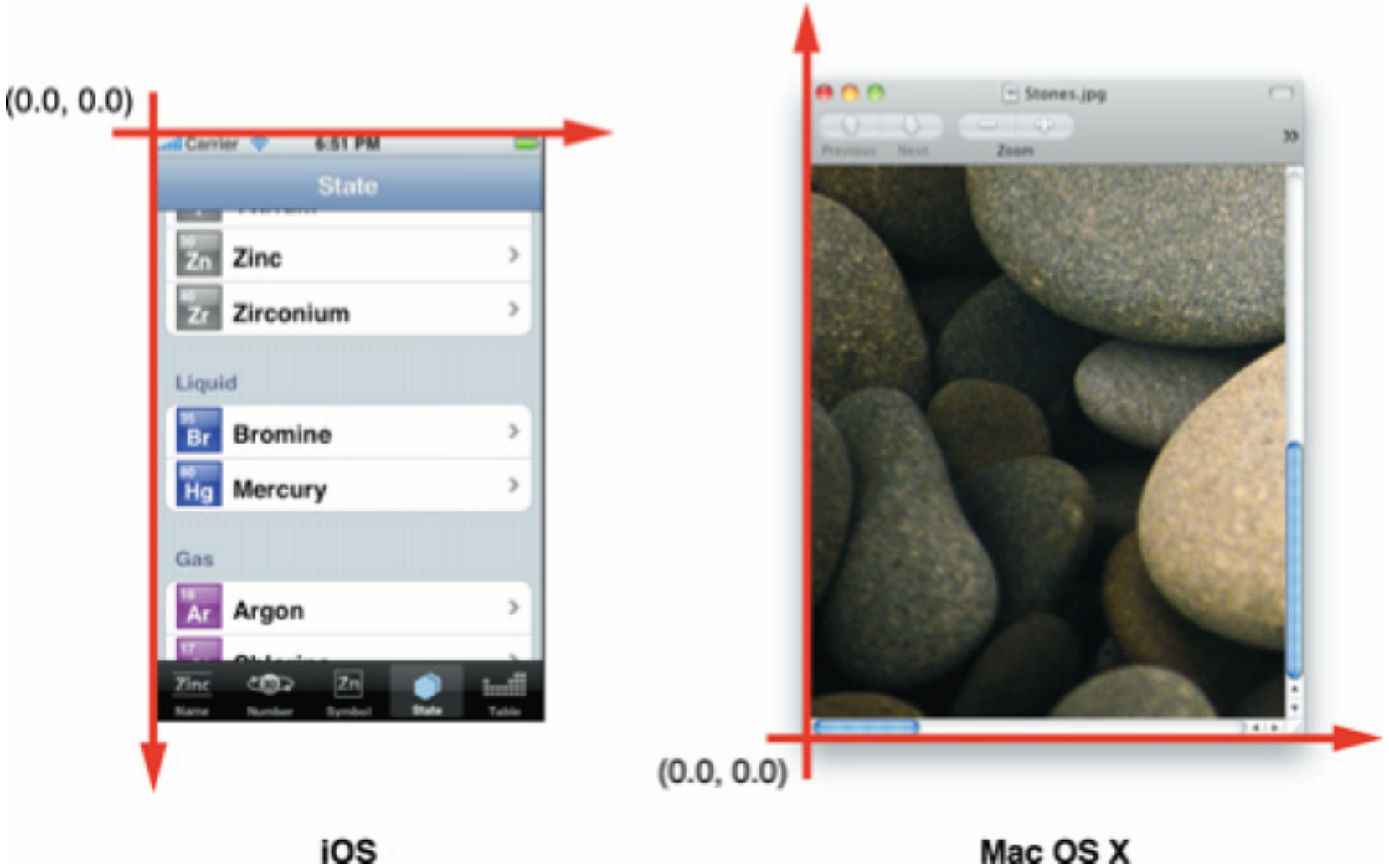
- View drawing occurs on an **as-needed basis**
- When a view first appears on the screen, the system asks it to draw its content
- Then it takes a **snapshot image** of the content and basically caches that until a change occurs
- Repeat…
- If you **never** change the view's content, the view's drawing code **may** never be called again

View Geometry

A UIView is just a rectangle on the screen, so two things are needed to draw it:

- `CGRect(origin: CGPoint, size: CGSize)`
- `CGRect(x: Double, y: Double, width: Double, height: Double)`

Origin on iOS



iOS

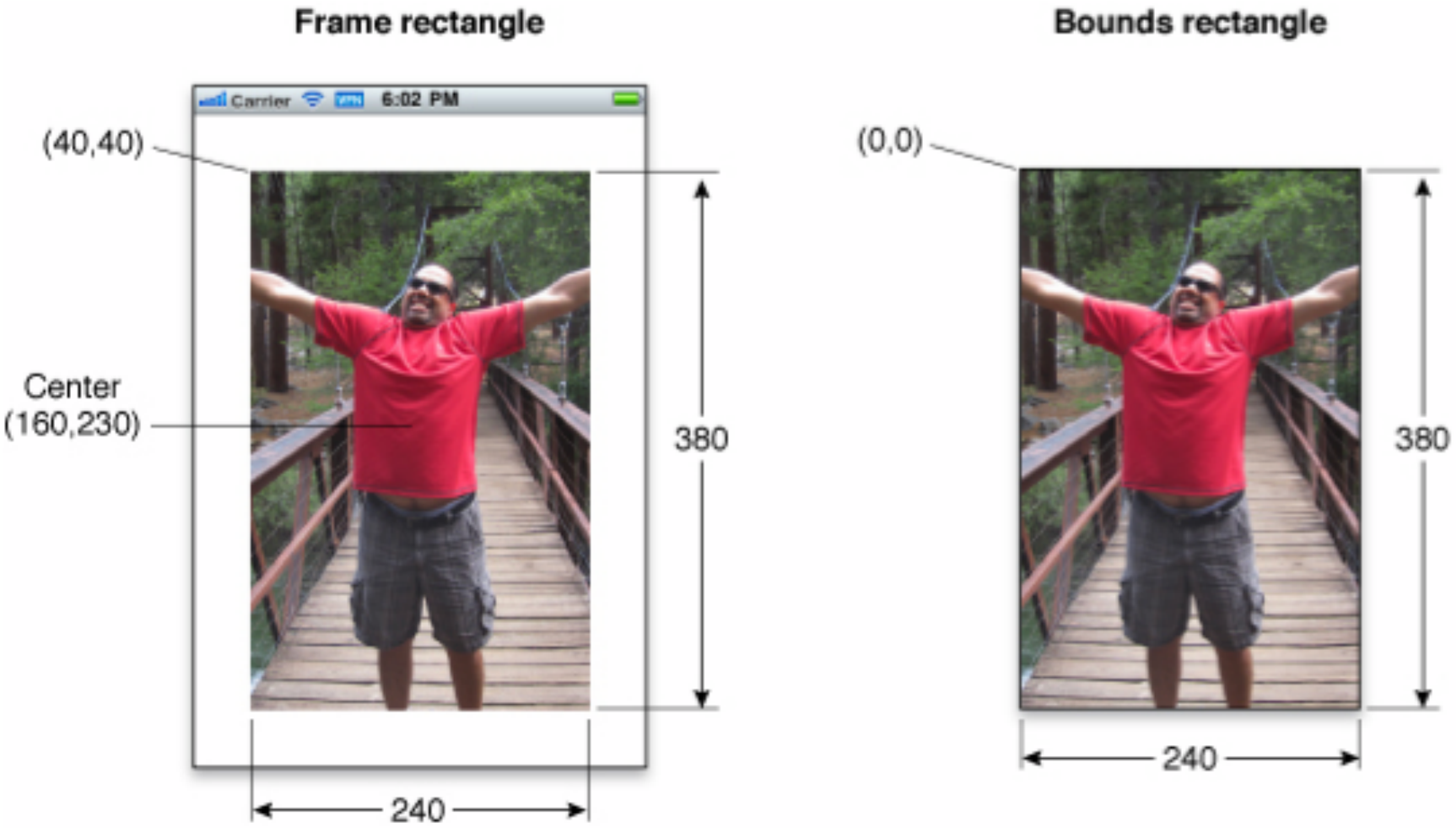
Mac OS X

View Geometry

A couple other important concepts:

- **Frame**: CGRect in superview's coordinate system
- **Bounds**: CGRect in view's own/internal coordinate system
- **Center**: center property that can be used to adjust view position without changing its size
- The size portion of the frame and bounds rects are **coupled together** so that changing size of either will updated both

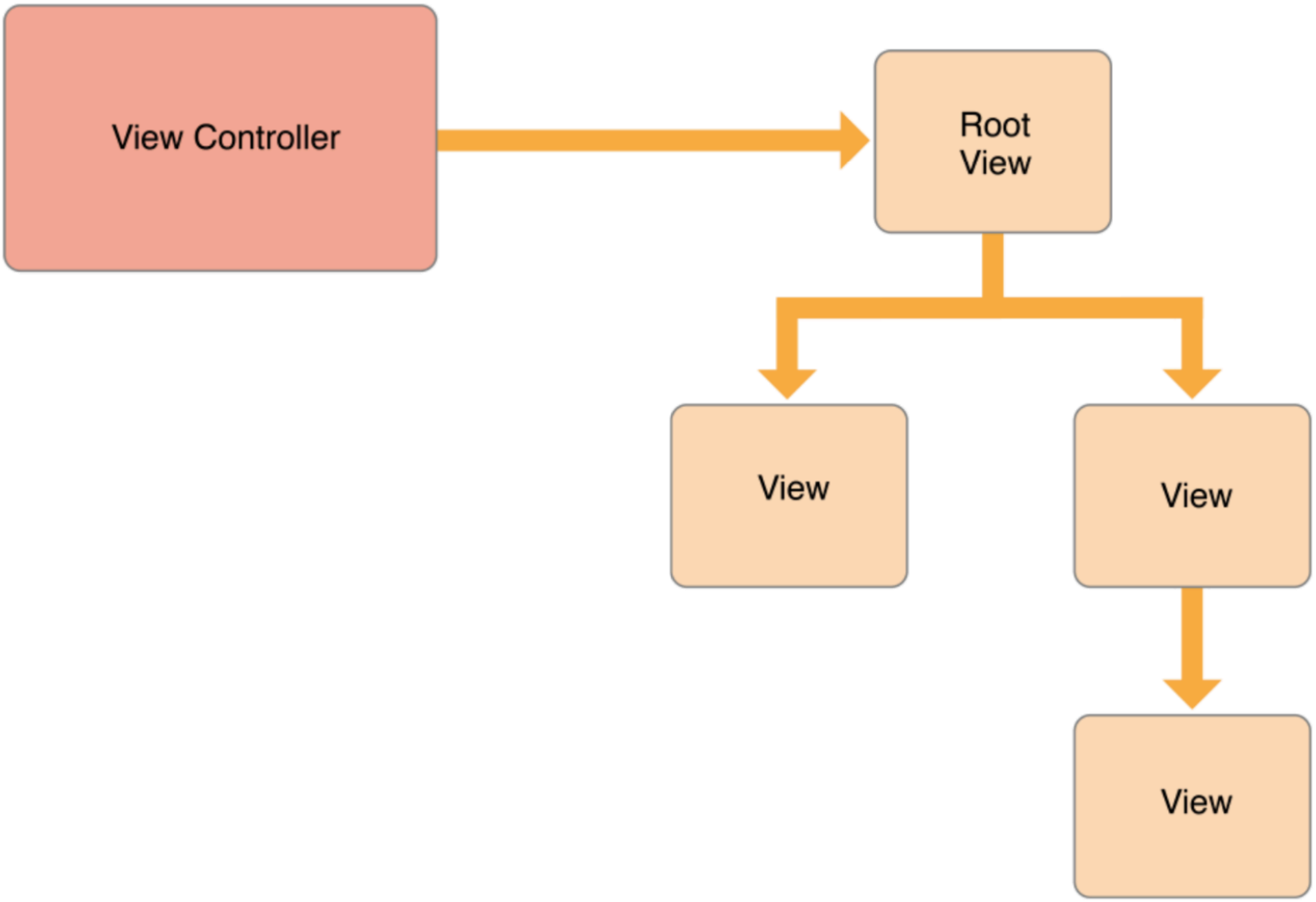
View Geometry



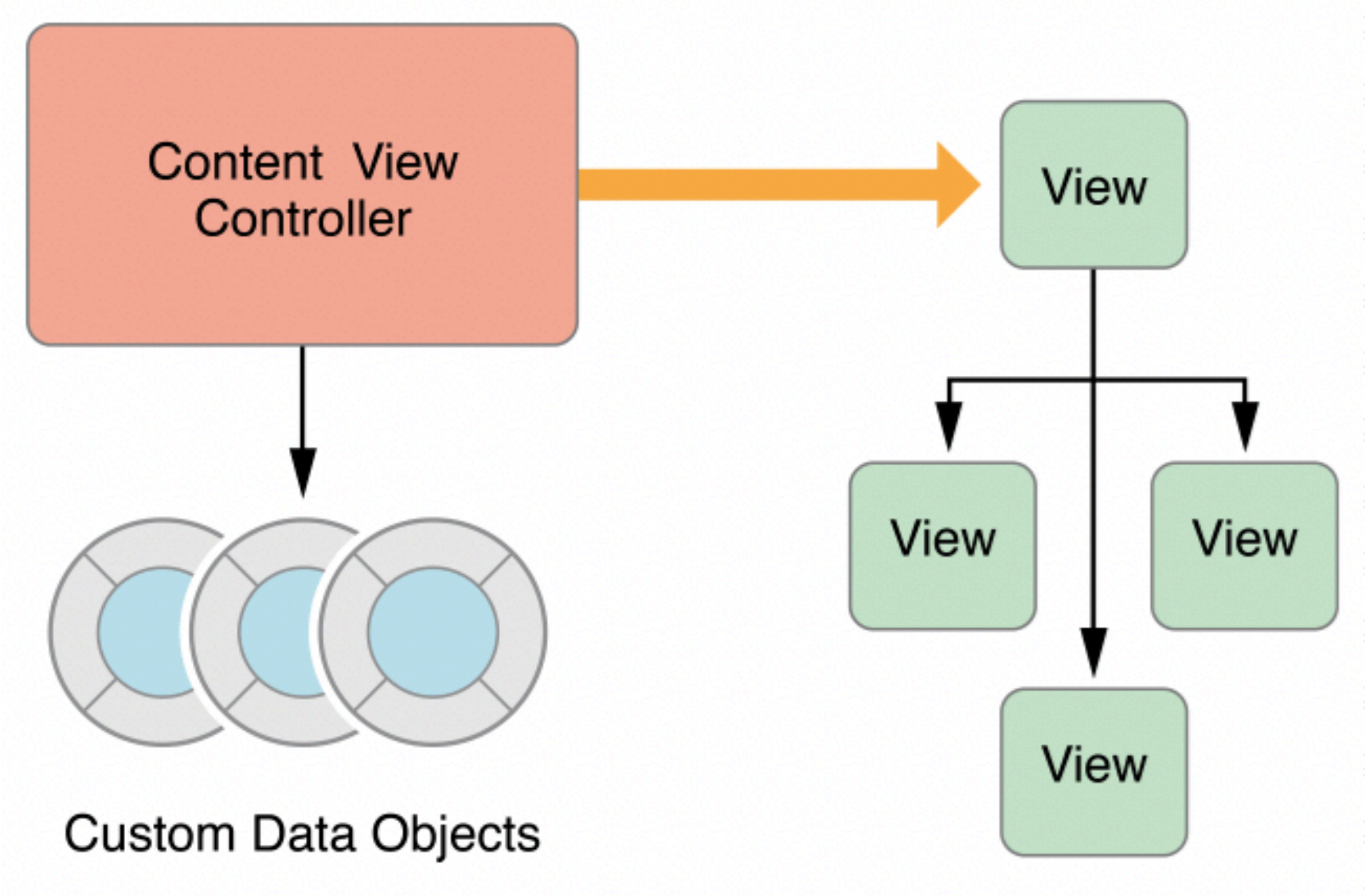
UIViewController

- Provides infrastructure for managing the views of a UIKit app
- Is a foundational piece of an app's internal structure
- Every app has **at least one view controller**, and most apps have several
- Each view controller manages a view hierarchy with **one root view**
- Each view controller manages a portion of the app's user interface + interactions between that interface and the underlying data (**MVC**)
- View controllers facilitate **transitions** between different parts of the user interface

UIViewController



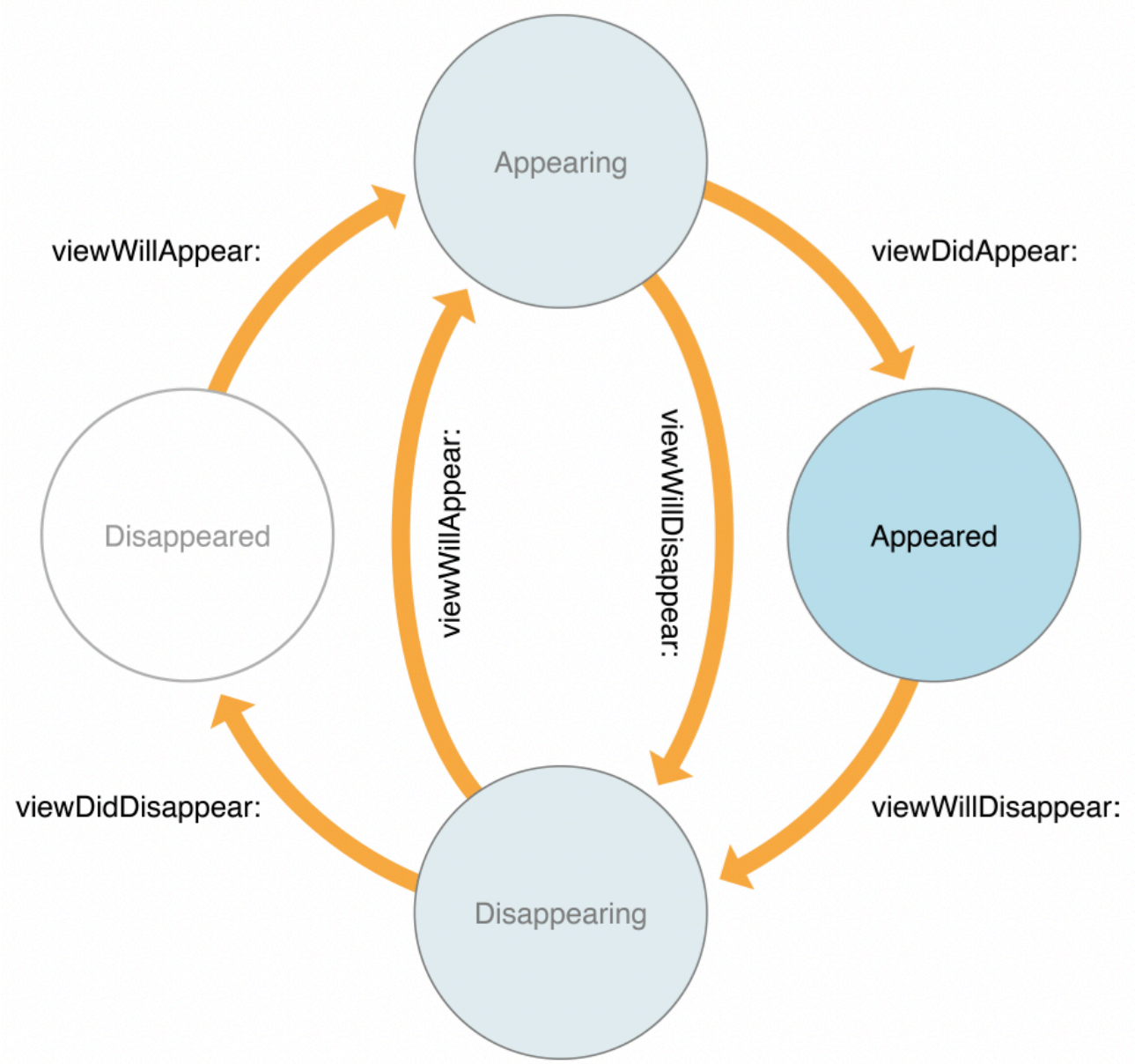
UIViewController



View Lifecycle

- View controllers manage the lifecycle of their view hierarchies
- Each view controller has several methods that are called when certain events occur to allow you to respond:
    1. **viewDidLoad**: called when the root view is done loading into memory (typically only once, at least while the controller is alive)
    2. **viewWillAppear**: when the root view is about to appear on screen
    3. **viewDidAppear**: right after the root view appears on screen
    4. **viewWillDisappear**: when the view is about to disappear from screen
    5. **viewDidDisappear**: after the view disappears from screen

View Lifecycle



Root View Controller & View Controller Hierarchy