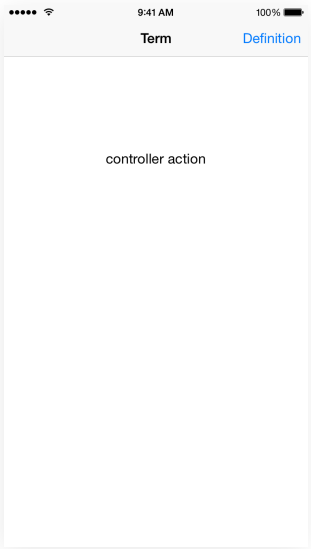
Flashcards
Lesson 4

Description

Add the `Deck` model to the Term Controller, and update the interface with a random card drawn from the `Deck`.



Learning Outcomes

- Discover how to bind a view controller in Interface Builder to a class implementation.
- Practice declaring properties and implementing methods.
- Analyze code to identify potential causes of runtime errors.
- Recognize how Swift optionals can represent the presence or absence of a value.
- Distinguish a computed property from a method.
- Apply the optional binding syntax with `if let`.

Vocabulary

Identity Inspector	property	method
optional	computed property	optional binding

Materials

- **Flashcards Lesson 4** Xcode project

Opening

What steps do we need to take to integrate a `Deck` with the Term Controller?

Agenda

- Using Interface Builder and the Document Outline (⊟), select the Term Controller and use the Identity Inspector (⌥⌘3) to reveal the binding to the custom `ViewController` class.
- Explain how each individual view controller in the storyboard can be associated with a specific class within the project.
- Discuss the naming inconsistency of Term Controller in the storyboard, and the `ViewController` class name.
- Using the Project Navigator (⌘1), rename **ViewController.swift** to **TermController.swift**, and update the class name to `TermController`.

```
class TermController : UIViewController {
```

- Using Interface Builder and the Document Outline (⊟), select the Term Controller and use the Identity Inspector (⌥⌘3) to change the **Custom Class** to `TermController`.
- Add a `Deck` property to the `TermController` class.

```
let deck = Deck()
```

- Discuss how the `TermController` `viewDidLoad` method will draw a random `Flashcard` from the `deck`, and use that `Flashcard` `term` property to update the text label.
- Add a naive `randomCard` method to the `Deck` class.

```
func randomCard() -> Flashcard {
   let randomIndex = Int(arc4random_uniform(UInt32(cards.count)))
   return cards[randomIndex]
}
```

- Explain the necessary type conversion for the `UInt32` argument expected by `arc4random_uniform`, and the need to convert its return value to an `Int`, to subscript the array.
- Discuss whether or not the `randomCard` method would return a `Flashcard` object when the deck is empty, and `cards.count` is `0`.
- Improve the `randomCard` method with an optional return type.

```
func randomCard() -> Flashcard? {
   if cards.isEmpty {
      return nil
   } else {
      let randomIndex = Int(arc4random_uniform(UInt32(cards.count)))
      return cards[randomIndex]
   }
}
```

- Explain how the optional `Flashcard?` type represents a "wrapped" value that will either be `nil` or a `Flashcard` when unwrapped.
- Discuss how the `randomCard` method has no parameters, only does the necessary work to return a value, and "feels" like a property of a `Deck`.
- Replace the `randomCard` method with a computed property.

```
var randomCard -> Flashcard? {
   if cards.isEmpty {
      return nil
   } else {
      return cards[Int(arc4random_uniform(UInt32(cards.count)))]
   }
}
```

- Discuss the similarities and differences between methods and read-only computed properties.
- In `TermController`, update the implementation of `viewDidLoad` to draw a `randomCard`, and use that card to update the text label.

```
override func viewDidLoad() {
   super.viewDidLoad()
   if let flashcard = deck.randomCard {
      termLabel.text = flashcard.term
}
```

- Discuss the use of optional binding when accessing the `randomCard` property.
- Run the app (⌘R), and observe the random card term on the screen. Tap the Definition button, observe how the default text view text appears, and navigate back to the first view controller.

Closing

What do you think would happen in our app if we had kept the naive implementation of `randomCard`? What if our app was loading terms and definitions from an external data source, and the loading of the data failed, resulting in an empty `Deck`?

Modifications And Extensions

- Add a parameterized initializer to the `Deck` class. Enable the controller to declare a dictionary of card data and pass it to this new `Deck` initializer.

Resources

View Controller Basics https://developer.apple.com/library/ios/featuredarticles/ViewControllerPGforiPhoneOS/AboutViewControllers/AboutViewControllers.html

UIViewController Class Reference https://developer.apple.com/library/ios/documentation/UIKit/Reference/UIViewController_Class/index.html

The Swift Programming Language: Properties https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/Properties.html

The Swift Programming Language: Methods https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/Methods.html

The Swift Programming Language: Computed Properties https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/Properties.html#//apple_ref/doc/uid/TP40014097-CH14-ID259

The Swift Programming Language: Conditional Statements https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/ControlFlow.html#//apple_ref/doc/uid/TP40014097-CH9-ID127

The Swift Programming Language: Subscripts https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/Subscripts.html

The Swift Programming Language: Optionals https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/TheBasics.html#//apple_ref/doc/uid/TP40014097-CH5-ID330

BSD Library Functions Manual: ARC4RANDOM(3) https://developer.apple.com/library/mac/documentation/Darwin/Reference/ManPages/man3/arc4random_uniform.3.html