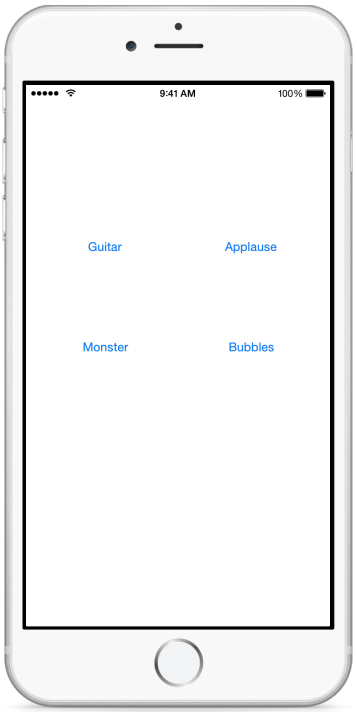
NoiseMaker
Lesson 6

Description

Extract the `AVAudioPlayer?` property initialization out of the playback methods and into and initializer.



Learning Outcomes

- Analyze existing code to determine the frequency of unnecessary object instantiation.
- Practice implementing an initializer.
- Describe the need for variables and optionals, based on initializer behavior.

Vocabulary

instantiation	initialization	initializer
`init`	variable	`var`
optional	optional binding	

Materials

- **NoiseMaker Lesson 6** Xcode project
- **Initialization** presentation

Opening

How many times are `AVAudioPlayer` objects created when we play sounds with our app?

Agenda

- Discuss the existing implementation of the `NoiseMaker` model.
- Discuss how a new `AVAudioPlayer` object is instantiated every time a "play" method is called.
- Discuss how the `AVAudioPlayer` instantiations can be reduced, by creating each `AVAudioPlayer` object once, when a `NoiseMaker` object is created.
- In the `NoiseMaker` class, extract the `AVAudioPlayer` instantiations into a new initializer.

```
init() {
   if let url = NSBundle.mainBundle().URLForResource("guitar",
      withExtension: "wav") {
      guitarPlayer = try? AVAudioPlayer(contentsOfURL: url)
   }
   if let url2 = NSBundle.mainBundle().URLForResource("applause",
      withExtension: "wav") {
      applausePlayer = try? AVAudioPlayer(contentsOfURL: url2)
   }
   if let url3 = NSBundle.mainBundle().URLForResource("monster",
      withExtension: "wav") {
      monsterPlayer = try? AVAudioPlayer(contentsOfURL: url3)
   }
   if let url4 = NSBundle.mainBundle().URLForResource("bubbles",
      withExtension: "wav") {
      bubblesPlayer = try? AVAudioPlayer(contentsOfURL: url4)
   }
}
```

- Present the concept of initialization.
- Discuss how each `AVAudioPlayer?` property needs to remain a variable and optional, since the initializer will not assign a property a value if the conditional binding fails.
- Update each "play" method such that they only call the `play` method on each respective `AVAudioPlayer?` property.

```
func playGuitarSound() {
   guitarPlayer?.play()
}

func playApplauseSound() {
   applausePlayer?.play()
}

func playMonsterSound() {
   monsterPlayer?.play()
}

func playBubblesSound() {
   bubblesPlayer?.play()
}
```

- Run the app (⌘R), and tap the buttons to play each sound.
- Discuss how the controller instantiates the `NoiseMaker` model once, and how the `NoiseMaker` model instantiates each of its `AVAudioPlayer?` properties only once.
- Discuss how tapping each button no longer instantiates a new `AVAudioPlayer` before playing each sound.

Closing

Repetitive code is often referred to as a "code smell." What repetitive code do you smell? How do you think we can reduce the repetitive code in our model?

Modifications and Extensions

- Implement a custom initializer called `initWithSoundFileNames:` that receives an array of sound file names, and uses the file names in the array to prepare each `AVAudioPlayer?` property. Refactor the existing initializer to use `initWithSoundFileNames:` as the designated initializer.
- Observe how the app has four buttons, four controller actions, four model methods, and four `AVAudioPlayer?` properties. Investigate how the text property of each button might be used to prepare the `AVAudioPlayer?` properties and to cause the respective `AVAudioPlayer` object to play the appropriate sound.

Resources

Cocoa Core Competencies: Model Object http://developer.apple.com/library/ios/documentation/General/Conceptual/DevPedia-CocoaCore/ModelObject.html

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

The Swift Programming Language: Classes and Structures https://developer.apple.com/library/ios/documentation/Swift/Conceptual/Swift_Programming_Language/ClassesAndStructures.html

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