SpaceAdventure
Lesson 9

Description

Add properties and an initializer to the `Planet` class. Use a mutable array when creating the array of `planets`, and add one `Planet` to the array.

```
Welcome to the Solar System!
There are 1 planets to explore.
What is your name?
Jane
Nice to meet you, Jane. My name is Eliza, I'm an old friend of Siri.
Let's go on an adventure!
Shall I randomly choose a planet for you to visit? (Y or N)
Y
Ok! Traveling to...
```

Learning Outcomes

- Practice declaring properties within a class definition.
- Extend existing code to accommodate new features.
- Practice implementing parameterized initializers.
- Define the concepts of mutability and immutability, and relate mutability to `var` and `let`.
- Discover how to append objects to an array.

Vocabulary

property	type annotation	initializer
parameter	self	array
mutability	immutability	

Materials

- **SpaceAdventure Lesson 9** Xcode project

Opening

What do we need to do to add a `Planet` to our `PlanetarySystem`? What kinds of properties does a `Planet` have?

Agenda

- Discuss the need to add properties to the `Planet` class.
- Using the Project Navigator (⌘1), select **Planet.swift**, and add two properties to the `Planet` class.

```
class Planet {

   let name: String
   let description: String

}
```

- Discuss the property declarations, the use of `let`, and the type annotations.
- Discuss the Xcode error, and the need to implement an initializer for the `Planet` class.
- Add a parameterized initializer to the `Planet` class.

```
...
   let description: String

   init(name: String, description: String) {
      self.name = name
      self.description = description
   }

}
```

- Review the concepts of initializers and initialization.
- Explain how the `Planet` initializer expects two `String` values, one called `name` and one called `description`; how the initializer assigns the value of the `name` parameter to the `name` property and the value of the `description` parameter to the `description` property; and uses `self` to refer to the object itself.
- Using the Project Navigator (⌘1), select **SpaceAdventure.swift**.

- Discuss how a `SpaceAdventure` initializer might take responsibility for preparing the `PlanetarySystem`, by creating `Planet` objects and adding them to the `planetarySystem` property's `planets` array.

```
init() {
   let mercury = Planet(name: "Mercury", description: "A very hot
      planet, closest to the sun.")
   planetarySystem.planets.append(mercury)
}
```

- Discuss the Xcode error, and why a `Planet` cannot be appended to the `planets` array because the array is immutable.
- Using the Project Navigator (⌘1), select **PlanetarySystem.swift**.
- Modify the `planets` property declaration, replacing `let` with `var`.

```
var planets: [Planet]
```

- Explain that Swift supports both mutable and immutable arrays, and how `var` and `let` indicate mutability and immutability.
- Run the program (⌘R), and observe the console (⇧⌘C) output displaying that there is "1 planet to explore."

Closing

Can you figure out how to add the other eight planets of our solar system to the planets array?

Modifications and Extensions

- Modify the `SpaceAdventure` initializer such that the `Planet` object is created and passed to `append`, without assigning it to a constant first.
- Enhance the `Planet` model such that a `Planet` can have multiple moons.
- Enhance the `displayIntroduction` method to correctly pluralize the word "planet" based on the value of `planetarySystem.planets.count`.

Resources

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

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

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

Project Navigator Help: Adding a New File https://developer.apple.com/library/ios/recipes/xcode_help-structure_navigator/articles/Adding_a_New_File.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

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

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

Swift Standard Library Reference: Array https://developer.apple.com/library/ios/documentation/General/Reference/SwiftStandardLibraryReference/Array.html