

SpaceAdventure

Lesson 6

Description

Extract the work done by the `start` method into three well-named methods.

```
Welcome to our solar system!  
There are 8 planets to explore.  
You are currently on Earth, which has a circumference of 24859.82 miles.  
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)  
Huh?  
Sorry, I didn't get that.  
Shall I randomly choose a planet for you to visit? (Y or N)  
Y  
Ok! Traveling to...
```

Learning Outcomes

- Reorganize related or repetitive code into well-named methods, and analyze the resulting expressiveness and readability of code.
- Discover how methods can call other methods defined within the same class definition.
- Discover the `return` keyword and apply it in a method that returns a value to its caller.
- Recognize how Swift method parameters are declared and passed.

Vocabulary

method	method call	access control
private	parameter	type annotation
argument	return type	return

Materials

- **SpaceAdventure Lesson 6** Xcode project

Opening

What general tasks does the `start` method accomplish? What repetitive code do we see?

Agenda

- Discuss how the `start` method seems to do three things: print an introduction, greet the user, and determine which planet to travel to.
- Extract the first few lines of `start` into a new private method called `displayIntroduction`.

```
private func displayIntroduction() {
    let numberOfPlanets = 8
    let diameterOfEarth = 24859.82 // In miles, from pole to pole.
    print("Welcome to our solar system!")
    print("There are \(numberOfPlanets) planets to explore.")
    print("Your are currently on Earth, which has a circumference
        of \(diameterOfEarth) miles.")
}
```

- Replace the extracted code with a method call at the beginning of `start`.

```
displayIntroduction()
```

- Discuss how the `displayIntroduction` will only be called by the `start` method, and is marked `private` to indicate that only code within the same file will be able to call `displayIntroduction`.
- Briefly explain the three Swift access levels: `public`, `internal` and `private`.
- Discuss how the `start` method uses a pair of `print` and `getln` methods twice, to prompt for and capture user input.
- Encapsulate the work of prompting for and capturing user input into a private method called `responseToPrompt`.

```
private func responseToPrompt(prompt: String) -> String {
    print(prompt)
    return getln()
}
```

- Explain the method implementation syntax, emphasizing the parameter name, parameter type annotation, and the method return type.
- Discuss how this method will print the `String` it receives, and will return what the user types as a `String`.
- Replace the relevant lines of code in `start` to use the new `responseToPrompt` method.

```
let name = responseToPrompt("What is your name?")
print("Nice to meet you, \(name). My name is Eliza, I'm an old
      friend of Siri.")

print("Let's go on an adventure!")

var decision = "" // Start with empty String
while !(decision == "Y" || decision == "N") {
    decision = responseToPrompt("Shall I randomly choose a planet for
        you to visit? (Y or N)")
    if decision == "Y" {
        ...
    }
}
```

- Discuss the function (or method) calling syntax with the use of an argument, tracing how the string literal argument passed to `responseToPrompt` becomes assigned to the method's `prompt` parameter, and is used by the body of the method.
- Extract the greeting-related code in `start` into a new method called `greetAdventurer`.

```
private func greetAdventurer {
    let name = responseToPrompt("What is your name?")
    print("Nice to meet you, \(name). My name is Eliza, I'm an old
          friend of Siri.")
}
```

- Extract the code remaining code in `start` into a new method called `determineDestination`.

```
private func determineDestination() {
    var decision = "" // Start with empty String
    while !(decision == "Y" || decision == "N") {
        decision = responseToPrompt("Shall I randomly choose a planet
        for you to visit? (Y or N)")
        if decision == "Y" {
            print("Ok! Traveling to...")
            // TODO: travel to random planet
        } else if decision == "N" {
            print("Ok, name the planet you would like to visit...")
            // TODO: let the user select a planet to visit
        } else {
            print("Sorry, I didn't get that.")
        }
    }
}
```

- Update the `start` method to call the new `greetAdventurer` and `determineDestination` methods.

```
func start {
    displayIntroduction()
    greetAdventurer()
    print("Let's go on an adventure!")
    determineDestination()
}
```

- Run the program (`⌘R`), observe the console (`⇧⌘C`), and confirm that the functionality remains unchanged.
- Discuss whether or not the `start` method has become more readable, expressive and concise.

Closing

Take a look at our `TODO` comments in `determineDestination`. What nouns do you see? What else do you think our program needs to model?

Modifications and Extensions

- Investigate the difference between functions and methods.
- Add the `private` access control modifier to the `start` method definition, re-run the program, and explain the reason for the error you see.

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

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

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

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