protocols / delegates / getting values from UI

CS112 Unit 9

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protocols

- a **protocol** specifies one or more requirements that a type must fulfill
- a type which satisfies these requirements is said to **conform** to the protocol

protocols - syntax

```
// define a protocol
protocol SomeProtocol {
     // protocol definition goes here
}

// define another protocol
protocol SomeOtherProtocol {
     // protocol definition goes here
}

// a class which conforms to SomeProtocol
class SomeClass: SomeProtocol {
     // class definition goes here
}

// a class which has a superclass and also conforms to
// SomeProtocol
class SomeOtherClass: SomeSuperClass, SomeProtocol {
     // class definition goes here
}
```

protocol requirements - property

- a protocol can specify property requirements and/or method requirements
- a property requirement can be specified as **gettable**, or **gettable/settable**

```
protocol hasName {
    var name: String {get set}
}
```

protocol example - property

- class Player conforms to protocol hasName, because it has property var name

```
protocol hasName {
    var name: String {get set}
}

class Player: hasName {
    var name = ""
    var weight = 0.0
    var height = 0.0
    var age = 0

    func printInfo() {
        print("\(name)")
        print("\(weight) kg, \(height) m, \(age) yrs")
    }
}
```

protocol requirements - method

- a protocol can also specify method requirements

```
protocol printsInfo {
    func printInfo()
}
```

protocol example - method

- class Player also conforms to protocol printsInfo, because it has method printInfo()

```
protocol hasName {
    var name: String {get}
}

protocol printsInfo {
    func printInfo()
}

class Player: hasName, printsInfo {
    let name = ""
    var weight = 0.0
    var height = 0.0
    var age = 0

    func printInfo() {
        print("\(name)")
        print("\(weight) kg, \(height) m, \(age) yrs")
    }
}
```

Exercise 9A

- modify the below Player class so that it conforms to the builtin **`CustomStringConvertible`** protocol. a class conforming to this protocol must have a gettable property named **`description`**

- create a player object, and then call print on your object to print it out

```
class Player {
    var name: String
    var weight: Int
    var height: Int
    var age: Int

    func printInfo() {
        print("\(name)")
        print("\(weight) kg, \(height) m, \(age) yrs")
    }
}
```

delegation

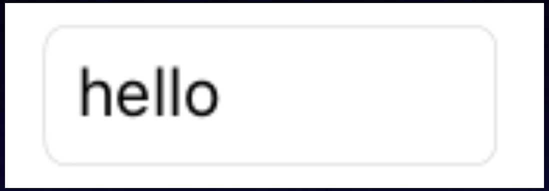
- an object can hand off some of its tasks to another object - this is known as **delegation**

delegation

- in Swift, we can guarantee that a delegate can handle its delegated responsibilities by making it conform to a protocol
- delegation is used often in iOS

delegation example - UITextField

- consider a text field in an iOS app:


hello

- this is implemented with a `UITextField` object
  - to enter text, the user taps the text field. the `UITextField` object becomes the **first responder** of the device, i.e. the user input goes to it
  - when the user is done entering some text, the `UITextField` object can let a delegate know.

delegation example - UITextField

- we can set up our ViewController class to be the delegate of the **`UITextField`** object! this involves a couple things:
  - it must conform to the **`UITextFieldDelegate`** protocol.
  - all of the methods in this protocol are optional. we will implement these methods:

    ```
    func textFieldShouldReturn(textField:
    UITextField) -> Bool

    func textFieldDidEndEditing(textField:
    UITextField)
    ```

  - it must set itself to be the delegate of the **`UITextField`** object

demo - build an app with a UITextField

Exercise 9B

- we have built an app which has a label and a text field. when the user hits return, the label changes to the text the user entered

- append an exclamation point to the text that the user entered. for example, if the user enters “Giants” the label should change to “Giants!”

- add another label to the ViewController. after the user enters some text, change this label to the number of characters the user entered