

**Batch #22 / iOS Class**  
Remote Learning Assignment - Week 2

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**Part 1: Object-Oriented Swift**

1. Declare a class **Animal** with a property **gender** and a method **eat()**. The data type of **gender** should be enum Gender as below and when you call **eat()** method, it will print "I eat everything!"

```
enum Gender {  
    case male  
    case female  
    case undefined  
}
```

2. Declare three classes: **Elephant**, **Tiger**, **Horse** that inherits from Animal and override the **eat()** method to print what they usually eat.
3. Declare a class **Zoo** with a property **weeklyHot** which means the most popular one in the zoo this week. The codes below can't work correctly, please find what data type should **A** be and solve the problem. Note that **tiger**, **elephant**, and **horse** are instances of class Tiger, Elephant, and Horse respectively.

```
class Zoo {  
  
    var weeklyHot: A  
  
    init(weeklyHot: A) { }  
}  
  
let zoo = Zoo(weeklyHot: Tiger())  
  
zoo.weeklyHot = tiger  
zoo.weeklyHot = elephant  
zoo.weeklyHot = horse
```

4. What is an instance? What does **Initializer** do in Class and Struct?
5. What's the difference between **Struct** and **Class**?
6. What's the difference between **reference type** and **value type**?
7. What's the difference between **instance method** and **type method**?
8. What does **self** mean in an instance method and a type method respectively?

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## Part 2: Enumerations and Optionals in Swift

1. There are several gasoline types, 92, 95, 98, and diesel that we can use enum to model them.
  - Please declare an enum named `Gasoline` to model gasoline.
  - Every kind of gasoline has its price. Please declare a computed property named `price` and a method named `getPrice` separately in `Gasoline` enum that both will return different prices depending on different gasoline.
  - Please establish `raw values` for `Gasoline`. The data type of raw value should be `String`. For example, `Gasoline.oil92.rawValue` should be "92".
  - Please explain what enum `associated value` is and how it works.
2. Optional is a very special data type in Swift. Take `var a: Int? = 10` for example, the value of `a` will be `nil` or `Int`. You should have learned how to deal with Optional.
  - People would like to have pets, but not everyone could have one. Declare a class `Pet` with `name` property and a class `People` with `pet` property which will store a `Pet` instance or `nil`. Please try to figure out what data type is suitable for these properties in `Pet` and `People`.
  - Please create a `People` instance. Use `guard let` to unwrap the `pet` property and print its name.
  - Please create another `People` instance. Use `if let` to unwrap the `pet` property and print its name.

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### Part 3: Protocol in Swift

1. Declare a struct `Person` with a `name` property type `String` and a protocol name `PoliceMan`. There is only one method `arrestCriminals` with no argument and return `void` in the protocol.
2. Make struct `Person` conform to `PoliceMan` protocol.
3. Declare a protocol `ToolMan` with a method `fixComputer` that has no argument and return `void`.
4. Add a property `toolMan` to the struct `Person` with data type `ToolMan`.
5. Declare a struct named `Engineer` that conforms to the `ToolMan` protocol.
6. Create a `Person` instance with the name "Steven" and also create the relative data you need to declare this instance.

### Part 4: Error Handling in Swift

```
enum GuessNumberGameError {
    case wrongNumber
}

class GuessNumberGame {

    var targetNumber = 10

    func guess(number: Int) throws {
        guard number == targetNumber else {
            throw GuessNumberGameError.wrongNumber
        }
        print("Guess the right number: \(targetNumber)")
    }
}
```

Read the code above first and paste it in the playground file, there is an error inside the code. Please solve the error **by adding a piece of code** in the file. Call `guess(number:)` and pass 20 as the argument after you fix the problem.

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### Part 5: A Simple App

Please implement the app by following the design below (measured in points.)

#### UI Requirements:

Label on the top:

Top: 100, Leading: 40, Font size: 16, Font Color: White

Label in the middle:

Top: 100, Leading: 40, Trailing: 40, Font size: 16, Font Color: White

Button:

Bottom: 50, Leading: 40, Trailing: 40, Font size: 16, Font Color: White



#### Functional Requirements:

Each time the user hits the button, the background color and text should change randomly. We give the text below. There are 7 sentences in the array. You can choose 7 kinds of color to cooperate with it. For example, you can take the colors of the rainbow as your color set.

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**Hints:**

1. RGB color
2. Random number in Swift

```
let text = [  
    "Lorem ipsum dolor sit amet, consectetur adipiscing elit. Maecenas tempus.",  
    "Contrary to popular belief, Lorem Ipsum is not simply random text.",  
    "Richard McClintock, a Latin professor at Hampden-Sydney College in ",  
    "looked up one of the more obscure Latin words, consectetur",  
    "from a Lorem Ipsum passage, and going through the cities of the word",  
    "This book is a treatise on the theory of ethics, very popular during the.",  
    "The first line of Lorem Ipsum, Lorem ipsum dolor sit amet..",  
]
```