# Batch #21 / iOS Class Remote Learning Assignment - Week 1

## Part 1: Git & GitHub

1. Please create a public GitHub repository named “Remote-Assignments” for uploading your homework. Please send your repository link to us through Discord direct message and we will check your assignments through your repository every week. We need you to structure your folders as below:

- Remote-Assignments
- week1
- [your assignments]
- week2
- [your assignments]
- week3
- [your assignments]
- week4
- [your assignments]

https://github.com/YuKi-Wang1124/Remote-Assignments/tree/main

2.Here are some Git and GitHub commands we usually use in software development. Please explain the meanings and use cases of them.

● git status

檢視目前 git 的狀態，可顯示：

1. 檔案的更動
2. 是否 track 這些更動
3. 沒有的話需使用 git add . 來讓電腦追蹤，
4. 是否 commit ，
5. 是否 push 上 github，
6. 現在所處的 branch。

● git add

git add . 儲存版本的暫存狀態，在 add 後仍可使 unstaged 回復到 add 之前的狀態，在 git commit 之前需使用。

● git commit

commit 後會修改存在電腦的數據中，可回復到之前的 commit 但無法回復到 add 之前，git commit -m “可不進入編輯器，直接將commit的訊息寫在這邊”

● git log

輸入 git log 預設的可以看到 commit 的 ID、作者、日期、內容。

git log

git log -數字  選擇看幾次的commit

git log  - -oneline 只顯示一行commit 資料

git log  - -decorate  新增branch的名字

git log  - -graph  用 ASCII 顯示分支

git log -p  顯示各commit 間的差異

git shortlog  顯示各commit的作者

git shortlog origin/master..HEAD 顯示原先的版本跟現在所處的位置

搜尋相關：

git log - -author=“作者名” 用commit的人來搜尋

git log - -grep=“想搜尋的commit訊息” 用commit 的訊息來搜尋

git log - -README.md 用檔案名稱搜尋

git log -S”想搜尋的內容”

git log 資料夾名稱/ 搜尋所有有這個資料夾名稱的commit

● git branch

git branch 可查看現有分支。

git branch +分支名稱 : 可建新的分支。

建立後若想刪除此 branch 可以使用 git branch -d 名稱，即可刪除。

● git push [ repo_name ] [ branch_name ]

把本地端的資料上傳遠端，例如 github

● git remote -v

可查詢在遠端數據庫，-v 則是指可以指定只顯示遠端的簡稱所使用的網址。

● fork

github 的功能，到別人的 repository 可複製相同的檔案一份到自己的 github。

到自己的repository 則可以看出repo的紀錄。

3.Please describe how to establish a GitHub repo and how to upload the local projects to GitHub. Try to explain your answers with as much detail as possible.

1. 先在 github 上建立 repository

2. 使用 terminal command line 輸入 git init 建立版本控管

3. 使用 git add . 追蹤版本

4.使用 git commit 儲存資訊，編輯 commit 的內容

5.使用以下三個 command line 將檔案上傳到 github (沒建立過 main 的情況)

git remote add origin https://github.com/YuKi-Wang1124/MyRepository.git
git branch -M main
git push -u origin main

---

## Part 2: Basic

1. Please explain the difference between let and var .

   兩者皆可用於宣告物件，但 let 為常數，內容經指派後，在這個物件的 scope 結束前不可改變。var 則為變數，可任意指派相同型別的內容給使用 var 宣告的物件運用。

2. In Swift, we usually define a variable through the syntax as below:
   var x: Int = 10.
   We use the formula: 2 * radius * Pi to calculate the circumference. Now, please define a variable Pi and assign a value to it. You can refer to the syntax above while thinking about using var or let and which data type it should be.

   ```
   var pi : Double = 3.14159
   ```

   Pi 為圓周率，約略數值為 3.14159 ，因此型別須選擇浮點數，Double 及 Float 皆可以用來表示 浮點數，但 Double 的精度較高，較為準確，在不考慮記體空間的形況下選擇以 Double 宣告 Pi 的型別在計算圓的面積上較為準確。

   我選擇以變數來宣告圓周率則是因為若計算需求不需要到精確，就可改變 指派給 Pi 的內容，可靈活運用。

3. Create two constants x and y of type Int then assign any value to them. After that, please calculate the average of x and y and store the result in a constant named average.

```
let x : Int = 11
let y : Int = 22
let average = Double(x + y) / 2
```

4. Following Q3, now we want to save the average in a record system, but the system doesn't accept 65 but 65.0.
   ● Please solve this problem so that we can put the average in the record system.

```
let average = Double(x + y) / 2
```

   ● Please explain the difference between ( 10 / 3 ) and ( 10.0 / 3.0 ).

   若在swift 中 10 / 3 的結果會等於 3，因為 Swift 把 10 / 3 判斷成型別 Int 除 Int，因此結果也只會取整數的部分。

   10.0 / 3.0 的結果會等於3.3333333333333335，Swift 會將10.0 / 3.0 則判斷成浮點數除以浮點數，結果則會出現計算浮點數後的近似值。

5. Declare two constants that values are 10 and 3 each, then please calculate the remainder and save the result in a constant named remainder .

```
let number1 = 10
let number2 = 3
let remainder = number1 % number2
```

6. Swift is a very powerful language that can infer the data type for you ( Type Inference ) while we still need to know the basics well. Please change the following codes into the ones with the data type.
   Ex: .var x = 10. => .var x: Int = 10.
   var flag = true
   var inputString = "Hello world."
   let bitsInBite = 8
   let averageScore = 86.8

```
var flag : Bool = true
var inputString : String = "Hello world."
let bitsInBite : Int = 8
let averageScore : Double = 86.8
```

7. What is Type Inference in Swift?

   Type Inference 是型別推斷，當使用常數或變數宣告一個物件但沒有給這個物件指定任何型別時，Swift 會依照你指派給這個物件的值去推斷這個物件的的型別。

8. What is the issue about this piece of code?
   var phoneNumber = 0987654321
   phoneNumber = "Hello world."

   因為一開始給定 phoneNumber 的值 0987654321 會被 Swift 推斷為 Int ，沒有特別轉型的話，就不能將屬於 String 型別的 “Hello world” 再指派給 phoneNumber。

9. Compound assignment operators are very useful when programming. Please create a salary as 22000, and use unary plus operator adding 28000 to salary, so it will be 50000 after this process.

   ```
   var salary = 22000
   salary += 28000
   ```

10. You should notice that ‘=’ has a different meaning in programming. In the real world, .‘=’ means equal while In programming, ‘=’ means assign . You simply put the right hand side data into the left hand side variable or constant.

    Now please write down the Equality operator in Swift.

    ```
    ==
    ```

## Part 3: Collection

You should know how to declare an array in Swift, and also how to **add, remove, insert,** read an object in an array. You should be familiar with the following syntax: append , insert , remove .

Arrays are dangerous in Swift. **If you access the array with an index which is out of range, your app will crash with fatal error.** Please interact with the array very carefully.

1. Please create an empty array with String data type and save it in a variable named myFriends

```
var myFriends : [String] = []
```

2. According to Q1, now I have three friends, ‘Ian’, ‘Bomi’, and ‘Kevin’. Please help me to add their name into myFriends array.

```
var myFriends : [String] = []
myFriends += ["Ian", "Bomi", "Kevin"]
```

3. Oops,I forgot to add ‘Michael’ who is one of my best friends, please help me to add Michael to the end of myFriends array.

```
var myFriends : [String] = []
myFriends += ["Ian", "Bomi", "Kevin"]

myFriends.append("Michael")
```

4. Because I usually hang out with Kevin, please move Kevin to the beginning of the myFriends array

```
var myFriends : [String] = []
myFriends += ["Ian", "Bomi", "Kevin"]
myFriends.append("Michael")

myFriends.swapAt(2, 0)
```

5. Use for…in to print all the friends in myFriends array.

```
for friend in myFriends {
    print(friend)
}
```

6. Now I want to know who is at index 5 in the myFriends array, try to find the answer for me. Please explain how you get the answer and why the answer is it.

   超出 Array 裡面元素數量的範圍

7. How to get the first element in an array?

```
myFriend.first
```

8. How to get the last element in an array?

```
myFriends.last
```

9. Please create a dictionary with keys of type String, value of type Int, and save it in a variable named myCountryNumber

```
var myCountryNumber = [String : Int]()
```

10. Please add three keys ‘US’, ‘GB’, ‘JP’ with values 1, 44 , 81.

```
myCountryNumber["US"] = 1
myCountryNumber["GB"] = 44
myCountryNumber["JP"] = 81
```

11. Change the ‘GB’ value from 44 to 0.

```
myCountryNumber["GB"] = 0
```

12. How to declare an empty dictionary?

```
var emptyDictionary = [String : Int]()
var emptyDictionary1 : [String : Int] = [:]
```

13. How to remove a key-value pair in a dictionary?

把對應的值設定為 nil ，或是使用 .removeValue()，例如要刪掉上面dictionary 裡的US：

```
myCountryNumber["US"] = nil

或是

myCountryNumber.removeValue(forkey: "US")
```

---

# Part 4: Control Flow

1. Here is an array:
   let lottoNumbers = [10, 9, 8, 7, 6, 5]
   Please use For-In loop and Range to print the last three members in the lottoNumbers array.

```
let lottoNumbers = [10, 9, 8, 7, 6, 5]

for i in 3...5 {
    print(lottoNumbers[i])
}
```

2. Please use a for-in loop to print the results as the images listed below respectively **(through .lottoNumbers.):**

   5
   6
   7
   8
   9
   10

```
let lottoNumbers = [10, 9, 8, 7, 6, 5]

for i in (0...5).reversed() {
     print(lottoNumbers[i])
}
```

   10
   8
   6

```
let lottoNumbers = [10, 9, 8, 7, 6, 5]

for i in stride(from: 0, through: 4, by: 2){
      print(lottoNumbers[i])
}
```

3. Please use a while loop to solve the Q2.

   5
   6
   7
   8

9
10

```
let lottoNumbers = [10, 9, 8, 7, 6, 5]

var i = 5
while i >= 0 {
   print(lottoNumbers[i])
   i -= 1
}
```

10
8
6

```
let lottoNumbers = [10, 9, 8, 7, 6, 5]

var i = 0

while i <= 4 {
    print(lottoNumbers[i])
    i += 2
}
```

4. Please use a repeat-while loop to solve Q2.

5
6
7
8
9
10

```
let lottoNumbers = [10, 9, 8, 7, 6, 5]

var i = 5
repeat {
   print(lottoNumbers[i])
```

```
   i -= 1
} while i >= 0
```

10
8
6

```
let lottoNumbers = [10, 9, 8, 7, 6, 5]

var i = 0
repeat {
   print(lottoNumbers[i])
   i += 2
} while i >= 4
```

5. What are the differences between while and repeat-while?

   如果需要至少執行一次的，需用 repeat，因爲 while 判斷句可能不成立

6. Here is the variable isRaining to record the weather. Please write a statement that if the weather is raining, print “It’s raining, I don’t want to work today.”, otherwise print “Although it’s sunny, I still don’t want to work today.”

```
var isRaining: Bool = true
if isRaining == true {
      print("It’s raining, I don’t want to work today.")
} else {
      print("Although it’s sunny, I still don’t want to work today.")
}
```

7. In a company, we usually use numbers to represent job levels. Let’s make an example. There are four job levels: Member, Team Leader, Manager, an.
   We use 1 for the Member, 2 for Team Leader, 3 for Manager, and 4 for Director. Now, create a variable name jobLevel and assign a number to it. If the jobLevel number is in our list, print the relative job title name; if not, just print “We don't have this job”. Please use a switch statement to complete this requirement.

```
var jobLevel = 0
switch jobLevel {
case 1:
    print("Member")
case 2:
    print("Team Leader")
case 3:
    print("Manager")
case 4:
    print("Director")
default:
    print("We don't have this job")
        }
```

---

## Part 5: Function

1. What are the return types in the following statements?
   func birthday( ) -> String {
   }
   String 字串

   func payment( ) -> Double {
   }

   Double 雙精度浮點數

2. Please declare a function named multiply with two arguments a and b . This function won't return any value and will only print out the result of a * b . Be noticed that we want to give argument b a default value of 10.

```
func multiply(a: Int, b: Int = 10) {
    let result = a * b
    print(result)
}
```

3. What's the difference between argument label and parameter name in a function?

argument label 是外部參數，parameter name是內部參數，外部參數使用於呼叫時，可用 _ 替代，若用 _ 替代後，在呼叫時，則可以省略參數名稱，內部參數則是使用於 function 內部。

4. Please declare a function named greet with person as an argument label and .name. as a parameter name. This greet function will return a String. For example, if you call the function greet like this: greet(person: "Luke")
   It will return the string: “Hello, Luke”.

```
func greet(person name : String) -> String {

    return "Hello" + name
}

greet(person: "Luke")
```