### **Lab 3:** **Loops in Swift**

Here's a lab exercise to help you practice using different types of loops in Swift. This exercise covers for, while, and repeat-while loops, including basic iterations, working with ranges, and practical examples.

**Part 1: for Loops**

1. **Simple for Loop:**

* Use a for loop to print the numbers from 1 to 10.

for i in 1...10 {

print(i)

}

1. **Iterating Over an Array:**

* Declare an array of strings called fruits and initialize it with a list of fruit names.
* Use a for loop to iterate over the fruits array and print each fruit name.

let fruits = ["Apple", "Banana", "Cherry", "Date", "Elderberry"]

for fruit in fruits {

print(fruit)

}

1. **for Loop with Index:**

* Use a for loop to print the elements of the fruits array along with their index.

for (index, fruit) in fruits.enumerated() {

print("\(index): \(fruit)")

}

**Part 2: while Loops**

1. **Basic while Loop:**

* Declare an integer variable counter and initialize it with the value 10.
* Use a while loop to print the value of counter and decrement it by 1 in each iteration until counter is greater than 0.

var counter = 10

while counter > 0 {

print(counter)

counter -= 1

}

1. **while Loop with Condition:**

* Declare an integer variable number and initialize it with the value 1.
* Use a while loop to print the value of number and double it in each iteration until number is greater than 100.

var number = 1

while number <= 100 {

print(number)

number \*= 2

}

**Part 3: repeat-while Loops**

1. **Basic repeat-while Loop:**

* Declare an integer variable countdown and initialize it with the value 5.
* Use a repeat-while loop to print the value of countdown and decrement it by 1 in each iteration until countdown is greater than 0.

var countdown = 5

repeat {

print(countdown)

countdown -= 1

} while countdown > 0

1. **repeat-while Loop with User Input:**

Declare an integer variable input and initialize it with the value 0.

Use a repeat-while loop to keep prompting the user to enter a number until they enter a number greater than 10. (Note: You can simulate user input using a fixed value since actual user input requires a different setup.)

var input = 0

repeat {

print("Enter a number: (simulating user input of 11)")

input = 11 // Simulate user input

} while input <= 10

print("You entered \(input), which is greater than 10.")

**Part 4: Practical Examples**

1. **Sum of Numbers:**

* Use a for loop to calculate the sum of the numbers from 1 to 100 and print the result.

var sum = 0

for i in 1...100 {

sum += i

}

print("The sum of numbers from 1 to 100 is \(sum).")

1. **Factorial Calculation:**

* Declare an integer variable n and initialize it with a value.
* Use a for loop to calculate the factorial of n and print the result.

let n = 5

var factorial = 1

for i in 1...n {

factorial \*= i

}

print("The factorial of \(n) is \(factorial).")

1. **Fibonacci Sequence:**

* Declare two integer variables a and b, and initialize them with 0 and 1, respectively.
* Use a for loop to print the first 10 numbers in the Fibonacci sequence.

var a = 0

var b = 1

for \_ in 1...10 {

print(a)

let temp = a

a = b

b = temp + b

}

**Summary**

This exercise covers the use of for, while, and repeat-while loops in Swift. By completing these tasks, you will become familiar with different loop constructs and how to use them to control the flow of your Swift programs. Experiment with additional operations and modifications to further enhance your understanding of Swift loops.