### **Lab 11:** **Collections in Swift**

Collections in Swift, like arrays, dictionaries, and sets, are fundamental for storing and managing groups of values. This lab exercise will cover various operations and manipulations with Swift collections.

**Part 1: Arrays**

1. **Basic Array Operations:**

* Create an array called numbers containing some integer values.
* Print the number of elements in the array.
* Print the first and last elements of the array.
* Append a new element to the array.
* Remove the second element from the array.

var numbers = [1, 2, 3, 4, 5]

print("Number of elements: \(numbers.count)")

print("First element: \(numbers.first ?? -1), Last element: \(numbers.last ?? -1)")

numbers.append(6)

numbers.remove(at: 1)

print("Array after manipulation: \(numbers)")

1. **Iterating Over an Array:**

* Iterate over the numbers array and print each element.

for number in numbers {

print(number)

}

**Part 2: Dictionaries**

1. **Basic Dictionary Operations:**

* Create a dictionary called person with keys "name" and "age" and corresponding values.
* Print the number of key-value pairs in the dictionary.
* Print the value associated with the key "name".
* Add a new key-value pair to the dictionary.
* Remove the key-value pair with the key "age".

var person = ["name": "Alice", "age": 30]

print("Number of key-value pairs: \(person.count)")

print("Name: \(person["name"] ?? "")")

person["city"] = "New York"

person.removeValue(forKey: "age")

print("Dictionary after manipulation: \(person)")

1. **Iterating Over a Dictionary:**

* Iterate over the person dictionary and print each key-value pair.

for (key, value) in person {

print("\(key): \(value)")

}

**Part 3: Sets**

1. **Basic Set Operations:**

* Create two sets called set1 and set2 containing some values.
* Print the number of elements in each set.
* Check if a specific element exists in each set.
* Perform set operations such as union, intersection, and difference.

let set1: Set<Int> = [1, 2, 3, 4, 5]

let set2: Set<Int> = [4, 5, 6, 7, 8]

print("Number of elements in set1: \(set1.count), set2: \(set2.count)")

print("Is 3 present in set1? \(set1.contains(3))")

print("Union: \(set1.union(set2))")

print("Intersection: \(set1.intersection(set2))")

print("Difference: \(set1.subtracting(set2))")

1. **Iterating Over a Set:**

* Iterate over the set1 set and print each element.

for element in set1 {

print(element)

}

**Part 4: Practical Examples**

1. **Filtering Arrays:**

* Filter the numbers array to create a new array containing only even numbers.

let evenNumbers = numbers.filter { $0 % 2 == 0 }

print("Even numbers: \(evenNumbers)")

1. **Mapping Arrays:**

* Map the numbers array to create a new array with each number squared.

let squaredNumbers = numbers.map { $0 \* $0 }

print("Squared numbers: \(squaredNumbers)")

1. **Merging Dictionaries:**

* Create two dictionaries and merge them into a single dictionary.

let dict1 = ["a": 1, "b": 2]

let dict2 = ["c": 3, "d": 4]

let mergedDict = dict1.merging(dict2) { (\_, new) in new }

print("Merged dictionary: \(mergedDict)")

**Summary**

This lab exercise covered various operations and manipulations with Swift collections, including arrays, dictionaries, and sets. By completing these tasks, you've gained familiarity with common operations performed on collections in Swift, enabling you to efficiently manage and manipulate data in your applications. Experiment with additional operations and explore more advanced features of Swift collections to deepen your understanding.