UNIVERSITY OF CALOOCAN CITY
COMPUTER ENGINEERING DEPARTMENT

Data Structure and Algorithm

Laboratory Activity No. 5

Implementation of Arrays

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August 16, 2025

I. Objectives

Introduction

Array, in general, refers to an orderly arrangement of data elements. Array is a type of data structure that stores data elements in adjacent locations. Array is considered as linear data structure that stores elements of same data types. Hence, it is also called as a linear homogenous data structure.

This laboratory activity aims to implement the principles and techniques in:

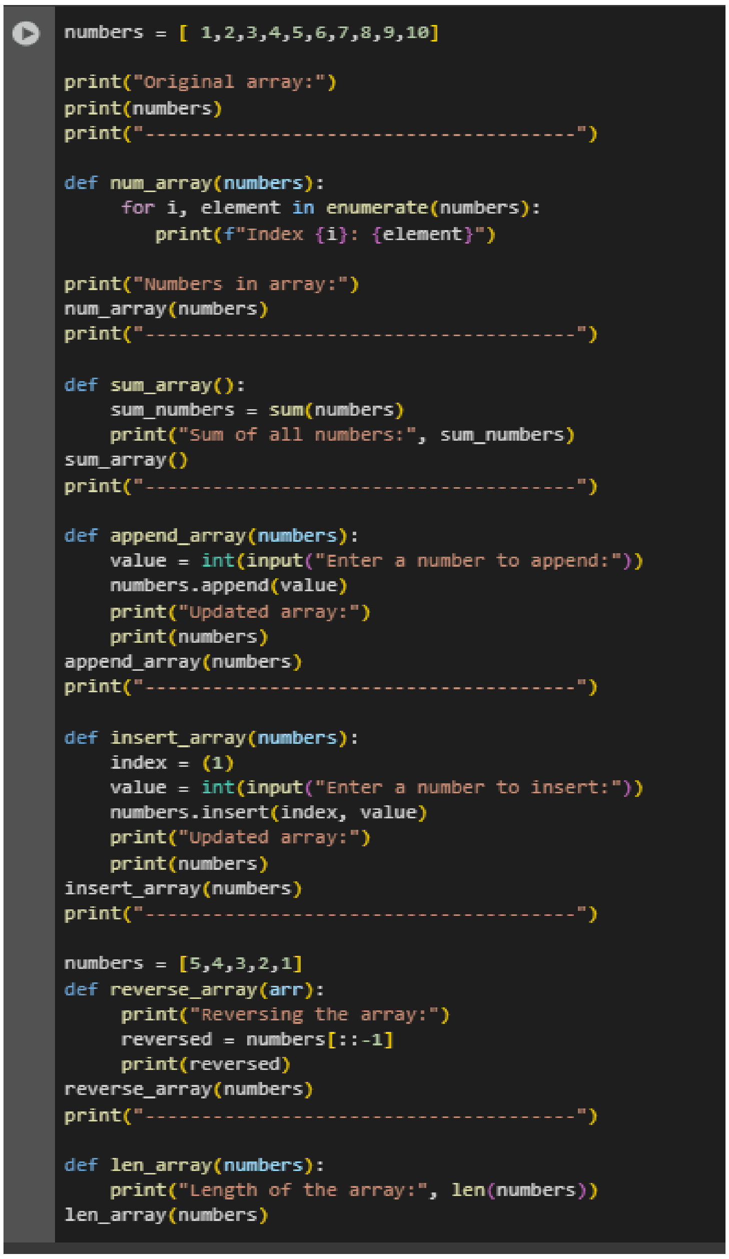
- Writing algorithms using Array data structure
- Writing a python program that can implement Array data structure

II. Methods

- Write a Python program to create an array of 10 integers and display the array items. Access individual elements through indexes and compute for the sum.
- Write a Python program to append a new item to the end of the array. Original array: numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
- Write a Python program to insert a new item before the second element in an existing array. Original array: numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
- Write a Python program to reverse the order of the items in the array. Original array: numbers = [5, 4, 3, 2, 1]

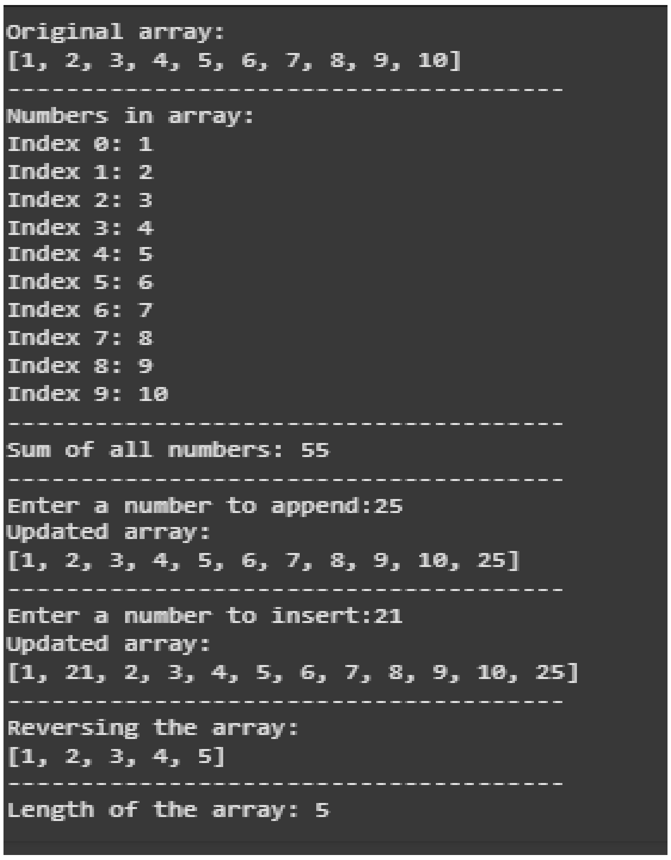
Write a Python program to get the length of the array. Original array: numbers = [5, 4, 3, 2, 1]

III. Results



```
numbers = [ 1,2,3,4,5,6,7,8,9,10]

print("Original array:")
print(numbers)
print("-------------------------------------")

def num_array(numbers):
     for i, element in enumerate(numbers):
        print(f"Index {i}: {element}")

print("Numbers in array:")
num_array(numbers)
print("-------------------------------------")

def sum_array():
    sum_numbers = sum(numbers)
    print("Sum of all numbers:", sum_numbers)
sum_array()
print("-------------------------------------")

def append_array(numbers):
    value = int(input("Enter a number to append:"))
    numbers.append(value)
    print("Updated array:")
    print(numbers)
append_array(numbers)
print("-------------------------------------")

def insert_array(numbers):
    index = (1)
    value = int(input("Enter a number to insert:"))
    numbers.insert(index, value)
    print("Updated array:")
    print(numbers)
insert_array(numbers)
print("-------------------------------------")

numbers = [5,4,3,2,1]
def reverse_array(arr):
     print("Reversing the array:")
     reversed = numbers[::-1]
     print(reversed)
reverse_array(numbers)
print("-------------------------------------")

def len_array(numbers):
    print("Length of the array:", len(numbers))
len_array(numbers)
```

Output:



```
Original array:
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
--------------------------------------
Numbers in array:
Index 0: 1
Index 1: 2
Index 2: 3
Index 3: 4
Index 4: 5
Index 5: 6
Index 6: 7
Index 7: 8
Index 8: 9
Index 9: 10
--------------------------------------
Sum of all numbers: 55
--------------------------------------
Enter a number to append:25
Updated array:
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 25]
--------------------------------------
Enter a number to insert:21
Updated array:
[1, 21, 2, 3, 4, 5, 6, 7, 8, 9, 10, 25]
--------------------------------------
Reversing the array:
[1, 2, 3, 4, 5]
--------------------------------------
Length of the array: 5
```

Figure 1 Screenshot of program

Refer to this link: Lab Act - 5 .ipynb - Colab

Insights: The program shows basic list operations such as displaying elements with indexes. Calculating the sum using the built-in function for sum. The program allows the user to input a number to append and insert, showcasing the .append() and .insert() methods. The program demonstrates also how to reverse list and calculate its length. This program helps me learn how to manipulate and familiarize lists functions.

IV. Conclusion

This activity demonstrated the use of arrays in Python in various operations such as creating, accessing, appending, inserting, reversing, and finding the length of an array. Through this task, I’m able to learn the concept of arrays and how to use it in basic Python programs. It helps me understand how data can be organized and processed effectively using array data structures in programming.