



UNIVERSITY OF CALOOCAN CITY  
COMPUTER ENGINEERING DEPARTMENT



Data Structure and Algorithm

Laboratory Activity No. 5

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# Implementation of Arrays

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# 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

```
#1.
def print_index(variable):
    print()
    for index, item in enumerate(variable):
        print(f"Index {index}: {item}")

def sum_all(list):
    add = sum(list)
    print(f"\nSum of all: {add}")

def for_sum(list):
    sum = 0
    for item in list:
        sum += item

    print(f"\nSum of all numbers: {sum}")

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

print(original_array)

print_index(original_array)

for_sum(original_array)
sum_all(original_array)

#2.

original_array.append(6)
print(f"\nAfter appending: {original_array}")
```

Figure 1 Screenshot of program from colab

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

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

Sum of all: 55

After appending: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 6]
```

Figure 2 Screenshot of output

These images covered number 1 and number 2, where I show how to display the elements along with its index, two sum methods, and how to append values to a list. I had an original list which values are from 1 to 10, then I learned how to display it as a whole and individually. Then I learned how to sum it using the sum function or using a for loop.

```
#3.
original_array2 = [1,2,3,4,5,6,7,8,9,10]
original_array2.insert(1, 11)

print(f"\nAfter inserting before the second element: {original_array2}")

#4.
original_array3 = [5, 4, 3, 2, 1]
original_array3.reverse()
print(f"\nThe array after reversing: {original_array3}")

#5.
original_array4 = [5, 4, 3, 2, 1]
print(f"\nThere are {len(original_array4)} indexes in the array")

def addIndexes(list):
    last = len(list) - 1
    toPrint = ""

    for index, value in enumerate(list):

        toPrint += f"index({index})"

        if value is not list[last]:
            toPrint += " + "
        else:
            toPrint += f" = {len(list)} indexes"
    print(toPrint)

addIndexes(original_array4)
```

Figure 3 Screenshot of program in colab

```
➞ After inserting before the second element: [1, 11, 2, 3, 4, 5, 6, 7, 8, 9, 10]

The array after reversing: [1, 2, 3, 4, 5]

There are 5 indexes in the array
index(0) + index(1) + index(2) + index(3) + index(4) = 5 indexes
```

Figure 4 Screenshot of output

These images covered inserting, reverse function, and the len function. I did the first two functions as normal, then I added my own twist in the len function where I print the process. For the insert function, I learned how to insert a value in any index from 0 to 11. Then I learned how to reverse a list valued from 5 to 1 and how to print the length of that list.

## IV. Conclusion

This laboratory explores the different functions of arrays, like sum, append, insert, reverse and len. This laboratory teaches me how to manipulate a list, which is going to be useful when a list is needed to be used in the future.

## References

[1] Co Arthur O.. “University of Caloocan City Computer Engineering Department Honor Code,” UCC-CpE Departmental Policies, 2020.