Data Structure and Algorithm

Laboratory Activity No. 5

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

```
[12]  array = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
      total = 0

      total += array [0]
      total += array [1]
      total += array [2]
      total += array [3]
      total += array [4]
      total += array [5]
      total += array [6]
      total += array [7]
      total += array [8]
      total += array [9]

      print (f"the sum of array:", total)
```

```
the sum of array: 55
```

```
array = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
print (f"Original array:", array)

numbers = int(input("Input a new number:"))

array.append(numbers)

print(f"Updated array:{array}")
```

```
Original array: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
Input a new number:4
Updated array:[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 4]
```

```
array = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
print (f"Original array:", array)

numbers = int(input("Input a new number in second element:"))

array.insert(1, numbers)

print(f"Updated array:{array}")
```

```
Original array: [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
Input a new number in second element:8
Updated array:[1, 8, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

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```
[10] array = [5, 4, 3, 2, 1]
     print(f"Original array:",array)

     array.reverse()

     print(f"Reversed array:",array)

     Original array: [5, 4, 3, 2, 1]
     Reversed array: [1, 2, 3, 4, 5]
```

```
[11] array = [1, 2, 3, 4, 5]

     length = len(array)

     print("the length of the arrays are:", length)

     the length of the arrays are: 5
```

IV. Conclusion

For this lab activity, I got to practice the basics of arrays in Python. I started by creating an array of integers, then accessed each element through its index and computed the sum. After that, I tried out different operations like adding a new item at the end, inserting an item before the second element, reversing the order of the array, and also checking its length.

Honestly, these exercises made me realize how useful arrays (or lists in Python) are. They're simple to use but also really powerful since you can easily add, remove, or reorganize items. The built-in functions like `.append()`, `.insert()`, `.reverse()`, and `len()` made the work a lot easier, and I now understand better how arrays can be applied in bigger programs. Overall, this task helped me build more confidence in handling data structures in Python.

References

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

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