UNIVERSITY OF CALOOCAN CITY
COMPUTER ENGINEERING DEPARTMENT

Data Structure and Algorithm

Laboratory Activity No. 8

Stacks

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I. Objectives

Introduction

A stack is a collection of objects that are inserted and removed according to the last-in, first-out (LIFO) principle.

A user may insert objects into a stack at any time, but may only access or remove the most recently inserted object that remains (at the so-called “top” of the stack)

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

- Writing Python program using Stack
- Writing a Python program that will implement Stack operations

II. Methods

Instruction: Type the python codes below in your Colab. After running your codes, answer the questions below.

```
# Stack implementation in python


# Creating a stack
def create_stack():
    stack = []
    return stack


# Creating an empty stack
def is_empty(stack):
    return len(stack) == 0

# Adding items into the stack
def push(stack, item):
    stack.append(item)
    print("Pushed Element: " + item)

# Removing an element from the stack
def pop(stack):
    if (is_empty(stack)):
        return "The stack is empty"
    return stack.pop()

stack = create_stack()
push(stack, str(1))
push(stack, str(2))
push(stack, str(3))
push(stack, str(4))
push(stack, str(5))

print("The elements in the stack are:"+ str(stack))
```

Answer the following questions:

1 Upon typing the codes, what is the name of the abstract data type? How is it implemented?
2 What is the output of the codes?
3 If you want to type additional codes, what will be the statement to pop 3 elements from the top of the stack?
4 If you will revise the codes, what will be the statement to determine the length of the stack? (Note: You may add additional methods to count the no. of elements in the stack)

III. Results

1. The name of the Abstract data type is .pop and .append, it is used to pop and push the elements. This also follow the LIFO (Last in, First out) method.

2.

```
Pushed Element: 1
Pushed Element: 2
Pushed Element: 3
Pushed Element: 4
Pushed Element: 5
The elements in the stack are:['1', '2', '3', '4', '5']
PS C:\Users\Administrator\Documents\VS CODE>
```

Figure 1.0 Output of the codes

3. Instead of using push(stack, str(1)) repeatedly, I will do looping so the code will be more organized and easy to understand, it helps the programming to minimize the repeated and redundancy of the code.

4. def size(stack):

    return len(stack)

    it helps to determine the length of the stack for easily

IV. Conclusion

The program shows how stack is implemented. It uses a Last in, First out (LIFO) Method to organize the data. Its implementation in real life is like a search history were in you will the last activity in you web browser. The basic operation the program used was adding, removing, checking and counting the elements in the Stack. It helps me to understand the how to use the stack and how to program it.

References

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