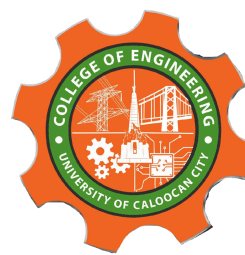




UNIVERSITY OF CALOOCAN CITY  
COMPUTER ENGINEERING DEPARTMENT



Data Structure and Algorithm

Laboratory Activity No. 8

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# 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 Stack which is a linear data structure that uses the LIFO principle and it is implemented using a list and it is used on append and pop methods.

2. The output of the code is

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']

3. I would pop the item one by one by using the pop function.

```
element1 = pop(stack)
```

```
element2 = pop(stack)
```

```
element3 = pop(stack)
```

4. I would use the python built-in function len to check the length of the stack.

```
len(stack)
```

### IV. Conclusion

In this Laboratory Report 8, I've learned to apply the stack principle into a python program as well as to analyze it. I have identified what data types are used as well as problem solving. I have to weigh which is better, by adding another function or just using the python built-in function on problem number 4. I chose to just use the python built-in function "len" directly. And also by using the pop function I was able to remove the 3 items starting from top in the list of stacks. Overall, I was able to apply and learn as well as to use my knowledge and experience to solve the problems on stacks.

## References

- [1] Co Arthur O.. “University of Caloocan City Computer Engineering Department Honor Code,” UCC-CpE Departmental Policies, 2020.
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- [3] *W3Schools.com*. (n.d.-b). [https://www.w3schools.com/python/python\\_dsa\\_stacks.asp](https://www.w3schools.com/python/python_dsa_stacks.asp)