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FACULTY OF EGINEERING & TECHNOLOGY

DATA STRUCTURE USING C

LECTURE -6

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OUTLINE

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INTRODUCTION OF STACK

Stack

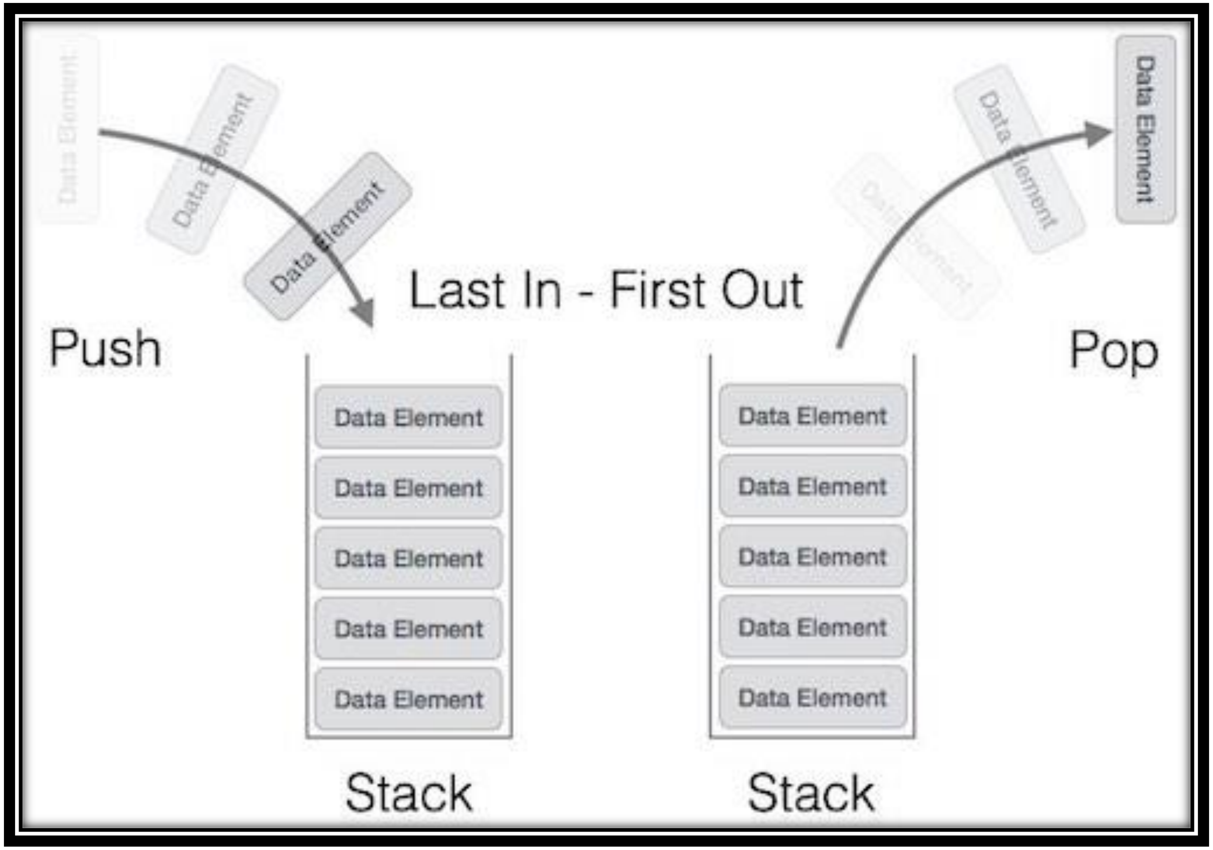
A stack is an Abstract Data Type (ADT), commonly used in most programming languages. It is named stack as it behaves like a real-world stack, for example – a deck of cards or a pile of plates, etc.

INTRODUCTION OF STACK

Stack Representation

The following diagram depicts a stack and its operations −

A stack can be implemented by means of Array, Structure, Pointer, and Linked List. Stack can either be a fixed size one or it may have a sense of dynamic resizing. Here, we are going to implement stack using arrays, which makes it a fixed size stack implementation.



INTRODUCTION OF STACK

Basic Operations

push() − Pushing (storing) an element on the stack.

pop() − Removing (accessing) an element from the stack.

Push Operation

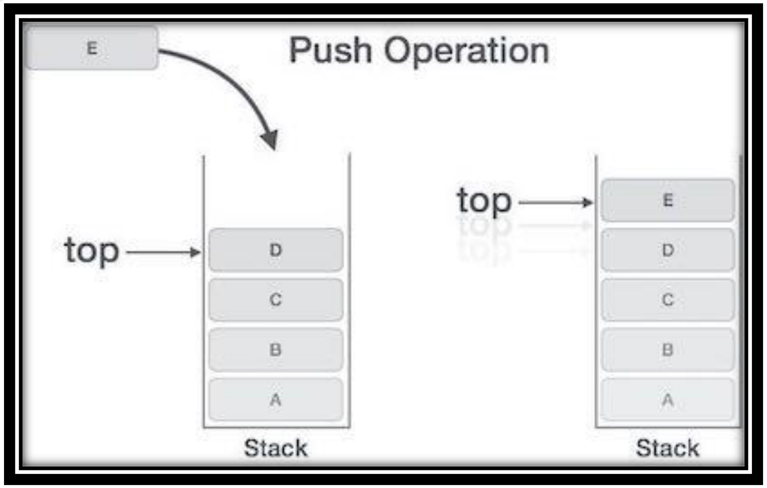
Step 1 − Checks if the stack is full.

Step 2 − If the stack is full, produces an error and exit.

Step 3 − If the stack is not full, increments top to point next empty space.

Step 4 − Adds data element to the stack location, where top is pointing.

Step 5 − Returns success.



INTRODUCTION OF STACK

Pop Operation

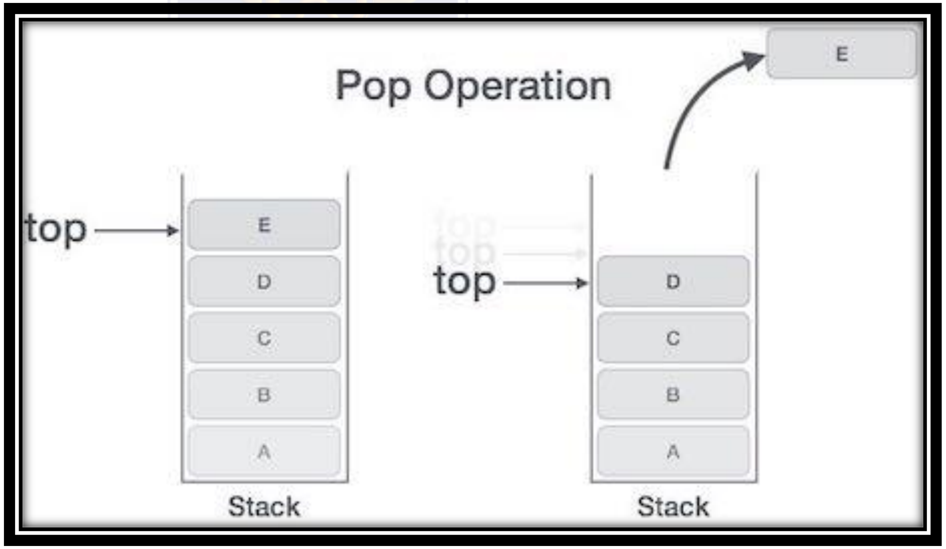
Step 1 − Checks if the stack is empty.

Step 2 − If the stack is empty, produces an error and exit.

Step 3 − If the stack is not empty, accesses the data element at which top is pointing.

Step 4 − Decreases the value of top by 1.

Step 5 − Returns success.



MCQ

6. Which of the following applications may use a stack?

a) A parentheses balancing program

b) Tracking of local variables at run time

c) Compiler Syntax Analyzer

d) Data Transfer between two asynchronous process

7. Consider the usual algorithm for determining whether a sequence of parentheses is balanced.

The maximum number of parentheses that appear on the stack AT ANY ONE TIME when the algorithm analyzes: (()(())(())) are:

a) 1

b) 2

c) 3

d) 4 or more

8. Consider the usual algorithm for determining whether a sequence of parentheses is balanced.

Suppose that you run the algorithm on a sequence that contains 2 left parentheses and 3 right parentheses (in some order).

The maximum number of parentheses that appear on the stack AT ANY ONE TIME during the computation?

a) 1

b) 2

c) 3

d) 4 or more

9. What is the value of the postfix expression 6 3 2 4 + – *:

a) 1

b) 40

c) 74

d) -18

10. Here is an infix expression: 4 + 3*(6*3-12). Suppose that we are using the usual stack algorithm to convert the expression from infix to postfix notation.

The maximum number of symbols that will appear on the stack AT ONE TIME during the conversion of this expression?

a) 1

b) 2

c) 3

d) 4

REFERENCES

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