

EXPERIMENT NO. 1

ARRAY REPRESENTATION OF STACK

Aim: Write A Program To Implement Stack Using Array.

Theory: A Stack Is An Important Data Structure Which Is Extensively Used In Computer Application. Implementation Of Stack Can Be Done By Using Array As Well As Linked Lists. It Stores The Element In A Well Ordered Manner. A Stack Is A Linear Data Structure In Which Elements Can Be Added & Removed Only From One End Which Is Called The **TOP**. Hence, A Stack Is Called A **LIFO (Last-In-First-Out)** Data Structure, As The Element That Was Inserted Last Is The First One To Be Taken Out.

OPERATIONS ON STACK

PUSH OPERATION: The Push Operation Is Used To Insert An Element On Stack.

POP OPERATION: The Pop Operation Is Used To Delete The Topmost Element From The Stack.

DISPLAY OPERATION: The Display Operation Is Used To Display The Stack.

Algorithm:

FOR PUSH OPERATION:

1. If (TOP == (SIZE-1)) Then [Check For Overflow]
2. Print: Stack Overflow.
3. Else
4. Set TOP = TOP + 1 [Increment TOP by 1]
5. Set STACK [TOP] = ELEMENT [Assign ELEMENT To Top Of STACK]
6. Print: ELEMENT Inserted [End Of If]
7. Exit.

FOR POP OPERATION:

1. If (TOP == -1) Then [Check For Stack Empty]
2. Print: Stack Empty
3. Else
4. Set TOP = TOP - 1 [Decrement TOP By 1]
5. Set ELEMENT = STACK[TOP] [Assign Top Of STACK To ELEMENT]
6. Print: ITEM Deleted [End Of If]
7. Exit.

FOR DISPLAY OPERATION:

1. If (TOP == -1) Then [Check For Stack Empty]
2. Print: Stack Empty

3. Else
4. Initialize Integer i
5. For (i=0; i<=TOP; i++) [Repeat Step 6]
6. Print: Element [i].
7. Exit

Program:

```
#include<stdio.
h>
#include<stdlib.
h>
#define MAX
100
int
stack[MAX];
int top = -1;

void push()
{   int data;
    printf("Enter
the number: ");

    scanf("%d",&d
ata);

    if(top==MAX-
1){

        printf("Stack
overflow\n");
    }
    else{
        top =
top+1;

        stack[top] =
data;

        printf("Element
inserted.\n");
    }
}
```

```
int pop(){
    int ele;
    if(top == -1){

printf("Stack
empty\n");

    }
    else{
        ele =
stack[top--];
        return ele;
    }

}
```

```
void display(){
    if(top== -1){

printf("\nStack
is empty\n");
    }
    else{

printf("The
elements in the
stack are:");
        for(int
i=0;i<=top;i++)
        {

printf("%d
",stack[i]);

        }

printf("\n");
    }
}
```

```
void main(){

    push();
    push();
    push();
```

```
push();  
push();  
display();  
  
printf("Deleted  
item:  
%d\n",pop());  
display();  
}
```

OUTPUT:

```
Enter the number: 45  
Element inserted.  
Enter the number: 13  
Element inserted.  
Enter the number: 18  
Element inserted.  
Enter the number: 63  
Element inserted.  
Enter the number: 78  
Element inserted.  
The elements in the stack are:45 13 18 63 78  
Deleted item: 78  
The elements in the stack are:45 13 18 63
```

