S.No: 18	Exp. Name: *Write a C program to implement different Operations on Stack using Array representation*	Date:2023-05-17

Aim:

Write a program to implement stack using **arrays**.

```
Sample Input and Output:
    1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit
    Enter your option : 4
    Stack is empty.
    1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit
    Enter your option : 2
    Stack is underflow.
    1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit
    Enter your option : 3
    Stack is empty.
    1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit
    Enter your option : 5
    Stack is underflow.
    1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit
    Enter your option : 1
    Enter element : 25
    Successfully pushed.
    1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit
    Enter your option : 1
    Enter element : 26
    Successfully pushed.
    1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit
    Enter your option : 3
    Elements of the stack are : 26 25
    1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit
    Enter your option : 2
    Popped value = 26
    1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit
    Enter your option : 4
    Stack is not empty.
    1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit
    Enter your option : 5
    Peek value = 25
    1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit
    Enter your option : 6
```

Source Code:

StackUsingArray.c

```c
#include <stdio.h>
#include <stdlib.h>
#define STACK_MAX_SIZE 10
#include "StackOperations.c"

int main() {
    int op, x;
```

```
    while(1) {
        printf("1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit\n");
        printf("Enter your option : ");
        scanf("%d", &op);
        switch(op) {
            case 1:
                printf("Enter element : ");
                scanf("%d", &x);
                push(x);
                break;
            case 2:
                pop();
                break;
            case 3:
                display();
                break;
            case 4:
                isEmpty();
                break;
            case 5:
                peek();
                break;
            case 6:
                exit(0);
        }
    }
}
```

StackOperations.c

```
#define size 10
int stack[size];
int top=-1;
void push(int x)
{
    if(top>=size-1)
    {
        printf("Stack is overflow.\n");
    }
    else
    {
        top++;
        stack[top]=x;
        printf("Successfully pushed.\n");
    }
}
int pop()
{
    if(top<0)
    {
        printf("Stack is underflow.\n");
    }
    else
    {
        printf("Popped value = %d\n",stack[top]);
```

```c
            top--;
        }
    }
 void display()
 {
    int i;
    if(top>=0)
    {
        printf("Elements of the stack are : ");
        for(i=top;i>=0;i--)
        {
            printf("%d ",stack[i]);
        }
        printf("\n");
    }
    else
    {
        printf("Stack is empty.\n");
    }
 }
 void peek()
 {
    if(top==-1)
    {
        printf("Stack is underflow.\n");
    }
    else
    {
        printf("Peek value = %d\n",stack[top]);
    }
 }
 void isEmpty()
 {
    if(top==-1)
    {
        printf("Stack is empty.\n");
    }
    else
    {
        printf("Stack is not empty.\n");
    }
 }
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1
Enter your option : 1
Enter element : 10
Successfully pushed. 1
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1
Enter your option : 1
Enter element : 20

Successfully pushed. 1

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1

Enter your option : 1

Enter element : 30

Successfully pushed. 3

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 3

Enter your option : 3

Elements of the stack are : 30 20 10 5

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 5

Enter your option : 5

Peek value = 30 2

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 2

Enter your option : 2

Popped value = 30 2

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 2

Enter your option : 2

Popped value = 20 3

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 3

Enter your option : 3

Elements of the stack are : 10 5

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 5

Enter your option : 5

Peek value = 10 4

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 4

Enter your option : 4

Stack is not empty. 2

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 2

Enter your option : 2

Popped value = 10 3

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 3

Enter your option : 3

Stack is empty. 4

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 4

Enter your option : 4

Stack is empty. 6

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 6

Enter your option : 6