S.No: 1	Exp. Name: ***Write a C program to implement different Operations on Stack using Arrays.***	Date:2024-04-21

ID: 92132321021

Aim:

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

Source Code:

StackUsingArray.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

```
#include <stdio.h>
int stack [STACK_MAX_SIZE],top=-1;

void push(int value) {
   if (top>=STACK_MAX_SIZE-1)
      printf("Stack is overflow.\n");
   else{
```

```
      stack[++top]=value;
      printf ("Successfully pushed.\n");
   }

}

void display() {
   int i;
   if (top==-1)
      printf ("Stack is empty.\n");
   else{
      printf("Elements of the stack are : ");
      for (i=top;i>=0;i--)
         if (stack[i]!=0)
            printf ("%d ",stack[i]);
      printf ("\n");
   }

}

void pop() {
   if (top==-1)
      printf ("Stack is underflow.\n");
   else
      printf ("Popped value = %d\n",stack [top--]);

}

void peek(){
   if (top==-1)
      printf ("Stack is underflow.\n");
   else if (top>=STACK_MAX_SIZE-1)
      printf ("Stack is overflow.\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

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```
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
```

Test Case - 2

User Output

```
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1
Enter your option :  1
Enter element :  1
Successfully pushed. 1
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1
Enter your option :  1
Enter element :  2
Successfully pushed. 1
```

1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1
Enter your option : 1
Enter element : 3
Successfully pushed. 1
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1
Enter your option : 1
Enter element : 4
Successfully pushed. 1
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1
Enter your option : 1
Enter element : 5
Successfully pushed. 1
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1
Enter your option : 1
Enter element : 6
Successfully pushed. 1
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1
Enter your option : 1
Enter element : 7
Successfully pushed. 1
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1
Enter your option : 1
Enter element : 8
Successfully pushed. 1
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 1
Enter your option : 1
Enter element : 9
Successfully pushed. 1
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 : 11
Stack is overflow. 6
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 6
Enter your option : 6

Test Case - 3
User Output
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 5
Enter your option : 5
Stack is underflow. 2
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 2
Enter your option : 2
Stack is underflow. 5
1.Push 2.Pop 3.Display 4.Is Empty 5.Peek 6.Exit 5
Enter your option : 5
Stack is underflow. 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