S.No: 17	Exp. Name: ***Write a C program to implement different Operations on Stack using Array representation***	Date:2023-06-18

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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

```
#include <stdio.h>
#include <stdlib.h>
#define STACK_MAX_SIZE 10
int arr[STACK_MAX_SIZE];
int top = -1;
void push(int element)
```

```
   {
      printf("Stack is overflow.\n");
   }
   else
   {
      top = top + 1;
      arr[top] = element;
      printf("Successfully pushed.\n");
   }
}
void display()
{
   if (top < 0)
   {
      printf("Stack is empty.\n");
   }
   else
   {
      printf("Elements of the stack are : " );
      for(int i = top; i >= 0; i--)
      {
         printf("%d ", arr[i]);
      }
      printf("\n");
   }
}
void pop()
{
   int x;
   if(top < 0)
   {
      printf("Stack is underflow.\n");
   }
   else
   {
      x = arr[top];
      top = top - 1;
      printf("Popped value = %d\n",x);
   }
}
void peek()
{
   int x;
   if(top < 0)
   {
      printf("Stack is underflow.\n");
   }
   else
   {
      x = arr[top];
      printf("Peek value = %d\n",x);
   }
}
void isEmpty()
{
   if (top < 0)
```


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```
    {
        printf("Stack is empty.\n");
    }
    else
    {
        printf("Stack is not empty.\n");
    }
}
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);
        }
    }
}
```

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

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```
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
```