**#3. Stack**

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**Aim:**

To perform following Stack operations using C Programming:

1. Stack Creation
2. Push an element
3. Pop an element
4. Peek the stack
5. Check the status of the stack full/empty
6. View the entire stack after each of the above operation

**Tools Required:**

Text editor with C Compiler.

**Experiment:**

**Code:**

**#include <stdio.h>**

**#include <stdlib.h>**

**typedef struct stack1**

**{**

**int top;**

**unsigned int size;**

**int \*array;**

**}S1;**

**struct stack1 create(unsigned int n)**

**{**

**S1 \*sp1;**

**sp1=(struct stack1\*)malloc(sizeof (struct stack1));**

**sp1->array=(int\*)malloc(n\*sizeof (int));**

**sp1->top=-1;**

**sp1->size=n;**

**return \*sp1;**

**}**

**int isfull(S1 \*s1)**

**{**

**if(s1->top==s1->size-1){**

**printf("\n\n----------Cannot enter the element: Stack is full------------------\n\n");**

**return 0;**

**}**

**else{**

**printf("stack is not full\n");**

**return 1;**

**}**

**}**

**int isEmpty(S1 \*s1){**

**if(s1->top==-1){**

**printf("\n\n-------------------Stack is Empty----------------\n\n");**

**return 0;**

**}**

**else{**

**printf("\n| Stack is not empty |\n");**

**return 1;**

**}**

**}**

**void push(S1 \*s1)**

**{**

**if(isfull(s1))**

**{**

**int number,a;**

**printf("Enter the element:");**

**scanf("%d",&number);**

**s1->array[++s1->top]=number;**

**}**

**}**

**void pop(S1 \*s1){**

**if(isEmpty(s1)){**

**printf("%d removed at positon %d",s1->array[s1->top],s1->top);**

**s1->top=s1->top-1;**

**}**

**}**

**void peek(S1 \*s1){**

**int peekValue;**

**printf("Enter the stack element to be viewed:");**

**scanf("%d",&peekValue);**

**printf("%d",s1->array[peekValue]);**

**}**

**void stackView(S1 \*s1){**

**int i;**

**for (i=s1->size;i>=0;i--){**

**printf("\n%d\n", s1->array[i]);**

**}**

**}**

**int main()**

**{**

**S1 \*s1;**

**unsigned int n,userInput;**

**int i;**

**printf("\nEnter size of the stack:");**

**scanf("%d", &n);**

**\*s1=create(n);**

**while(1){**

**printf("\n======================OPTIONS=========================");**

**printf("\n1-Push\n2-Pop\n3-Peek\n4-isFull()\n5-isEmpty()\n6-View Stack\n7-Exit\n");**

**printf("Enter the option:");**

**scanf("%d",&userInput);**

**switch(userInput){**

**case 1:push(s1);**

**break;**

**case 2:pop(s1);**

**break;**

**case 3:peek(s1);**

**break;**

**case 4:isfull(s1);**

**break;**

**case 5:isEmpty(s1);**

**break;**

**case 6:**

**printf("-------STACK--------\n");**

**stackView(s1);**

**case 7: break;**

**default: printf("Enter a valid number");**

**}**

**}**

**return 0;**

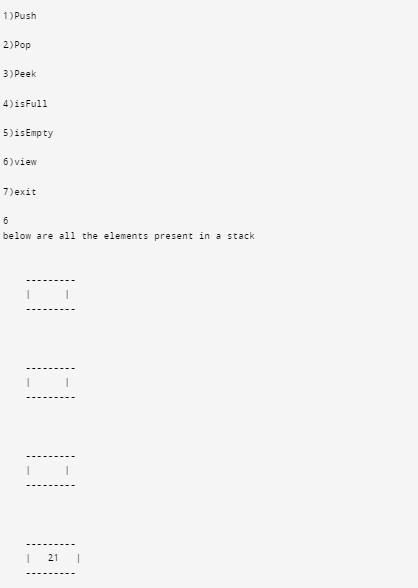
**}**

**Result:**

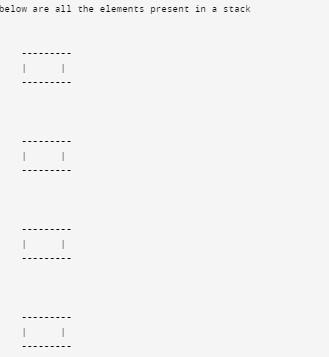
1. Stack Creation



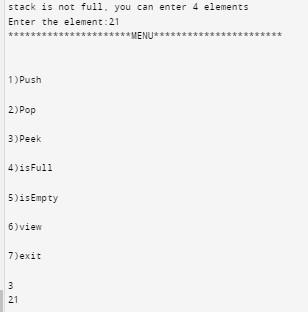
1. Push an element



1. Pop an element



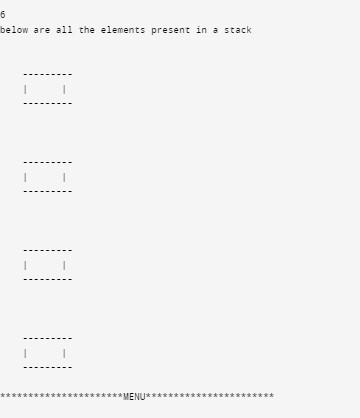
1. Peek the stack



1. Check the status of the stack full/empty



1. View the entire stack after each of the above operation



**Inference and Result:**

Implementation of stack has been performed, functions such as push , pop, view, peek and other functions have also been implemented.