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EX 4: Implementation of stack using array and linked list

Stack using array

```
#include <stdio.h>
#include <stdlib.h>
#define Size 25
int Stack[Size];
int Top=-1;

void Push(int);
int Pop();
void Display();
int IsFull();
int IsEmpty();
int Peak();

int IsFull(){
    if (Top==Size-1)
        return 1;
    else
        return 0;
}

int IsEmpty(){
    if (Top==-1)
        return 1;
    else
        return 0;
}

void Push(int val){
    if (!IsFull())
    {
        Top=Top+1;
        Stack[Top]=val;
    }
    else
    {
        printf("Stack Overflow");
    }
}
```

```
    }  
}
```

```
int Pop(){  
    if (!IsEmpty()){  
        int del=Stack[Top];  
        Top=Top-1;  
        return del;  
    }  
    else  
    {  
        printf("Stack Underflow");  
        return -1;  
    }  
}
```

```
void Display(){  
    int a=Top;  
    if (!IsEmpty()){  
        for (int i=a;i>=0;i--)  
            printf("%d ",Stack[i]);  
    }  
    else  
    {  
        printf("Stack Underflow");  
        return ;  
    }  
}
```

```
int Peak(){  
    if (!IsEmpty())  
        return Stack[Top];  
    else  
    {  
        printf("Stack Underflow");  
        return -1 ;  
    }  
}
```

```
int main(){
```

```

int choice,t=1,n;
while (t==1)
{
    printf("\n\nMENU FOR STACK IMPLEMENTATION USING ARRAY:");
    printf("\n1.Push an element.\n2.Pop an element.\n3.Return Top most
element.\n4.Display.\n5.EXIT\n");
    printf("\nEnter your choice:");
    scanf("%d",&choice);
    switch (choice)
    {
        case 1:

            printf("Enter an element:");
            scanf("%d",&n);
            Push(n);
            break;

            case 2:
        {
            n=Pop();
            printf("%d",n);
            break;
        }
        case 3:
        {
            printf("%d",Peak());
            break;
        }
        case 4:
        {
            Display();
            break;
        }
        case 5:
        {
            t=0;
            break;
        }
        default:
        {
            printf("INVALID CHOICE");
            break;
        }
    }
}

```

```
    }  
    }  
}
```

Stack using linked list

```
#include<stdio.h>  
#include<stdlib.h>
```

```
struct node  
{  
    int data;  
    struct node *link;  
}*first=NULL;
```

```
void push(int);  
void pop();  
void Top();  
void display1();
```

```
void push(int data)  
{  
    struct node *newnode;  
    newnode=(struct node*)malloc(sizeof(struct node));  
    newnode->data=data;  
    if(first==NULL){  
        newnode->link=NULL;  
        first=newnode;  
    }  
    else  
    {  
        newnode->link=first;  
        first=newnode;  
    }  
    printf("Data inserted\n");  
}
```

```
void pop()  
{  
    struct node *temp=NULL;  
    temp=first;
```

```

if(first==NULL){
printf("INVALID OPERATION");
}
else{
printf("\n%d is the popped element",temp->data);
first=temp->link;
free(temp);
temp=NULL;
}
}

```

```

void Top()
{
if(first!=NULL)
printf("%d is the top element",first->data);
else
printf("\nNo data inside");
}

```

```

void display1()
{
{
struct node *temp=NULL;
temp=first;
if(temp!=NULL){
while(temp!=NULL)
{
printf("%d ",temp->data);
temp=temp->link;
}
}
else{
printf("\nNo data inside");
}
}
}

```

```

int main()
{
int ch,n;
printf("MENU DRIVEN PROGRAM");
printf("0. Exit\n");
printf("1. Push\n");

```

```

printf("2. Pop\n");
printf("3. Return Top element\n");
printf("4. Display\n");

while(1){
printf("\nEnter your choice : ");
scanf("%d",&ch);
switch (ch)
{
case 1:
printf("\nEnter data to push : ");
scanf("%d",&n);
push_beg(n);
break;

case 2:
pop_beg();
break;

case 3:
top_elemt();
break;

case 4:
display1();
break;

default:
printf("\nMENU EXITED");
break;
}
if(ch==0){
break;
}
else{
continue;
}

printf("\nProgram exited");
}
}

```

