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PROGRAM: Implementation Of Stack Using Array and Linked List Implementation

Write a C program to implement a stack using Array and linked List implementation and execute the following operation on stack.

1. Push an element into a stack
2. Pop an element from a stack
3. Return the Top most element from a stack
4. Display the elements in a stack

LINKED LIST IMPLEMENTATION

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

struct node
{
    struct node *link;
    int data;
}*first;

void push(int n)
{
    struct node *newnode,*top;
    newnode = (struct node*)malloc(sizeof(struct node));

    newnode->data = n;
    if (first == NULL)
    {
        newnode->link = NULL;
        first = newnode;
    }
    else
    {
        newnode->link = first;
        first = newnode;
        top=newnode;
    }
}
```

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```
    }  
}
```

```
void pop()  
{  
    struct node *tmp, *top;  
    if (first == NULL)  
    {  
        printf("\nStack is empty\n");  
    }  
    tmp = first;  
    first=tmp->link;  
    free(tmp);  
}
```

```
void top()  
{  
    struct node *temp=first;  
    while (temp->link!=NULL)  
    {  
        temp=temp->link;  
    }  
    printf("%d",temp->data);  
}
```

```
void display()  
{  
    struct node*temp=first;  
    while (temp!=NULL)  
    {  
        printf("%d ",temp->data);  
        temp=temp->link;  
    }  
}
```

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```
int main()
{
    while(1)
    {
        printf("Enter an operation to be executed: \n");
        printf("1. Push\n2. Pop\n3. Return top\n4. Display\n");

        int t;
        scanf("%d",&t);
        switch (t)
        {
            case 1:
                printf("\nTo push an element, Enter element: ");
                int y;
                scanf("%d",&y);
                push(y);
                display();
                break;

            case 2:
                printf("\nTo pop an element: ");
                pop();
                break;

            case 3:
                printf("\nThe top element is: ");
                top();
                break;

            case 4:
                printf("\nThe stack is: ");
                display();
                break;

            default:
                printf("Invalid choice!");
                break;
        }
        printf("\nOperations terminated!\nDo you wish to continue? 1/0\n");
    }
}
```

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```
int ch;  
scanf("%d",&ch);  
if (ch==1)  
continue;
```

ARRAY IMPLEMENTATION

```
#include<stdio.h>  
  
#include<stdlib.h>  
  
#define size 5  
  
Int top=-1;  
  
Int stack[size];  
  
Void push(int rol)  
{  
if (top==size-1)  
{  
printf("Overflow!");  
}  
else  
{  
top=top+1;  
stack[top]=rol;  
}}  
  
int pop()  
{  
if(top==-1){
```

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printf("Underflow!");

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```
}  
  
else{  
    int del=stack[top];  
    top=top-1;  
    printf("Deleted value is: %d",del);  
}  
}  
  
void isempty()  
{  
    if(top==-1)  
    {  
        printf("Stack underflow!");  
    }  
}
```

```
void isfull()  
{  
    if (top==size-1)  
    {  
        printf("Stack Overflow");  
    }  
}}
```

```
void display()  
{  
    if (isfull())  
    {
```

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```
printf("Overflow");
```

```
}else{
```

```
int i=top;
```

```
for (I;i<t>=0;i--){
```

```
printf("%d",stack[i]);
```

```
}}}
```

```
int main(){
```

```
while(1)
```

```
{
```

```
printf("Enter a choice:");
```

```
printf("\n1. Push\n2. Pop\n3. Return Top\n4. Display\n");
```

```
int ch;
```

```
scanf("%d",&ch);
```

```
switch(ch)
```

```
{
```

```
case 1:
```

```
int n;
```

```
printf("Enter an element:");
```

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

```
push(n);
```

```
display();
```

```
break;
```

```
case 2:
```

```
pop();
```

```
break;
```

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case 3

return top;

break;

case 4

display();

break;

case 5:

print("invalid choice");

break;

}

int l;

scanf("%d",&l);

if (l==1)

continue;

else

break;

}}