

## **Aim:- Implementation of Stack using Linked List.**

### **Code:-**

```
#include <stdio.h>

#include <stdlib.h>

struct Node {

int data;

struct Node *next;

};

struct Node *top = NULL;

void push(int value) {

struct Node *newNode;

newNode = (struct Node

*)malloc(sizeof(struct Node));

newNode->data = value;

if (top == NULL) {

newNode->next = NULL;

} else {

newNode->next = top;

} top =

newNode;

printf("Node is Inserted\n\n");

}
```

```
int pop() {
    if (top == NULL) {
        printf("\nStack Underflow\n");
    } else {
        struct Node *temp = top;
        int temp_data = top->data;
        top = top->next;
        free(temp);
        return temp_data;
    }
}

void display() {
    if (top == NULL) {
        printf("\nStack Underflow\n");
    } else {
        printf("The stack is \n");
        struct Node *temp = top;
        while (temp->next != NULL) {
            printf("%d--->", temp->data);
            temp = temp->next;
        }
        printf("%d--->NULL\n\n", temp->data);
    }
}
```

```
}

int main() {

int choice, value;

printf("D10A_Atharva Chavan_9\n");

printf("\n****Implementaion of Stack using Linked List****\n");

while (1) {

printf("1. Push\n2. Pop\n3. Display\n4. Exit\n");

printf("\nEnter your choice : ");

scanf("%d", &choice);

switch (choice) {

case 1:

printf("\nEnter the value to insert: ");

scanf("%d", &value);

push(value);

break;

case 2:

printf("Popped element is :%d\n", pop());

break;

case 3:

display();

break;

case 4:

printf("You have exited the list!");
```

```
exit(0);

break;

default:

printf("\nWrong Choice\n");

}

}

}
```

## **Output:-**

```
/tmp/KZAJFyJRYm.o
D10A_Atharva Chavan_9

****Implementaion of Stack using Linked List****
1. Push
2. Pop
3. Display
4. Exit
Enter your choice : 1
Enter the value to insert: 10
Node is Inserted

1. Push
2. Pop
3. Display
4. Exit

Enter your choice : 1
Enter the value to insert: 20
Node is Inserted

1. Push
2. Pop
3. Display
4. Exit

Enter your choice : 1
Enter the value to insert: 30
Node is Inserted

1. Push
2. Pop
3. Display
4. Exit
```

Enter your choice : 2

Popped element is :30

1. Push
2. Pop
3. Display
4. Exit

Enter your choice : 3

The stack is

20--->10--->NULL

1. Push
2. Pop
3. Display
4. Exit

Enter your choice : 4

You have exited the list!

## **Aim:- Implementation of Queue using Linked List**

### **Code:-**

```
#include<stdio.h>

#include<stdlib.h>

struct node
{
    int data;
    struct node *next;
};

struct node *front;
struct node *rear;

void insert();
void delete();
void display();
void main ()
{
    printf("D10A_Atharva Chavan_9\n");
    int choice;

    printf("\n1. Insert an element\n2. Delete an element\n3. Display the queue\n4. Exit\n");
    while(choice != 4)
    {
        printf("\nEnter your choice:");
        scanf("%d",& choice);
```

```
switch(choice)
{
case 1:
insert();
break;
case 2:
delete();
break;
case 3:
display();
break;
case 4:
printf("You have exited the list!");
exit(0);
break;
default:
printf("\nEnter valid choice\n");
}
}
}

void insert()
{
struct node *ptr;
int item;

ptr = (struct node *) malloc (sizeof(struct
node));
```

```
if(ptr == NULL)
{
printf("\nOVERFLOW\n");
return;
}
else
{
printf("\nEnter the value:\n");
scanf("%d",&item);
printf("Element is inserted\n");
ptr -> data = item;
if(front == NULL)
{
front = ptr;
rear = ptr;
front -> next = NULL;
rear -> next = NULL;
}
else
{
rear -> next = ptr;
rear = ptr;
rear->next = NULL;
}
}
}
```



```

void delete ()
{
    struct node *ptr;
    if(front == NULL)
    {
        printf("\nUNDERFLOW\n");
        return;
    }
    else
    {
        printf("Element is Deleted\n");
        ptr = front;
        front = front -> next;
        free(ptr);
    }
}

void display()
{
    struct node *ptr;
    ptr = front;
    if(front == NULL)
    {
        printf("\nQueue is empty!\n");
    }
    else
    { printf("\nThe list is as follows:\n");

```

```
while(ptr != NULL)
{
printf("%d\n",ptr -> data);
ptr = ptr -> next;
}
}
}
```

## Output:-

```
D10A_Atharva Chavan_9

1. Insert an element
2. Delete an element
3. Display the queue
4. Exit

Enter your choice:1
Enter the value:
30
Element is inserted

Enter your choice:1
Enter the value:
20
Element is inserted

Enter your choice:1
Enter the value:
10
Element is inserted

Enter your choice:2
Element is Deleted

Enter your choice:3
The list is as follows:
20
10

Enter your choice:4
You have exited the list|
```