

EXP NO:03

IMPLEMENTATION OF STACKS AND

DATE:

QUEUES USING LINKED LIST

AIM : TO IMPLEMENT STACKS AND QUEUES USING LINKED LIST.

A] MENU DRIVEN PROGRAM TO PERFORM OPERATIONS SUCH AS

I)PUSH AN ELEMENT IN A STACK

II)POP AN ELEMENT FROM STACK

Code:

```
//To implement stacks using linked lists
#include <stdio.h>
#include <stdlib.h>
struct node
{
int data;
struct node *link;
}*tos=NULL;

void push()
{
int num;
printf("\nEnter data: ");
scanf("%d",&num);
struct node *r;
r=(struct node *)malloc(sizeof(struct node));
r->data=num;
r->link=tos;
tos=r;
}
void pop()
{
struct node *temp=tos;
if(tos!=NULL)
{
tos=tos->link;
free(temp);
}
else
{
printf("\nStack underflow");
}
}

void display()
{
```

```

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

int main()
{
int o;
int con;
do
{
printf("\nEnter 1 to push a element in a stack\nEnter 2 to pop anelement in a stack\n");
scanf("%d",&o);
switch(o)
{
case 1:push();
display();
break;
case 2 :pop();
display();
break;
default: printf("\nWrong choice");
break;
}
printf("\nDo you want to continue(1/0)? ");
scanf("%d",&con);
}
while(con==1);
return 0;
}

```

Output:

Enter 1 to push a element in a stack

Enter 2 to pop anelement in a stack

1

Enter data: 12

12--->NULL

Do you want to continue(1/0)? 1

Enter 1 to push a element in a stack

Enter 2 to pop anelement in a stack

1

Enter data: 1

1--->12--->NULL

Do you want to continue(1/0)? 1

Enter 1 to push a element in a stack

Enter 2 to pop anelement in a stack

2

12--->NULL

Do you want to continue(1/0)? 1

Enter 1 to push a element in a stack

Enter 2 to pop anelement in a stack

2

NULL

Do you want to continue(1/0)? 1

Enter 1 to push a element in a stack

Enter 2 to pop anelement in a stack

2

Stack underflowNULL

Do you want to continue(1/0)? 0

B] MENU DRIVEN PROGRAM TO PERFORM OPERATIONS SUCH AS

I]INSERT AN ELEMENT IN QUEUE

II]ENTER 2 TO DELETE AN ELEMENT IN A QUEUE

Code:

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

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

```
int count = 0;
```

```
struct node {  
int data;  
struct node* link;  
} * front = NULL, * rear = NULL;
```

```
void enqueue() {  
int num;  
printf("\nEnter data: ");  
scanf("%d", &num);  
struct node* r;  
r = (struct node*)malloc(sizeof(struct node));  
r->data = num;  
r->link = NULL;  
if (count == 0) {  
front = r;  
rear = r;  
count++;  
} else {  
rear->link = r;  
rear = r;  
}  
}
```

```
void dequeue() {  
struct node* temp = front;  
if (front == NULL) {  
printf("\nQueue Underflow");  
return;  
}  
if (front != rear) {  
front = front->link;  
} else {  
front = NULL;  
rear = NULL;  
}  
free(temp);
```

```

count--;
}

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

int main() {
int o;
int con;
do {
printf("\nEnter 1 to enqueue\nEnter 2 to dequeue\n");
scanf("%d", &o);
switch (o) {
case 1:
enqueue();
display();
break;
case 2:
dequeue();
display();
break;
default:
printf("\nWrong choice");
break;
}
printf("\nDo you want to continue(1/0)? ");
scanf("%d", &con);
} while (con == 1);
return 0;
}

```

Output:

Enter 1 to enqueue

Enter 2 to dequeue

1

Enter data: 12

12--->NULL

Do you want to continue(1/0)? 1

Enter 1 to enqueue

Enter 2 to dequeue

1

Enter data: 22

12--->22--->NULL

Do you want to continue(1/0)? 1

Enter 1 to enqueue

Enter 2 to dequeue

2

22--->NULL

Do you want to continue(1/0)? 1

Enter 1 to enqueue

Enter 2 to dequeue

2

NULL

Do you want to continue(1/0)? 1

Enter 1 to enqueue

Enter 2 to dequeue

2

Queue UnderflowNULL

Do you want to continue(1/0)? 0