

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

```
struct node  
{  
int info;  
struct node *left, *right;  
};
```

```
typedef struct node * nodeptr;  
nodeptr p,list,temp;
```

```
nodeptr getnode();  
void insert_left();  
void insert_last();  
void delete_left();  
void delete_last();  
void display();
```

```
void main()  
{  
int c,i,x;  
char ch;  
do  
{  
printf("Menu\n");  
printf("1. Insert_left\n 2. Delete_left\n 3. Insert_last\n 4. Delete_last\n 5.  
display\n");  
scanf("%d",&c);  
switch(c)  
{  
case 1: scanf("%d",&x);  
        insert_left(x);  
        break;  
case 2: delete_left();  
        break;  
case 3: scanf("%d",&x);  
        insert_last(x);  
        break;
```

```
case 4: delete_last();  
        break;
```

```
case 5: display();  
        break;
```

```
}  
printf("\ndo you want to continue\n");  
scanf(" %c",&ch);  
}while(ch!='n');  
}
```

```
nodeptr getnode()  
{  
return(nodeptr)malloc(sizeof(struct node));  
return p;  
}
```

```
void insert_left(int x)  
{  
temp=getnode();  
temp→info=x;  
temp →left=NULL;  
if(list==NULL)  
{  
temp →right= NULL;  
list=temp;  
}  
else  
{  
temp →right=list;  
list →left=temp;  
list=temp;  
}  
return;  
}
```

```
void delete_left()  
{  
if(list==NULL)
```

```

{
printf("Invalid deletion\n");
}
else
{
p=list;
if(p→right==NULL)
list=NULL;
else
{
list=p→right;
list→left=NULL;
}
printf("%d\n",p →info);
p→right=NULL;
free(p);
}
return;
}

```

```

void insert_last(int x)
{
p=getnode();
p →info=x;
p →right=NULL;
if(list == NULL)
{
list=p;
list →left=NULL;
}
else
{
temp=list;
while(temp →right!=NULL)
{
temp=temp →right;
}
temp →right=p;
}
}

```

```

    p→left=temp;
}
return;
}

```

```

void delete_last()
{
if (list==NULL)
printf( "Invalid deletion\n ");
else
{

temp=list;
while(temp →right!=NULL)
{
temp=temp →right;
}
if(list→right == NULL)
list=NULL;
else
q=temp→left;
q→right == NULL;
printf(“%d”, temp →info);
temp →left=NULL;
temp →right=NULL;
free(temp);
}
return;
}

```

```

void display()
{
p=list;
if(p==NULL)
{
printf("No nodes existed\n");
}
}

```

```
}  
else  
{  
while(p!=NULL)  
{  
printf("%d\t",p→info);  
p=p→right;  
}  
}  
}
```