LAB PROGRAM 7 SINGLY Linked List operations (SORT , REVERSE, CONCAT)EXECUTION

```
#include<stdio.h>

#include<conio.h>

#include<stdlib.h>

struct node

{

  int info;

  struct node *link;

};

typedef struct node *NODE;

NODE getnode()

{

NODE x;

x=(NODE)malloc(sizeof(struct node));

if(x==NULL)

 {

  printf("mem full\n");

  exit(0);

 }
 return x;

}

void freenode(NODE x)

{

free(x);

}

NODE insert_front(NODE first,int item)

{

NODE temp;

temp=getnode();

temp->info=item;

temp->link=NULL;

if(first==NULL)

return temp;

temp->link=first;

first=temp;

return first;

}

NODE delete_front(NODE first)

{
```

```
NODE temp;

if(first==NULL)

{

printf("List is empty cannot delete\n");

return first;

}

temp=first;

temp=temp->link;

printf("Item deleted at front-end is=%d\n",first->info);

free(first);

return temp;

}

NODE insert_rear(NODE first,int item)

{

NODE temp,cur;

temp=getnode();

temp->info=item;

temp->link=NULL;

if(first==NULL)

 return temp;
```

```
cur=first;

while(cur->link!=NULL)

 cur=cur->link;

cur->link=temp;

return first;

}

NODE delete_rear(NODE first)

{

NODE cur,prev;

if(first==NULL)

{

printf("List is empty cannot delete\n");

return first;

}

if(first->link==NULL)

{

printf("Item deleted is %d\n",first->info);

free(first);

return NULL;

}
```

```
prev=NULL;
cur=first;
while(cur->link!=NULL)
{
prev=cur;
cur=cur->link;
}
printf("Item deleted at rear-end is %d",cur->info);
free(cur);
prev->link=NULL;
return first;
}
NODE order_list(int item,NODE first)
{
NODE temp,prev,cur;
temp=getnode();
temp->info=item;
temp->link=NULL;
if(first==NULL) return temp;
if(item<first->info)
```

```
{
temp->link=first;
return temp;
}
prev=NULL;
cur=first;
while(cur!=NULL&&item>cur->info)
{
prev=cur;
cur=cur->link;
}
prev->link=temp;
temp->link=cur;
return first;
}

void display(NODE first)
{
 NODE temp;
 if(first==NULL)
 printf("List empty cannot display items\n");
 else
 printf("Contents of the list:\n");
 for(temp=first;temp!=NULL;temp=temp->link)
  {
  printf("%d\n",temp->info);
  }
}
NODE concat(NODE first,NODE second)
{
 NODE cur;
 if(first==NULL)
  return second;
 if(second==NULL)
  return first;
 cur=first;
 while(cur->link!=NULL)
  cur=cur->link;
 cur->link=second;
 return first;
```

```
}

NODE reverse(NODE first)

 {

 NODE cur,temp;

 cur=NULL;

 while(first!=NULL)

  {

   temp=first;

   first=first->link;

   temp->link=cur;

   cur=temp;

  }

 return cur;

}


void main()

{

int item,choice,key,n,i;

NODE first=NULL,a,b;

for(;;)
```

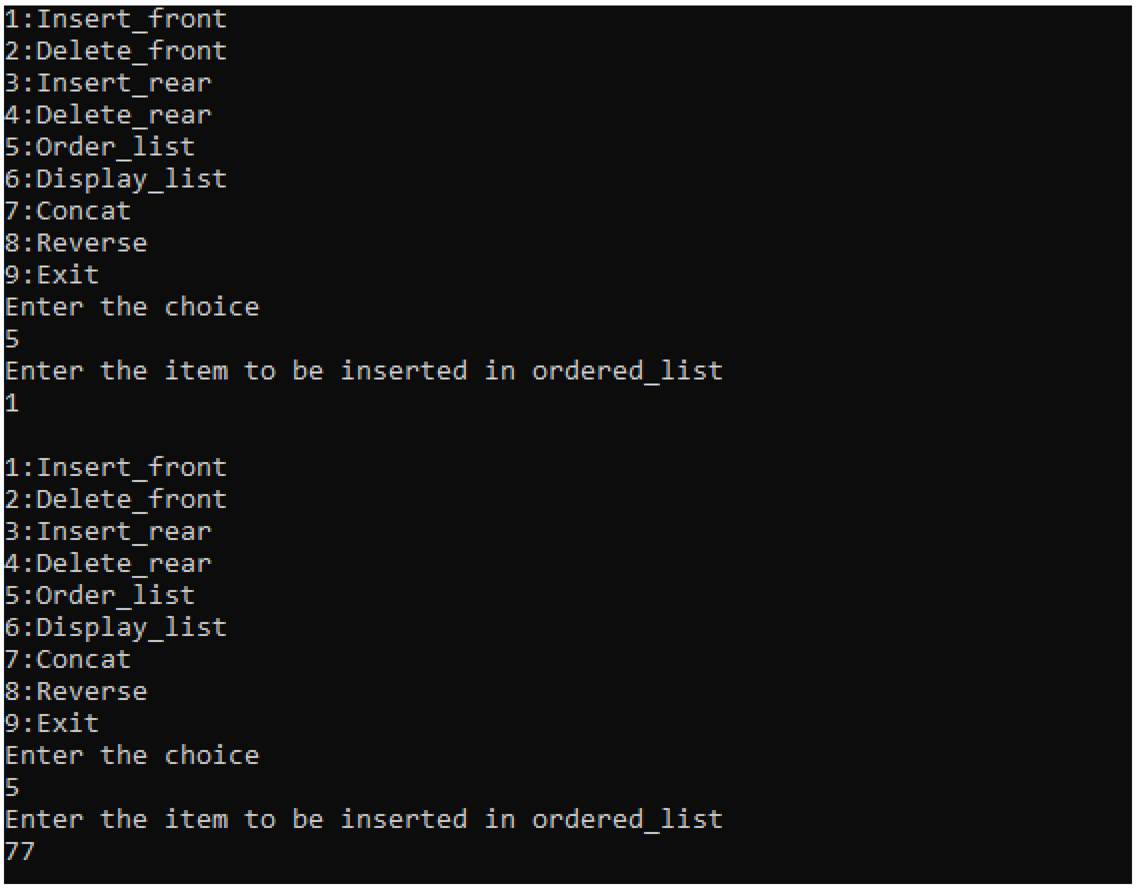
```
{
printf("\n1:Insert_front\n2:Delete_front\n3:Insert_rear\n4:Delete_rear
\n");
printf("5:Order_list\n6:Display_list\n7:Concat\n8:Reverse\n9:Exit\n");
printf("Enter the choice\n");
scanf("%d",&choice);
switch(choice)
 {
  case 1:printf("Enter the item at front-end\n");
         scanf("%d",&item);
         first=insert_front(first,item);
         break;
  case 2:first=delete_front(first);
         break;
  case 3:printf("Enter the item at rear-end\n");
         scanf("%d",&item);
         first=insert_rear(first,item);
         break;
  case 4:first=delete_rear(first);
         break;
```

```
case 5:printf("Enter the item to be inserted in ordered_list\n");
        scanf("%d",&item);
        first=order_list(item,first);
        break;

case 6:display(first);
        break;
case 7:printf("Enter the no of nodes in 1\n");
                scanf("%d",&n);
                a=NULL;
                for(i=0;i<n;i++)
                 {
                  printf("Enter the item\n");
                  scanf("%d",&item);
                  a=insert_rear(a,item);
                 }
                 printf("Enter the no of nodes in 2\n");
                scanf("%d",&n);
                b=NULL;
                for(i=0;i<n;i++)
```

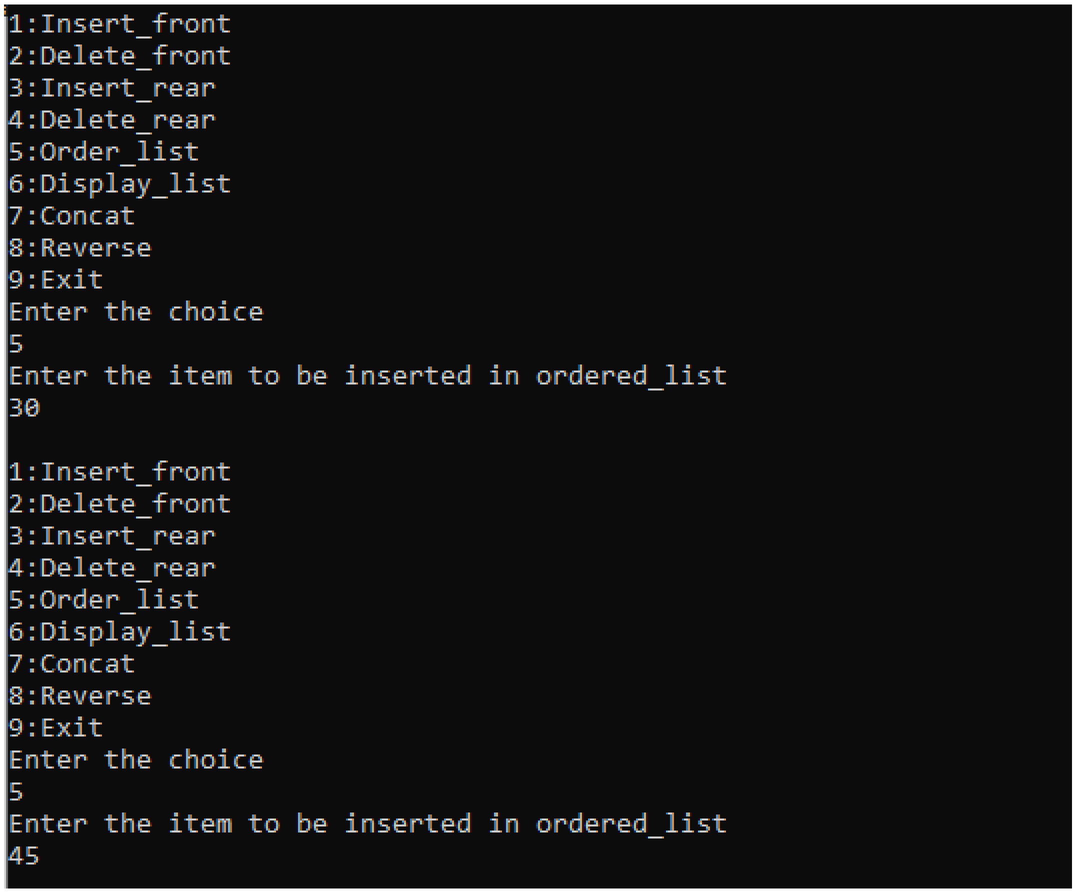
```
                    {
                     printf("Enter the item\n");
                     scanf("%d",&item);
                     b=insert_rear(b,item);
                    }
                    a=concat(a,b);
                    display(a);
                   break;
  case 8:first=reverse(first);
                   display(first);
                   break;
 case 9:exit(0);
         break;
         default:printf("Invalid choice\n");
 }
}


}
```

OUTPUT:

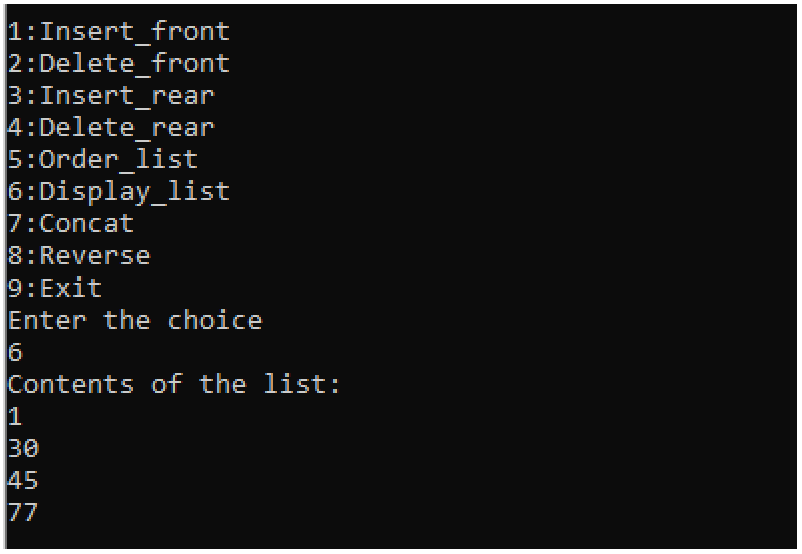
1. Sort the Linked List



```
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:Order_list
6:Display_list
7:Concat
8:Reverse
9:Exit
Enter the choice
5
Enter the item to be inserted in ordered_list
1

1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:Order_list
6:Display_list
7:Concat
8:Reverse
9:Exit
Enter the choice
5
Enter the item to be inserted in ordered_list
77
```

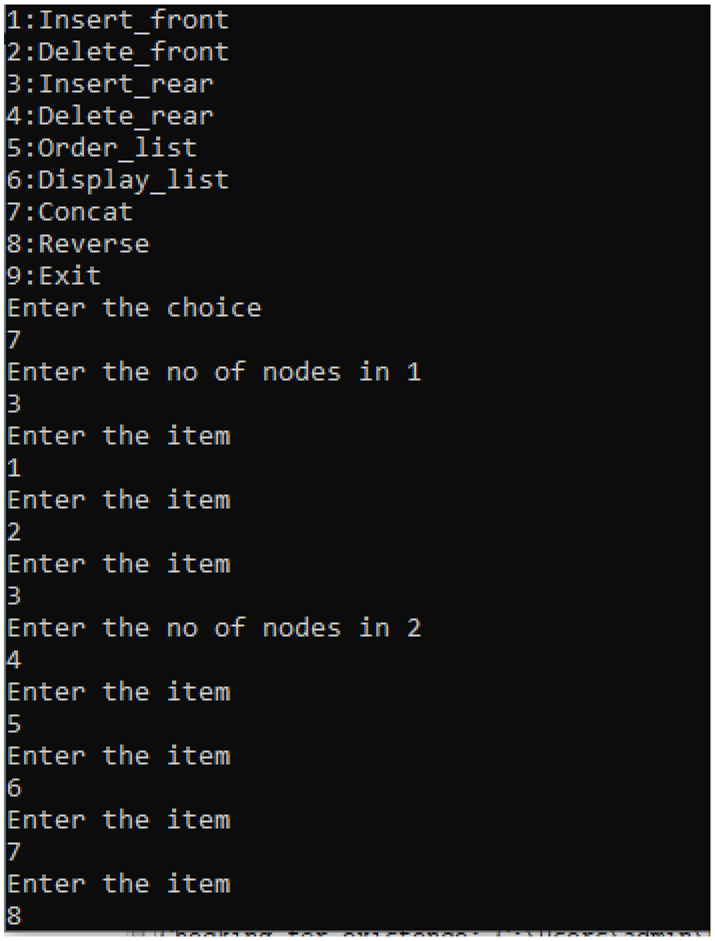


```
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:Order_list
6:Display_list
7:Concat
8:Reverse
9:Exit
Enter the choice
5
Enter the item to be inserted in ordered_list
30

1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:Order_list
6:Display_list
7:Concat
8:Reverse
9:Exit
Enter the choice
5
Enter the item to be inserted in ordered_list
45
```

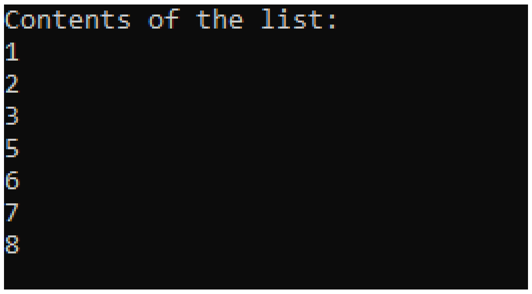


```
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:Order_list
6:Display_list
7:Concat
8:Reverse
9:Exit
Enter the choice
6
Contents of the list:
1
30
45
77
```

2. Concat the Linked List

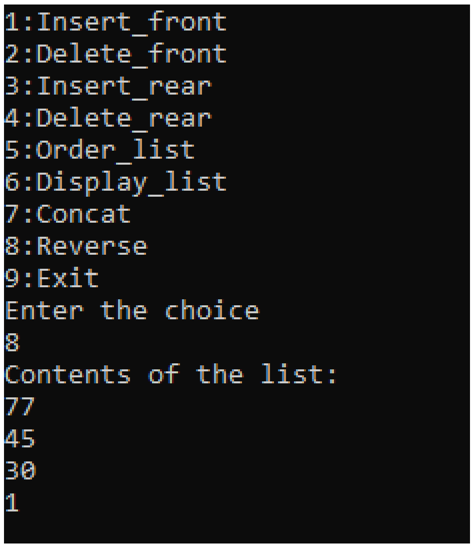


```
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:Order_list
6:Display_list
7:Concat
8:Reverse
9:Exit
Enter the choice
7
Enter the no of nodes in 1
3
Enter the item
1
Enter the item
2
Enter the item
3
Enter the no of nodes in 2
4
Enter the item
5
Enter the item
6
Enter the item
7
Enter the item
8
```



```
Contents of the list:
1
2
3
5
6
7
8
```

3. Reverse the Linked List



```
1:Insert_front
2:Delete_front
3:Insert_rear
4:Delete_rear
5:Order_list
6:Display_list
7:Concat
8:Reverse
9:Exit
Enter the choice
8
Contents of the list:
77
45
30
1
```