LAB 6 -SINGLY LINKED LIST

```
#include<stdio.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("Memory 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");
```

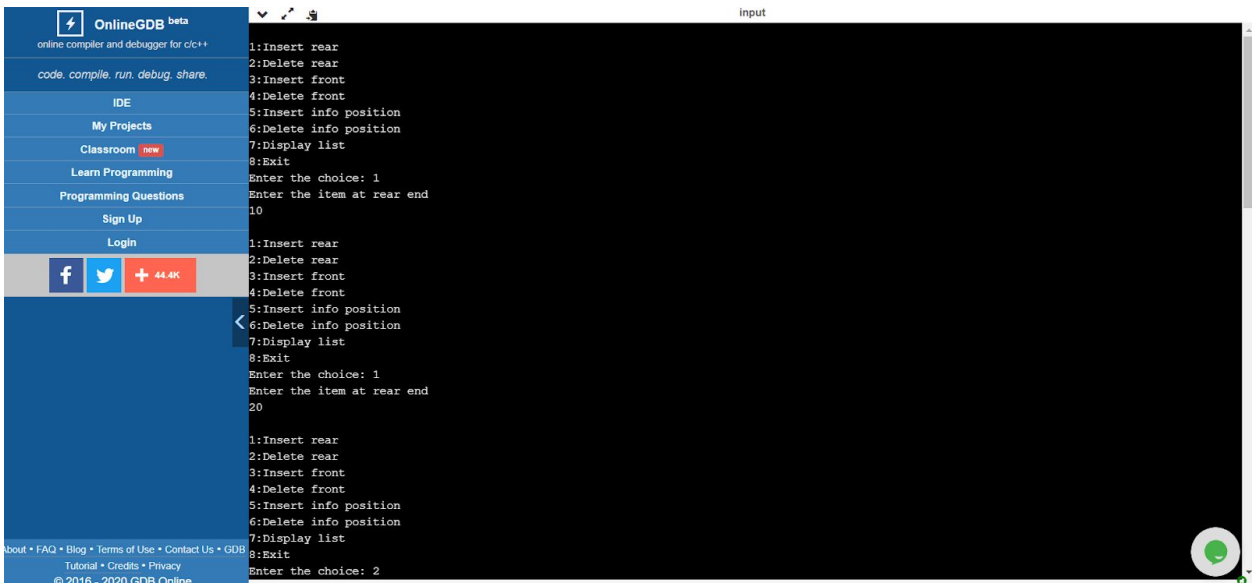
```
return first;
}
if(first->link==NULL){
printf("Item deleted is %d\n",first->info);
free(first);
return NULL;
}
prev=NULL;
cur=first;
while(cur->link!=NULL){
prev=cur;
cur=cur->link;
}
printf("Item deleted at rear end is %d",cur->info);
free(cur);
prev->link=NULL;
return first;
}
NODE insert_pos(int item,int pos,NODE first){
NODE temp,cur,prev;
int count;
temp=getnode();
temp->info=item;
temp->link=NULL;
if(first==NULL&&pos==1){
return temp;
}
if(first==NULL){
printf("Invalid position\n");
return first;
```

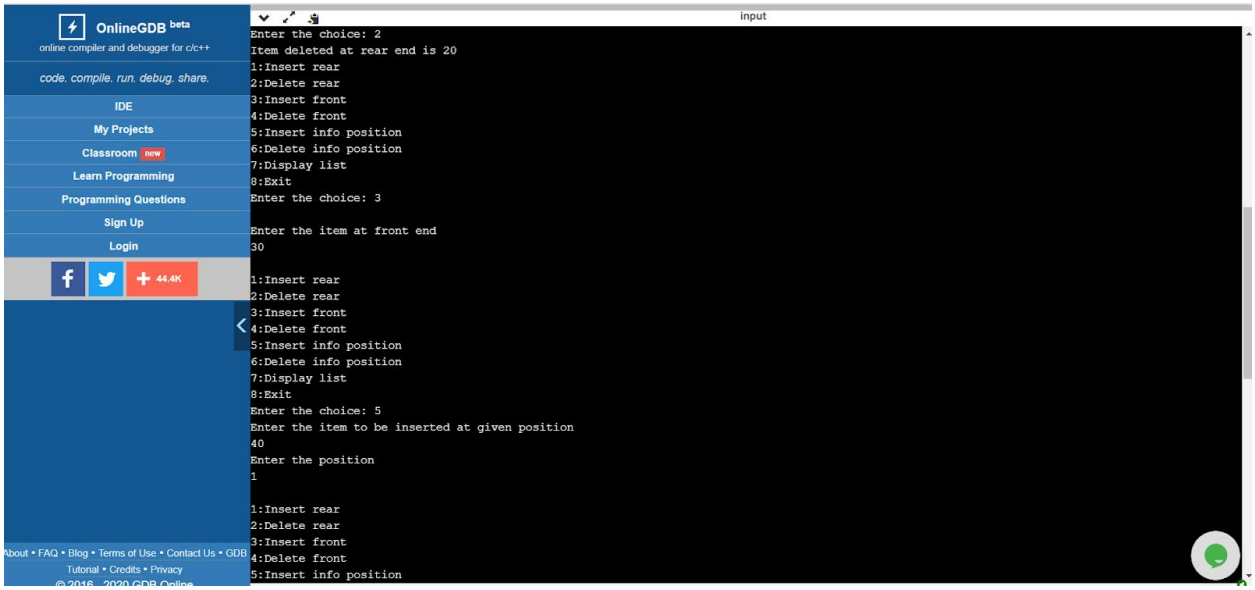
```
}
if(pos==1){
temp->link=first;
first=temp;
return temp;
}
count=1;
prev=NULL;
cur=first;
while(cur!=NULL&&count!=pos){
prev=cur;
cur=cur->link;
count++;
}
if(
count==pos){
prev->link=temp;
temp->link=cur;
return first;
}
printf("Invalid position\n");
return first;
}
NODE delete_pos(int pos,NODE first){
NODE cur;
NODE prev;
int count,flag=0;
if(first==NULL || pos<0){
printf("Invalid position\n");
return NULL;
```

```
}
if(pos==1){
cur=first;
first=first->link;
freenode(cur);
return first;
}
prev=NULL;
cur=first;
count=1;
while(cur!=NULL){
if(count==pos){
flag=1;
break;
}
count++;
prev=cur;
cur=cur->link;
}
if(flag==0){
printf("Invalid position\n");
return first;
}
printf("Item deleted at given position is %d\n",cur->info);
prev->link=cur->link;
freenode(cur);
return first;
}
void display(NODE first){
NODE temp;
```

```
if(first==NULL)
printf("List empty cannot display items\n");
for(temp=first;temp!=NULL;temp=temp->link){
printf("%d\n",temp->info);
}
}
void main()
{
int item,choice,key,pos;
int count=0;
NODE first=NULL;
for(;;){
printf("\n1:Insert rear\n2:Delete rear\n3:Insert front\n4:Delete
front\n5:Insert info position\n6:Delete info position\n7:Display
list\n8:Exit\n");
printf("Enter the choice: ");
scanf("%d",&choice);
switch(choice){
case 1:printf("Enter the item at rear end\n");
scanf("%d",&item);
first=insert_rear(first,item);
break;
case 2:first=delete_rear(first);
break;
case 3:printf("\nEnter the item at front end\n");
scanf("%d",&item);
first=insert_front(first,item);
break;
case 4:first=delete_front(first);
break;
```

```
case 5:printf("Enter the item to be inserted at given position\n");
scanf("%d",&item);
printf("Enter the position\n");
scanf("%d",&pos);
first=insert_pos(item,pos,first);
break;
case 6:printf("Enter the position\n");
scanf("%d",&pos);
first=delete_pos(pos,first);
break;
case 7:display(first);
break;
default:exit(0);
break;
}
}
}
```

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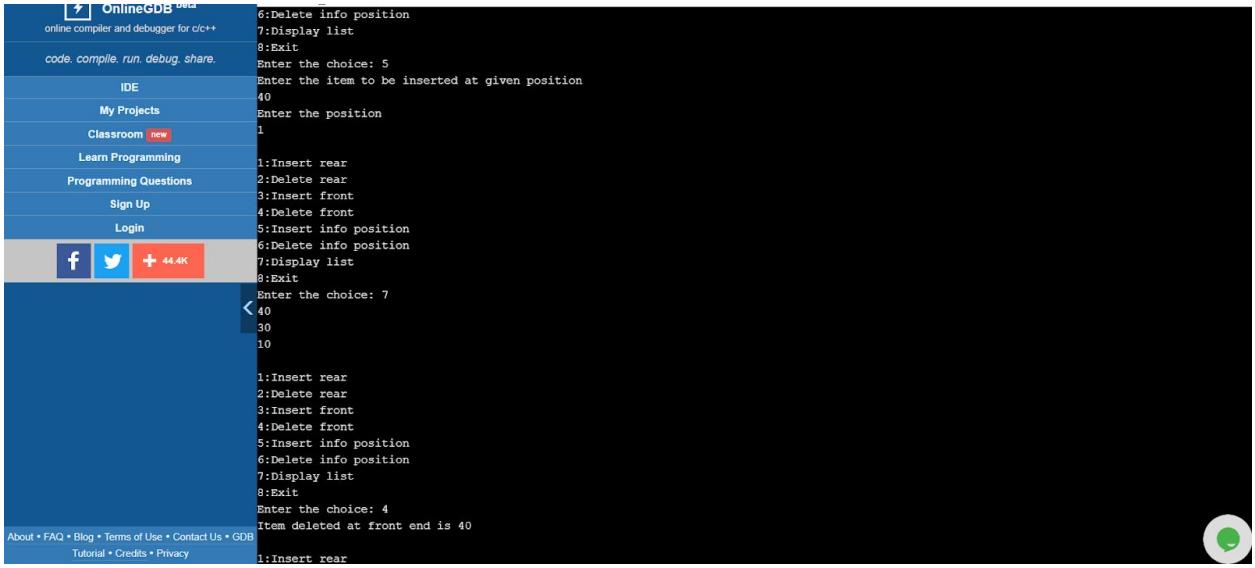
input
Enter the choice: 2
Item deleted at rear end is 20
1:Insert rear
2:Delete rear
3:Insert front
4:Delete front
5:Insert info position
6:Delete info position
7:Display list
8:Exit
Enter the choice: 3
Enter the item at front end
30
1:Insert rear
2:Delete rear
3:Insert front
4:Delete front
5:Insert info position
6:Delete info position
7:Display list
8:Exit
Enter the choice: 5
Enter the item to be inserted at given position
40
Enter the position
1
1:Insert rear
2:Delete rear
3:Insert front
4:Delete front
5:Insert info position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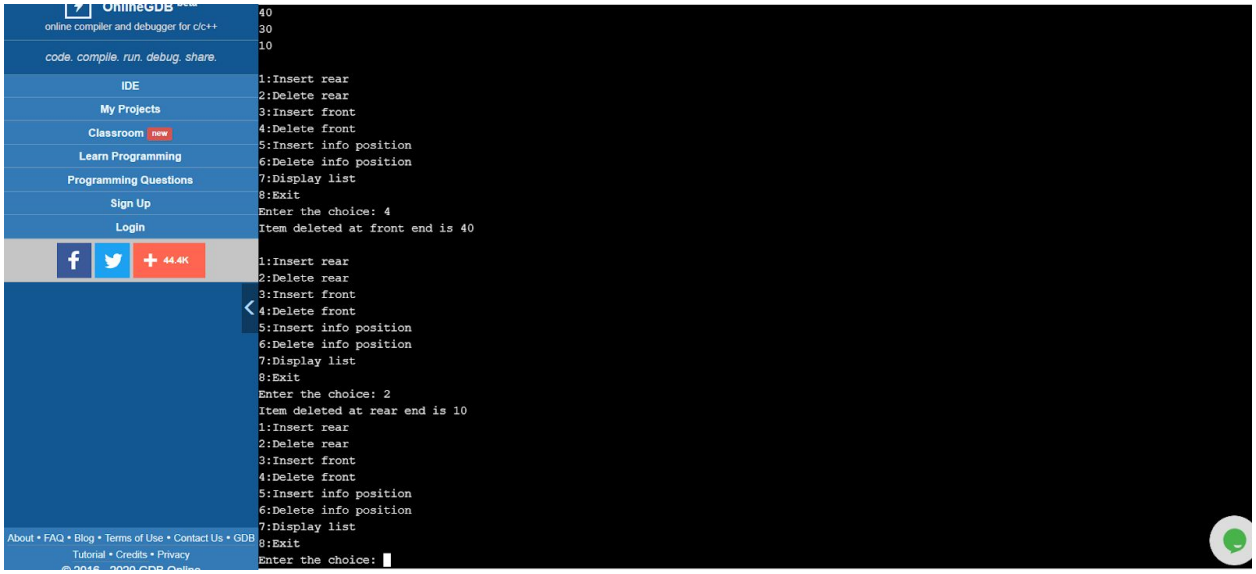
6:Delete info position
7:Display list
8:Exit
Enter the choice: 5
Enter the item to be inserted at given position
40
Enter the position
1
1:Insert rear
2:Delete rear
3:Insert front
4:Delete front
5:Insert info position
6:Delete info position
7:Display list
8:Exit
Enter the choice: 7
40
30
10
1:Insert rear
2:Delete rear
3:Insert front
4:Delete front
5:Insert info position
6:Delete info position
7:Display list
8:Exit
Enter the choice: 4
Item deleted at front end is 40
1:Insert rear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40
30
10
1:Insert rear
2:Delete rear
3:Insert front
4:Delete front
5:Insert info position
6:Delete info position
7:Display list
8:Exit
Enter the choice: 4
Item deleted at front end is 40
1:Insert rear
2:Delete rear
3:Insert front
4:Delete front
5:Insert info position
6:Delete info position
7:Display list
8:Exit
Enter the choice: 2
Item deleted at rear end is 10
1:Insert rear
2:Delete rear
3:Insert front
4:Delete front
5:Insert info position
6:Delete info position
7:Display list
8:Exit
Enter the choice: