S.R.POOJA
1BM19CS135

```
#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(NODEx){
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);
```

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```
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 and 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;
```

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```
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;
```

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```
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); }}
int main() {
int item, choice, key, pos;
int count=0;
NODE first =NULL;
for (;;) {
printf ("\n 1: Insert rear \n 2: Delete rear \n 3: Insert Front \n
  4: Delete front \n 5: Insert info position \n 6: Delete info
  position \n 7: Display list \n 8: Exit \n");
```

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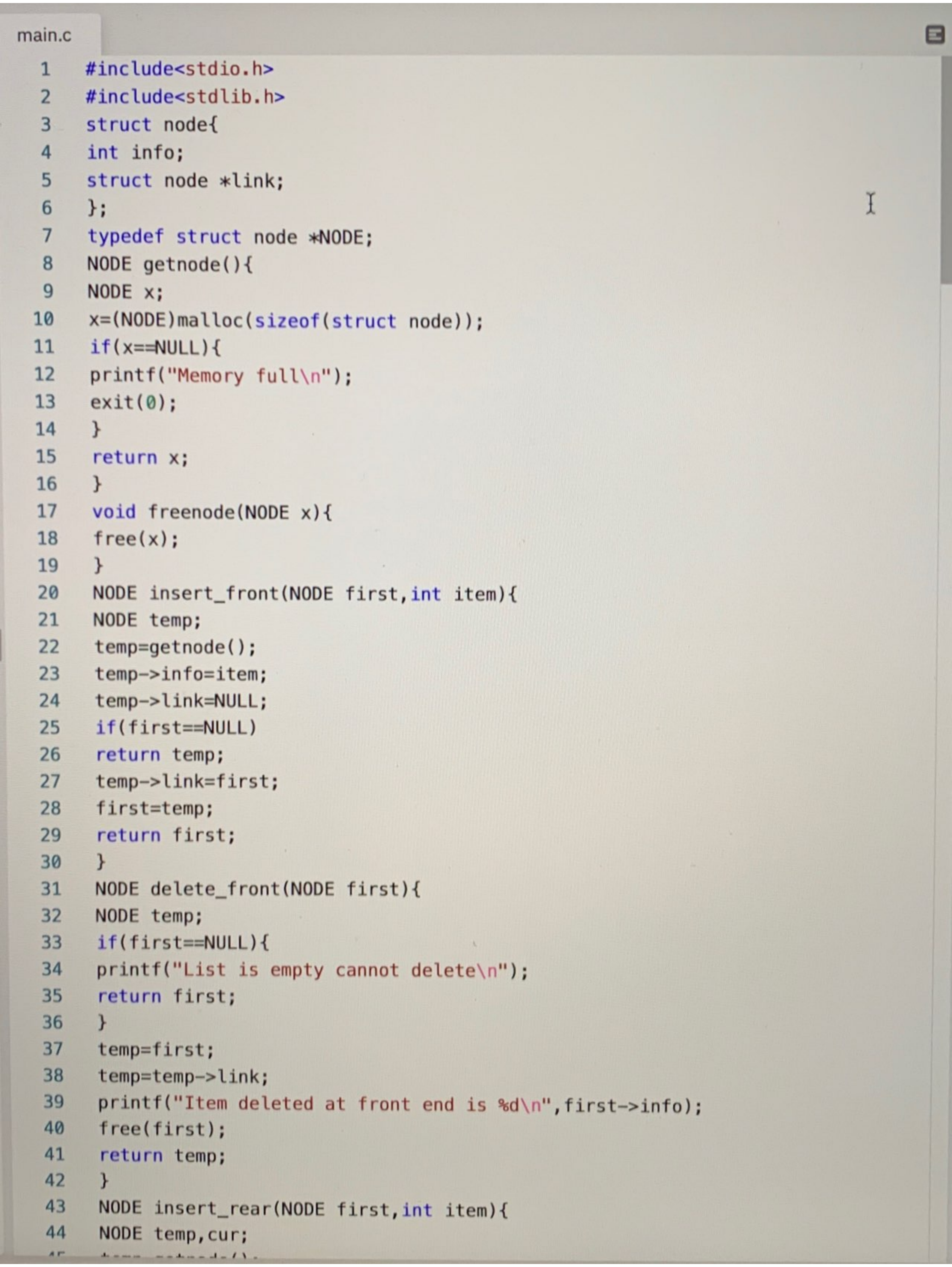
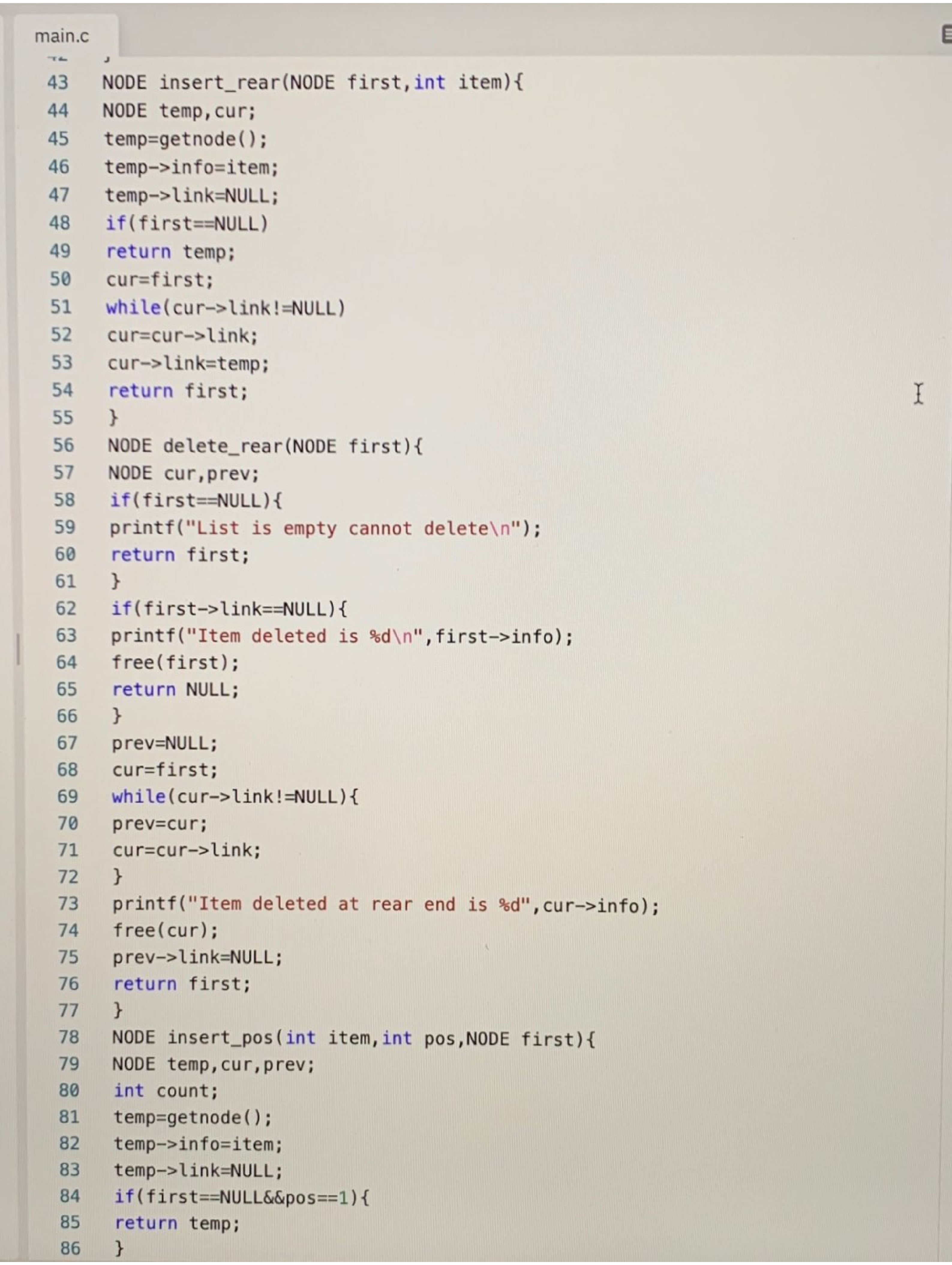
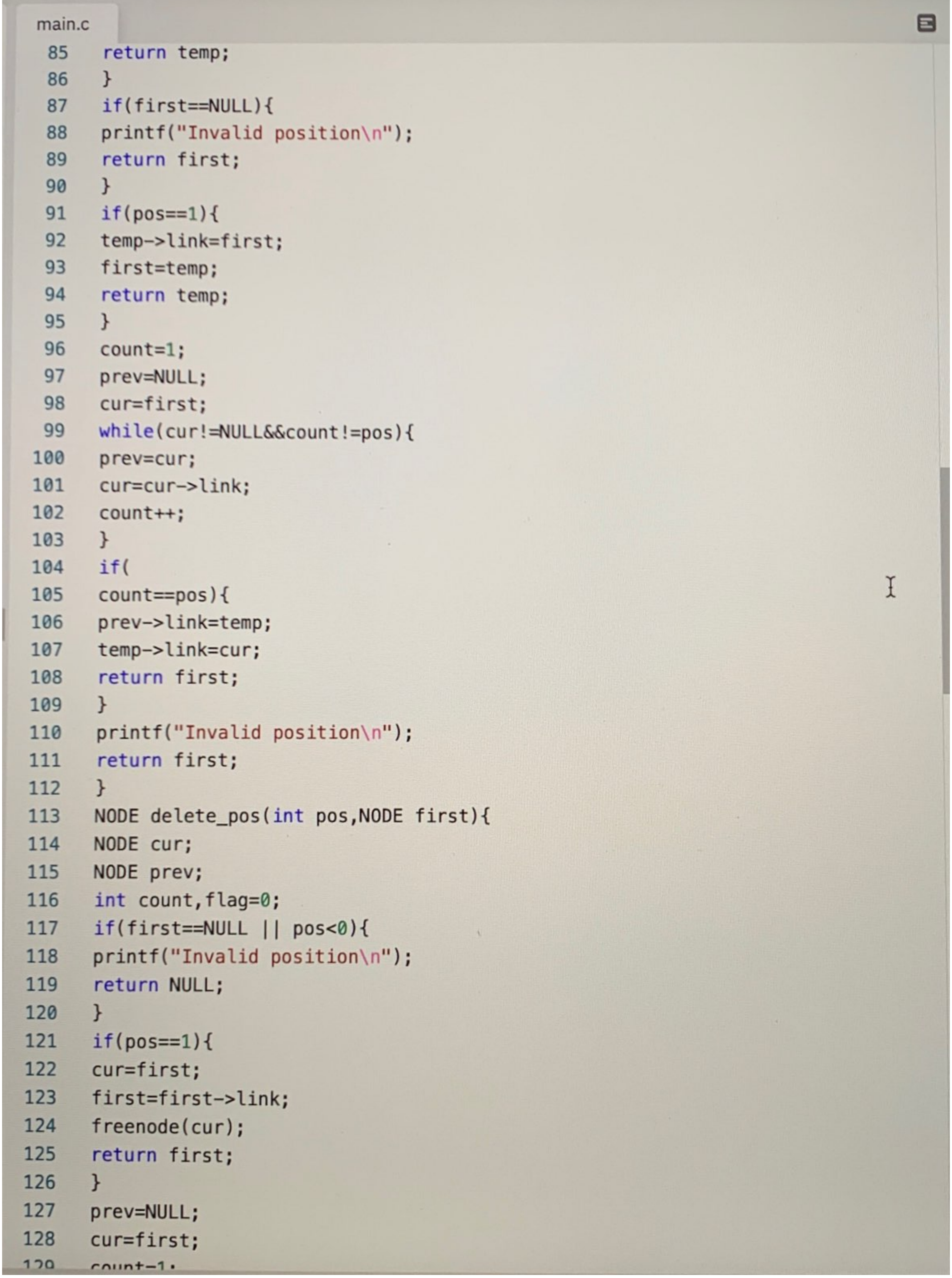
```
~~print~~ printf (" Enter the choice:");
  scanf (" %d", &choice);
switch (choice) {
case 1: printf (" Enter the item at rear end\n");
scanf ("%d", &item);
first = insert_rear (first, item);
break;
case 2: first = delete_rear (first);
break;
case 3: printf ("\n Enter the item at front end\n");
scanf (" %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; }
}
}
```



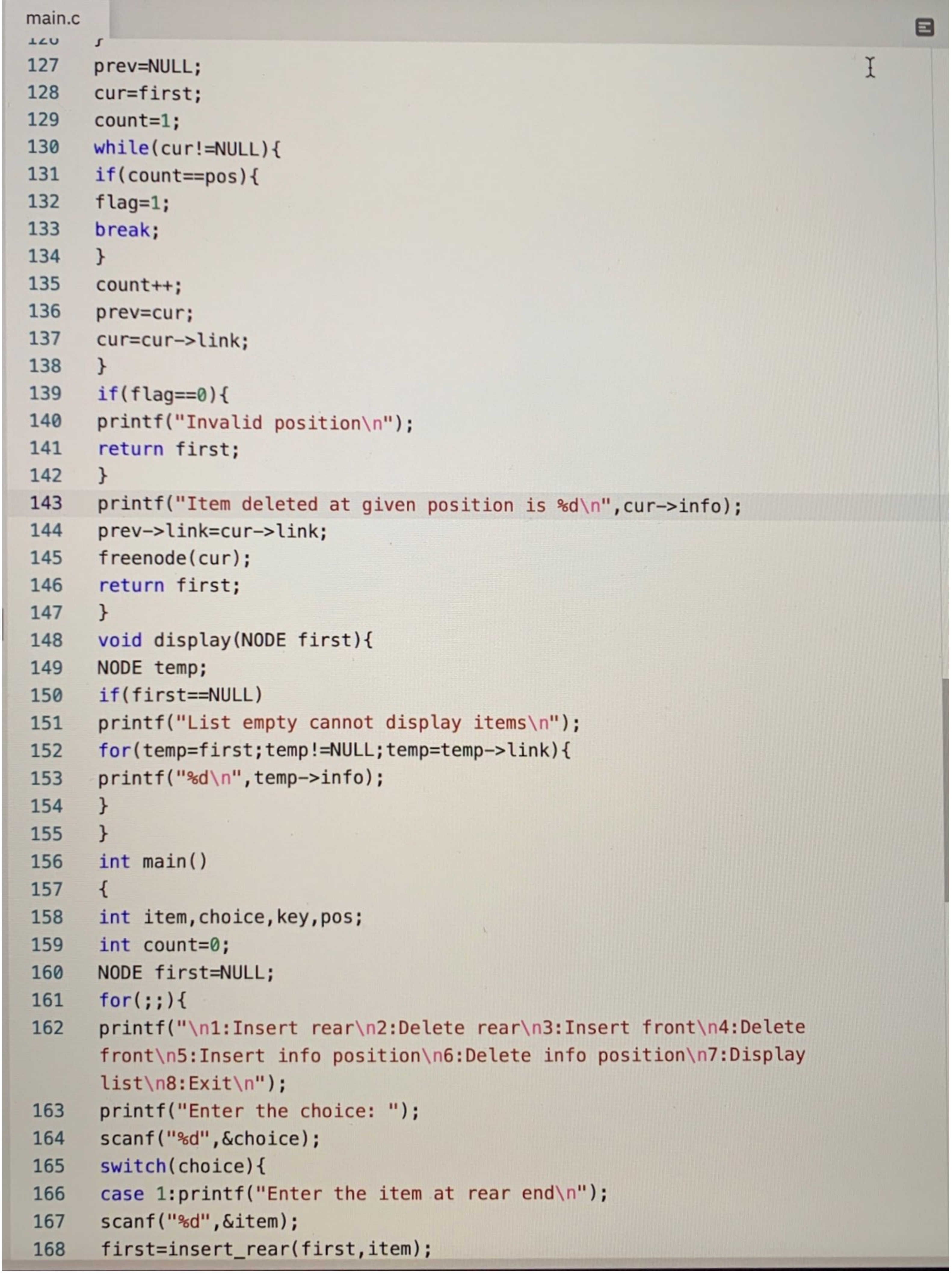
```c
#include<stdio.h>
#include<stdlib.h>
struct node{
int info;
struct node *link;
};
typedef struct node *NODE;
NODE getnode(){
NODE x;
x=(NODE)malloc(sizeof(struct node));
if(x==NULL){
printf("Memory full\n");
exit(0);
}
return x;
}
void freenode(NODE x){
free(x);
}
NODE insert_front(NODE first,int 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;
```



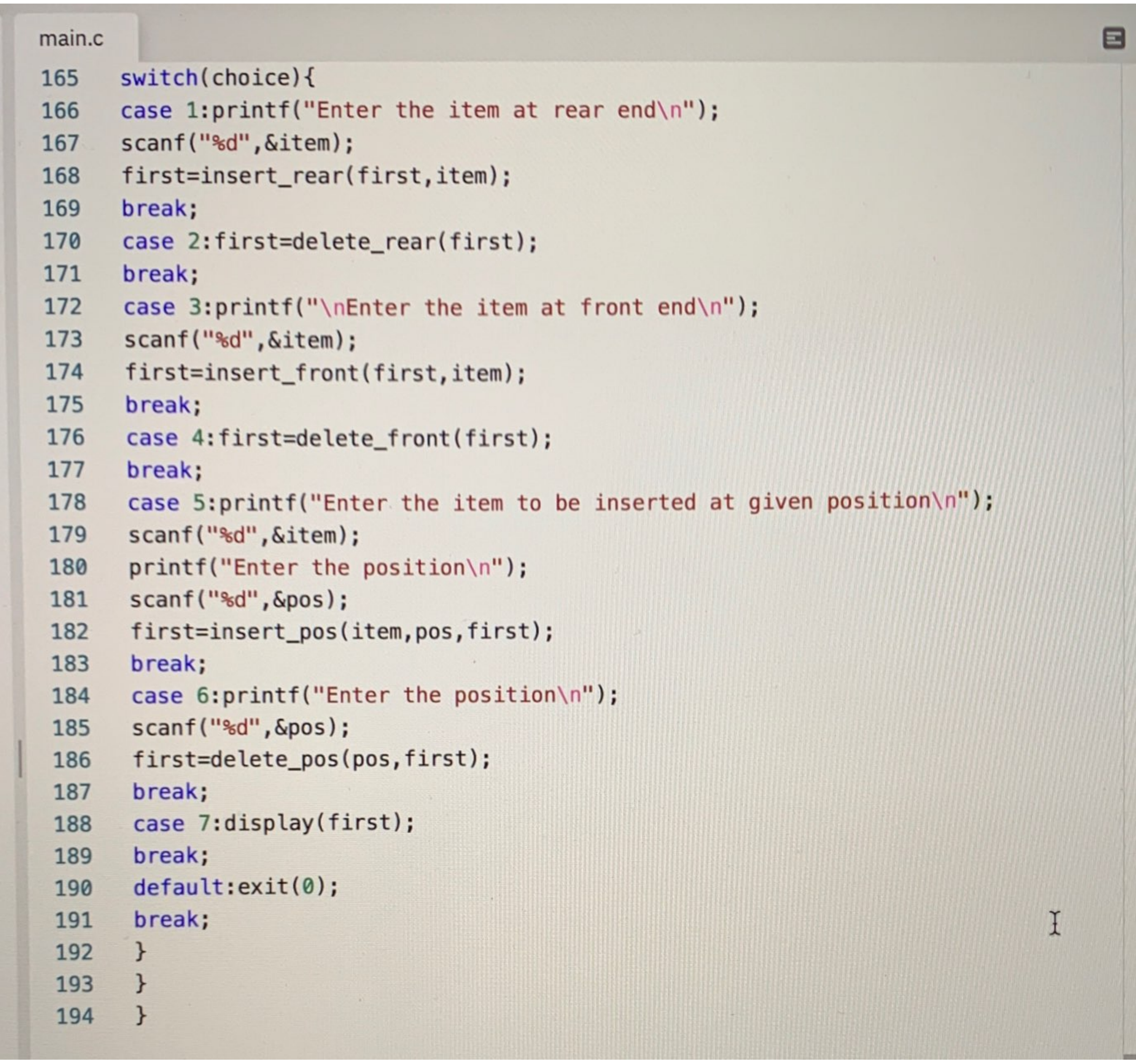
```c
}
NODE insert_rear(NODE first,int item){
NODE temp,cur;
temp=getnode();
temp->info=item;
temp->link=NULL;
if(first==NULL)
return temp;
cur=first;
while(cur->link!=NULL)
cur=cur->link;
cur->link=temp;
return first;
}
NODE delete_rear(NODE first){
NODE cur,prev;
if(first==NULL){
printf("List is empty 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;
}
```


main.c

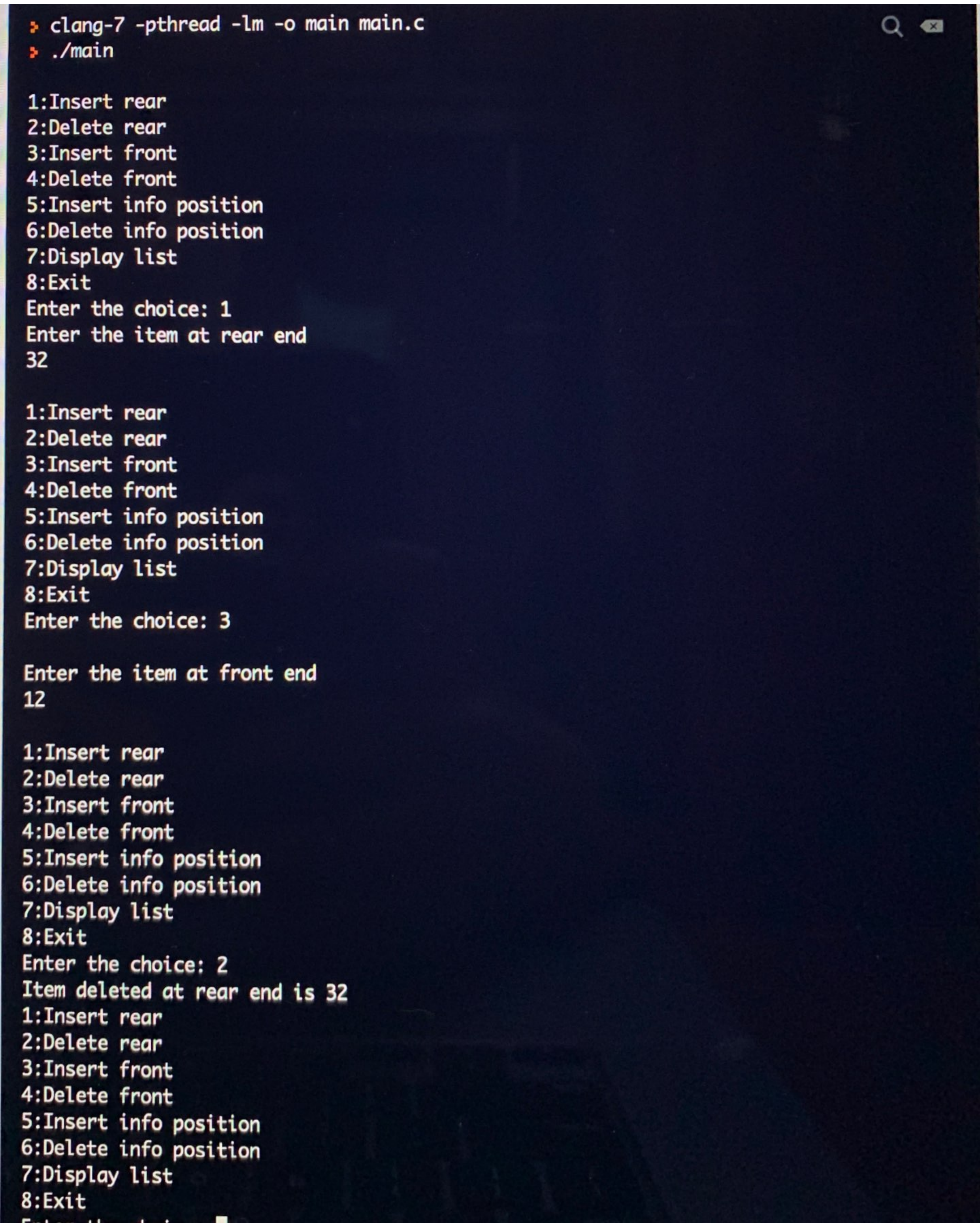
```c
return temp;
}
if(first==NULL){
printf("Invalid position\n");
return first;
}
if(pos==1){
temp->link=first;
first=temp;
return temp;
}
count=1;
prev=NULL;
cur=first;
while(cur!=NULL&&count!=pos){
prev=cur;
cur=cur->link;
count++;
}
if(
count==pos){
prev->link=temp;
temp->link=cur;
return first;
}
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;
```



```c
}
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);
}
}
int 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);
```


main.c

```c
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;
}
}
}
```



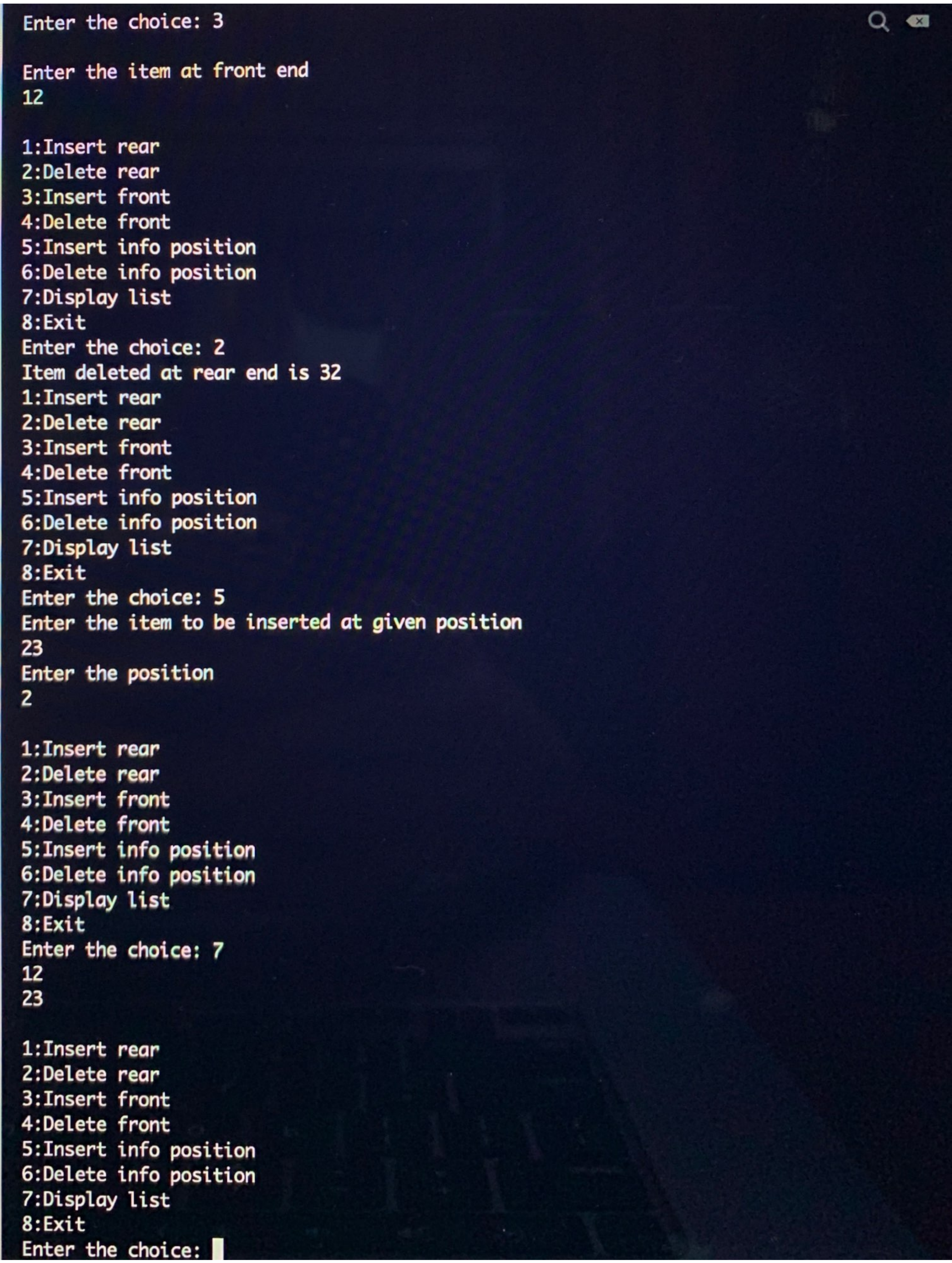
```
> clang-7 -pthread -lm -o main main.c
> ./main

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: 1
Enter the item at rear end
32

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
12

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 32
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
12

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 32
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
23
Enter the position
2

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
12
23

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: 
```