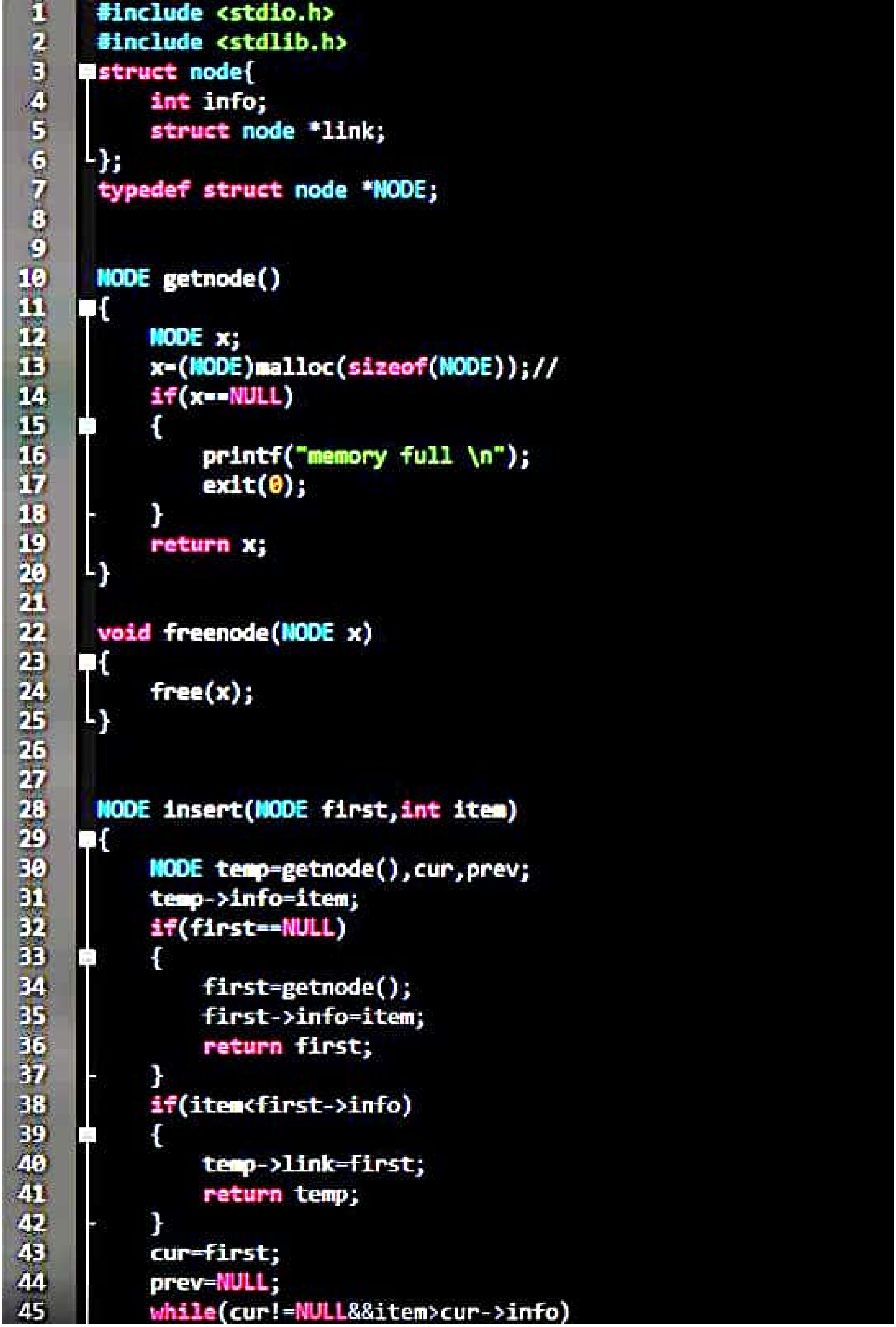
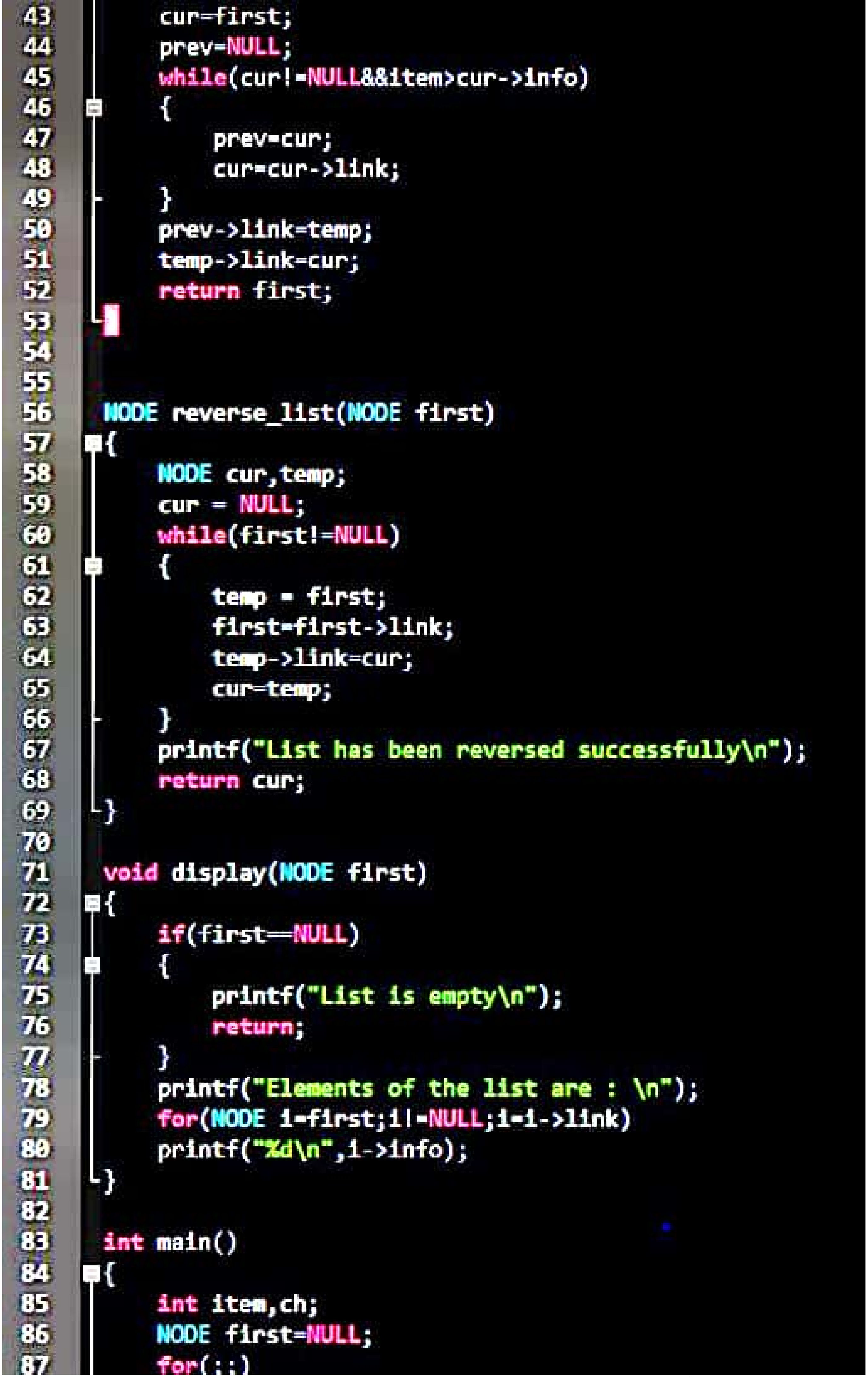
→ DS Lab Program 7

```
#include <stdio.h>
struct Node {
  int info;
  struct Node *link;
};
typedef struct Node node;
node getnode() {
   node x;
   x=(node)malloc(sizeof(node));
   if (x==NULL) {
      printf("Memory full\n");
      exit(0);
   }
   return x;
}
void freenode (node x) {
    free(x);
}
node insert(node first, int item) {
  node temp = getnode(), cur, prev;
  temp->info = item;
  if (first==NULL) {
        first = getnode();
        first->info = item;
        return first;
  }
  if (item < first->info) {
       temp->link = first;
       return temp;
  }
  cur = first;
  prev = NULL;
while (cur != NULL && item > cur -> info) {
    prev = cur;
    cur = cur -> link;
}
prev -> link = temp;
temp -> link = cur;
return ~~temp~~; first;
}
node reverse_list (node first) {
  node cur, temp;
  cur = NULL;
  while (first != NULL) {
     temp = first;
     first = first -> link;
     temp -> link = cur;
     cur = temp;
  }
  printf ("List has been reversed \n");
  return cur;
}
void display (node first) {
 if (first == NULL) {
     printf ("List is empty \n");
     return;
 }
 printf ("Elements of the list : \n");
 for (node i = first; i != NULL; i = i -> link)
    printf ("%d \n", i -> info);
}
```

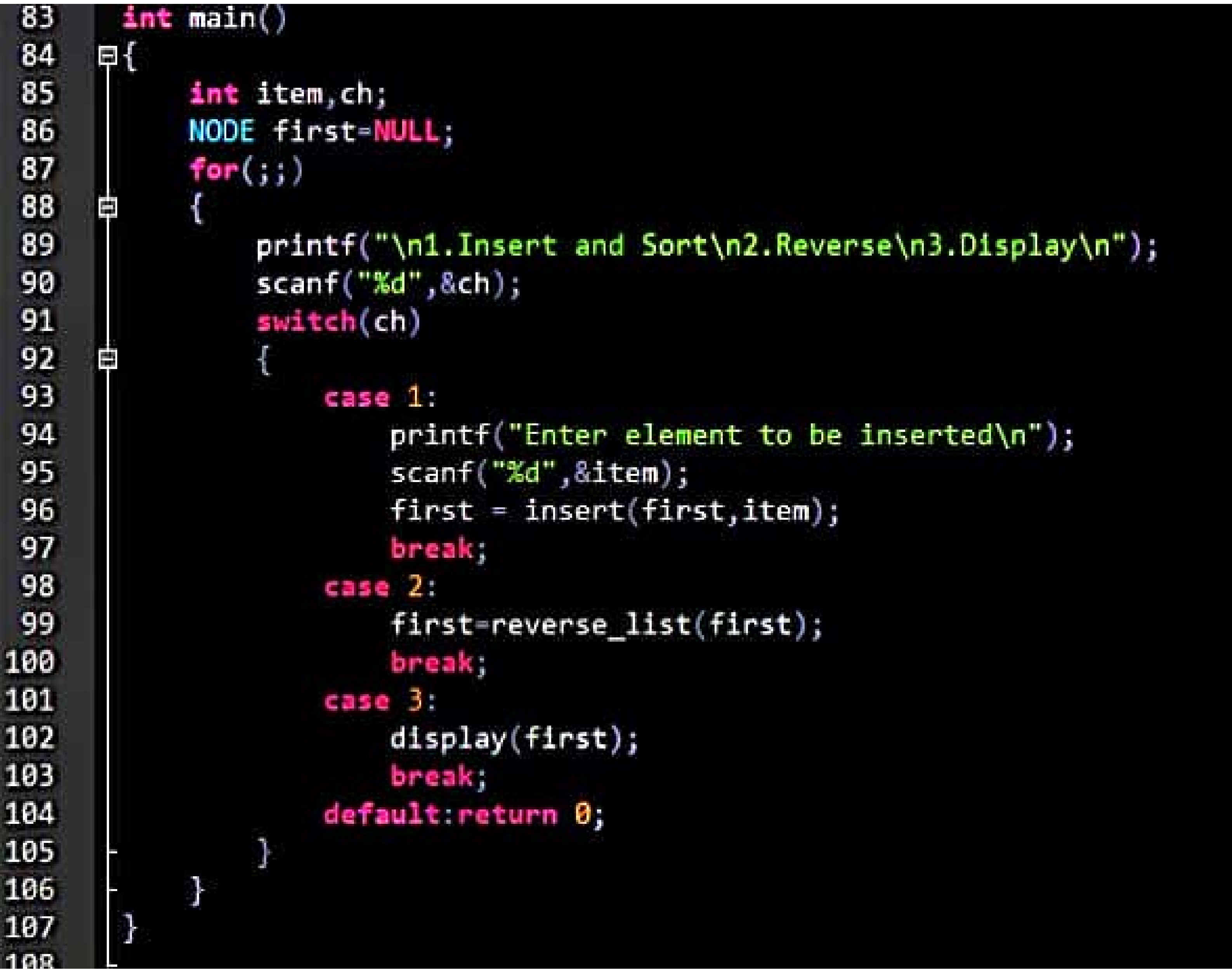
```
~~printf~~
node concat (node first, node second) {
  node cur;
  if (first == NULL)
       return second;
  if (second == NULL);
       return first;
  cur = first;
  while (cur -> link != NULL)
       cur = cur -> link;
  cur -> link = second;
  return first;
}
int main () {
  int item, choice, pos, i, n;
  node first~~a~~ = NULL, firstb = NULL;
  for (;;) {
  printf ("\n 1. Insert front -I \n 2. Insert front
          -2 \n 3. Concatenate \n 4. Reverse \n 5. display \n");
  scanf ("%d", &choice);
  switch (choice) {
   case 1: printf ("Enter item \n");
           scanf ("%d", &item);
           firsta = insert (firsta, item);
           break;
   case 2: printf ("Enter item \n");
           scanf ("%d", & item);
           firstb = insert (firstb, item);
           break;
   case 3: printf ("concatenated list:");
           firsta = concat (firsta, firstb);
           display (firsta);
           break;
case 4: firsta = reverse_list (firsta);
        firstb = reverse _list (firstb);
        break;
case 5: display (firsta);
        display (firstb);
        break;
default: return 0;
     }
   }
}
```



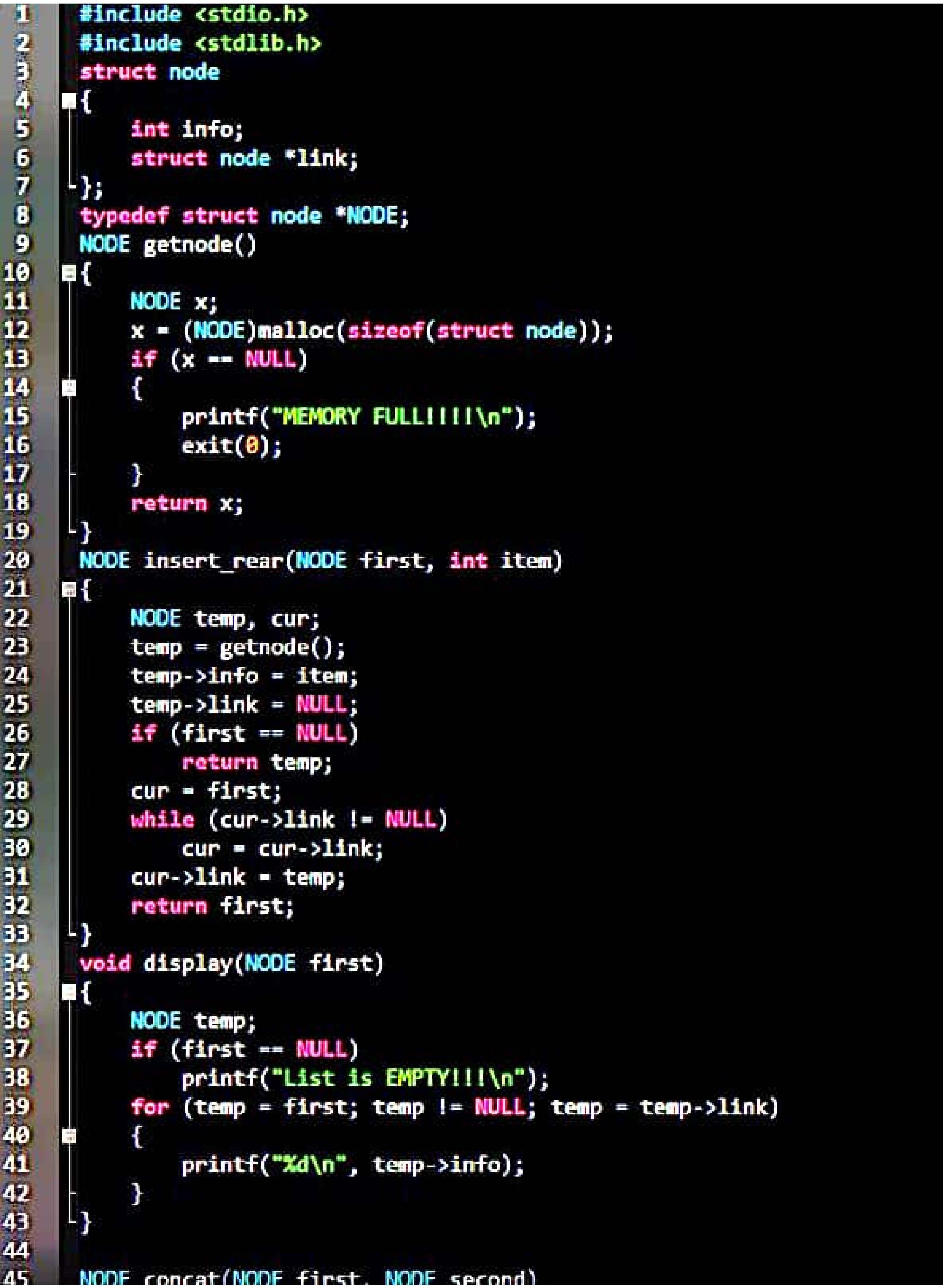
```c
#include <stdio.h>
#include <stdlib.h>
struct node{
    int info;
    struct node *link;
};
typedef struct node *NODE;


NODE getnode()
{
    NODE x;
    x=(NODE)malloc(sizeof(NODE));//
    if(x==NULL)
    {
        printf("memory full \n");
        exit(0);
    }
    return x;
}

void freenode(NODE x)
{
    free(x);
}


NODE insert(NODE first,int item)
{
    NODE temp=getnode(),cur,prev;
    temp->info=item;
    if(first==NULL)
    {
        first=getnode();
        first->info=item;
        return first;
    }
    if(item<first->info)
    {
        temp->link=first;
        return temp;
    }
    cur=first;
    prev=NULL;
    while(cur!=NULL&&item>cur->info)
```



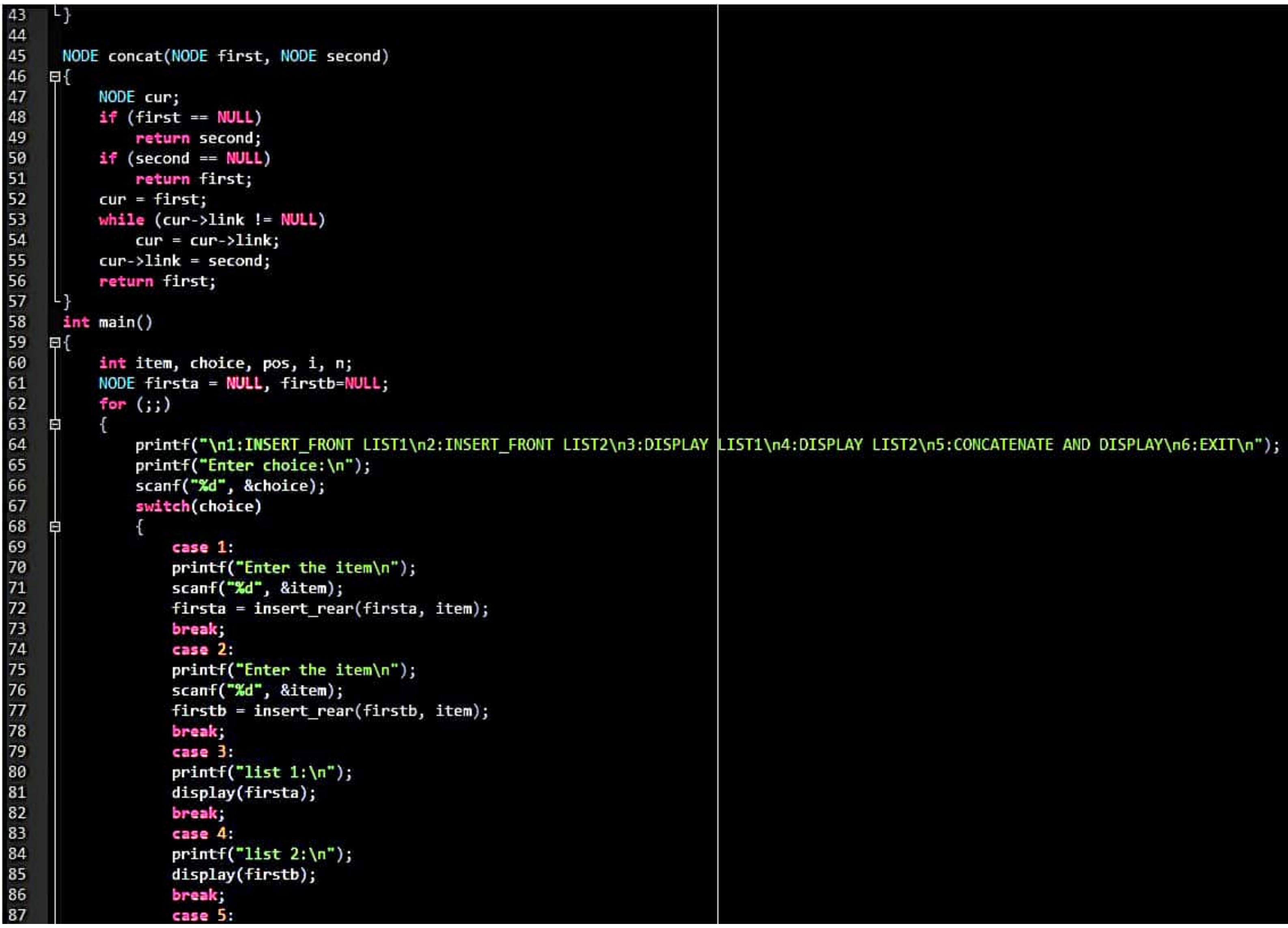
```
    cur=first;
    prev=NULL;
    while(cur!=NULL&&item>cur->info)
    {
        prev=cur;
        cur=cur->link;
    }
    prev->link=temp;
    temp->link=cur;
    return first;
}


NODE reverse_list(NODE first)
{
    NODE cur,temp;
    cur = NULL;
    while(first!=NULL)
    {
        temp = first;
        first=first->link;
        temp->link=cur;
        cur=temp;
    }
    printf("List has been reversed successfully\n");
    return cur;
}

void display(NODE first)
{
    if(first==NULL)
    {
        printf("List is empty\n");
        return;
    }
    printf("Elements of the list are : \n");
    for(NODE i=first;i!=NULL;i=i->link)
    printf("%d\n",i->info);
}

int main()
{
    int item,ch;
    NODE first=NULL;
    for(;;)
```



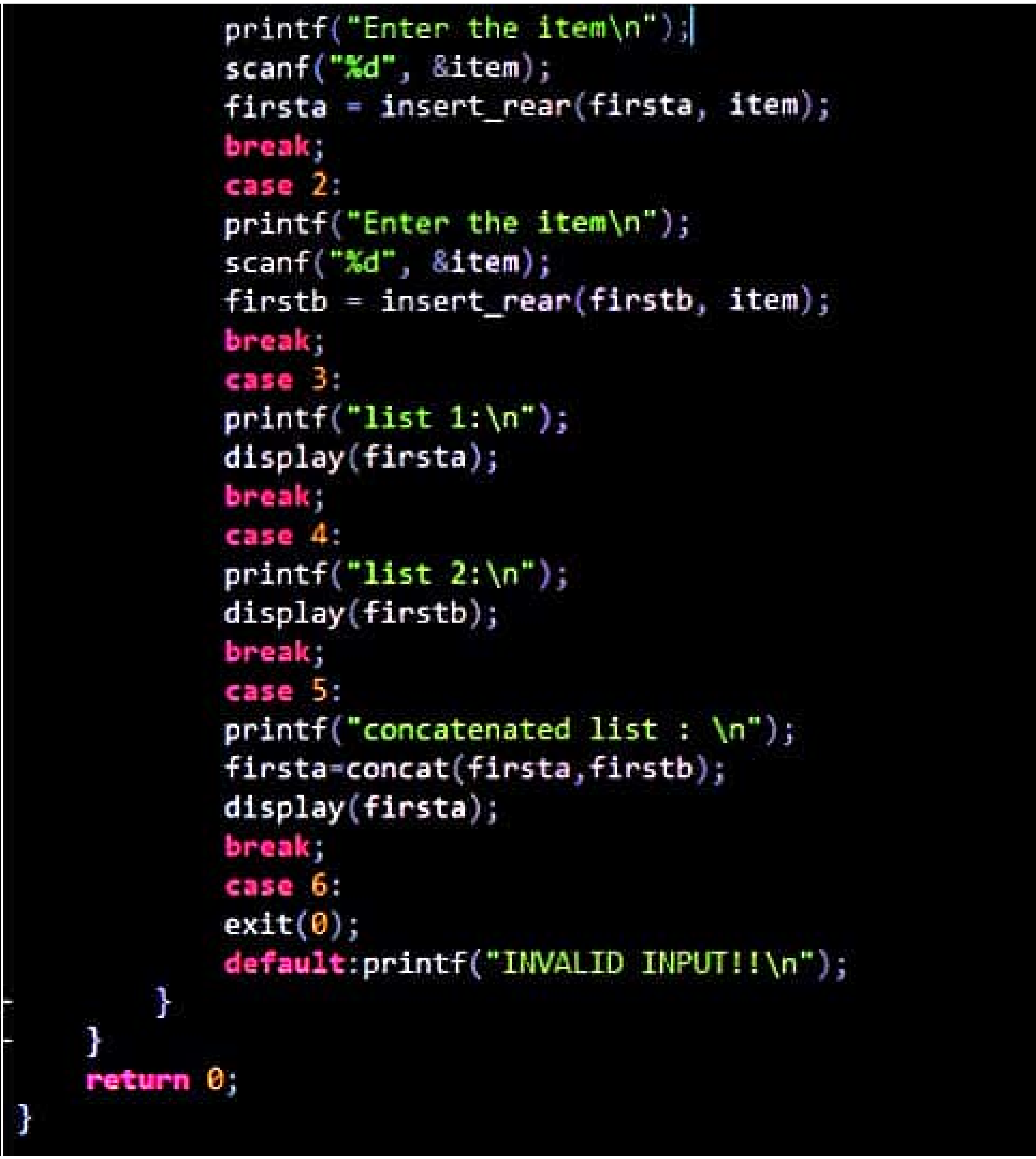
```c
int main()
{
    int item,ch;
    NODE first=NULL;
    for(;;)
    {
        printf("\n1.Insert and Sort\n2.Reverse\n3.Display\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1:
                printf("Enter element to be inserted\n");
                scanf("%d",&item);
                first = insert(first,item);
                break;
            case 2:
                first=reverse_list(first);
                break;
            case 3:
                display(first);
                break;
            default:return 0;
        }
    }
}
```



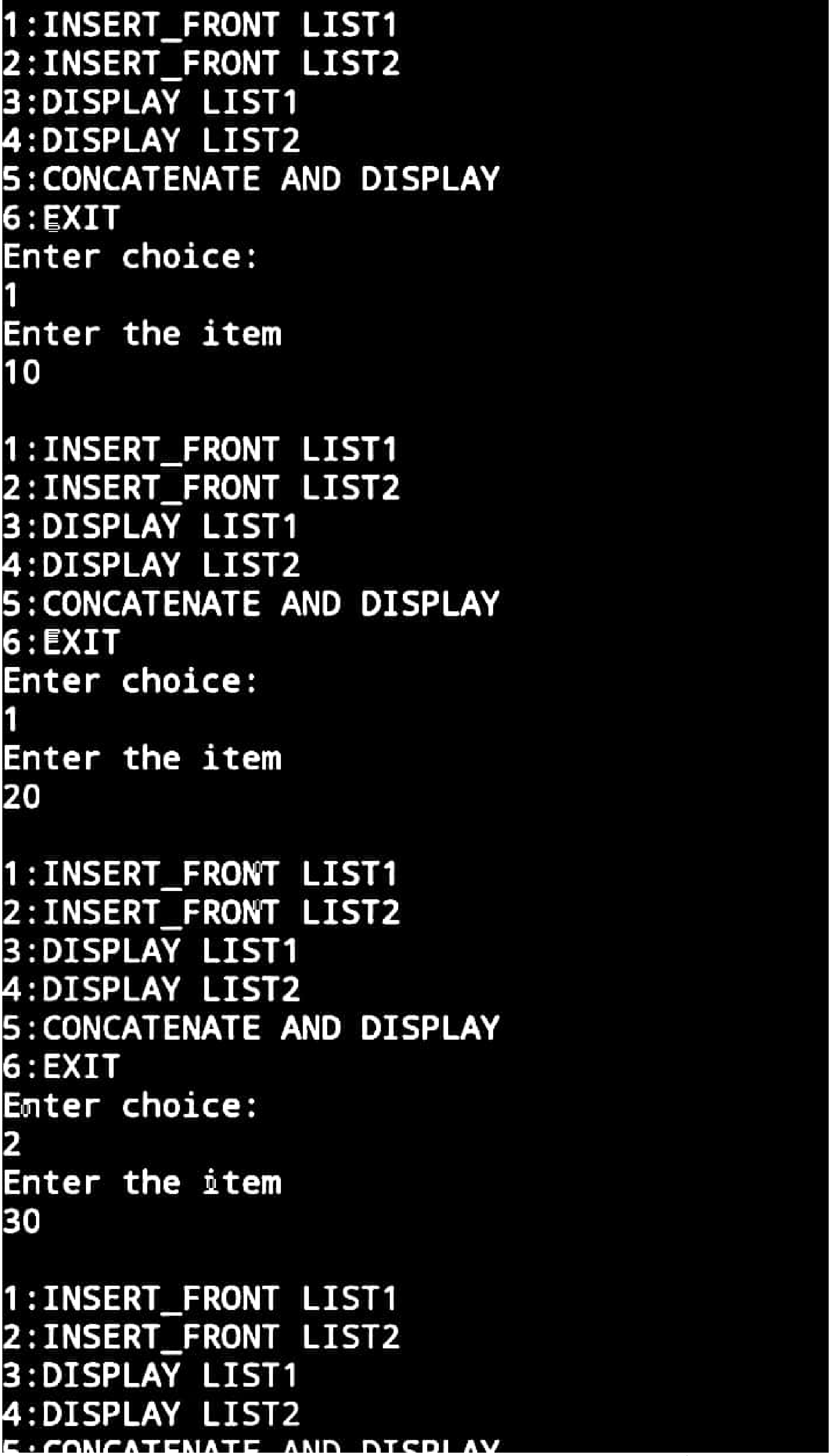
```c
#include <stdio.h>
#include <stdlib.h>
struct node
{
    int info;
    struct node *link;
};
typedef struct node *NODE;
NODE getnode()
{
    NODE x;
    x = (NODE)malloc(sizeof(struct node));
    if (x == NULL)
    {
        printf("MEMORY FULL!!!!\n");
        exit(0);
    }
    return x;
}
NODE 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;
}
void display(NODE first)
{
    NODE temp;
    if (first == NULL)
        printf("List is EMPTY!!!\n");
    for (temp = first; temp != NULL; temp = temp->link)
    {
        printf("%d\n", temp->info);
    }
}

NODE concat(NODE first, NODE second)
```



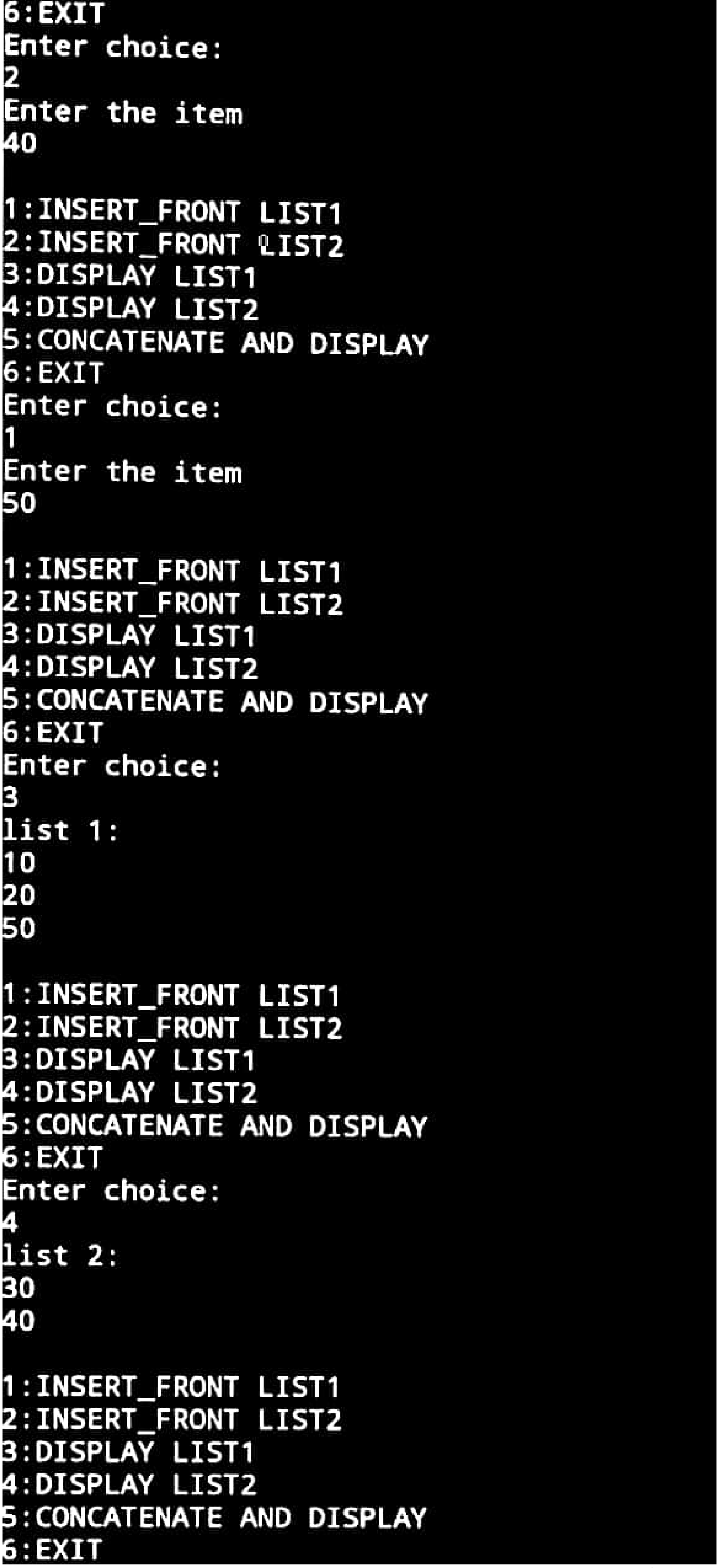
```c
}

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;
}
int main()
{
    int item, choice, pos, i, n;
    NODE firsta = NULL, firstb=NULL;
    for (;;)
    {
        printf("\n1:INSERT_FRONT LIST1\n2:INSERT_FRONT LIST2\n3:DISPLAY LIST1\n4:DISPLAY LIST2\n5:CONCATENATE AND DISPLAY\n6:EXIT\n");
        printf("Enter choice:\n");
        scanf("%d", &choice);
        switch(choice)
        {
            case 1:
            printf("Enter the item\n");
            scanf("%d", &item);
            firsta = insert_rear(firsta, item);
            break;
            case 2:
            printf("Enter the item\n");
            scanf("%d", &item);
            firstb = insert_rear(firstb, item);
            break;
            case 3:
            printf("list 1:\n");
            display(firsta);
            break;
            case 4:
            printf("list 2:\n");
            display(firstb);
            break;
            case 5:
```



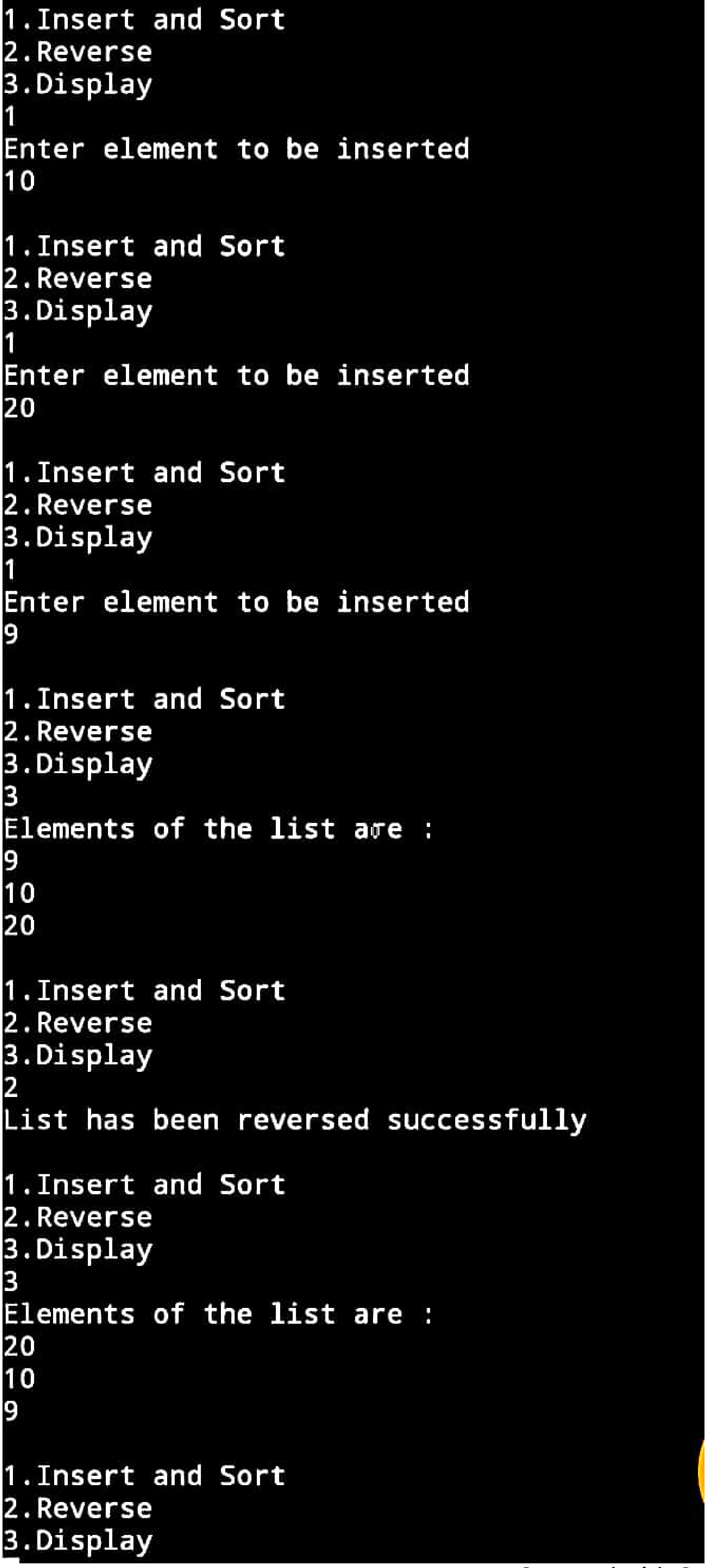
```
            printf("Enter the item\n");
            scanf("%d", &item);
            firsta = insert_rear(firsta, item);
            break;
            case 2:
            printf("Enter the item\n");
            scanf("%d", &item);
            firstb = insert_rear(firstb, item);
            break;
            case 3:
            printf("list 1:\n");
            display(firsta);
            break;
            case 4:
            printf("list 2:\n");
            display(firstb);
            break;
            case 5:
            printf("concatenated list : \n");
            firsta=concat(firsta,firstb);
            display(firsta);
            break;
            case 6:
            exit(0);
            default:printf("INVALID INPUT!!\n");
        }
    }
    return 0;
}
```



```
1:INSERT_FRONT LIST1
2:INSERT_FRONT LIST2
3:DISPLAY LIST1
4:DISPLAY LIST2
5:CONCATENATE AND DISPLAY
6:EXIT
Enter choice:
1
Enter the item
10

1:INSERT_FRONT LIST1
2:INSERT_FRONT LIST2
3:DISPLAY LIST1
4:DISPLAY LIST2
5:CONCATENATE AND DISPLAY
6:EXIT
Enter choice:
1
Enter the item
20

1:INSERT_FRONT LIST1
2:INSERT_FRONT LIST2
3:DISPLAY LIST1
4:DISPLAY LIST2
5:CONCATENATE AND DISPLAY
6:EXIT
Enter choice:
2
Enter the item
30

1:INSERT_FRONT LIST1
2:INSERT_FRONT LIST2
3:DISPLAY LIST1
4:DISPLAY LIST2
5:CONCATENATE AND DISPLAY
```



```
6:EXIT
Enter choice:
2
Enter the item
40

1:INSERT_FRONT LIST1
2:INSERT_FRONT LIST2
3:DISPLAY LIST1
4:DISPLAY LIST2
5:CONCATENATE AND DISPLAY
6:EXIT
Enter choice:
1
Enter the item
50

1:INSERT_FRONT LIST1
2:INSERT_FRONT LIST2
3:DISPLAY LIST1
4:DISPLAY LIST2
5:CONCATENATE AND DISPLAY
6:EXIT
Enter choice:
3
list 1:
10
20
50

1:INSERT_FRONT LIST1
2:INSERT_FRONT LIST2
3:DISPLAY LIST1
4:DISPLAY LIST2
5:CONCATENATE AND DISPLAY
6:EXIT
Enter choice:
4
list 2:
30
40

1:INSERT_FRONT LIST1
2:INSERT_FRONT LIST2
3:DISPLAY LIST1
4:DISPLAY LIST2
5:CONCATENATE AND DISPLAY
6:EXIT
```



```
1.Insert and Sort
2.Reverse
3.Display
1
Enter element to be inserted
10

1.Insert and Sort
2.Reverse
3.Display
1
Enter element to be inserted
20

1.Insert and Sort
2.Reverse
3.Display
1
Enter element to be inserted
9

1.Insert and Sort
2.Reverse
3.Display
3
Elements of the list are :
9
10
20

1.Insert and Sort
2.Reverse
3.Display
2
List has been reversed successfully

1.Insert and Sort
2.Reverse
3.Display
3
Elements of the list are :
20
10
9

1.Insert and Sort
2.Reverse
3.Display
```