Lab-9 Singly Linked List

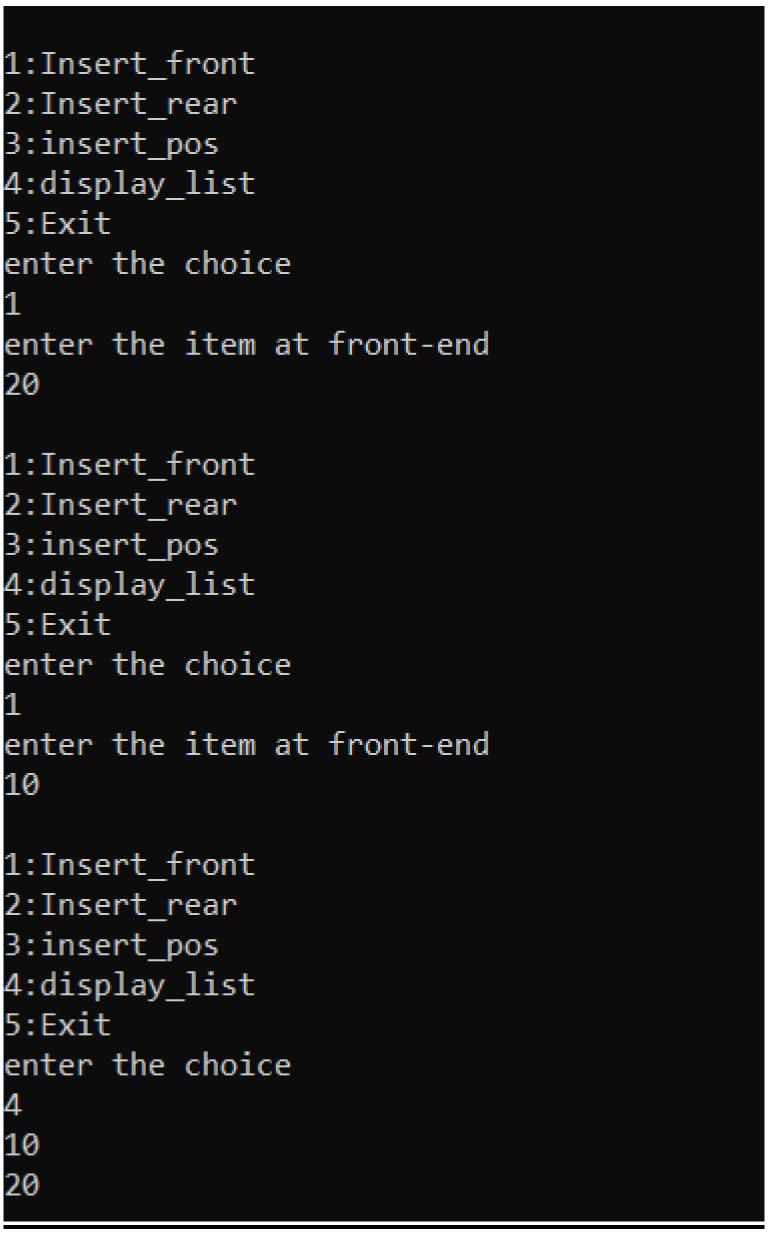
WAP to Implement Singly Linked List with following operations a) Create a linked list. b) Insertion of a node at first position, at any position and at end of list. c) Display the contents of the linked list.

```
#include <stdio.h>
#include <conio.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 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;
}
```

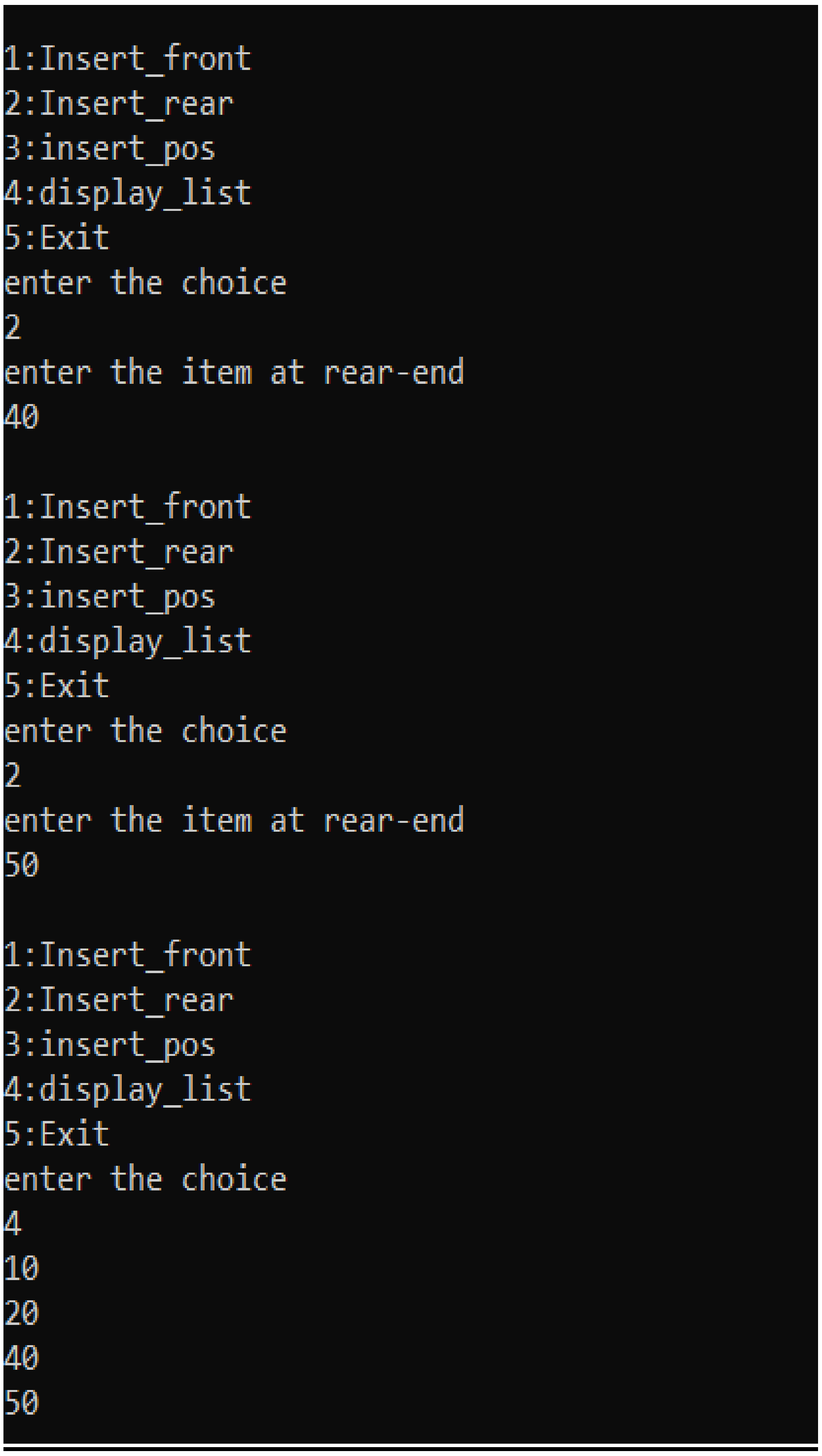
```
NODE insert_pos(int item, int pos, NODE first)
{
    NODE temp;
    NODE prev, cur;
    int count;
    temp = getnode();
    temp->info = item;
    temp->link = NULL;
    if (first == NULL && pos == 1)
        return temp;
    if (first == NULL)
    {
        printf("invalid pos\n");
        return first;
    }
    if (pos == 1)
    {
        temp->link = first;
        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("IP\n");
    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, pos;
    NODE first = NULL;

    for (;;)
    {
```

```
printf("\n1:Insert_front\n2:Insert_rear\n3:insert_pos\n4:display_list\n5:Exi
t\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:
            printf("enter the item at rear-end\n");
            scanf("%d", &item);
            first = insert_rear(first, item);
            break;

        case 3:
            printf("enter the position and item:\n");
            scanf("%d", &pos);
            scanf("%d",&item);
            first = insert_pos(item, pos, first);
            break;
        case 4:
            display(first);
            break;
        default:
            exit(0);

        }
    }
}
```

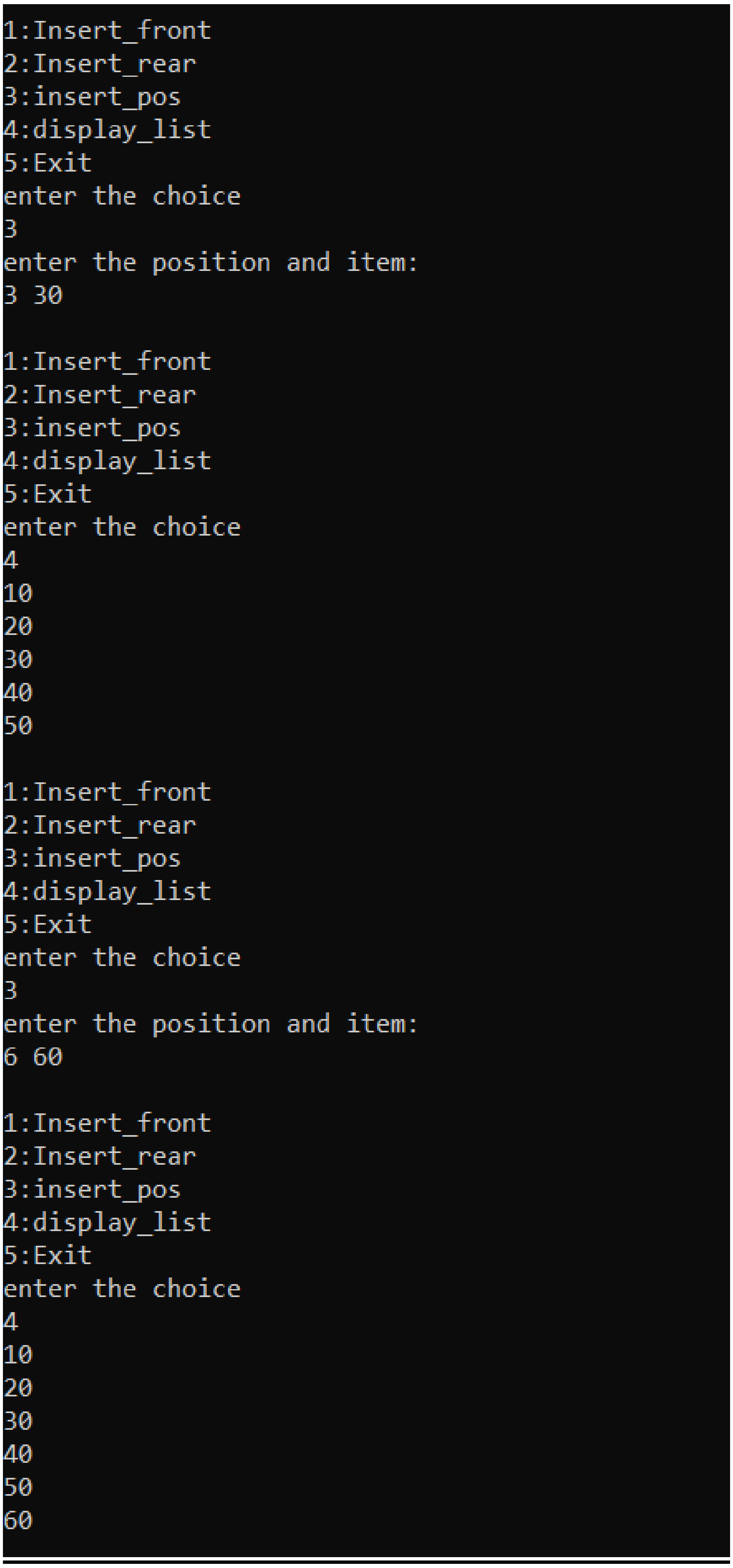
OUTPUT:



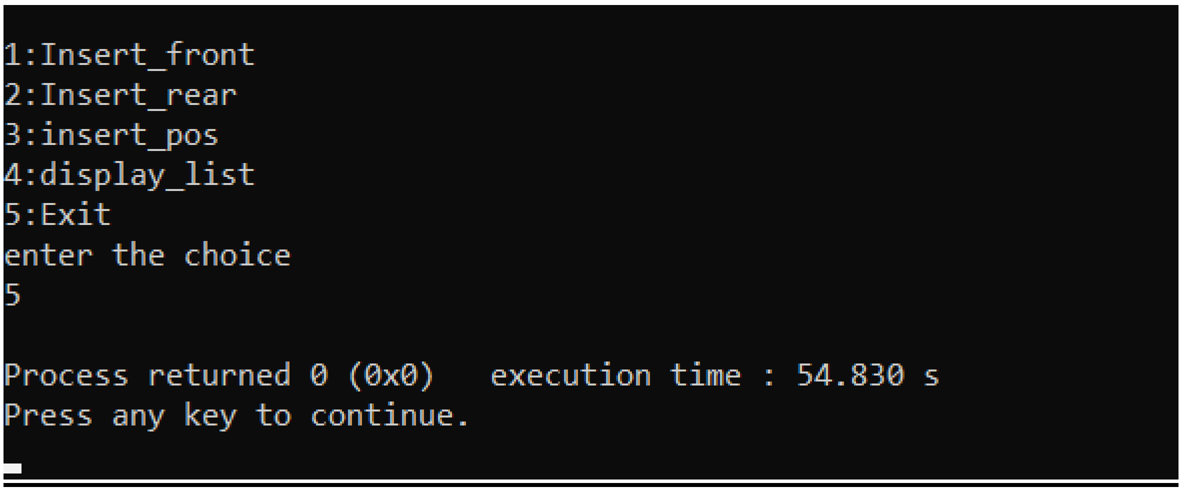
```
1:Insert_front
2:Insert_rear
3:insert_pos
4:display_list
5:Exit
enter the choice
1
enter the item at front-end
20

1:Insert_front
2:Insert_rear
3:insert_pos
4:display_list
5:Exit
enter the choice
1
enter the item at front-end
10

1:Insert_front
2:Insert_rear
3:insert_pos
4:display_list
5:Exit
enter the choice
4
10
20
```



```
1:Insert_front
2:Insert_rear
3:insert_pos
4:display_list
5:Exit
enter the choice
2
enter the item at rear-end
40

1:Insert_front
2:Insert_rear
3:insert_pos
4:display_list
5:Exit
enter the choice
2
enter the item at rear-end
50

1:Insert_front
2:Insert_rear
3:insert_pos
4:display_list
5:Exit
enter the choice
4
10
20
40
50
```



```
1:Insert_front
2:Insert_rear
3:insert_pos
4:display_list
5:Exit
enter the choice
3
enter the position and item:
3 30

1:Insert_front
2:Insert_rear
3:insert_pos
4:display_list
5:Exit
enter the choice
4
10
20
30
40
50

1:Insert_front
2:Insert_rear
3:insert_pos
4:display_list
5:Exit
enter the choice
3
enter the position and item:
6 60

1:Insert_front
2:Insert_rear
3:insert_pos
4:display_list
5:Exit
enter the choice
4
10
20
30
40
50
60
```


```
1:Insert_front
2:Insert_rear
3:insert_pos
4:display_list
5:Exit
enter the choice
5

Process returned 0 (0x0)   execution time : 54.830 s
Press any key to continue.
```