B.M.S. College of Engineering

(Autonomous Institution affiliated to VTU, Belagavi)

Department of Computer Science and Engineering

ACADEMIC YEAR: 2020-2021

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CLASS: CSE-3

SUBJECT: DATA STRUCTURES LAB RECORD

LAB-1

1.

```
#include <stdio.h>

      int top = -1;
      void push(int stack[], int ele);
      int pop(int stack[]);
      void display(int stack[]);

      int main()
      {
          int stack[5];
          int i, choice, ele;

          do
          {
              printf("---MENU---\n");
              printf("1. Push\n");
              printf("2. Pop\n");
              printf("3. Display\n");
              printf("4. Exit\n");
              printf("Enter your
      choice!\n");
              scanf("%d", &choice);
              switch(choice)
              {
                  case 1:
                  printf("Enter the element
      that you want to Push :\n");
```

```
            scanf("%d", &ele);
            push(stack, ele);
            break;

            case 2:
            ele = pop(stack);
            if (ele == -1)
                printf("Stack
Underflow\n");
            else
                printf("The Poped
element is : %d\n", ele);
            break;
            case 3: display(stack);

                    break;
            case 4:
printf("EXITING....\n");
                    break;
            default: printf("Invalid
choice!\n");
        }
    }
    while(choice != 4);
    return 0;
}

void push(int stack[], int ele)
{
    if (top==4)
    {
        printf("Stack overflow");
    }
```

```
    else
    {
        top++;
        stack[top]=ele;
    }
}

int pop(int stack[])
{
    int popele;
    if(top==-1)

       return -1;

    else
    {
        popele=stack[top];
        top--;
        return (popele);
    }
}

void display(int stack[])
{
    int i;
    printf("The stack elements\n");
    for(i=top;i>=0;i--)
    {

        printf("%d\n",stack[i]);
    }
}
```

```
---MENU---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice!
1
Enter the element that you want to Push :
12
---MENU---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice!
1
Enter the element that you want to Push :
13
---MENU---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice!
1
Enter the element that you want to Push :
14
---MENU---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice!
```

```
4. Exit
Enter your choice!
3
The stack elements
14
13
12
---MENU---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice!
2
The Poped element is : 14
---MENU---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice!
2
The Poped element is : 13
---MENU---
1. Push
2. Pop
3. Display
4. Exit
Enter your choice!
3
The stack elements
12
---MENU---
```

LAB-2

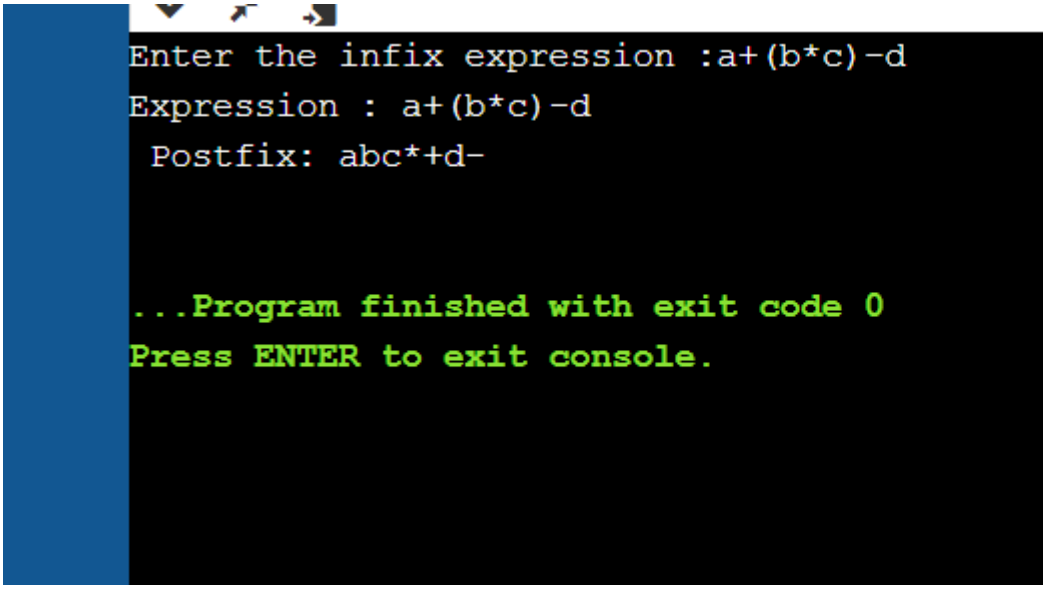
2.

```
#i
nc
lu
de
<s
td
io
.h
>
    # define MAX 100
    char stack[MAX];
    int top=-1;

    void push(char ch)
    {
        if (top==MAX-1)
            printf("Stack is full\n");
        else
        {
            top++;
            stack[top]=ch;
        }
    }
    char pop()
    {
        char item;
        if (top==-1)
            printf("\n stack is empty !");
        else
        {
            item=stack[top];
            top--;
            return item;
```

```
    }

}

int stackempty()
{
    if(top==-1) return 1;
    else return 0;
}

char stacktop()
{
    if( top==-1)
        printf("\n stack is empty!");
    else
        return stack[top];
}
int priority(char ch)
{
    switch(ch)
    {
        case '+':
        case '-':return (1);
        case '*':
        case '/':return (2);
        case '^': return (3);
        default : return (0);
    }
}



int main(int argc, char **argv)
```

```
{
    char infix[100];
    int i, item;
    printf("Enter the infix expression
:");
    scanf("%s",infix);
    printf("Expression : %s",infix);
    printf("\n Postfix: ");
    i=0;
     while (infix[i]!='\0')
    {


        switch (infix[i])
        {
            case '(': push(infix[i]);
                      break;
            case ')':while((
item=pop())!='(')

printf("%c",item);
                      break;
            case '+':
            case '-':
            case '*':
            case '/':
            case '^':

while(!stackempty() &&
priority(infix[i])<=priority(stacktop(
)))
                      {
```

```
item=pop();


printf("%c", item);
                        }

                        push(infix[i]);
                        break;
            default : printf("%c",
infix[i]);
                        break;


        }
         i++;
    }

    while(!stackempty())
    {
        char item;
        item=pop();
        printf("%c", item);

    }
    printf("\n");
    return 0;

}
```



LAB-3

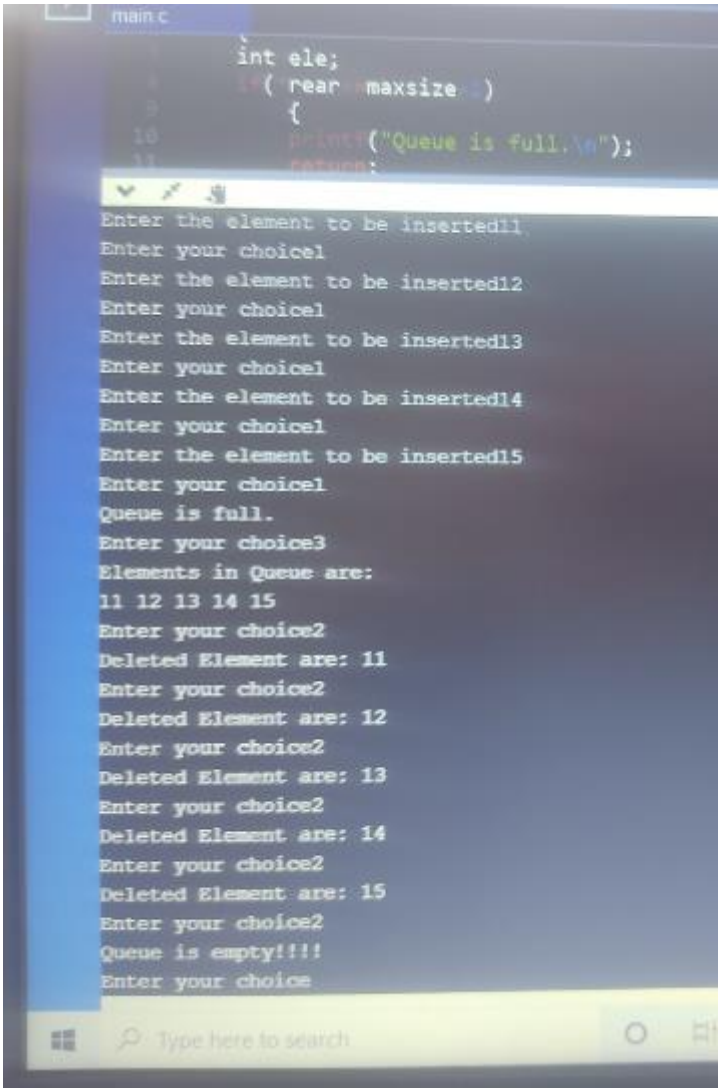
3.

```
#include<stdio
.h>

                    #include<stdlib.h>
                    #define maxsize 5
                    void enqueue(int *Q,int
                    *front, int *rear)
                        {
                        int ele;
                        if(*rear>=maxsize-1)
                            {
                            printf("Queue is
                    full.\n");
                            return;
                            }
                        if(*front==-1)
                            {
                            (*front)++;
                            }
```

```
    (*rear)++;
    printf("Enter the
element to be inserted");
    scanf("%d",&ele);
    *(Q+*rear)=ele;
    }

void display(int *Q,int
*front,int *rear)
    {
    if(*front==-
1&&*rear==-1)
        printf("Queue is
empty!!!!.\n");
    else
        {
        printf("Elements
in Queue are:\n");
        for(int
i=*front;i<=*rear;i++)
            {
            printf("%d
",*(Q+i));
            }
            printf("\n");
        }
    }

void dequeue(int *Q,int
*front, int *rear)
    {
    int ele;
```

```
    if(*front==-
1&&*rear==-1)
        {
        printf("Queue is
empty!!!!\n");
        return;
        }
    else if(*front==*rear)
        {
        ele=*(Q+*front);
        *front=-1;
        *rear=-1;
        }
    else
        {
        ele=*(Q+*front);
        (*front)++;
        }
    printf("Deleted
Element are: %d\n",ele);
    }

void main()
{
int front1=-1,rear1=-1;
int queue1[maxsize];
int choice;
    printf("1.
Enqueue\n");
    printf("2.
Dequque\n");
    printf("3.
Display\n");
```

```
    printf("4. Exit\n");

do
    {
    printf("Enter your
choice");
    scanf("%d",&choice);

    switch(choice)
        {
        case 1:
enqueue(queue1,&front1,&re
ar1);
            break;
        case 2:
dequeue(queue1,&front1,&re
ar1);
            break;
        case 3:
display(queue1,&front1,&re
ar1);
            break;
        case 4:exit(0);
            break;

default:printf("Please
input correct choice\n");
            break;

        }
    }while(choice!=4);

}
```



LAB-4

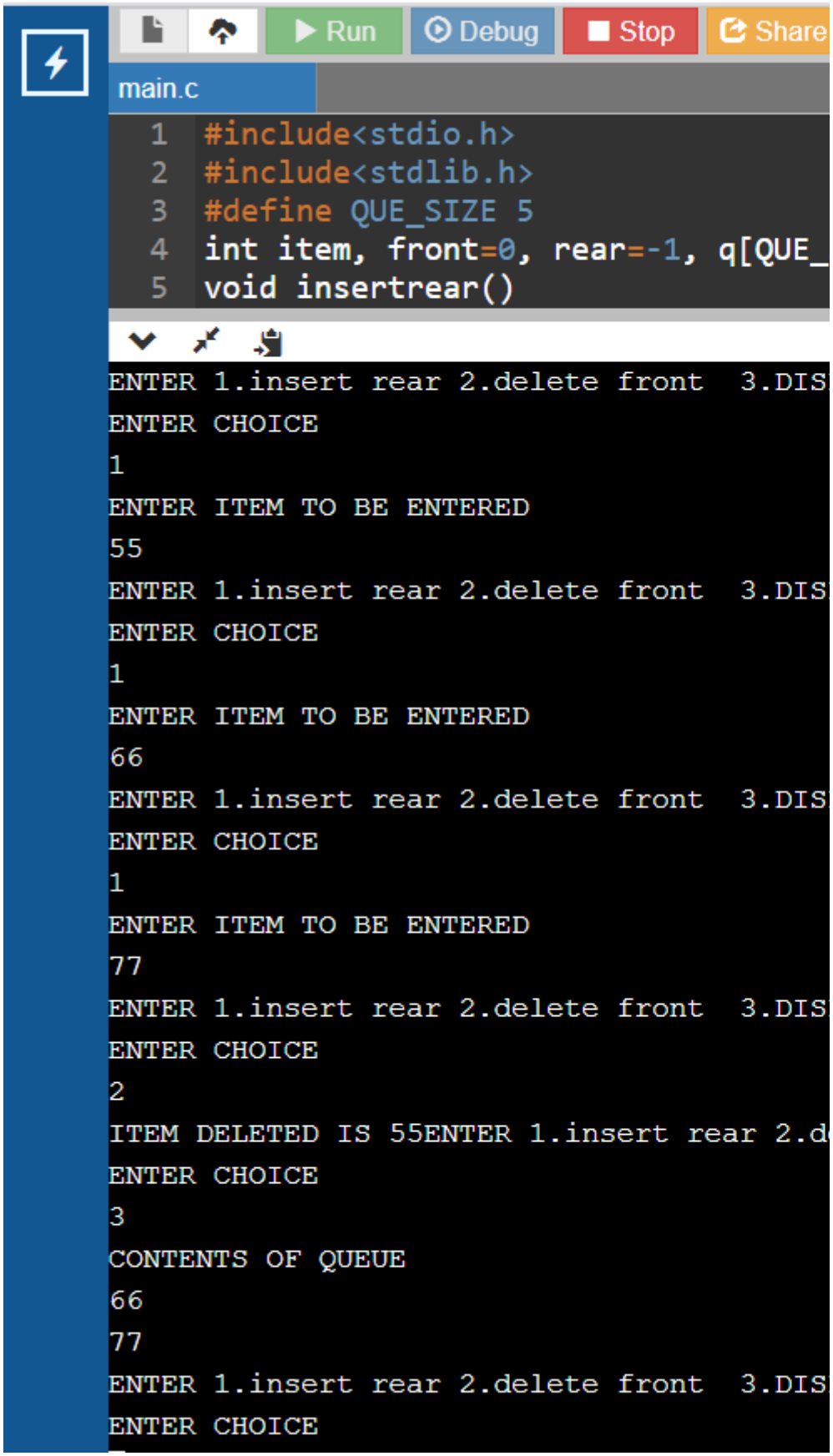
4.

```
#inc
lude
<std
io.h
>
      #include<stdlib.h>
      #define QUE_SIZE 5
      int item, front=0, rear=-1,
      q[QUE_SIZE],count=0;
```

```
void insertrear()
{
    if(count == QUE_SIZE)
    {
        printf("QUEUE OVERFLOW \n");
        return ;
    }

    rear= (rear+1)%QUE_SIZE;
    q[rear]= item;
    count++;
}

int deletefront()
{
    if(count==0)
        {return -1;
    }
  item=q[front];
  front=(front+1)%QUE_SIZE;
  count=count-1;
    return item;
}

void display()
{
    int i,f;
    if(count==0)
    {
        printf("QUEUE IS EMPTY \n");
        return;
    }
    f=front;
```

```
    printf("CONTENTS OF QUEUE \n");
    for(i=1; i<=count; i++)
    {
        printf("%d \n", q[f]);
        f=(f+1)%QUE_SIZE;
    }
}

void main()
{
    int choice ;
    for(;;)
    {
        printf("ENTER 1.insert rear
2.delete front  3.DISPLAY \n");
        printf("ENTER CHOICE \n");
        scanf("%d", &choice);
        switch(choice)
        {
            case 1: printf("ENTER
ITEM TO BE ENTERED \n");
                    scanf("%d",
&item);
                    insertrear();
                    break;
            case 2: item=
deletefront();
                    if(item == -1)

printf("QUEUE EMPTY \n");
                    else
```

```
                        printf("ITEM
DELETED IS %d", item);
                        break;
            case 3: display();
                        break;
            default: exit(0);
        }
    }
}
```


Run
Debug
Stop
Share
main.c
1 #include<stdio.h>
2 #include<stdlib.h>
3 #define QUE_SIZE 5
4 int item, front=0, rear=-1, q[QUE_
5 void insertrear()
ENTER 1.insert rear 2.delete front 3.DIS
ENTER CHOICE
1
ENTER ITEM TO BE ENTERED
55
ENTER 1.insert rear 2.delete front 3.DIS
ENTER CHOICE
1
ENTER ITEM TO BE ENTERED
66
ENTER 1.insert rear 2.delete front 3.DIS
ENTER CHOICE
1
ENTER ITEM TO BE ENTERED
77
ENTER 1.insert rear 2.delete front 3.DIS
ENTER CHOICE
2
ITEM DELETED IS 55ENTER 1.insert rear 2.d
ENTER CHOICE
3
CONTENTS OF QUEUE
66
77
ENTER 1.insert rear 2.delete front 3.DIS
ENTER CHOICE

LAB-5

5.

```
#i
nc
lu
de
<s
td
io
.h
>
    #include <stdlib.h>
    #include <string.h>
    struct node
    {
      int sem;
      char name[100];
      char usn[100];
      struct node *next;
    };
    struct node *head = NULL;
    int counter = 0;


    void
    Insertst ()
    {
      struct node *newnode;
      int s;
      char n[100], u[100];
```

```
  printf ("\t ----Enter the name-----
: ");
  scanf ("%s", n);
  printf ("\t ----Enter the semester--
---  : ");
  scanf ("%d", &s);
  printf ("\t ----Enter the usn---- :
");
  scanf ("%s", u);
  newnode = (struct node *) malloc
(sizeof (struct node));
  newnode->sem = s;
  strcpy (newnode->name, n);
  strcpy (newnode->usn, u);
  if (head == NULL)
    printf (">>First node created\n");
  newnode->next = head;
  head = newnode;
  counter++;
  printf ("Node created!\n");
}

void
Insertany (int p)
{
  struct node *newnode;
  int s;
  char n[100], u[100];
  printf ("\t -Enter the name-  : ");
  scanf ("%s", n);
  printf ("\t -Enter the semester- :
");
  scanf ("%d", &s);
```

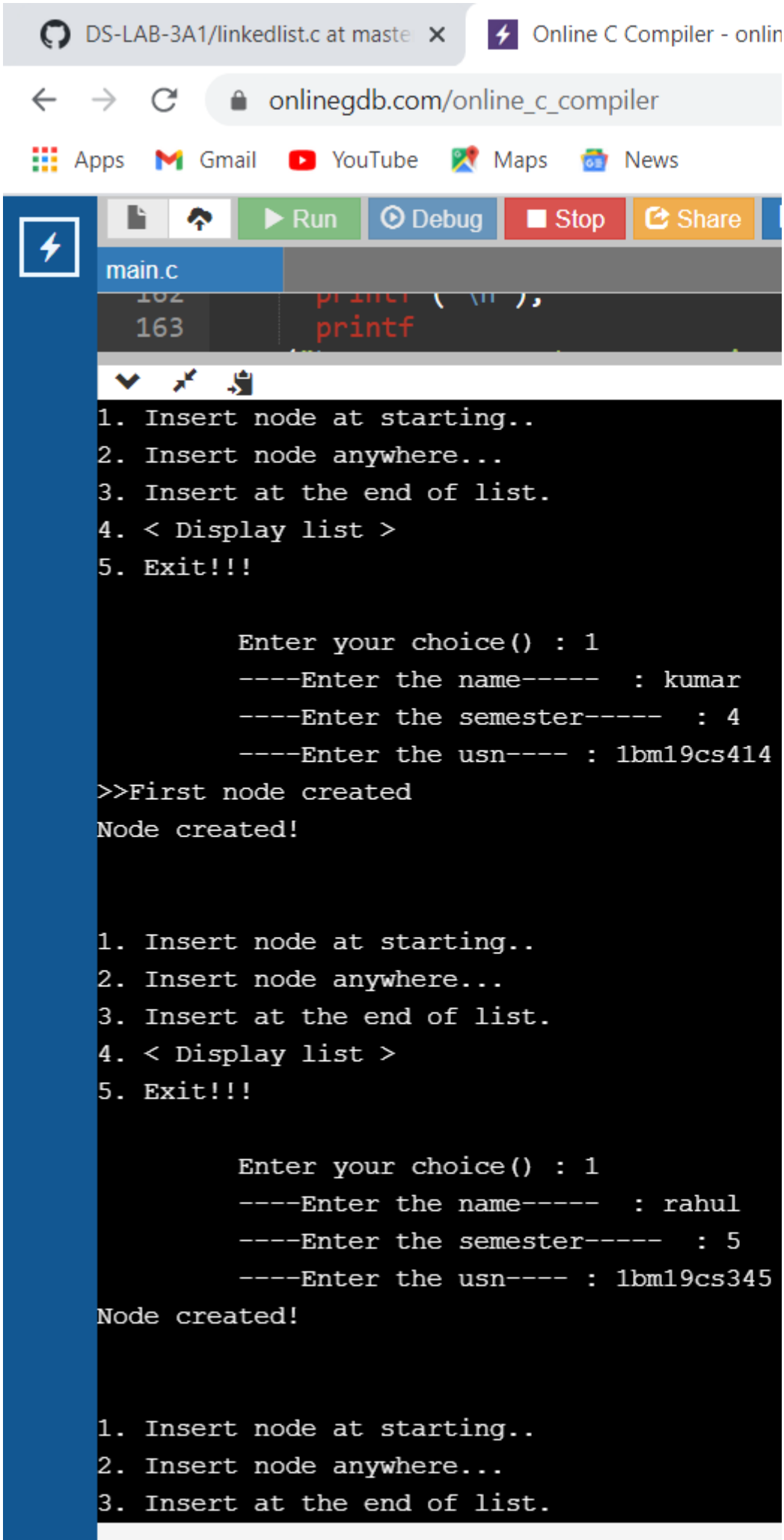
```
  printf ("\t -Enter the usn-  : ");
  scanf ("%s", u);
  newnode = (struct node *) malloc
(sizeof (struct node));
  newnode->sem = s;
  strcpy (newnode->name, n);
  strcpy (newnode->usn, u);
  if (p == 1)
    {
      printf ("Node of linked list is
inserted in the first position\n");
      newnode->next = head;
      head = newnode;
      counter++;
    }
  else if (head == NULL && p > 1)
    {
      printf ("currently empty!!!\n");
      return;
    }
  else if (p > (counter + 1))
    {
      printf
    ("Not possible since number of pre-
existing nodes in list is
insufficient!\n");
      return;
    }
  else
    {
      struct node *temp1;
      struct node *temp2;
      int count = 1;
```

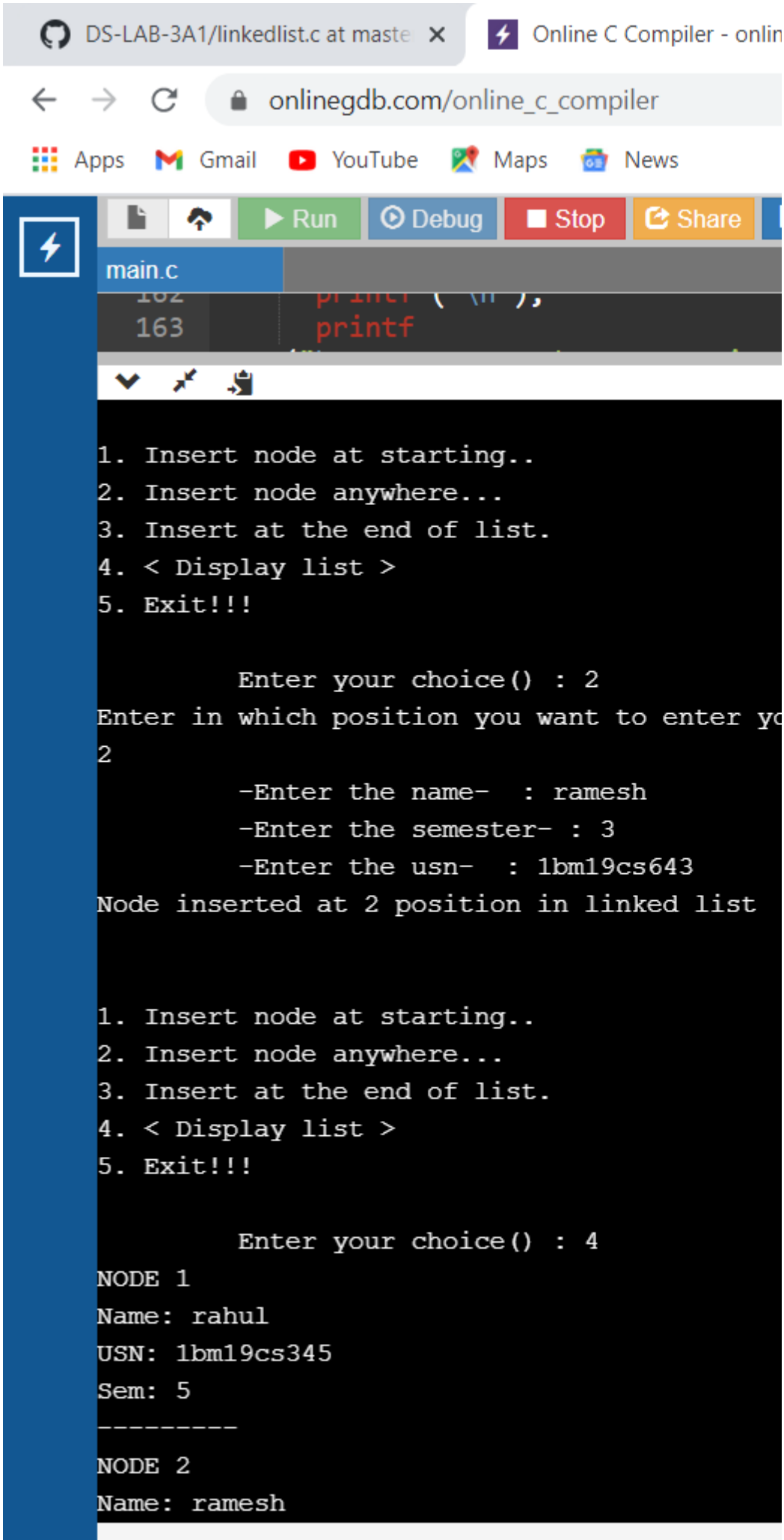
```
      temp1 = head;
      while (count < (p - 1))
    {
      temp1 = temp1->next;
      count++;
    }
      temp2 = temp1->next;
      temp1->next = newnode;
      newnode->next = temp2;
      counter++;
      printf ("Node inserted at %d
position in linked list\n", p);
    }
}

void
Insertend ()
{
  struct node *newnode;
  struct node *temp;
  int s;
  char n[100], u[100];
  printf ("Enter the name- : ");
  scanf ("%s", n);
  printf ("Enter the semester-  : ");
  scanf ("%d", &s);
  printf ("Enter the usn-  : ");
  scanf ("%s", u);
  newnode = (struct node *) malloc
(sizeof (struct node));
  newnode->sem = s;
  strcpy (newnode->name, n);
  strcpy (newnode->usn, u);
```

```
  if (head == NULL)
    {
      newnode->next = NULL;
      head = newnode;
      printf (">Very first node
created\n");
      counter++;
    }
  else
    {
      temp = head;
      while (temp->next != NULL)
    {
      temp = temp->next;
    }
      temp->next = newnode;
      newnode->next = NULL;
      counter++;
      printf ("Node created!\n");
    }
}

void
display ()
{
  struct node *ptr;
  ptr = head;
  int i = 1;

  if (ptr == NULL)
    {
      printf ("Linked list is
empty!!\n");
```

```
    }
  else
    {
      while (ptr != NULL)
    {
      printf ("NODE %d\n", i);
      printf ("Name: %s\n", ptr->name);
      printf ("USN: %s\n", ptr->usn);
      printf ("Sem: %d\n", ptr->sem);
      printf ("---------\n");
      i++;
      ptr = ptr->next;
    }

    }
}
int
main ()
{
  int choice, pos;
  do
    {
      printf ("\n");
      printf
    ("\n1. Insert node at starting..
\n2. Insert node anywhere... \n3.
Insert at the end of list.\n4. <
Display list >\n5. Exit!!!\n");
      printf ("\n\t Enter your
choice() : ");
      scanf ("%d", &choice);
      if (choice == 5)
    break;
```

```
      switch (choice)
    {
    case 1:
      Insertst ();
      break;

    case 2:
      printf ("Enter in which position
you want to enter your node\n");
      scanf ("%d", &pos);
      Insertany (pos);
      break;

    case 3:
      Insertend ();
      break;

    case 4:
      display ();
      break;

    default:
      printf ("invalid!\n");
      break;
    }
     }
  while (choice != 5);
  return 0;
}
```


DS-LAB-3A1/linkedlist.c at maste
Online C Compiler - onlin
onlinegdb.com/online_c_compiler
Apps
Gmail
YouTube
Maps
News
Run
Debug
Stop
Share
main.c
163 printf
1. Insert node at starting..
2. Insert node anywhere...
3. Insert at the end of list.
4. < Display list >
5. Exit!!!
Enter your choice() : 1
----Enter the name----- : kumar
----Enter the semester----- : 4
----Enter the usn---- : 1bm19cs414
>>First node created
Node created!
1. Insert node at starting..
2. Insert node anywhere...
3. Insert at the end of list.
4. < Display list >
5. Exit!!!
Enter your choice() : 1
----Enter the name----- : rahul
----Enter the semester----- : 5
----Enter the usn---- : 1bm19cs345
Node created!
1. Insert node at starting..
2. Insert node anywhere...
3. Insert at the end of list.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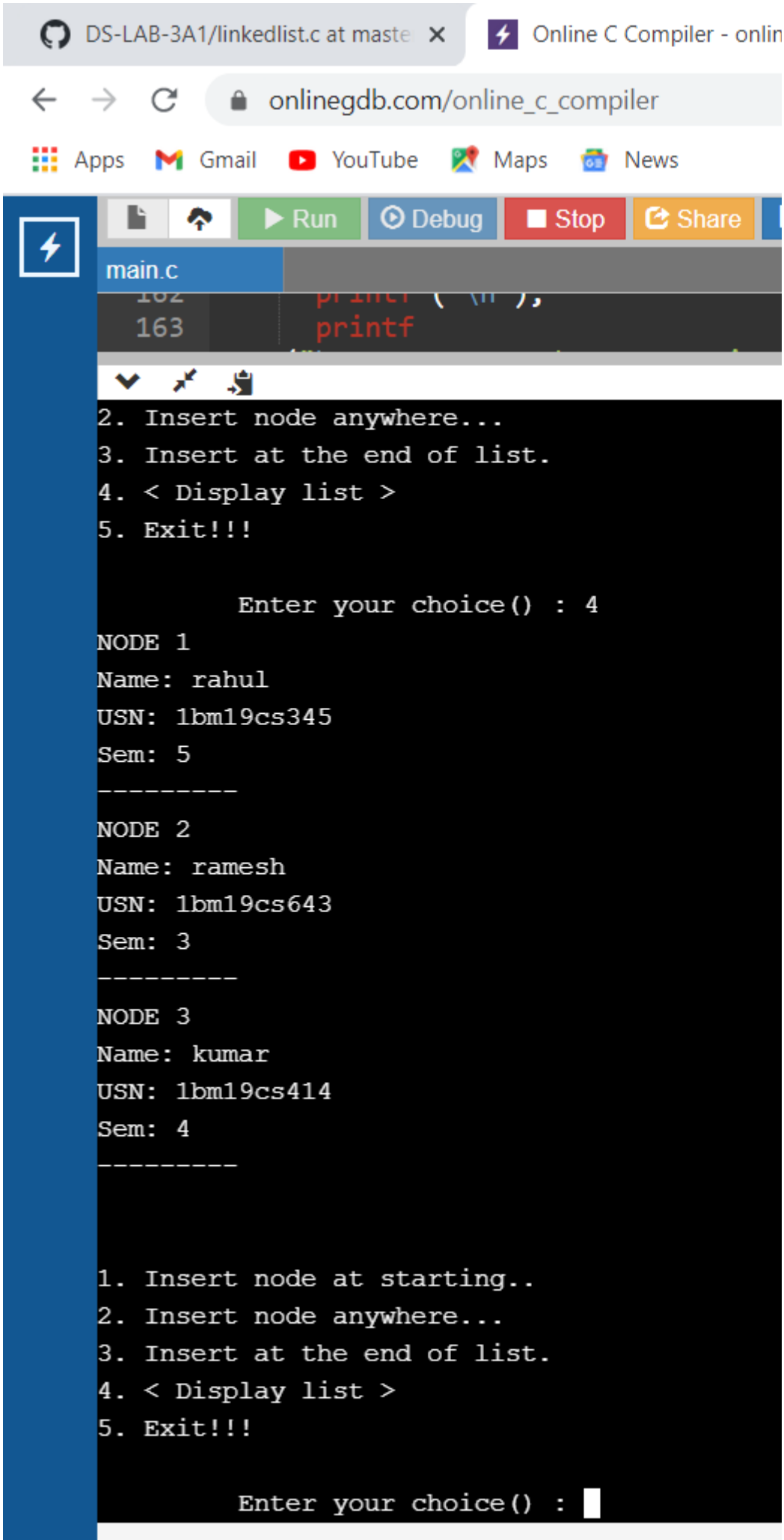
onlinegdb.com/online_c_compiler
Apps
Gmail
YouTube
Maps
News
Run
Debug
Stop
Share
main.c
163
printf
1. Insert node at starting..
2. Insert node anywhere...
3. Insert at the end of list.
4. < Display list >
5. Exit!!!
Enter your choice() : 2
Enter in which position you want to enter yo
2
-Enter the name- : ramesh
-Enter the semester- : 3
-Enter the usn- : 1bm19cs643
Node inserted at 2 position in linked list
1. Insert node at starting..
2. Insert node anywhere...
3. Insert at the end of list.
4. < Display list >
5. Exit!!!
Enter your choice() : 4
NODE 1
Name: rahul
USN: 1bm19cs345
Sem: 5

NODE 2
Name: ramesh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onlinegdb.com/online_c_compiler
Apps
Gmail
YouTube
Maps
News
Run
Debug
Stop
Share
main.c
163
printf
2. Insert node anywhere...
3. Insert at the end of list.
4. < Display list >
5. Exit!!!
Enter your choice() : 4
NODE 1
Name: rahul
USN: 1bm19cs345
Sem: 5

NODE 2
Name: ramesh
USN: 1bm19cs643
Sem: 3

NODE 3
Name: kumar
USN: 1bm19cs414
Sem: 4
---
1. Insert node at starting..
2. Insert node anywhere...
3. Insert at the end of list.
4. < Display list >
5. Exit!!!
Enter your choice() :

LAB-6

6.

```
#i
nc
lu
de
<s
td
io
.h
>
    #include <stdlib.h>
    #include <string.h>
    void create();
    void display();
    void insertpos(int);
    void insert_beg();
    void delete();
    void delpos(int);
    void del_beg();
    struct node
    {
        int sem,usn;
        char name[20];
        struct node *next;
    };

    struct node *head=NULL;
    int count=0;
    int main(int argc, char **argv)
    {
```

```
    int choice,ele,a;

    do
    {
    printf("\n1.Insert at the end
\n2.Insert at the beginning  \n3.
Insert at a position \n4.Delete at the
end \n5.Delete at the beginning
\n6.Delete at a position
\n7.Display\n8.Exit");
    printf("\nEnter your choice : ");
    scanf("%d",&choice);
    switch(choice)
    {
        case 1: create(); break;
        case 2:insert_beg();
        break;
        case 3: printf("Enter the
position to be inserted\n");
                scanf("%d",&ele);
                insertpos(ele);
                break;
        case 4:delete();break;
        case 5:del_beg();break;
        case 6:printf("enter the
position");
        scanf("%d",&a);
        delpos(a);

        break;
        case 7:display();
        break;
```

```
        case 8:exit(0);
    }

    }while(choice!=8);
}

void create()
{
   struct node *newnode,*temp;
    int sem1,usn1;
    char name1[20];
    printf("Enter the name USN
semester of student : ");
    scanf("%s %d
%d",name1,&usn1,&sem1);
    newnode =(struct node *) malloc
(sizeof(struct node));

    strcpy(newnode->name,name1);
    newnode->usn=usn1;
    newnode->sem=sem1;
    if (head==NULL)
     {
       newnode->next=NULL;
      head=newnode;
      printf("Node created\n");
     }
     else
    {
    temp=head;
       while(temp->next!=NULL)
       {
                temp=temp->next;
```

```
        }
      temp->next=newnode;
      newnode->next=NULL;
       printf("Node created\n");
       count++;
   }
}

void display()
{
    struct node *ptr=NULL;
    ptr=head;

    if(ptr==NULL)
    {
        printf("Nothing to print\n");
    }
    else
    {
        while(ptr!=NULL)
       {
        printf("%s ",ptr->name);
        printf("%d ",ptr->usn);
        printf("%d ",ptr->sem);
        printf("\n");
        ptr=ptr->next;
       }
    }

}

void insertpos(int p)
{
```

```
    struct node *newnode;
    int sem1,usn1;
    char name1[20];
    if(count+2<p)
   printf("the position exceeds the
number of nodes");
    else if(head==NULL&& p>1)
    {
      printf("node empty enter in
first position");
    }
    else
    {
    printf("Enter the name USN
semester of student : ");
    scanf("%s %d
%d",name1,&usn1,&sem1);
    newnode =(struct node *) malloc
(sizeof(struct node));

    strcpy(newnode->name,name1);
    newnode->usn=usn1;
    newnode->sem=sem1;



    if(p==1)
    {
       printf("inserted at the
beginning\n");
       newnode->next=head;
       head=newnode;
       count++;
```

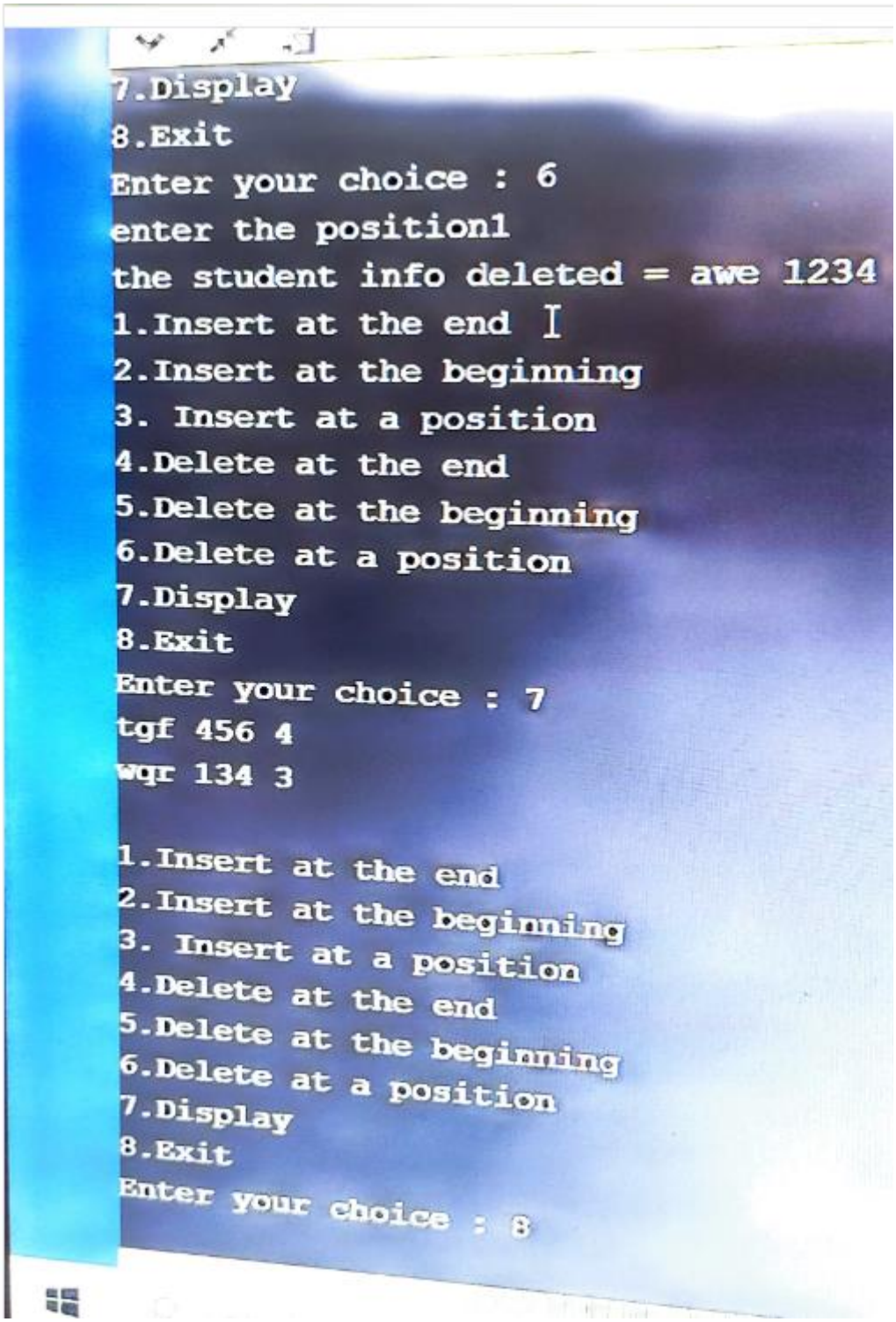
```
    }

    else
    {


        int i;
        struct node *temp1;
        temp1=head;
        for(i=2;i<p;i++)
        {
        temp1= temp1->next;
        }
        newnode->next=temp1->next;
        temp1->next=newnode;

        printf("Node inserted at %d
position in linked list\n",p);
        count++;
        }
    }
}

 void insert_beg()
 {
    struct node *newnode;
    int sem1,usn1;
    char name1[20];
    printf("Enter the name USN
semester of student : ");
    scanf("%s %d
%d",name1,&usn1,&sem1);
```

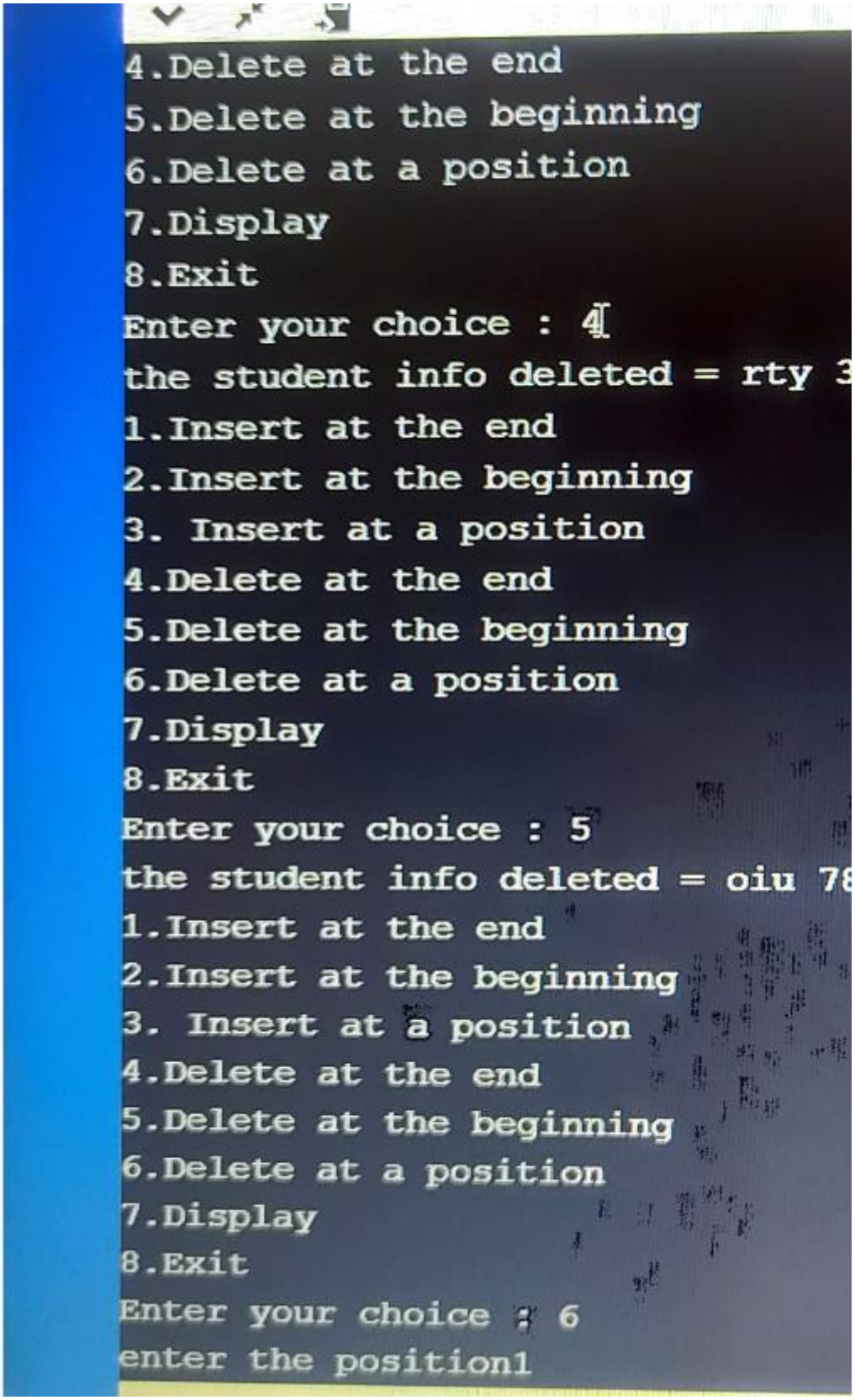
```
    newnode =(struct node *) malloc
(sizeof(struct node));

    strcpy(newnode->name,name1);
    newnode->usn=usn1;
    newnode->sem=sem1;
    newnode->next=head;
    head=newnode;
    count++;
 }

void delete()
 {
     struct node *temp=NULL;
     int sem1,usn1;
    char name1[20];
     if(head==NULL)
     printf("linked list is empty");
     else
     {
         temp=head;
         while(temp->next->next!=NULL)
         {
             temp=temp->next;
         }
         strcpy(name1,temp->next-
>name);
         sem1=temp->next->sem;
         usn1=temp->next->usn;
         printf("the student info
deleted = %s %d %d",name1,usn1,sem1);
         temp->next=NULL;
         count--;
```

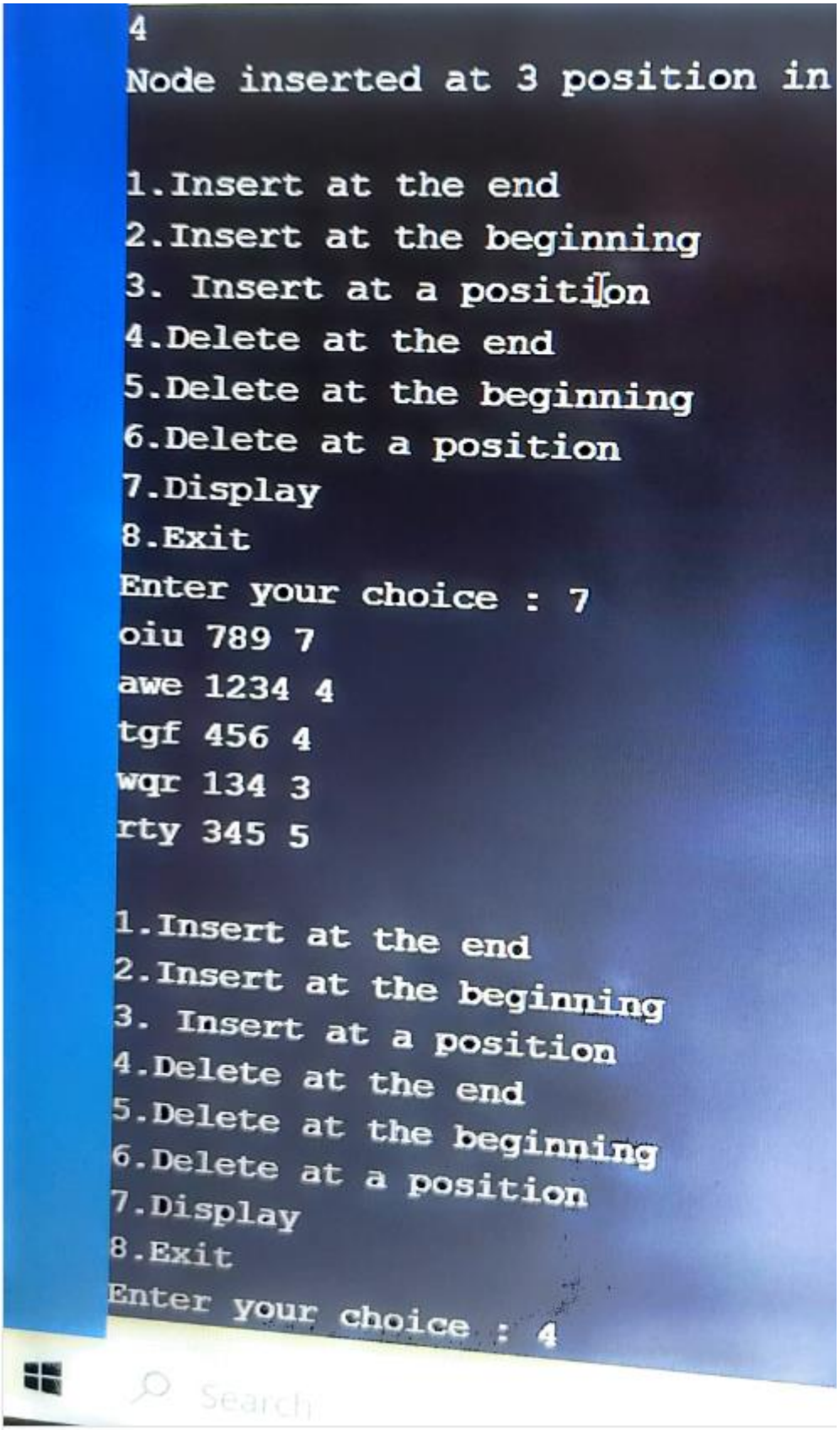
```
     }
 }


 void del_beg()
{
    struct node *temp=NULL;
    int sem1,usn1;
    char name1[20];
    if(head==NULL)
     printf("linked list is empty");
     else
     {
         strcpy(name1,head->name);
         sem1=head->sem;
         usn1=head->usn;
         printf("the student info
deleted = %s %d %d",name1,usn1,sem1);
        temp=head;
        head=temp->next;
        free(temp);
        count--;
     }
}
void delpos(int p)
{
    struct node *temp=NULL;
    int sem1,usn1;
    char name1[20];
    if(head==NULL)
     printf("linked list is empty");
     else if(count+1<p)
```

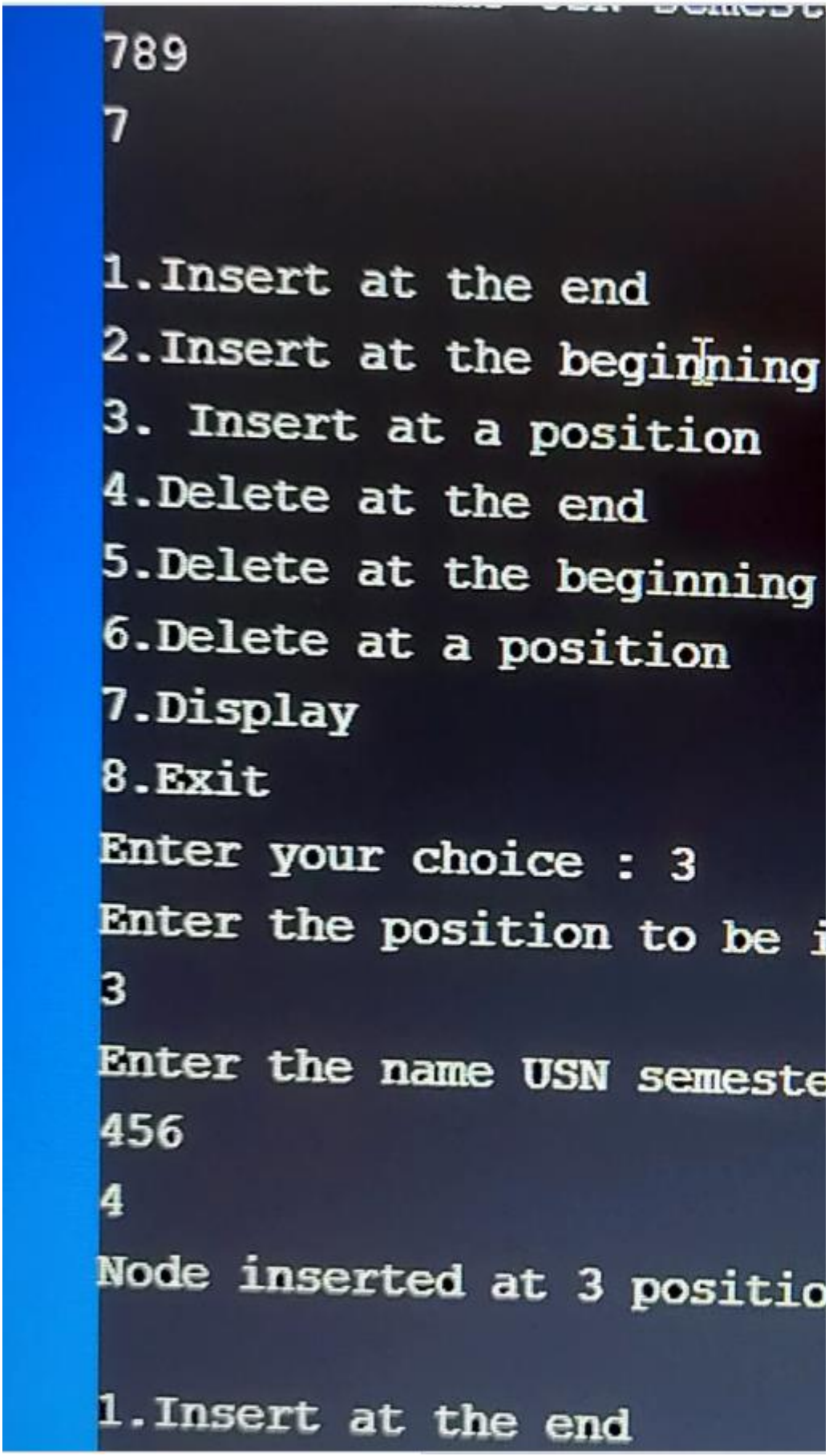
```
    printf("the position exceeds the
number of nodes");
    else if(p==1)
    {
        strcpy(name1,head->name);
         sem1=head->sem;
         usn1=head->usn;
         printf("the student info
deleted = %s %d %d",name1,usn1,sem1);
        temp=head;
        head=temp->next;
        free(temp);
        count--;
    }
    else
    {
         int i;
       struct node *temp,*ptr;
       temp=head;
       for(i=2;i<p;i++)
       {
       temp= temp->next;
       }

         strcpy(name1,temp->next-
>name);
         sem1=temp->next->sem;
         usn1=temp->next->usn;
         printf("the student info
deleted = %s %d %d",name1,usn1,sem1);
         ptr=temp->next;
         temp->next=temp->next->next;
         free(ptr);
```

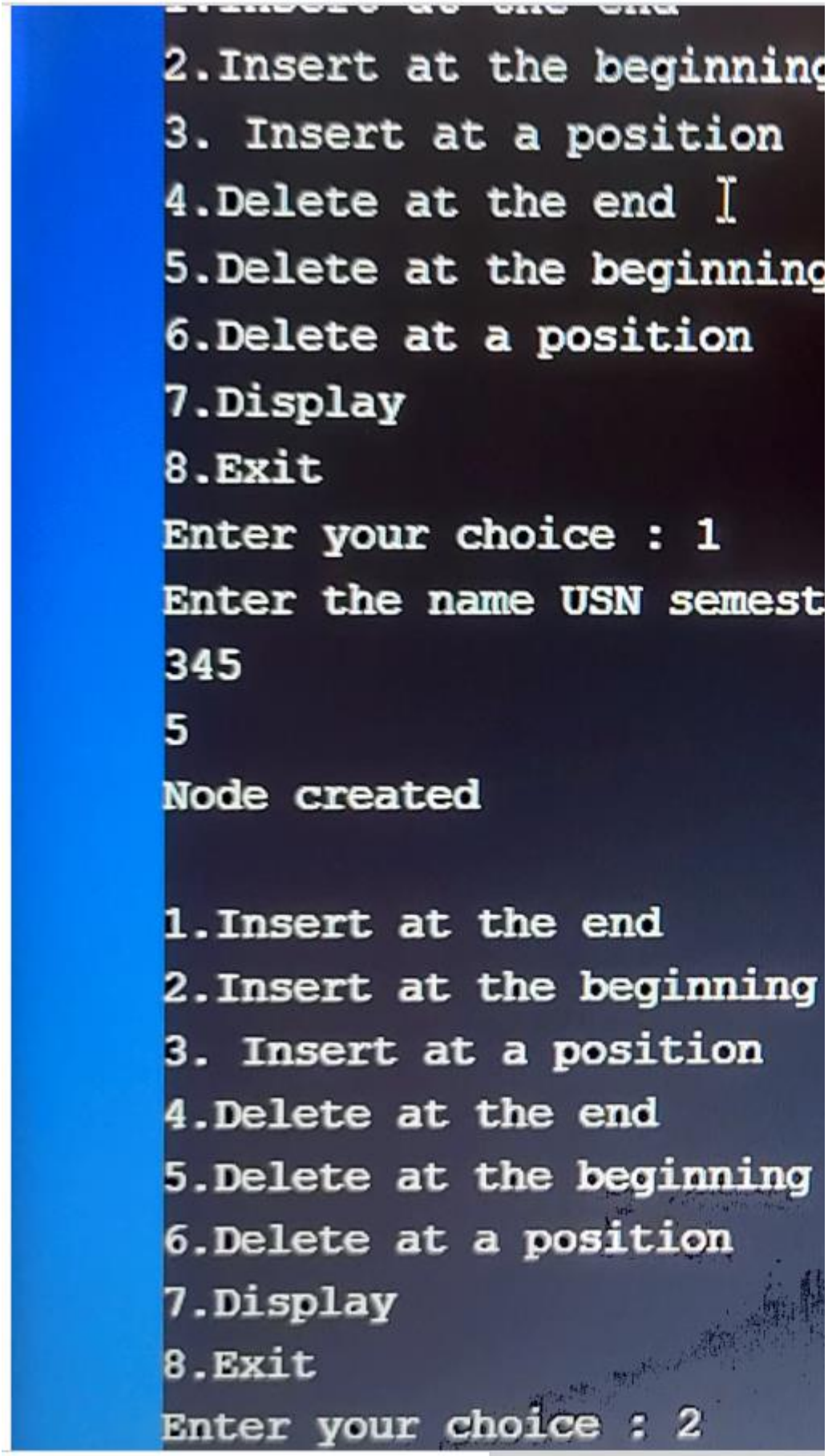
```
            count--;
        }

    }
```

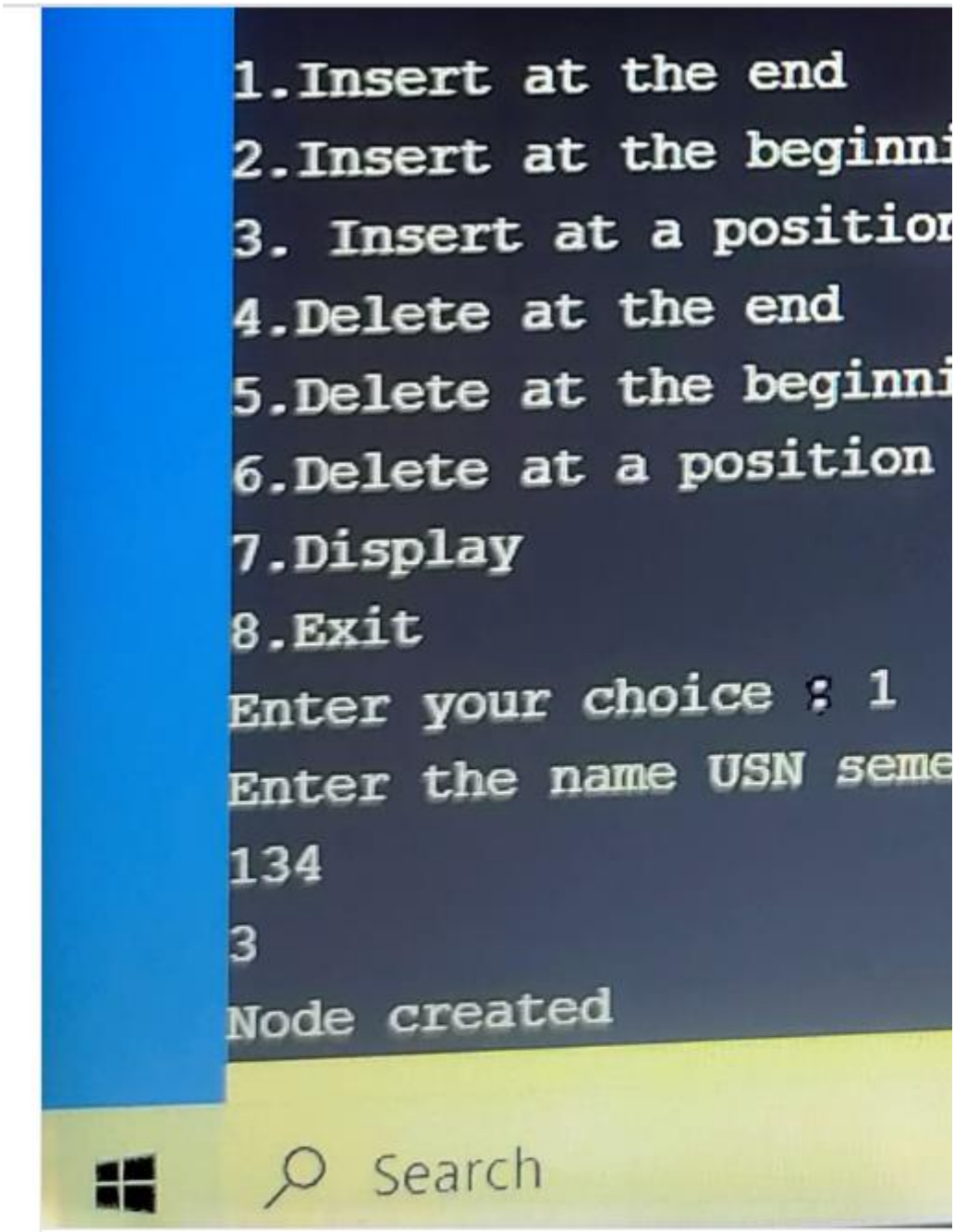

7.Display
8.Exit
Enter your choice : 6
enter the position1
the student info deleted = awe 1234
1.Insert at the end
2.Insert at the beginning
3. Insert at a position
4.Delete at the end
5.Delete at the beginning
6.Delete at a position
7.Display
8.Exit
Enter your choice : 7
tgf 456 4
wqr 134 3
1.Insert at the end
2.Insert at the beginning
3. Insert at a position
4.Delete at the end
5.Delete at the beginning
6.Delete at a position
7.Display
8.Exit
Enter your choice : 8


4.Delete at the end
5.Delete at the beginning
6.Delete at a position
7.Display
8.Exit
Enter your choice : 4
the student info deleted = rty 3
1.Insert at the end
2.Insert at the beginning
3. Insert at a position
4.Delete at the end
5.Delete at the beginning
6.Delete at a position
7.Display
8.Exit
Enter your choice : 5
the student info deleted = oiu 78
1.Insert at the end
2.Insert at the beginning
3. Insert at a position
4.Delete at the end
5.Delete at the beginning
6.Delete at a position
7.Display
8.Exit
Enter your choice : 6
enter the position1

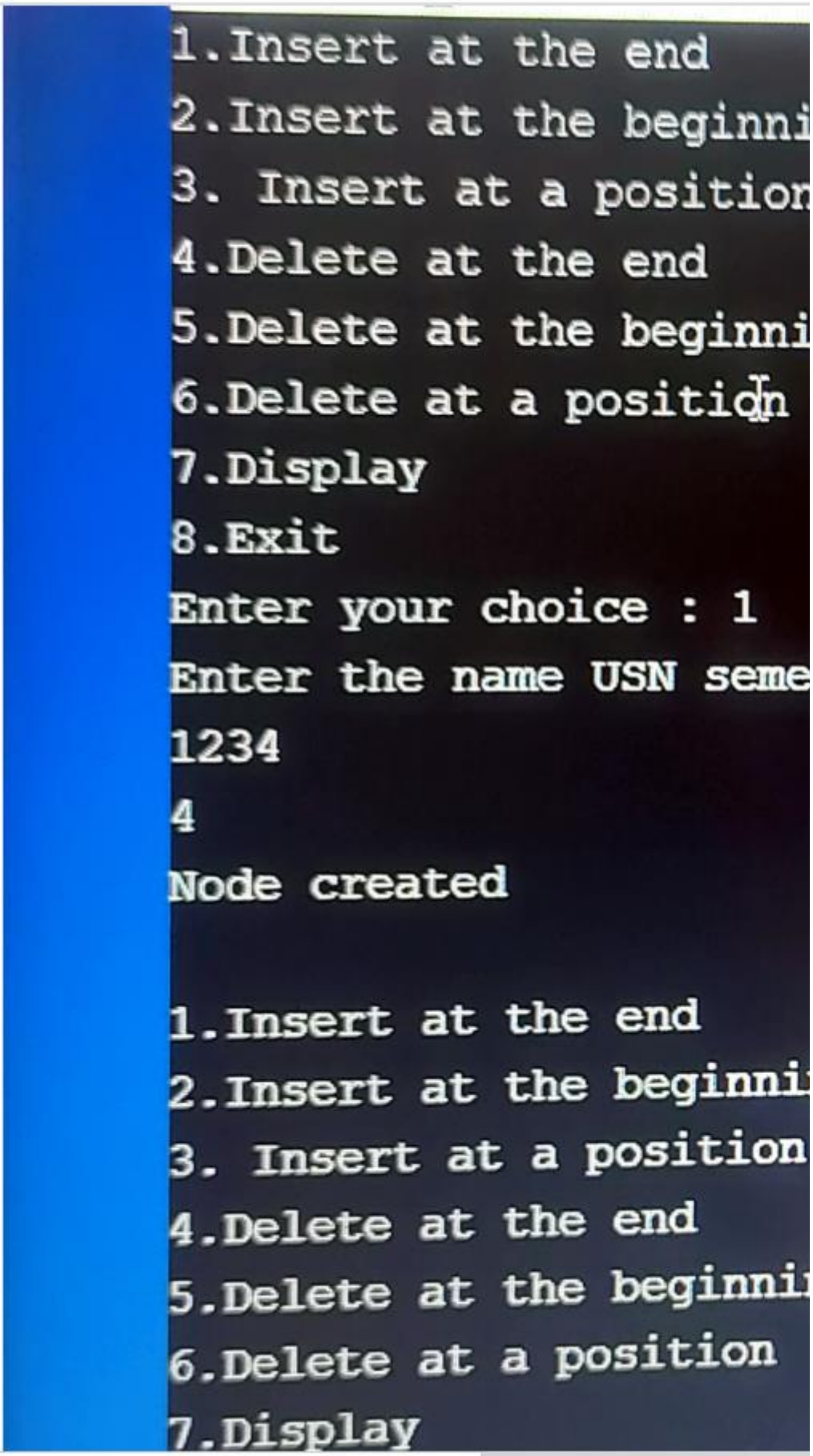

4
Node inserted at 3 position in
1.Insert at the end
2.Insert at the beginning
3. Insert at a position
4.Delete at the end
5.Delete at the beginning
6.Delete at a position
7.Display
8.Exit
Enter your choice : 7
oiu 789 7
awe 1234 4
tgf 456 4
wqr 134 3
rty 345 5
1.Insert at the end
2.Insert at the beginning
3. Insert at a position
4.Delete at the end
5.Delete at the beginning
6.Delete at a position
7.Display
8.Exit
Enter your choice : 4
Search


789
7
1.Insert at the end
2.Insert at the beginning
3. Insert at a position
4.Delete at the end
5.Delete at the beginning
6.Delete at a position
7.Display
8.Exit
Enter your choice : 3
Enter the position to be i
3
Enter the name USN semeste
456
4
Node inserted at 3 positio
1.Insert at the end


2.Insert at the beginning
3. Insert at a position
4.Delete at the end
5.Delete at the beginning
6.Delete at a position
7.Display
8.Exit
Enter your choice : 1
Enter the name USN semest
345
5
Node created
1.Insert at the end
2.Insert at the beginning
3. Insert at a position
4.Delete at the end
5.Delete at the beginning
6.Delete at a position
7.Display
8.Exit
Enter your choice : 2


1.Insert at the end
2.Insert at the beginni
3. Insert at a positio
4.Delete at the end
5.Delete at the beginni
6.Delete at a position
7.Display
8.Exit
Enter your choice : 1
Enter the name USN seme
134
3
Node created
Search


Run
main.c
#include <stdio.h
#include <stdlib.
#include <string.


1.Insert at the end
2.Insert at the beginni
3. Insert at a position
4.Delete at the end
5.Delete at the beginni
6.Delete at a position
7.Display
8.Exit
Enter your choice : 1
Enter the name USN seme
1234
4
Node created
1.Insert at the end
2.Insert at the beginni
3. Insert at a position
4.Delete at the end
5.Delete at the beginni
6.Delete at a position
7.Display

LAB-7

7

```
#in
clu
de
<st
dli
b.h
>
#include <string.h>
struct node
{
    int sem;
    struct node *next;
};
struct node *head= NULL;
struct node *head2= NULL;
int c=0;
void Insert()
{
   struct node *newnode;
   struct node *temp;
    int s;
    printf("Enter integer  : ");
    scanf("%d",&s);
    newnode=(struct
node*)malloc(sizeof(struct node));
    newnode->sem =s;
    if (head==NULL)
    {
      newnode->next=NULL;
```

```
      head=newnode;
      printf("first node of linked
list created\n");
      c++;
    }
     else
     {
       temp=head;
        while(temp->next!=NULL)
        {
           temp=temp->next;
        }
       temp->next=newnode;
       newnode->next=NULL;
       c++;
       printf("Node created\n");
     }
}
void Insert2()
{
    struct node *newnode;
    struct node *temp;
    int s,y;
    printf("enter elements to create
list 2\n");
    do
    {
    printf("Enter integer  : \n");
    scanf("%d",&s);
    newnode=(struct
node*)malloc(sizeof(struct node));
    newnode->sem =s;
    if (head2==NULL)
```

```
    {
      newnode->next=NULL;
      head2=newnode;
      printf("first node of linked
list created\n");
      c++;
    }
     else
     {
        temp=head2;
         while(temp->next!=NULL)
         {
            temp=temp->next;
         }
        temp->next=newnode;
        newnode->next=NULL;
        c++;
        printf("Node created\n");
     }
     printf("do u want to continue
adding:0 or 1\n");
     scanf("%d",&y);
    }while(y!=0);
}


void bubbleSort()
{
    int swapped, i;
    struct node *ptr1;
    struct node *lptr = NULL;
```

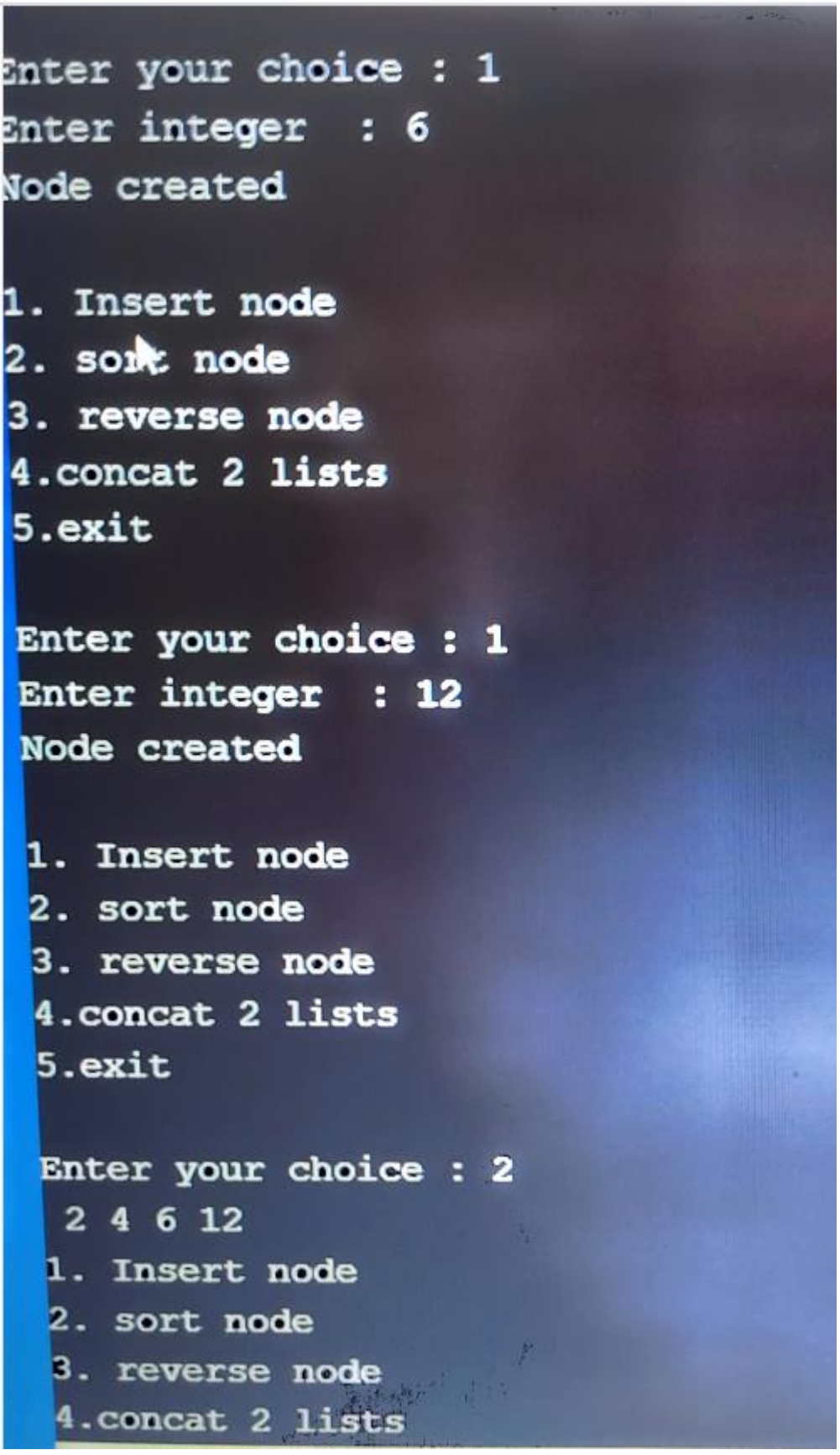
```
    if (head == NULL)
        return;

    do
    {
        swapped = 0;
        ptr1 = head;

        while (ptr1->next != lptr)
        {
            if (ptr1->sem > ptr1-
>next->sem)
            {
                int temp = ptr1->sem;
                ptr1->sem = ptr1-
>next->sem;
                ptr1->next->sem =
temp;
                swapped = 1;
            }
            ptr1 = ptr1->next;
        }
        lptr = ptr1;
    }
    while (swapped);
}

void reverse()
{
    struct node* prev = NULL;
    struct node* current = head;
    struct node* next = NULL;
    while (current != NULL) {
```

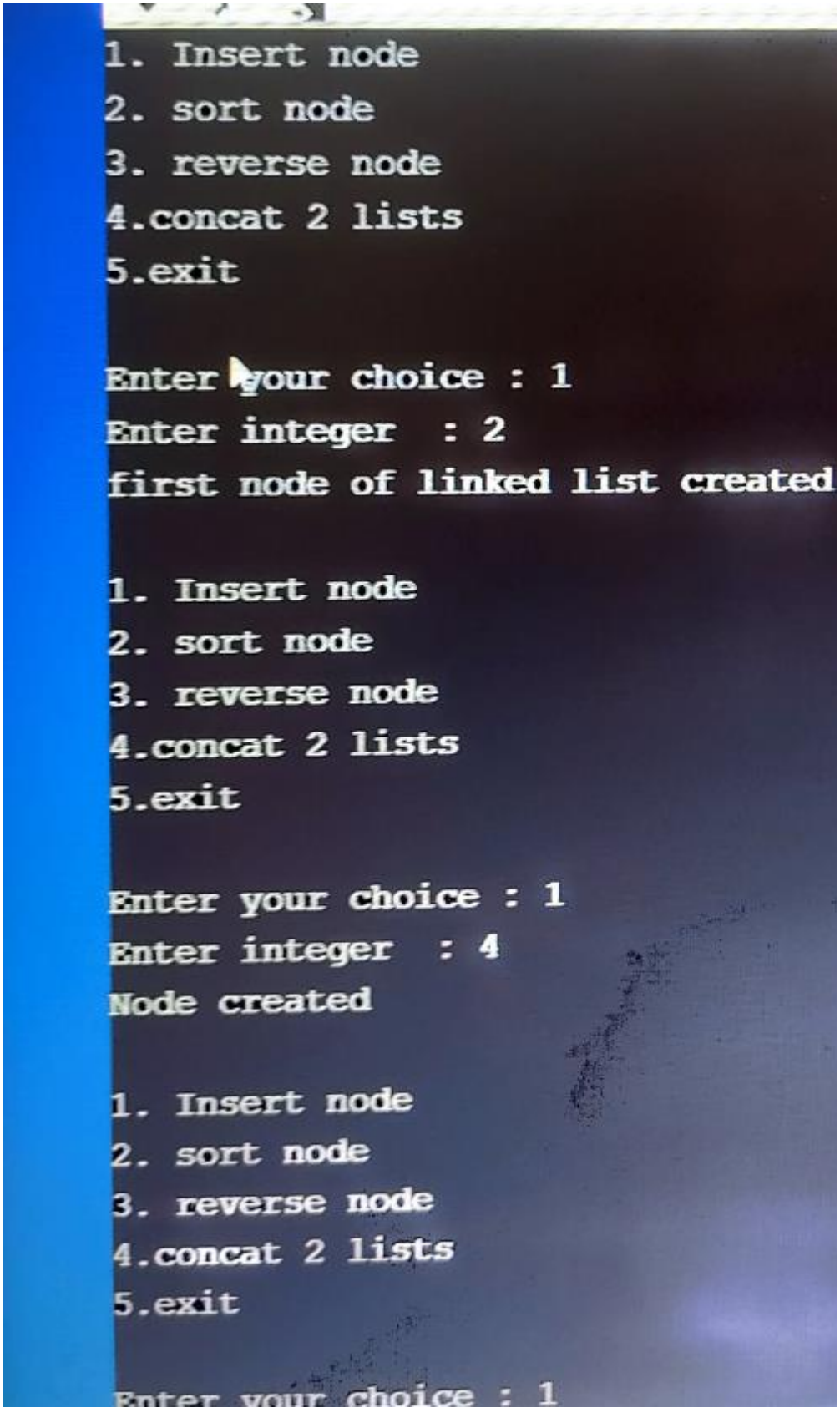
```
        next = current->next;
        current->next = prev;
        prev = current;
        current = next;
    }
    head= prev;
}

void concat()
{
        struct node *ptr;
        if(head==NULL)
        {
                head=head2;
        }
        if(head2==NULL)
               {
                  head2=head;
               }
        ptr=head;
        while(ptr->next!=NULL)
                ptr=ptr->next;
        ptr->next=head2;
}
void display1()
{
    struct node *ptr;
    ptr=head;
    int i=1;

    if(ptr==NULL)
    {
```

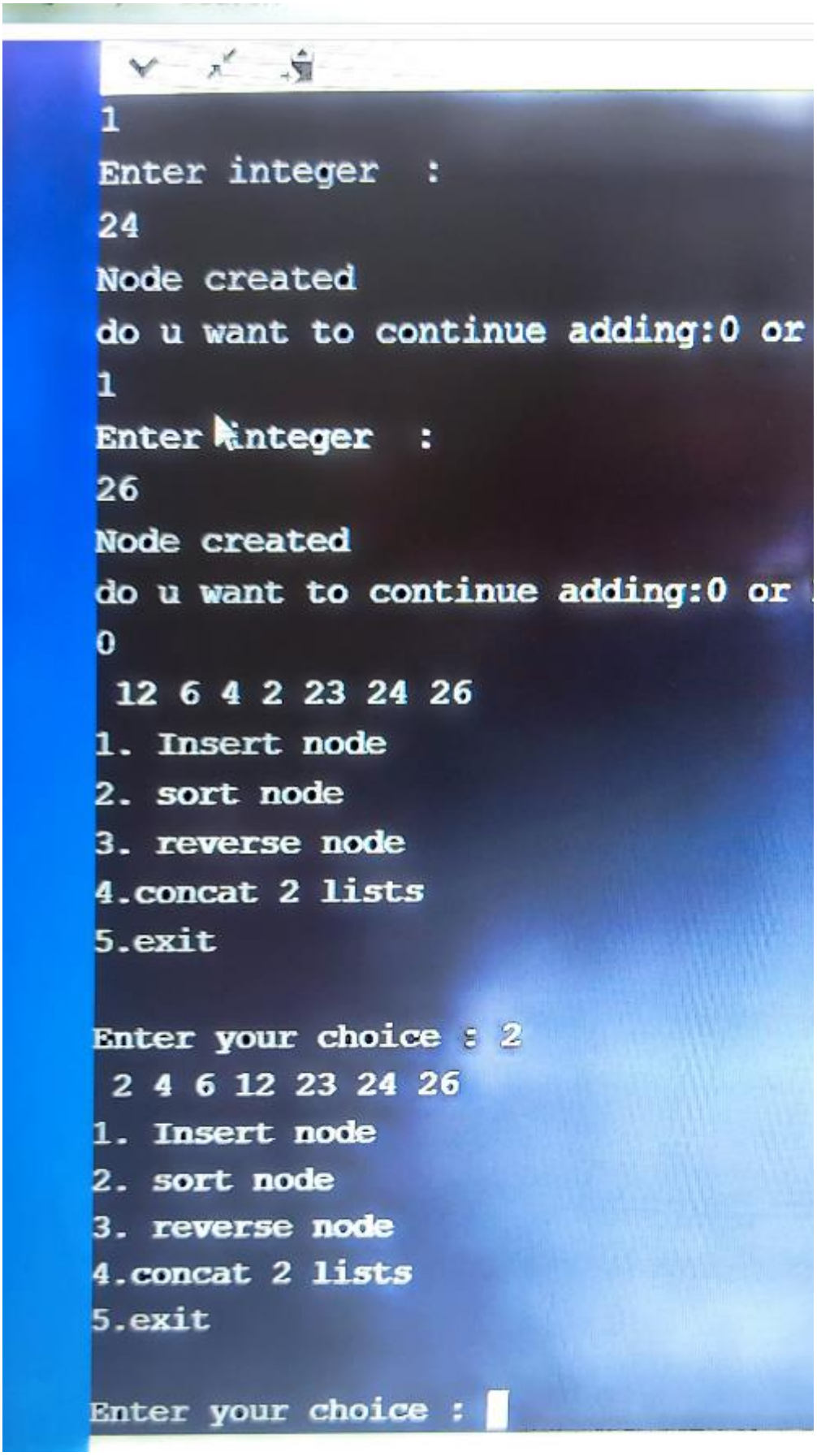
```
        printf("Linked list is
empty!\n");
    }
    else
    {
        while(ptr!= NULL)
        {
           printf(" %d",ptr->sem);
           i++;
           ptr=ptr->next;
        }

    }

}
void display2()
{
    struct node *ptr;
    ptr=head2;
    int i=1;

    if(ptr==NULL)
    {
        printf("Linked list is
empty!\n");
    }
    else
    {
        while(ptr!= NULL)
        {


           printf(" %d",ptr->sem);
```

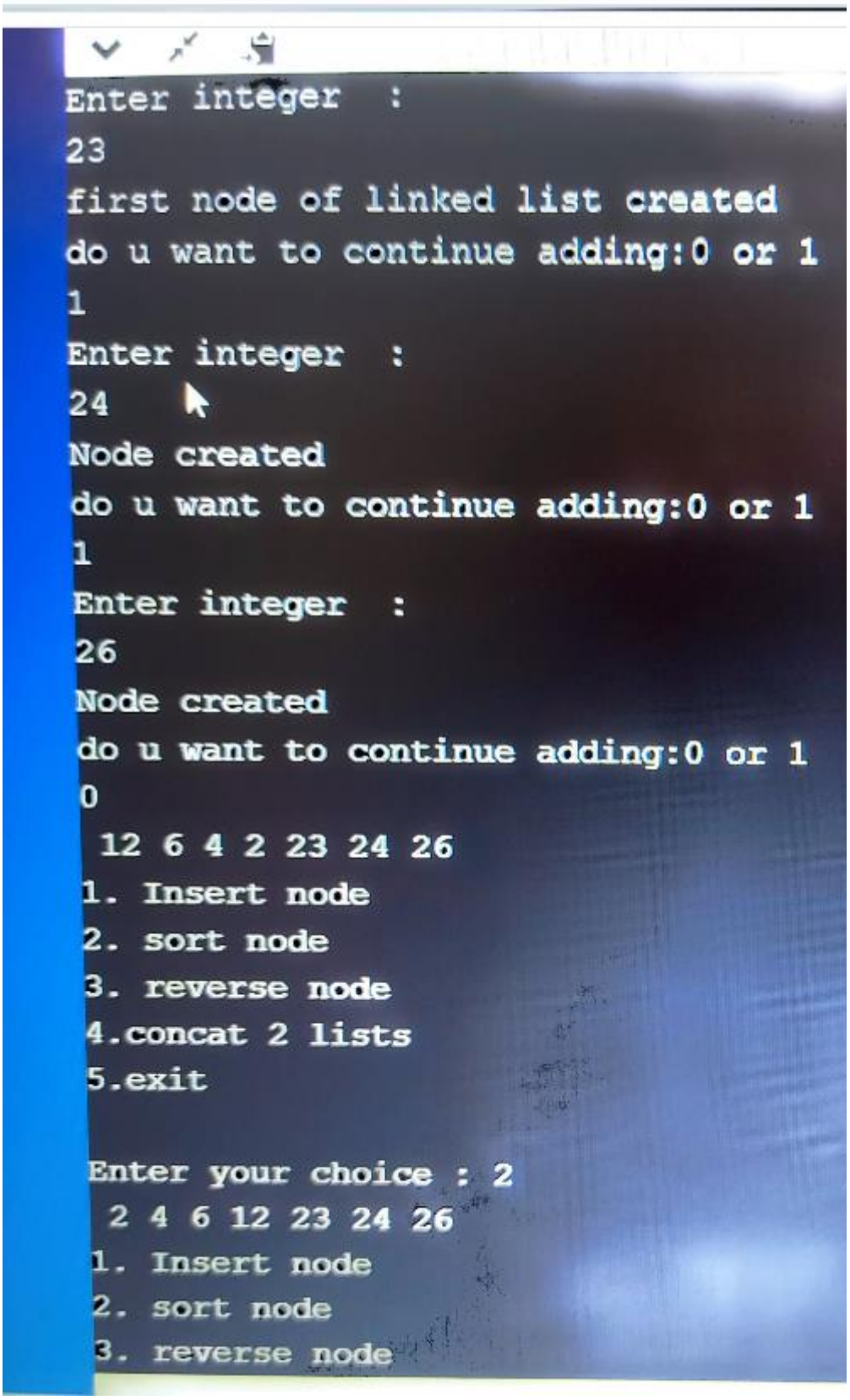
```
            printf("\n");
            i++;
            ptr=ptr->next;
         }

    }

}

int main()
{
    int choice,pos;
    do
    {

        printf("\n1. Insert node \n2.
sort node\n3. reverse node\n4.concat
2 lists \n5.exit\n");
        printf("\nEnter your choice :
");
        scanf("%d",&choice);
        switch(choice)
        {
            case 1:
            Insert();
            break;

            case 2:
            bubbleSort();
            display1();
            break;

            case 3:
```

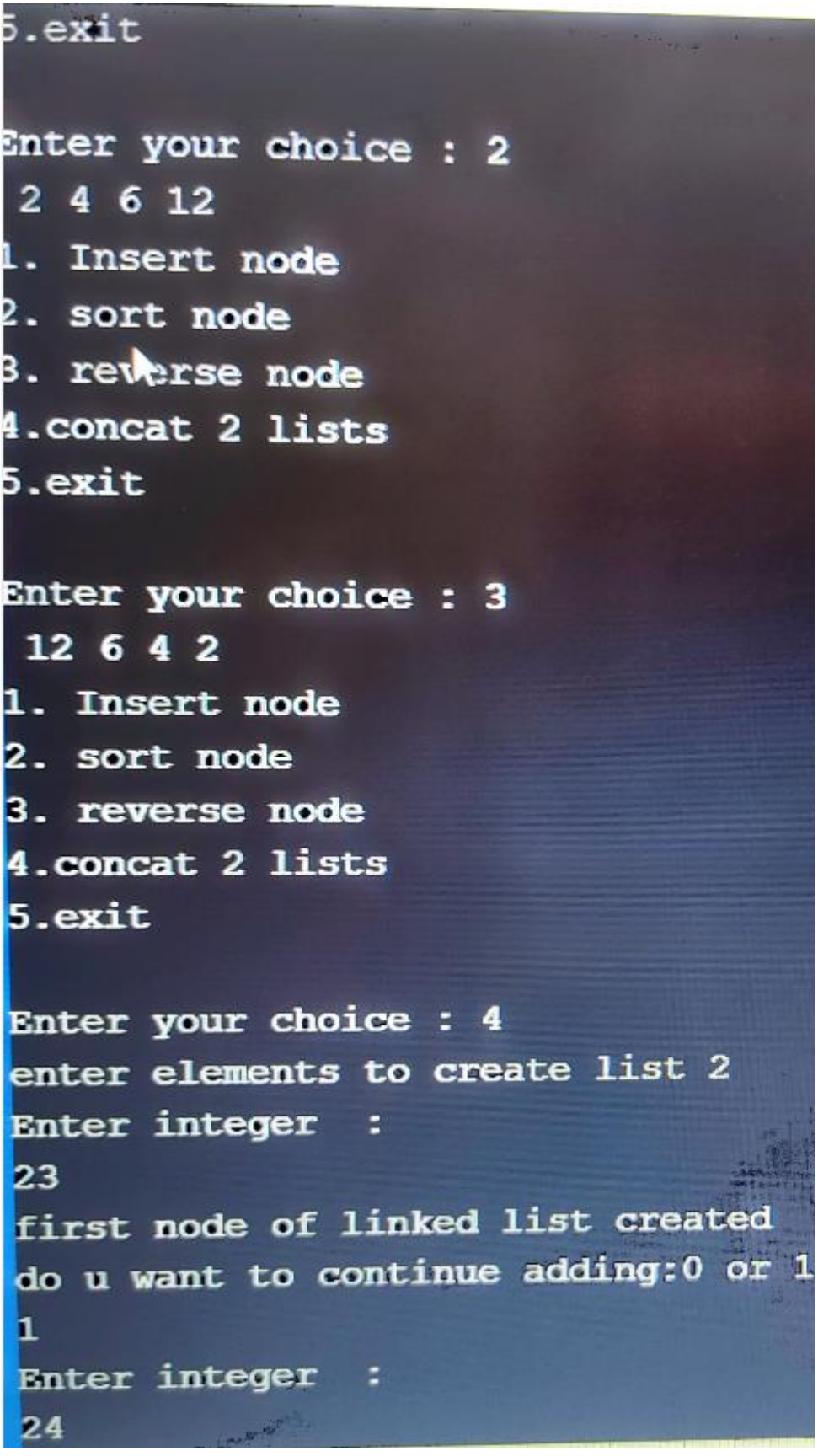
```
                reverse();
                display1();
                break;

                case 4:
                 Insert2();
                 concat();
                 display1();
                break;

                case 5:
                break;

                default:
                printf("Wrong choice!\n");
                break;
            }
        }while(choice!=5);
        return 0;
}
```


Enter your choice : 1
Enter integer : 6
Node created
1. Insert node
2. sort node
3. reverse node
4.concat 2 lists
5.exit
Enter your choice : 1
Enter integer : 12
Node created
1. Insert node
2. sort node
3. reverse node
4.concat 2 lists
5.exit
Enter your choice : 2
2 4 6 12
1. Insert node
2. sort node
3. reverse node
4.concat 2 lists


1. Insert node
2. sort node
3. reverse node
4.concat 2 lists
5.exit
Enter your choice : 1
Enter integer : 2
first node of linked list created
1. Insert node
2. sort node
3. reverse node
4.concat 2 lists
5.exit
Enter your choice : 1
Enter integer : 4
Node created
1. Insert node
2. sort node
3. reverse node
4.concat 2 lists
5.exit
Enter your choice : 1


1
Enter integer :
24
Node created
do u want to continue adding:0 or
1
Enter integer :
26
Node created
do u want to continue adding:0 or
0
12 6 4 2 23 24 26
1. Insert node
2. sort node
3. reverse node
4.concat 2 lists
5.exit
Enter your choice : 2
2 4 6 12 23 24 26
1. Insert node
2. sort node
3. reverse node
4.concat 2 lists
5.exit
Enter your choice :


Enter integer :
23
first node of linked list created
do u want to continue adding:0 or 1
1
Enter integer :
24
Node created
do u want to continue adding:0 or 1
1
Enter integer :
26
Node created
do u want to continue adding:0 or 1
0
12 6 4 2 23 24 26
1. Insert node
2. sort node
3. reverse node
4.concat 2 lists
5.exit
Enter your choice : 2
2 4 6 12 23 24 26
1. Insert node
2. sort node
3. reverse node


5.exit
Enter your choice : 2
2 4 6 12
1. Insert node
2. sort node
3. reverse node
4.concat 2 lists
5.exit
Enter your choice : 3
12 6 4 2
1. Insert node
2. sort node
3. reverse node
4.concat 2 lists
5.exit
Enter your choice : 4
enter elements to create list 2
Enter integer :
23
first node of linked list created
do u want to continue adding:0 or 1
1
Enter integer :
24

LAB-8

8.1

```
 #include
 <stdio.h>
            #include <stdlib.h>
            struct node
            {
                int data;
                struct node *next;
            };
            void insert();
            void display();
            void del();

            struct  node *rear=NULL, *front
            =NULL;

            int main()
            {
            printf("\n--QUEUE IMPLEMENTATION
            USING LL--\n");
                int choice;

                do
                {

                printf("\n1. Create \n2.
            Display  \n3. Delete  \n4. Exit
            \n");
                printf("\nEnter your choice
            : ");
```

```
    scanf("%d",&choice);
    switch(choice)
    {
        case 1: insert(); break;
        case 2: display();break;
        case 3: del(); break;
        case 4: exit(0);

    }
    }while(choice!=4);
}

void insert()
{
    struct  node *newnode;
    newnode=(struct node *)
malloc(sizeof(struct node));
    printf("Enter the
element:\n");
    scanf("%d",&newnode->data);
    newnode->next=NULL;

    if(rear==NULL)
    {
        rear=newnode;
        front=newnode;

    }
    else
    {
        rear->next=newnode;
        rear=newnode;
    }
```

```
}

void del()
{
    if(front==NULL)
    {
       printf("Queue is
empty\n");return;
    }

    else
    {
        printf("Deleted element
is %d",front->data);
        if(front==rear)
        {
           printf("\nQueue is
empty\n");
           front=NULL;
rear=NULL;
        }
        else
        front=front->next;
    }
}

void display()
{
    struct node *temp;
    if(front ==NULL)
    {
        printf("Queue is
empty");
```

```
                return;
            }
            temp=front;
            while (temp !=NULL)
            {
                printf("%d ",temp-
        >data);
                temp=temp->next;
            }

        }
```

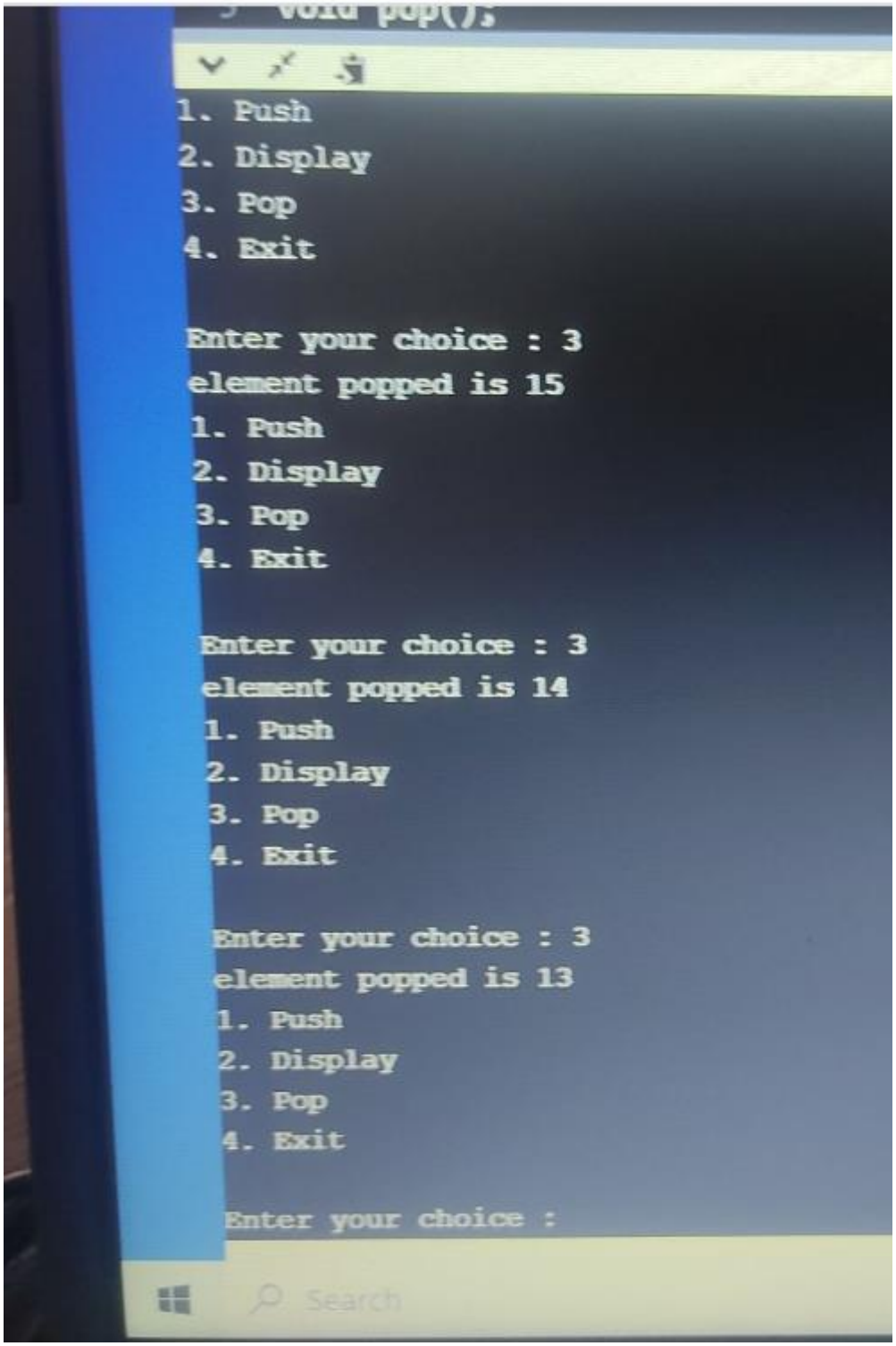
8.2

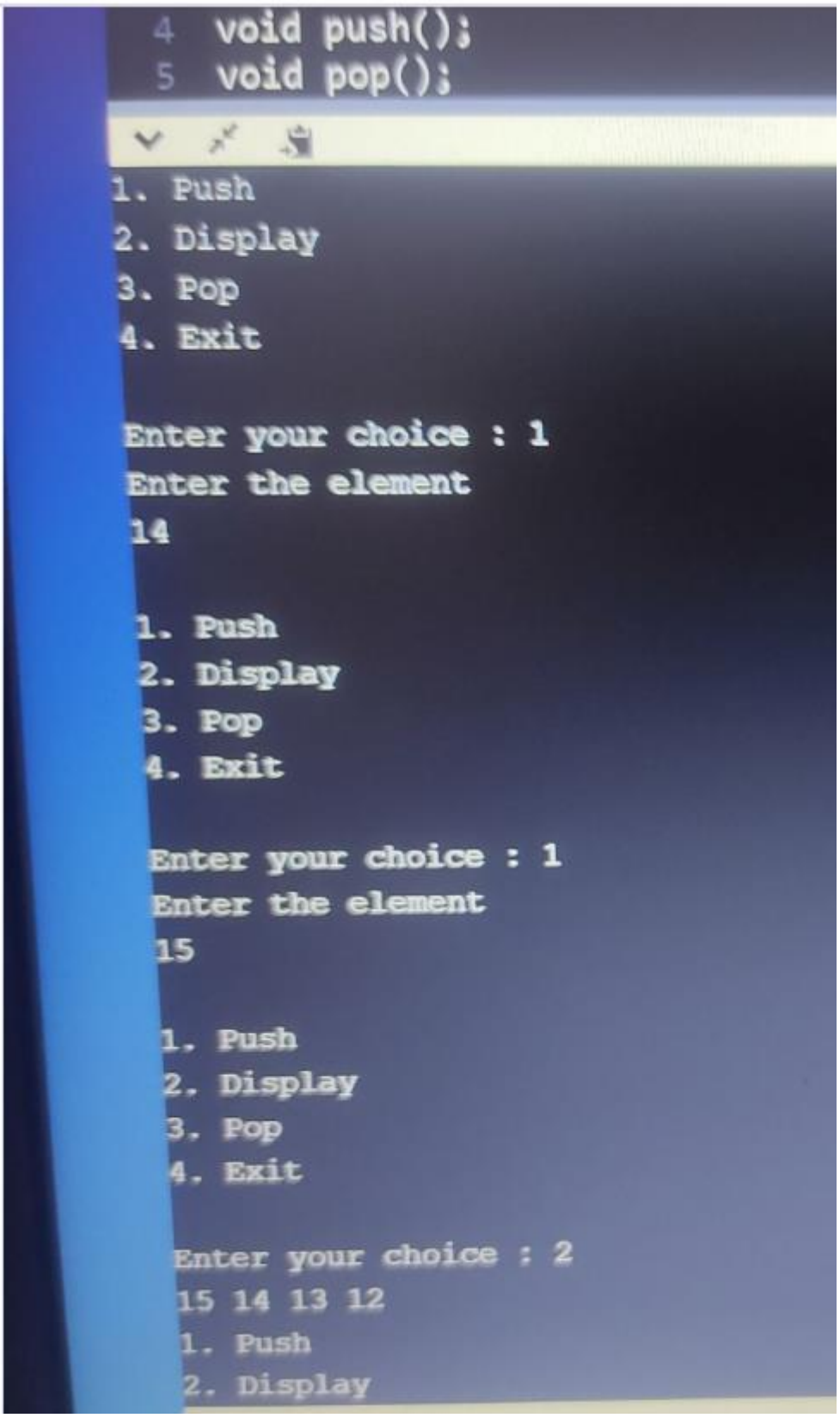
```
#inc
lude
<std
io.h
>
      #include<stdlib.h>

      void push();
      void pop();
      void display();
      struct node
      {
          int data;
          struct node *next;
      };
      struct node *top=NULL;

      int main()
      {
```

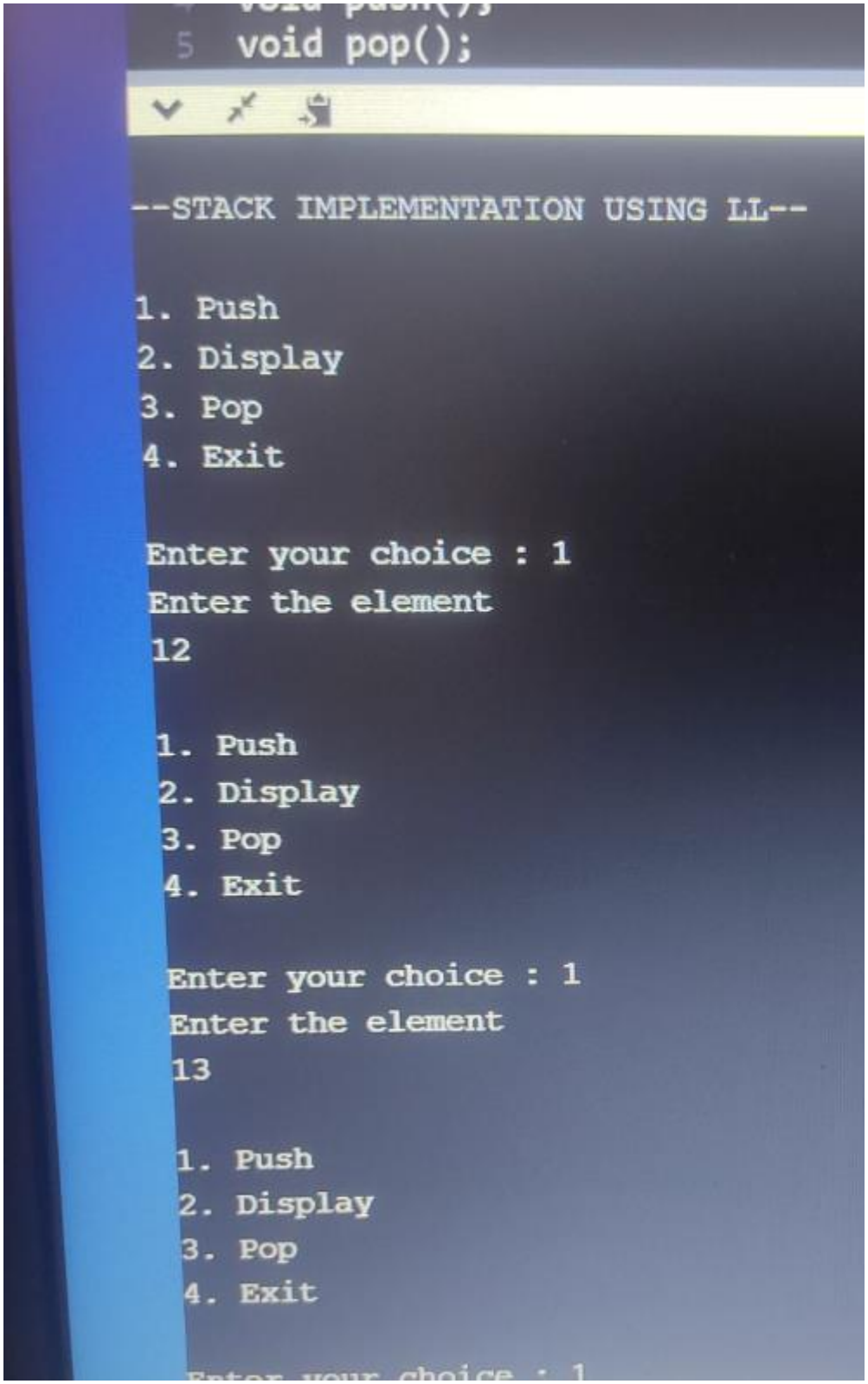
```
    int choice;
  printf("\n--STACK IMPLEMENTATION
USING LL--\n");
    do
    {
    printf("\n1. Push \n2. Display
\n3. Pop\n4. Exit\n");
    printf("\nEnter your choice :
");
    scanf("%d",&choice);
    switch(choice)
    {
        case 1: push(); break;
        case 2: display();break;
        case 3: pop(); break;
        case 4:exit(0);
    }

    }while(choice!=4);
}


void push()
{
    int item;
    struct node *newnode;
    printf("Enter the element\n");
    scanf("%d",&item);

    newnode=(struct
node*)malloc(sizeof(struct node));
    newnode->data=item;
    newnode->next=NULL;
```

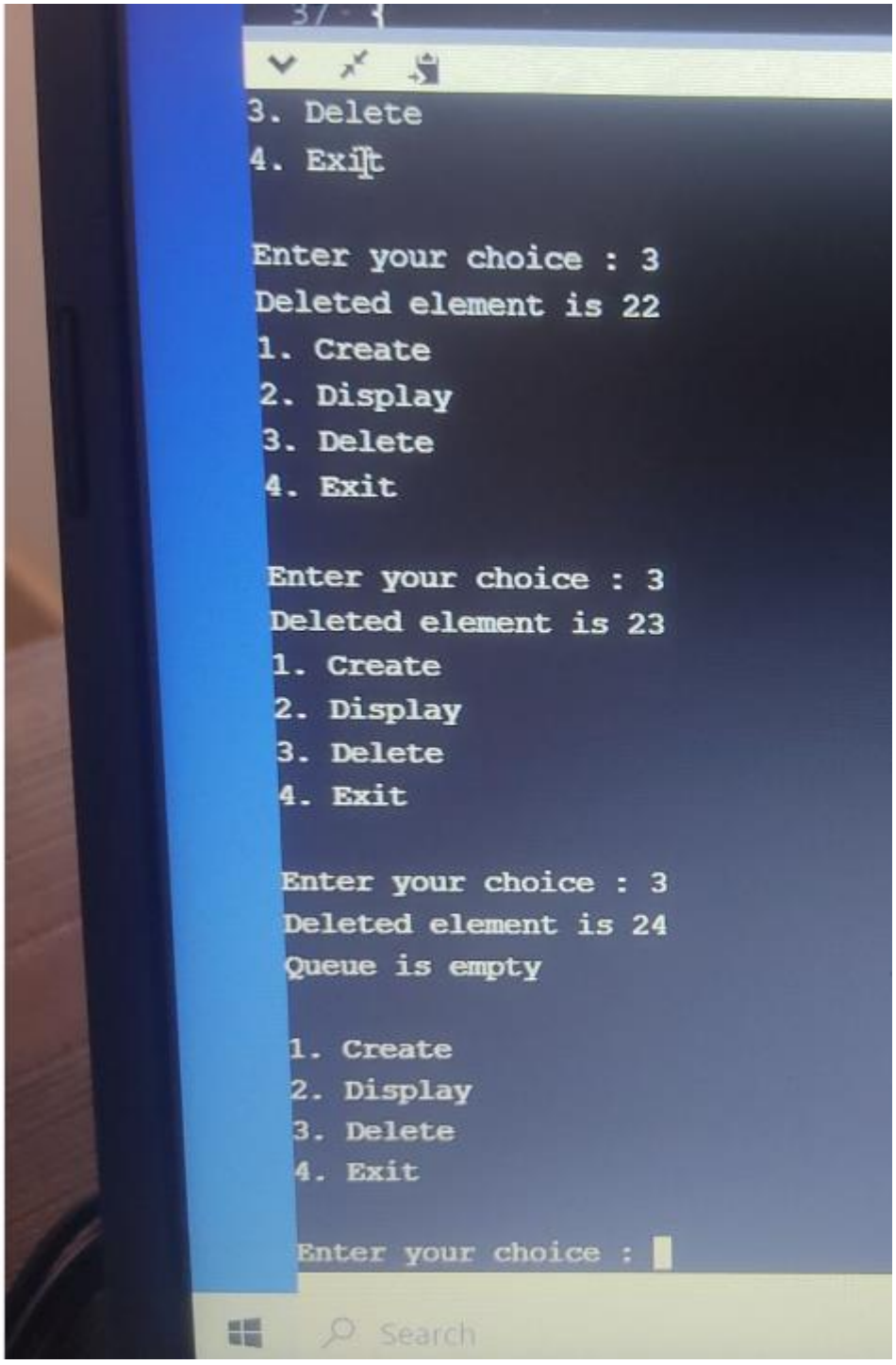
```
    if(top==NULL)
        top=newnode;
    else
        newnode->next=top;
        top=newnode;
}
void pop()
{
    if(top==NULL)
        printf("stack is empty");
    else
    {

      printf("element popped is %d",
top->data);

      top=top->next;

    }


}

void display()
{
struct node *temp;
temp=top;
if(top==NULL)
    printf("Stack is empty");
while(temp!=NULL)
{
    printf("%d ",temp->data);
    temp=temp->next;
```

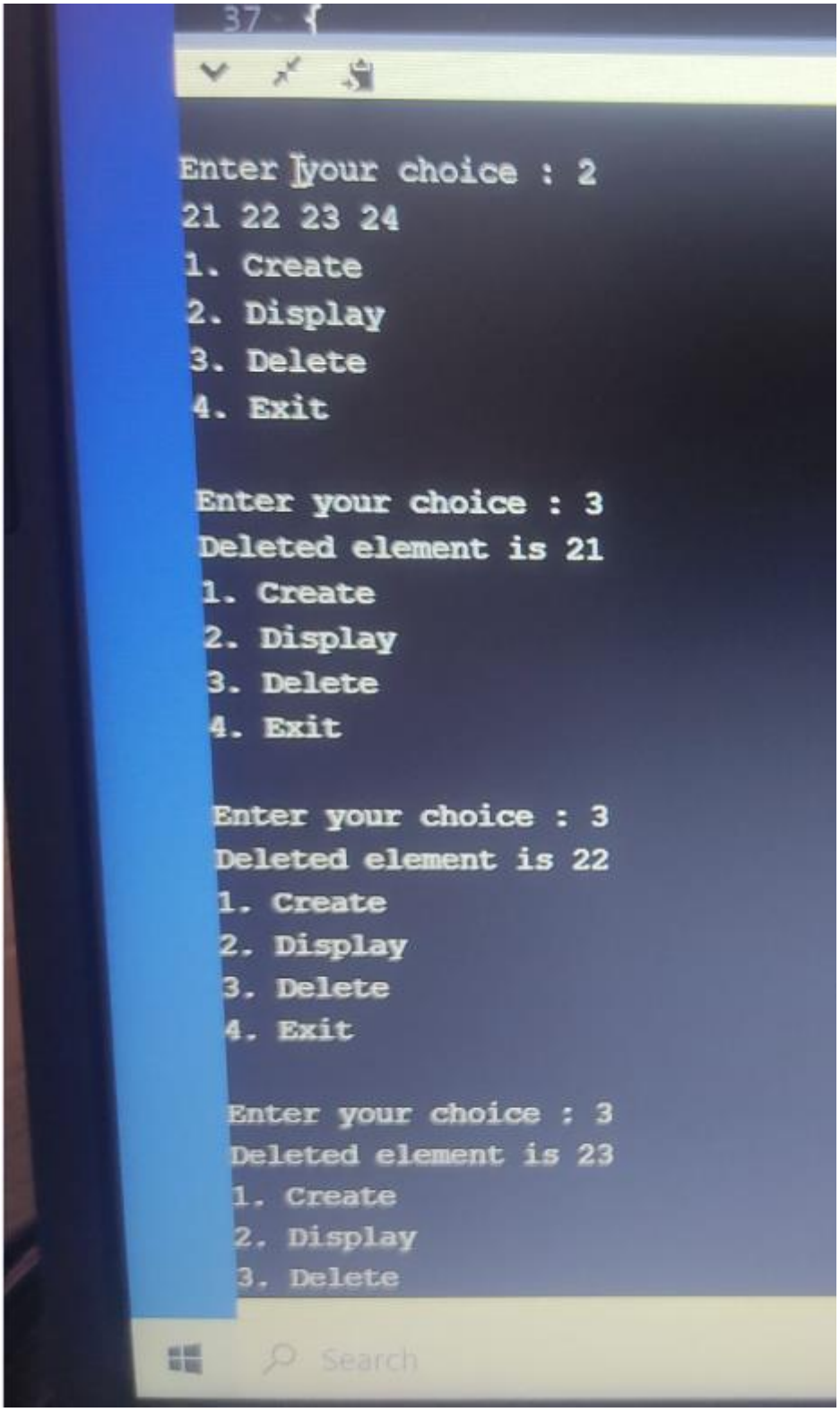
```
}

}
```

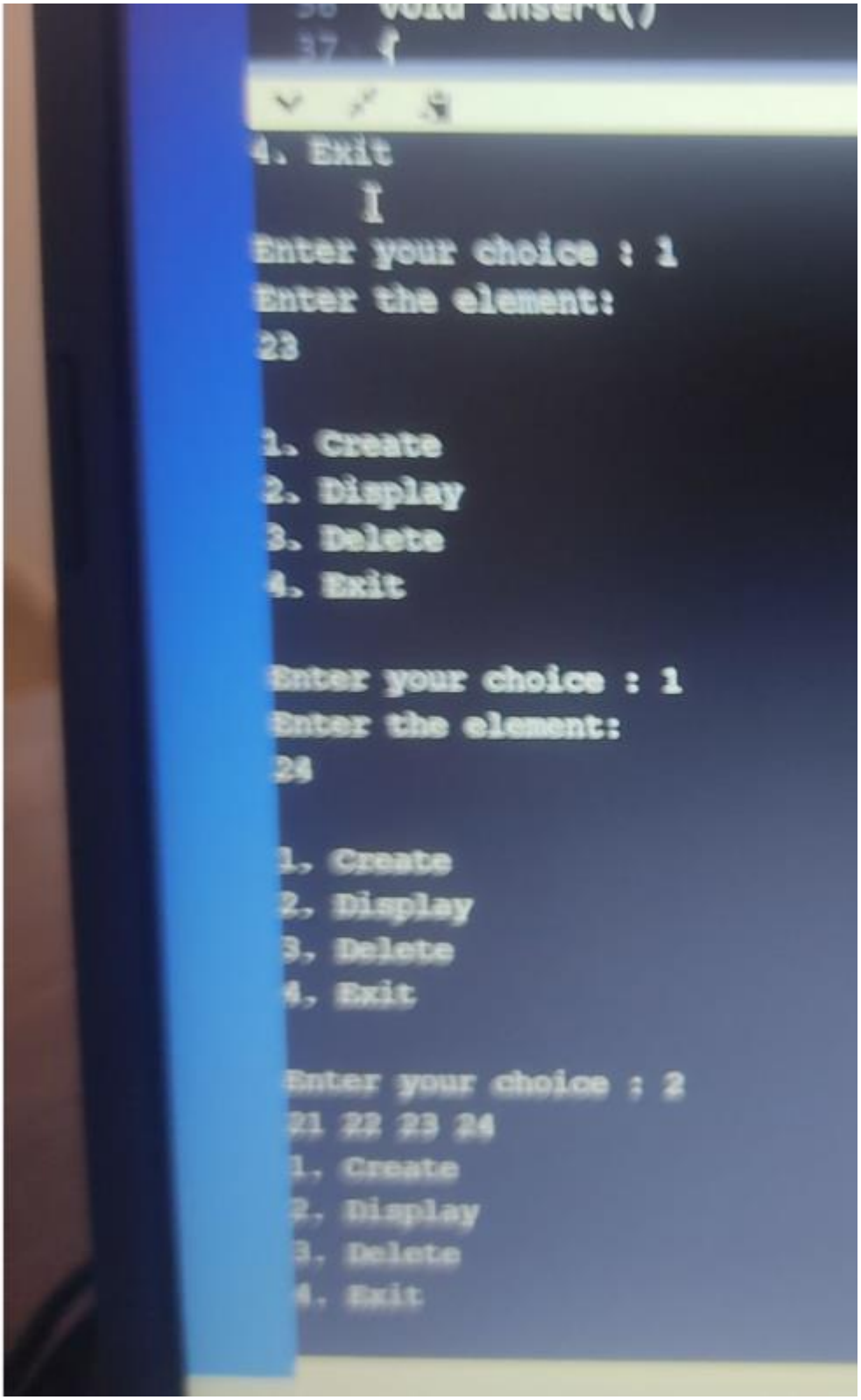

void pop();
1. Push
2. Display
3. Pop
4. Exit
Enter your choice : 3
element popped is 15
1. Push
2. Display
3. Pop
4. Exit
Enter your choice : 3
element popped is 14
1. Push
2. Display
3. Pop
4. Exit
Enter your choice : 3
element popped is 13
1. Push
2. Display
3. Pop
4. Exit
Enter your choice :
Search

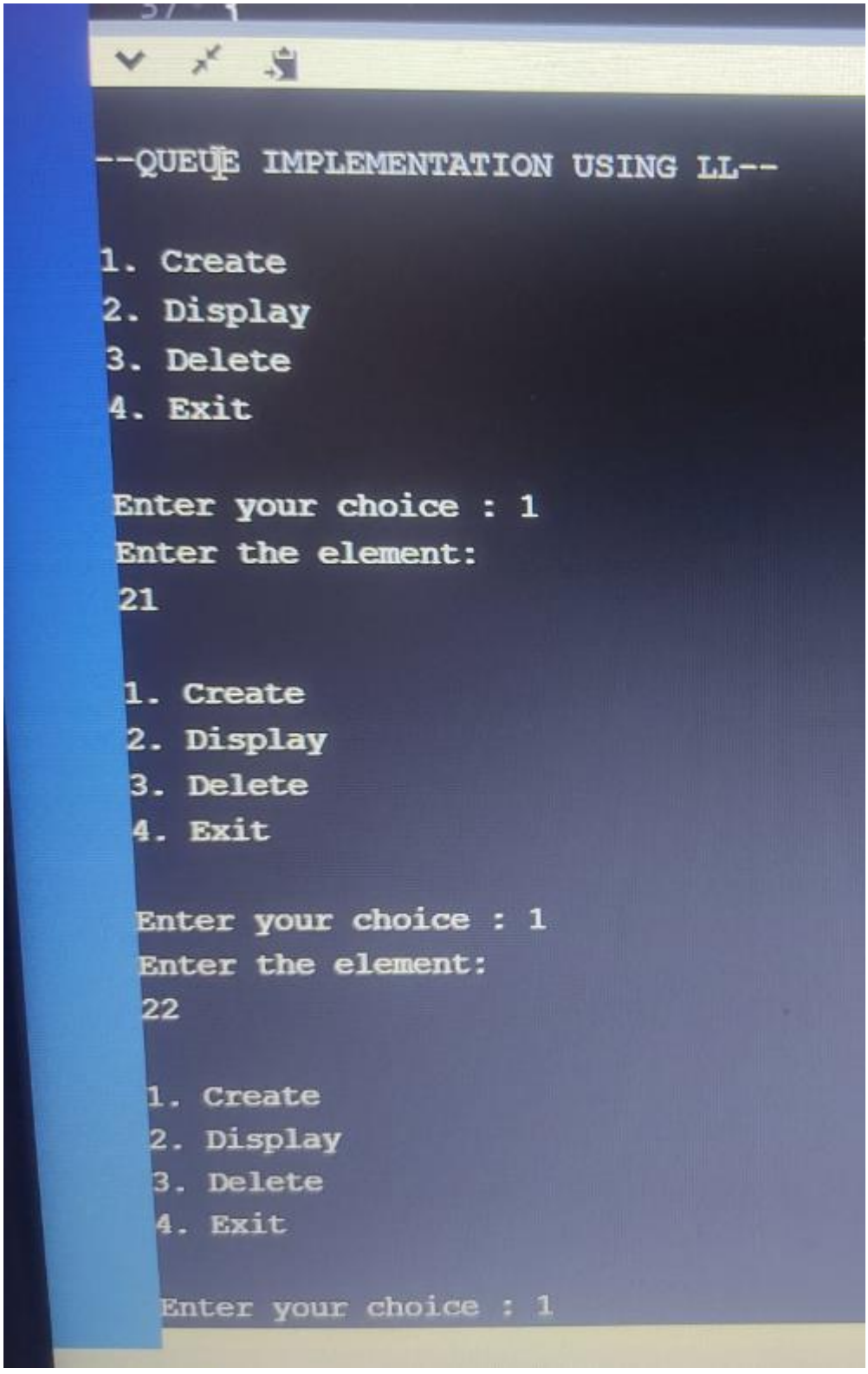

4 void push();
5 void pop();
1. Push
2. Display
3. Pop
4. Exit
Enter your choice : 1
Enter the element
14
1. Push
2. Display
3. Pop
4. Exit
Enter your choice : 1
Enter the element
15
1. Push
2. Display
3. Pop
4. Exit
Enter your choice : 2
15 14 13 12
1. Push
2. Display


void pop();
--STACK IMPLEMENTATION USING LL--
1. Push
2. Display
3. Pop
4. Exit
Enter your choice : 1
Enter the element
12
1. Push
2. Display
3. Pop
4. Exit
Enter your choice : 1
Enter the element
13
1. Push
2. Display
3. Pop
4. Exit


3. Delete
4. Exit
Enter your choice : 3
Deleted element is 22
1. Create
2. Display
3. Delete
4. Exit
Enter your choice : 3
Deleted element is 23
1. Create
2. Display
3. Delete
4. Exit
Enter your choice : 3
Deleted element is 24
Queue is empty
1. Create
2. Display
3. Delete
4. Exit
Enter your choice :
Search


37 {
Enter your choice : 2
21 22 23 24
1. Create
2. Display
3. Delete
4. Exit
Enter your choice : 3
Deleted element is 21
1. Create
2. Display
3. Delete
4. Exit
Enter your choice : 3
Deleted element is 22
1. Create
2. Display
3. Delete
4. Exit
Enter your choice : 3
Deleted element is 23
1. Create
2. Display
3. Delete
Search


4. Exit
Enter your choice : 1
Enter the element:
23
1. Create
2. Display
3. Delete
4. Exit
Enter your choice : 1
Enter the element:
24
1. Create
2. Display
3. Delete
4. Exit
Enter your choice : 2
21 22 23 24
1. Create
2. Display
3. Delete
4. Exit


--QUEUE IMPLEMENTATION USING LL--
1. Create
2. Display
3. Delete
4. Exit
Enter your choice : 1
Enter the element:
21
1. Create
2. Display
3. Delete
4. Exit
Enter your choice : 1
Enter the element:
22
1. Create
2. Display
3. Delete
4. Exit
Enter your choice : 1

LAB-9

```
#include<stdio.h
>
                    #include<stdlib.h>
                    struct node
                    {
                        int data;
                        struct node *next;
                        struct node *prev;
                    };
                    struct node *head=NULL;

                    void insert_left()
                    {
                         struct node
                    *new_node;
                         new_node=(struct
                    node*)malloc(sizeof(stru
                    ct node));
                         printf("Enter the
                    item\n");

                    scanf("%d",&new_node-
                    >data);
                         new_node->next=NULL;
                         new_node->prev=NULL;

                         if(head==NULL)
                         {

                        head=new_node;
                         }
                         else
                         {
```

```
            new_node-
>next=head;
            head-
>prev=new_node;

    head=new_node;
     }

}
void insert_right()
{
    struct node
*new_node,*temp;
    new_node=(struct
node*)malloc(sizeof(stru
ct node));
    printf("Enter the
item\n");
    scanf("%d",&new_node-
>data);
    new_node->next=NULL;
    new_node->prev=NULL;
    if(head==NULL)
    {
        head=new_node;
    }
    else
    {
         temp=head;
         while(temp-
>next!=NULL)
         temp=temp->next;
```

```
        temp->next=new_node;
        new_node->prev=temp;

    }

}
void insert_leftpos()
{
    if(head==NULL)
    {
        printf("Empty list\n"); return;
    }
    int ele;
    struct node *new_node,*temp;
    printf("Enter the element in the list\n");
    scanf("%d",&ele);
    new_node=(struct node*)malloc(sizeof(struct node));
    printf("Enter the new node data\n");
    scanf("%d",&new_node->data);
    new_node->next=NULL;
    new_node->prev=NULL;

    temp=head;
    if(temp->data==ele)
```

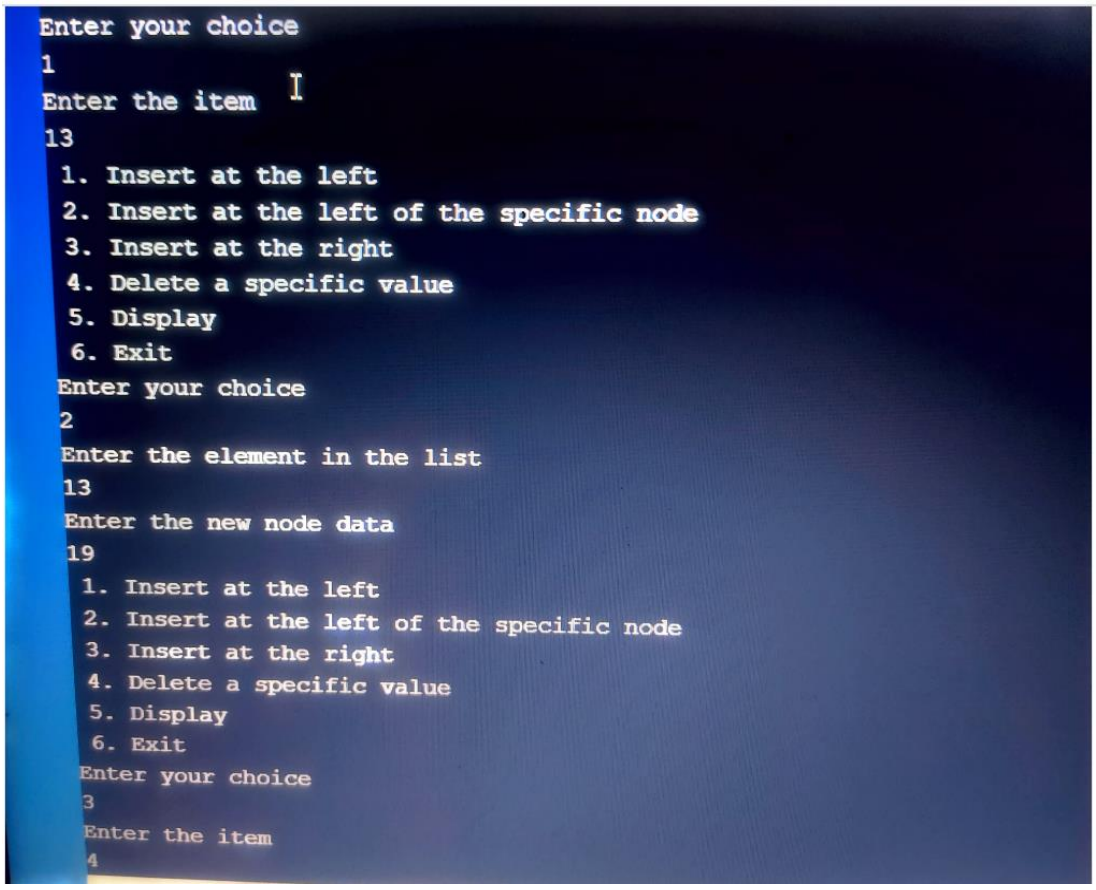
```
    {
        new_node->next=head;
            head->prev=new_node;

    head=new_node;
    }
    else if(temp->next==NULL)
    {
        printf("Element is not in the list\n");
    }
    else
    {
    while(temp->next->data!=ele)
    {
        temp=temp->next;
        if(temp==NULL)
        {

    printf("Element is not in the list\n");
            return;
        }
    }

    new_node->next=temp->next;
    temp->next=new_node;
    new_node->prev=temp;
```

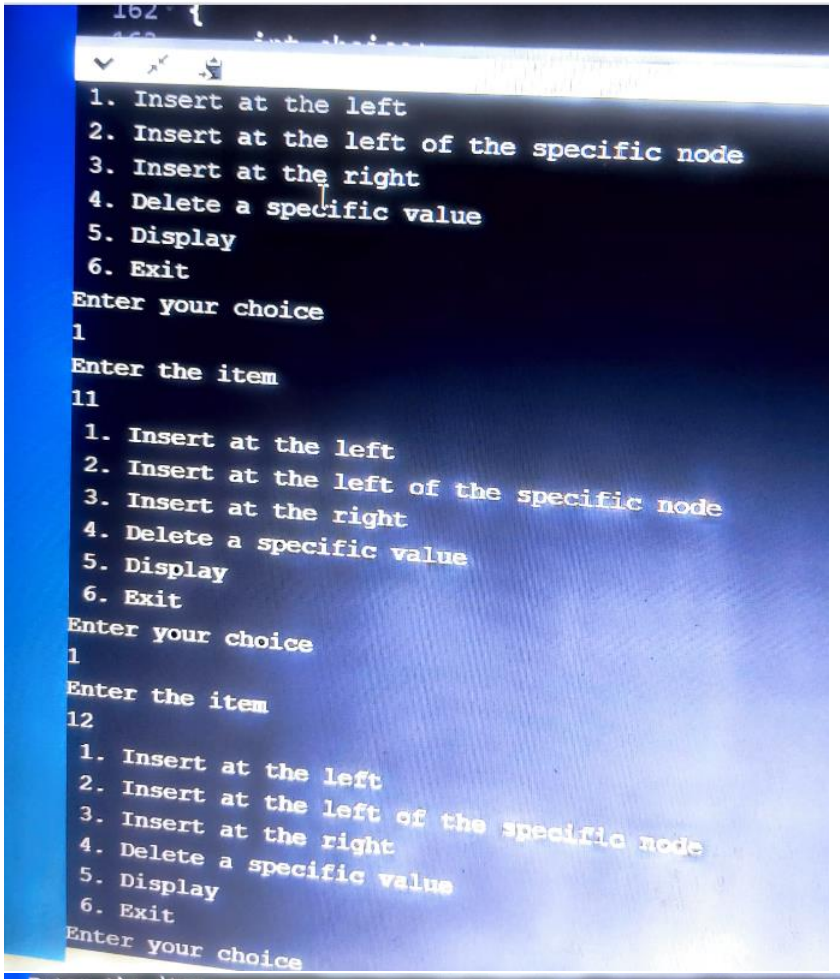
```
    new_node->next-
>prev=new_node;
    }


}
void delete()
{
    struct node *temp;
    int ele;
     if(head==NULL)
     {
         printf("Empty
List \n");
         return;
     }
    printf("Enter the
element to be
deleted\n");
    scanf("%d",&ele);
    temp=head;
    while(temp-
>data!=ele)
    {
        temp=temp->next;
        if(temp==NULL)
        {
         printf("Element
is not in the list\n");
         return;
        }
     }
```

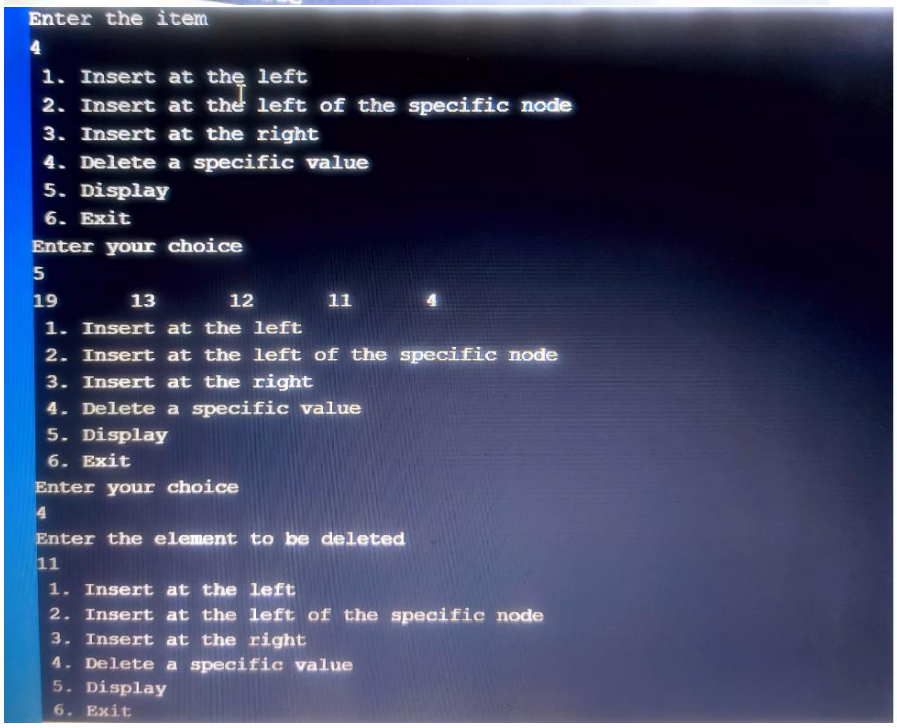
```
     if(temp==head)
//first node
     {
         head=head->next;
     }
     else if(temp-
>next==NULL)  //last
node
     {
           temp=temp-
>prev;
           temp-
>next=NULL;
     }

     else  //middle
     {
         temp->prev-
>next=temp->next;
         temp->next-
>prev=temp->prev;
         free(temp);
     }

}
void display()
{
    if(head==NULL)
    {
        printf("Empty
List \n");
    }
     else
```

```
    {
        struct node
*temp;
    temp=head;
    while(temp!=NULL)
    {

printf("%d\t",temp-
>data);
        temp=temp->next;
    }
    printf("\n");
    }
}


int main()
{
   int choice;
    do
    {
           printf(" 1.
Insert at the left \n");
           printf(" 2.
Insert at the left of
the specific node \n");
           printf(" 3.
Insert at the right
\n");
           printf(" 4.
Delete a specific
value\n");
```

```
            printf(" 5. Display\n");
            printf(" 6. Exit\n");
            printf("Enter your choice\n");

    scanf("%d",&choice);

    switch(choice)
            {
                case 1: insert_left(); break;
                case 2: insert_leftpos(); break;
                case 3: insert_right(); break;
                case 4: delete(); break;
                case 5: display(); break;
                case 6: exit(0);
            }
     }while(choice!=6);
}
```


Enter your choice
1
Enter the item
13
1. Insert at the left
2. Insert at the left of the specific node
3. Insert at the right
4. Delete a specific value
5. Display
6. Exit
Enter your choice
2
Enter the element in the list
13
Enter the new node data
19
1. Insert at the left
2. Insert at the left of the specific node
3. Insert at the right
4. Delete a specific value
5. Display
6. Exit
Enter your choice
3
Enter the item
4


162 {
1. Insert at the left
2. Insert at the left of the specific node
3. Insert at the right
4. Delete a specific value
5. Display
6. Exit
Enter your choice
1
Enter the item
11
1. Insert at the left
2. Insert at the left of the specific node
3. Insert at the right
4. Delete a specific value
5. Display
6. Exit
Enter your choice
1
Enter the item
12
1. Insert at the left
2. Insert at the left of the specific node
3. Insert at the right
4. Delete a specific value
5. Display
6. Exit
Enter your choice


Enter the item
4
1. Insert at the left
2. Insert at the left of the specific node
3. Insert at the right
4. Delete a specific value
5. Display
6. Exit
Enter your choice
5
19 13 12 11 4
1. Insert at the left
2. Insert at the left of the specific node
3. Insert at the right
4. Delete a specific value
5. Display
6. Exit
Enter your choice
4
Enter the element to be deleted
11
1. Insert at the left
2. Insert at the left of the specific node
3. Insert at the right
4. Delete a specific value
5. Display
6. Exit

LAB-10

10.

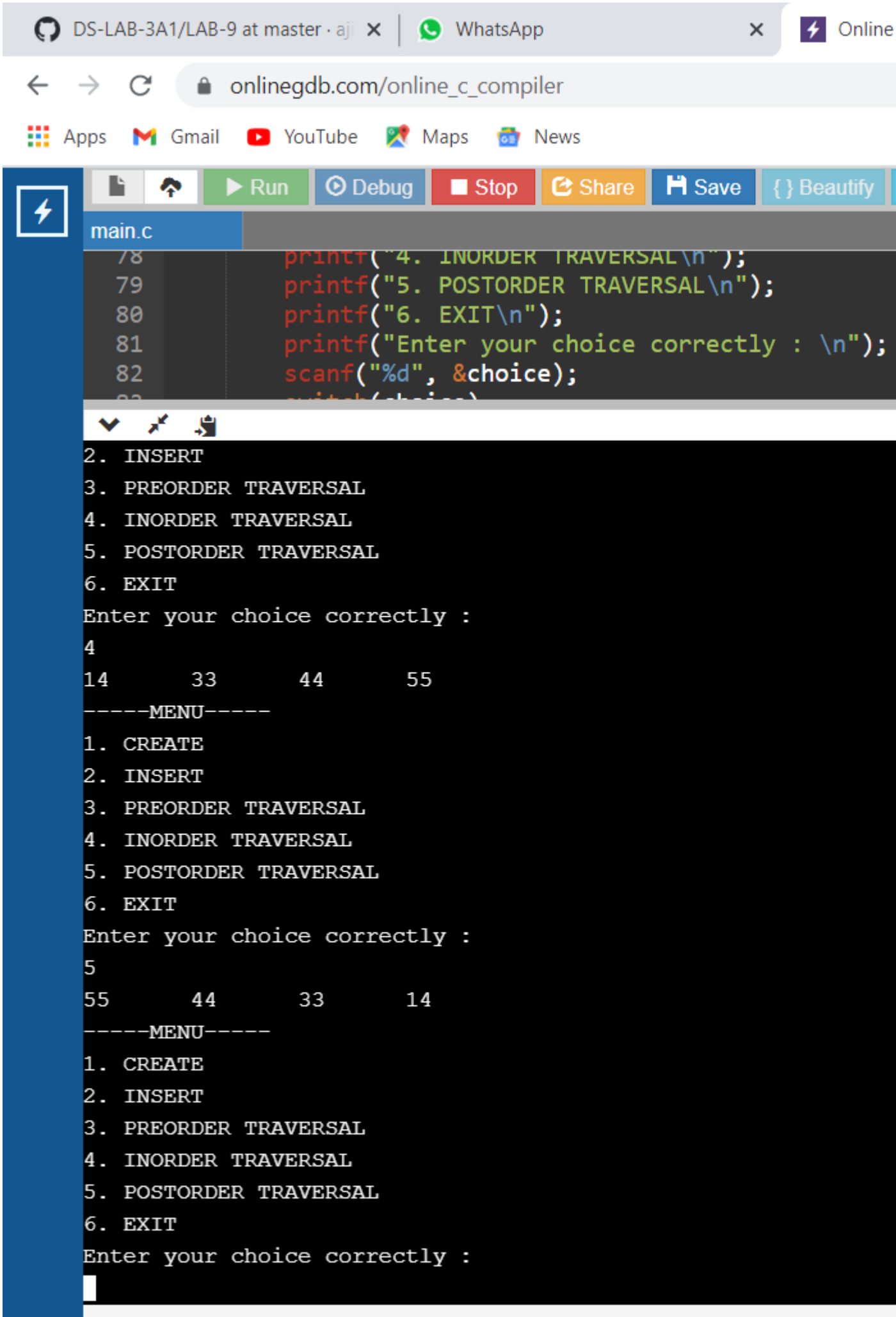
```
#include<stdio.h>
#include<stdlib.h>
struct node
{
    int data;
    struct node* left;
    struct node* right;
}*root1;

struct node *create()
{
        struct node *temp;
        printf("Enter ROOT NODE ELEMENT : ");
        temp=(struct node*)malloc(sizeof(struct node));
        scanf("%d",&temp->data);
        temp->left=temp->right=NULL;
        return temp;
}
```

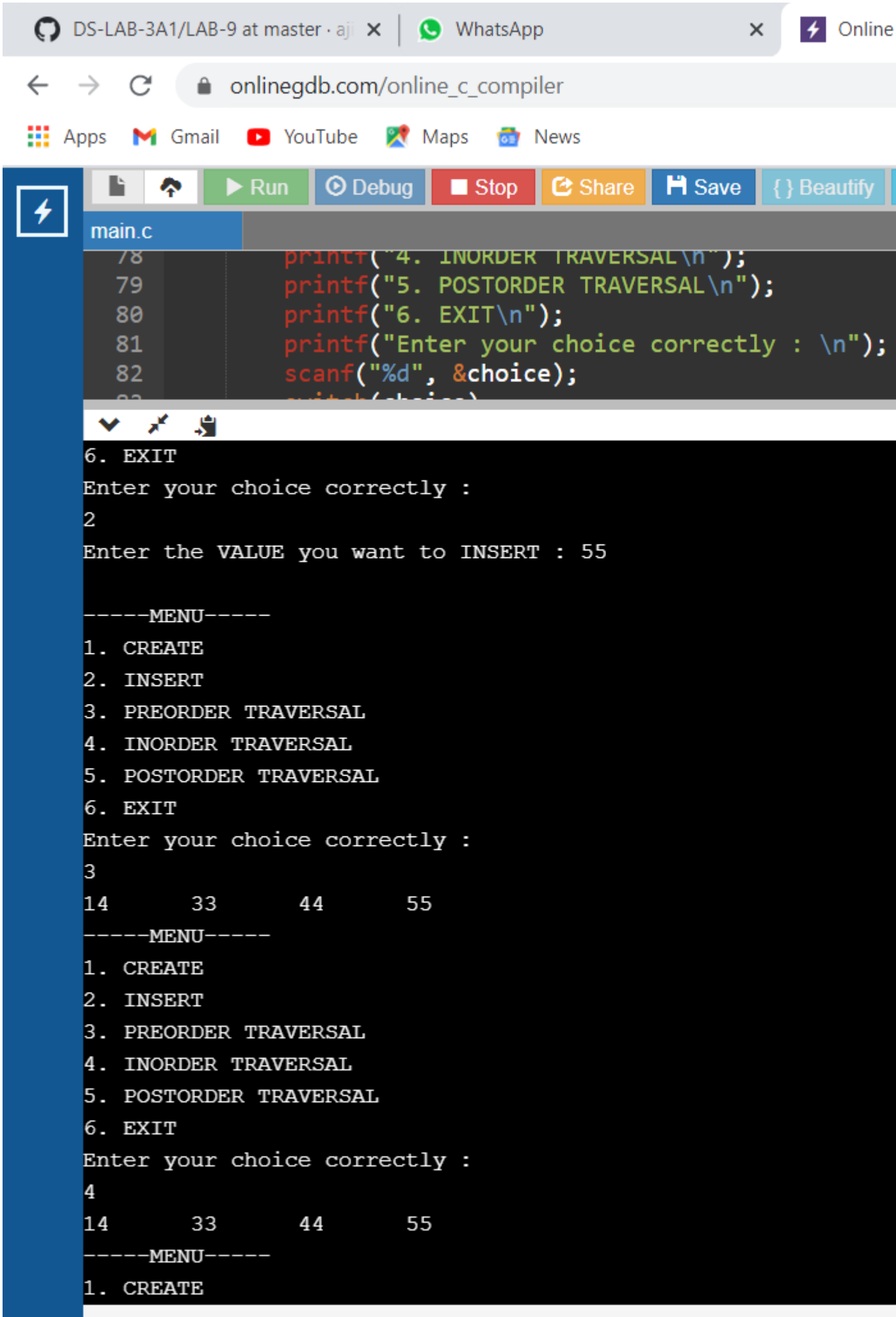
```
void insert(struct node *root,struct node *temp)
{
	if(temp->data<root->data)
	{
		if(root->left!=NULL)
			insert(root->left,temp);
		else
			root->left=temp;
	}
	if(temp->data>root->data)
	{
		if(root->right!=NULL)
			insert(root->right,temp);
		else
			root->right=temp;
	}
}


void printPostorder(struct node* node)
{
    if (node == NULL)
```

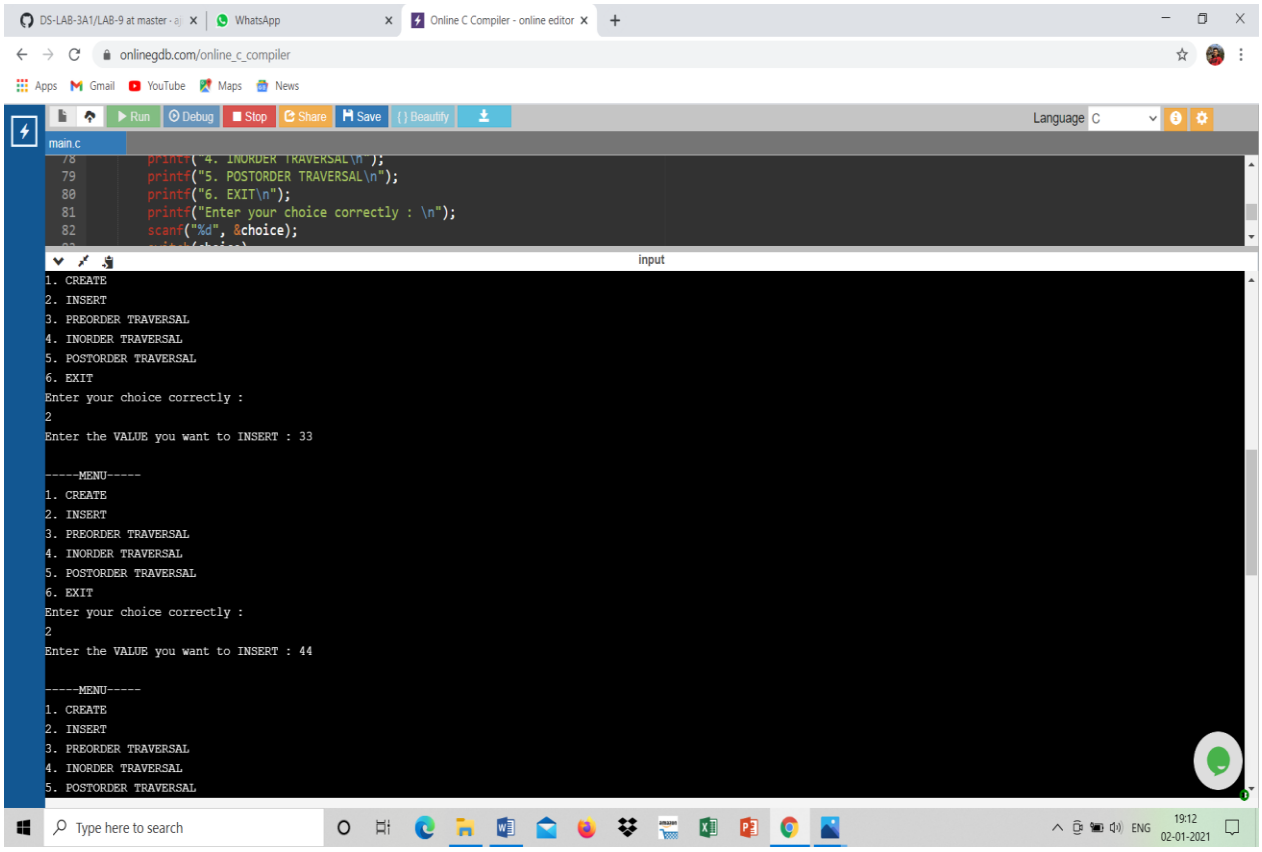
```
        return;
    printPostorder(node->left);
    printPostorder(node->right);
    printf("%d\t", node->data);
}


void printInorder(struct node* node)
{
    if (node == NULL)
        return;
    printInorder(node->left);
    printf("%d\t", node->data);
    printInorder(node->right);
}


void printPreorder(struct node* node)
{
    if (node == NULL)
        return;
    printf("%d\t", node->data);
```

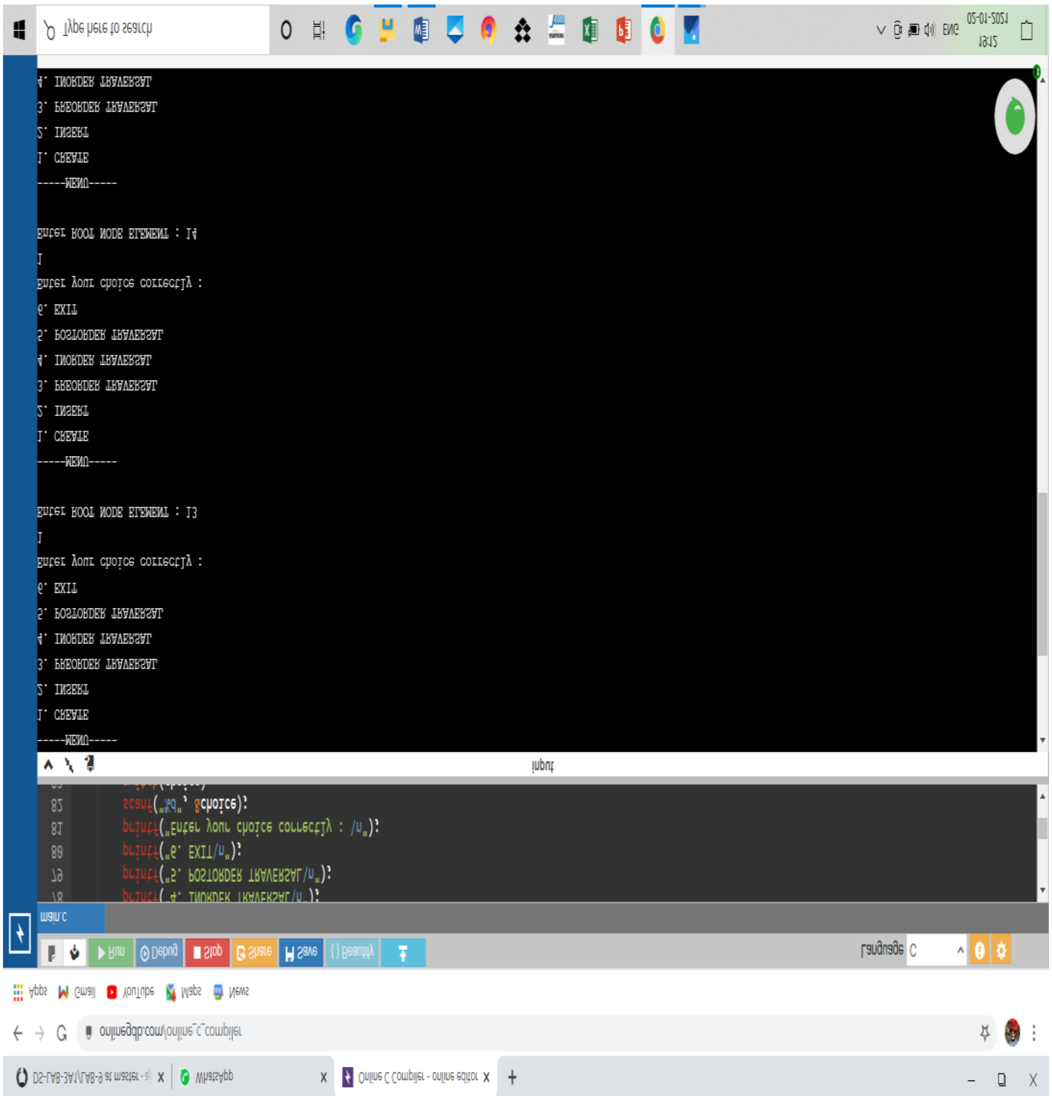
```
    printPreorder(node->left);
    printPreorder(node->right);
}

int main()
{
        int choice;
        struct node* temp;
        do
        {
                printf("\n-----MENU-----\n");
                printf("1. CREATE\n");
                printf("2. INSERT\n");
                printf("3. PREORDER TRAVERSAL\n");
                printf("4. INORDER TRAVERSAL\n");
                printf("5. POSTORDER TRAVERSAL\n");
                printf("6. EXIT\n");
                printf("Enter your choice correctly : \n");
                scanf("%d", &choice);
                switch(choice)
                {
                        case 1: root1 = create();
```

```
                    break;
            case 2: printf("Enter the VALUE you want to
INSERT : ");
                    temp=(struct
node*)malloc(sizeof(struct node));
                    scanf("%d",&temp->data);
                    insert(root1, temp);
                    break;
            case 3: printPreorder(root1);
                    break;
            case 4: printInorder(root1);
                    break;
            case 5: printPostorder(root1);
                    break;
            case 6: printf("EXITING...!!!");
                    break;
            default: printf("Incorrect Choice!!\n");
        }
    }while(choice != 6);
    return 0;
}
```


DS-LAB-3A1/LAB-9 at master · aj
WhatsApp
Online
onlinegdb.com/online_c_compiler
Apps
Gmail
YouTube
Maps
News
Run
Debug
Stop
Share
Save
{ } Beautify
main.c
printf("4. INORDER TRAVERSAL\n");
printf("5. POSTORDER TRAVERSAL\n");
printf("6. EXIT\n");
printf("Enter your choice correctly : \n");
scanf("%d", &choice);
2. INSERT
3. PREORDER TRAVERSAL
4. INORDER TRAVERSAL
5. POSTORDER TRAVERSAL
6. EXIT
Enter your choice correctly :
4
14 33 44 55
-----MENU-----
1. CREATE
2. INSERT
3. PREORDER TRAVERSAL
4. INORDER TRAVERSAL
5. POSTORDER TRAVERSAL
6. EXIT
Enter your choice correctly :
5
55 44 33 14
-----MENU-----
1. CREATE
2. INSERT
3. PREORDER TRAVERSAL
4. INORDER TRAVERSAL
5. POSTORDER TRAVERSAL
6. EXIT
Enter your choice correctly :


DS-LAB-3A1/LAB-9 at master · aj
WhatsApp
Online
onlinegdb.com/online_c_compiler
Apps
Gmail
YouTube
Maps
News
Run
Debug
Stop
Share
Save
{ } Beautify
main.c
printf("4. INORDER TRAVERSAL\n");
printf("5. POSTORDER TRAVERSAL\n");
printf("6. EXIT\n");
printf("Enter your choice correctly : \n");
scanf("%d", &choice);
6. EXIT
Enter your choice correctly :
2
Enter the VALUE you want to INSERT : 55
-----MENU-----
1. CREATE
2. INSERT
3. PREORDER TRAVERSAL
4. INORDER TRAVERSAL
5. POSTORDER TRAVERSAL
6. EXIT
Enter your choice correctly :
3
14 33 44 55
-----MENU-----
1. CREATE
2. INSERT
3. PREORDER TRAVERSAL
4. INORDER TRAVERSAL
5. POSTORDER TRAVERSAL
6. EXIT
Enter your choice correctly :
4
14 33 44 55
-----MENU-----
1. CREATE


DS-LAB-3A1/LAB-9 at master - a
WhatsApp
Online C Compiler - online editor
onlinegdb.com/online_c_compiler
Apps
Gmail
YouTube
Maps
News
Run
Debug
Stop
Share
Save
{ } Beautify
Language C
main.c
printf("5. POSTORDER TRAVERSAL\n");
printf("6. EXIT\n");
printf("Enter your choice correctly : \n");
scanf("%d", &choice);
input
1. CREATE
2. INSERT
3. PREORDER TRAVERSAL
4. INORDER TRAVERSAL
5. POSTORDER TRAVERSAL
6. EXIT
Enter your choice correctly :
2
Enter the VALUE you want to INSERT : 33
-----MENU-----
1. CREATE
2. INSERT
3. PREORDER TRAVERSAL
4. INORDER TRAVERSAL
5. POSTORDER TRAVERSAL
6. EXIT
Enter your choice correctly :
2
Enter the VALUE you want to INSERT : 44
-----MENU-----
1. CREATE
2. INSERT
3. PREORDER TRAVERSAL
4. INORDER TRAVERSAL
5. POSTORDER TRAVERSAL
Type here to search
ENG
19:12
02-01-2021


DS-LAB-3A1/LAB-9 at master
WhatsApp
Online C Compiler - online editor
onlinegdb.com/online_c_compiler
Apps
Gmail
YouTube
Maps
News
Run
Debug
Stop
Share
Save
{ } Beautify
Language C
main.c
printf("4. INORDER TRAVERSAL/n");
printf("5. POSTORDER TRAVERSAL/n");
printf("6. EXIT/n");
printf("Enter your choice correctly : /n");
scanf("%d", &choice);
input
-----MENU-----
1. CREATE
2. INSERT
3. PREORDER TRAVERSAL
4. INORDER TRAVERSAL
5. POSTORDER TRAVERSAL
6. EXIT
Enter your choice correctly :
1
Enter ROOT NODE ELEMENT : 13
-----MENU-----
1. CREATE
2. INSERT
3. PREORDER TRAVERSAL
4. INORDER TRAVERSAL
5. POSTORDER TRAVERSAL
6. EXIT
Enter your choice correctly :
1
Enter ROOT NODE ELEMENT : 14
-----MENU-----
1. CREATE
2. INSERT
3. PREORDER TRAVERSAL
4. INORDER TRAVERSAL
Type here to search
ENG
19:12
02-01-2021

END...

THANK YOU

AJITH MS

1BM19CS010

CSE 3-A