Practice Lab 10 - Circularly and Doubly Linked list - 21-10-2020

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2019115126

Double linked list

Source code:

```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>

struct noderec
{
    int info;
    struct noderec *lptr;
    struct noderec *rptr;
};
typedef struct noderec * node ;
typedef node header;
node new, temp;
header h ;
int i = 1 ;
void create()
{
    h = (struct noderec*) malloc(sizeof(struct noderec));
    h->lptr = NULL;
    h->rptr = NULL;
}
int isEmpty()
{
    return (h->rptr ==NULL);
}
void insertBeg( header h, int x)
{
    new = (struct noderec*) malloc(sizeof(struct noderec));
    new->info = x;
    if(isEmpty())
    {
        new->rptr = NULL;
```

```
        new->lptr = h;
        h->rptr = new;
     }
    else
    {
        new->rptr = h->rptr;
        new->lptr = h;
        (h->rptr)->lptr = new;
        h->rptr = new;
    }
}
void insertEnd(header h, int x)
{
    new = (struct noderec*) malloc(sizeof(struct noderec));
    new->info = x;
    if(isEmpty())
    {
        new->rptr = NULL;
        new->lptr = h;
        h->rptr = new;
     }
    else
    {
        temp = h->rptr ;
        while(temp->rptr !=NULL)
            temp = temp->rptr ;
        new->rptr = NULL;
        new->lptr = temp;
        temp->rptr = new;
    }
}
void insertMid(header h, int x, int pos)
{
new = (struct noderec*) malloc(sizeof(struct noderec));
    new->info = x;
    if(isEmpty())
    {
        new->rptr = NULL;
        new->lptr = h;
        h->rptr = new;
     }
    else
    {
        temp = h;
        while( temp->rptr !=NULL && i< pos)
        {
            temp = temp->rptr ;
            i++ ;
```

```
        }
        if(temp->rptr ==NULL)
        {           //insertEnd(h, x);
            new->rptr = NULL;
            new->lptr = temp;
            temp->rptr = new;
        }
        else
        {
            new->lptr = temp;
            new->rptr = temp->rptr;
            (temp->rptr)->lptr = new;
            temp->rptr = new ;
        }
    }
}
void delete( header h, int x)
{
    if(!isEmpty(h))
    {
        temp = h->rptr ;
        while(temp != NULL &&temp->info!=x)
            temp = temp->rptr;
        if(temp ==NULL)
            printf("element not found");
        else
        {
            (temp->rptr)->lptr = temp->lptr ;
            (temp->lptr)->rptr = temp->rptr ;
            free(temp);
        }
    }
    else
        printf("list is empty");
}
int search(header h, int x)
{
    temp = h->rptr;
int pos=0;
    if(!isEmpty(h))
    {
        while(temp!=h && temp->info!=x)
        {
            temp = temp->rptr ;
            pos++;
        }
        if(temp ==h)
            return 0 ;
```

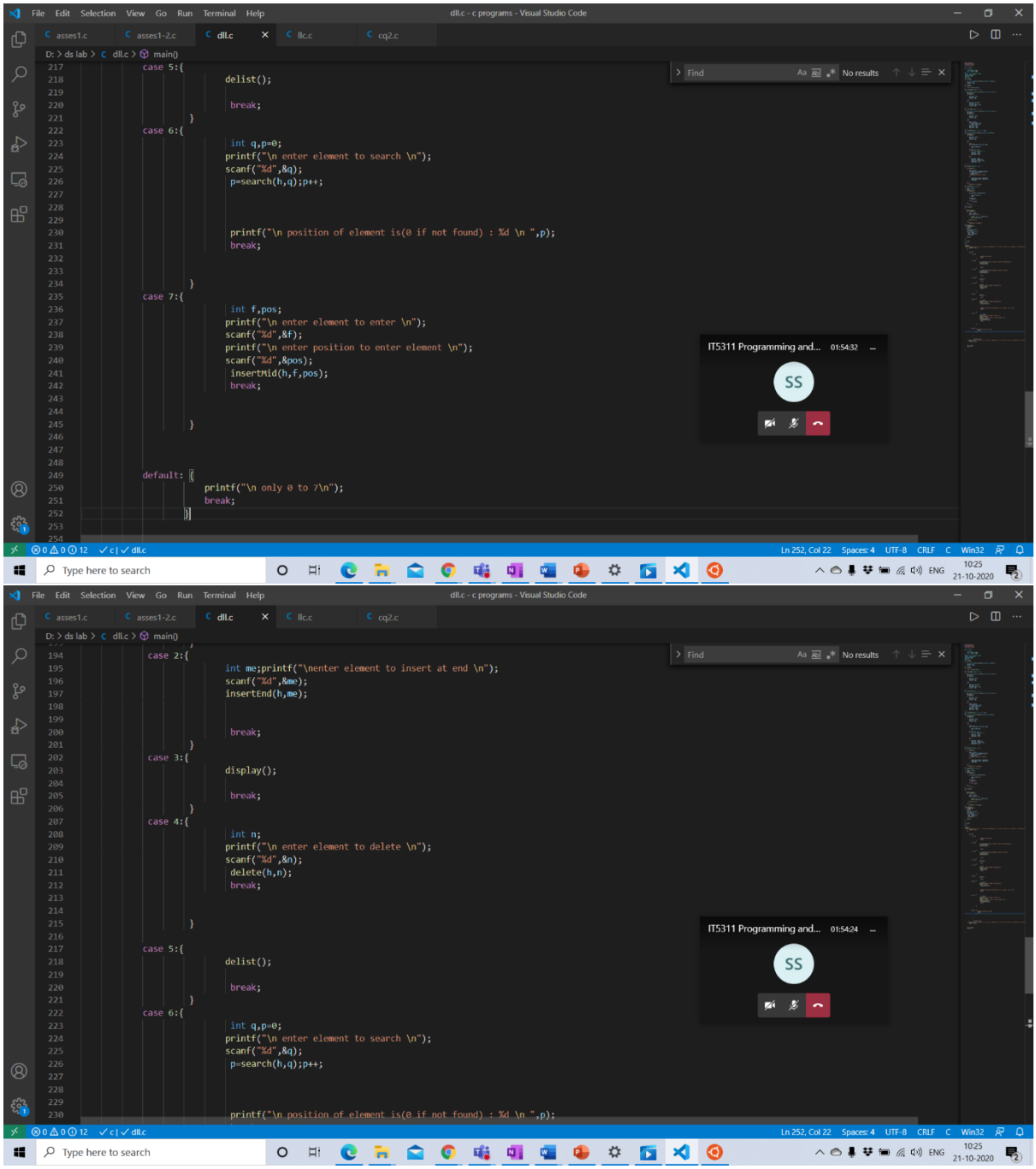
```
        else
            return pos;
    }
    else
        return -1 ;
}
void display()
{

   printf("\n\n");
    if( !isEmpty(h) )
    {
        temp = h->rptr ;
        while( temp != NULL )
        {
            printf(" \t %d  ", temp->info );
            temp = temp ->rptr ;
        }
        printf("\n\n");
      }
    else
        printf("list is empty");
}
void delist() {
  if (isEmpty(h)) {
    free(h);
  } else {
    node temp = h->rptr;
    node prev = h;
    while (temp != NULL) {
      prev = temp;
      temp = temp->rptr;
      free(prev);
    }
    free(h);
  }
}

int main()
{
int c;

create();
 printf("\nenter 0 to exit\n  1 to insert at beginning \n 2  to insert at end
\n 3 to display \n 4 to delete element\n 5 to delete list \n 6 search \n 7 ins
ert mid\n");
        scanf("%d",&c);
    do
```

```
    {

        switch(c)
        {
             case 0:{

                              printf("\nexiting\n");
                              break;
                    }

             case 1:{
                             int me;printf("\nenter  element to insert at begin
ning\n");
                             scanf("%d",&me);
                             insertBeg(h,me);


                              break;
                    }
             case 2:{
                             int me;printf("\nenter element to insert at end \n
");
                             scanf("%d",&me);
                             insertEnd(h,me);


                              break;
                    }
             case 3:{
                             display();

                              break;
                    }
             case 4:{
                              int n;
                             printf("\n enter element to delete \n");
                             scanf("%d",&n);
                              delete(h,n);
                              break;


                    }

            case 5:{
                             delist();

                              break;
                    }
```

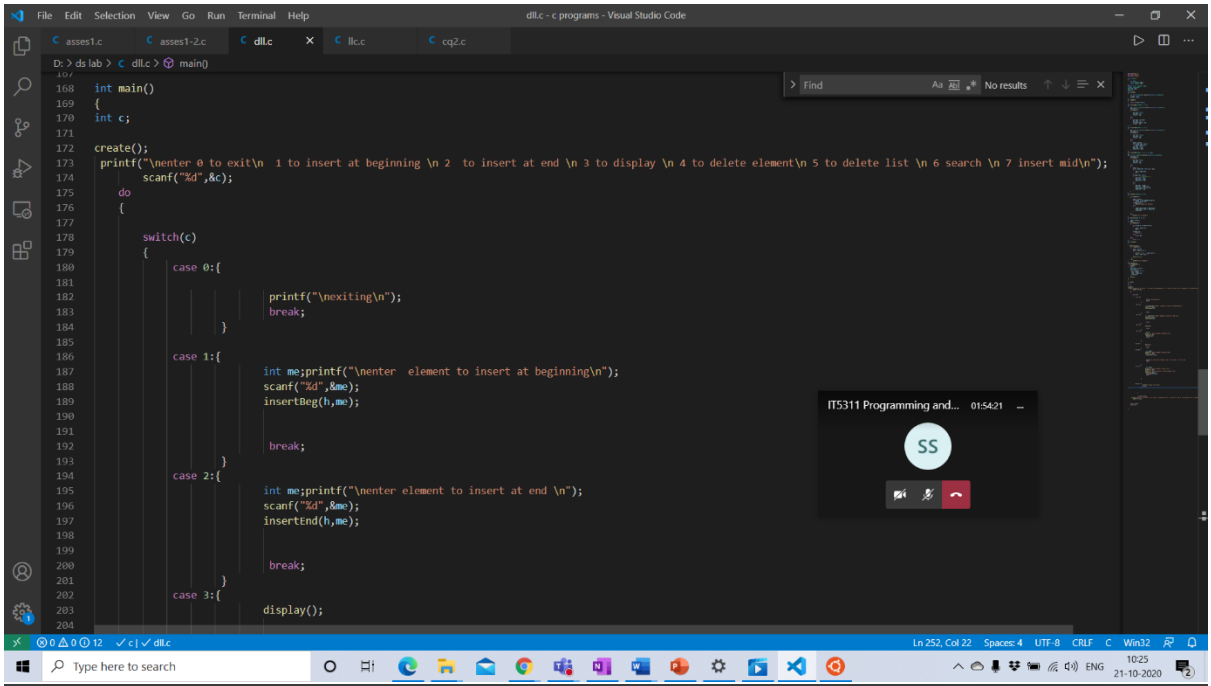
```
            case 6:{
                            int q,p=0;
                           printf("\n enter element to search \n");
                           scanf("%d",&q);
                            p=search(h,q);p++;



                            printf("\n position of element is(0 if not found)
: %d \n ",p);
                            break;


                     }
            case 7:{
                            int f,pos;
                           printf("\n enter element to enter \n");
                           scanf("%d",&f);
                           printf("\n enter position to enter element \n");
                           scanf("%d",&pos);
                            insertMid(h,f,pos);
                            break;


                     }



            default: {
                        printf("\n only 0 to 7\n");
                        break;
                    }



               }


                if(c==0) break;
      printf("\nenter 0 to exit\n  1 to insert at beginning \n 2  to insert at
 end \n 3 to display \n 4 to delete element\n 5 to deletelist \n 6 search \n
7 insert at mid\n");
         scanf("%d",&c);



    }while(c!=0);
    return 0;
```

```
}
```

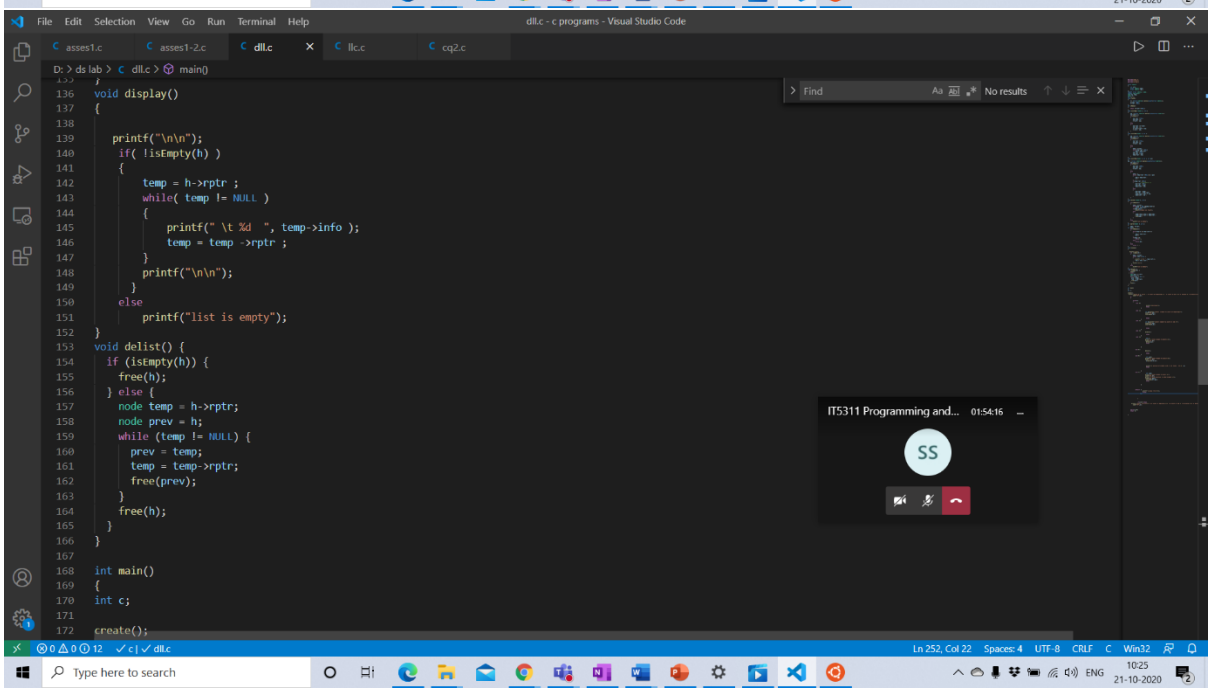
Source code screenshot:


File Edit Selection View Go Run Terminal Help
dll.c - c programs - Visual Studio Code
asses1.c
asses1-2.c
dll.c
llc.c
cq2.c
D: > ds lab > dll.c > main()
Find
No results
case 5:{
delist();
break;
}
case 6:{
int q,p=0;
printf("\n enter element to search \n");
scanf("%d",&q);
p=search(h,q);p++;
printf("\n position of element is(0 if not found) : %d \n ",p);
break;
}
case 7:{
int f,pos;
printf("\n enter element to enter \n");
scanf("%d",&f);
printf("\n enter position to enter element \n");
scanf("%d",&pos);
insertMid(h,f,pos);
break;
}
default: {
printf("\n only 0 to 7\n");
break;
}
IT5311 Programming and... 01:54:32
SS
Ln 252, Col 22 Spaces: 4 UTF-8 CRLF C Win32
Type here to search
ENG
10:25
21-10-2020

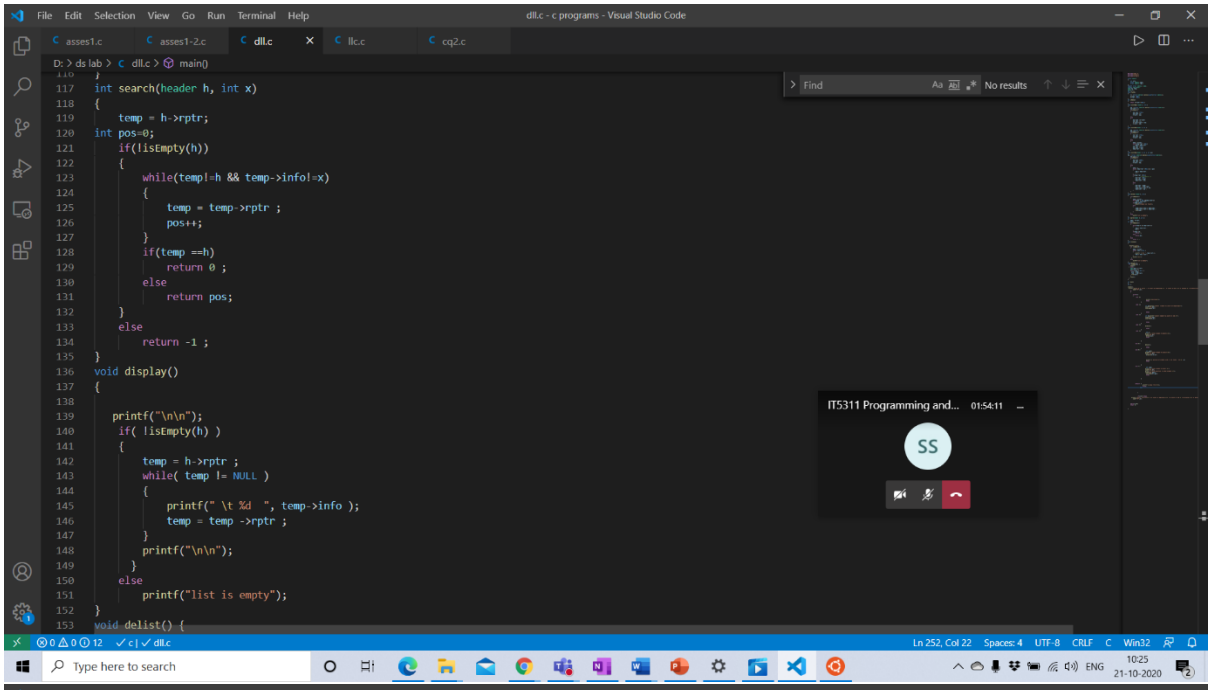
File Edit Selection View Go Run Terminal Help
dll.c - c programs - Visual Studio Code
asses1.c
asses1-2.c
dll.c
llc.c
cq2.c
D: > ds lab > dll.c > main()
Find
No results
case 2:{
int me;printf("\nenter element to insert at end \n");
scanf("%d",&me);
insertEnd(h,me);
break;
}
case 3:{
display();
break;
}
case 4:{
int n;
printf("\n enter element to delete \n");
scanf("%d",&n);
delete(h,n);
break;
}
case 5:{
delist();
break;
}
case 6:{
int q,p=0;
printf("\n enter element to search \n");
scanf("%d",&q);
p=search(h,q);p++;
printf("\n position of element is(0 if not found) : %d \n ",p);
IT5311 Programming and... 01:54:24
SS
Ln 252, Col 22 Spaces: 4 UTF-8 CRLF C Win32
Type here to search
ENG
10:25
21-10-2020



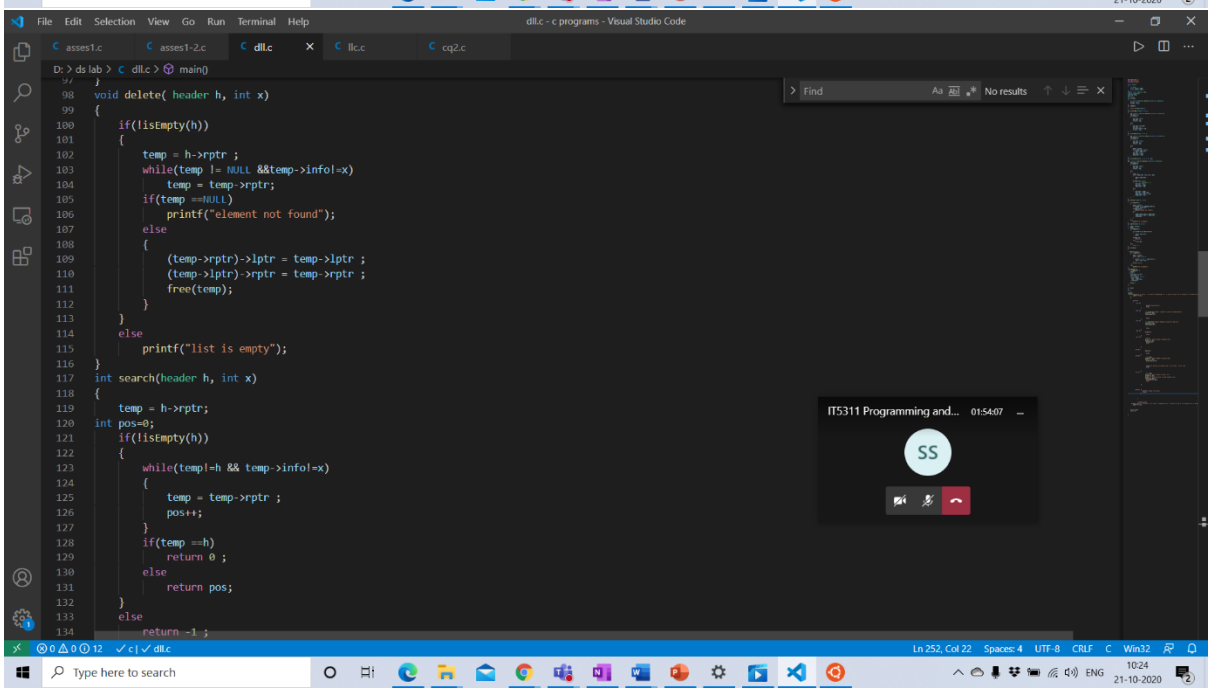

```c
int main()
{
int c;

create();
 printf("\nenter 0 to exit\n  1 to insert at beginning \n 2  to insert at end \n 3 to display \n 4 to delete element\n 5 to delete list \n 6 search \n 7 insert mid\n");
      scanf("%d",&c);
    do
    {

        switch(c)
        {
            case 0:{

                        printf("\nexiting\n");
                        break;
                    }

            case 1:{
                        int me;printf("\nenter  element to insert at beginning\n");
                        scanf("%d",&me);
                        insertBeg(h,me);


                        break;
                    }
            case 2:{
                        int me;printf("\nenter element to insert at end \n");
                        scanf("%d",&me);
                        insertEnd(h,me);


                        break;
                    }
            case 3:{
                        display();
```



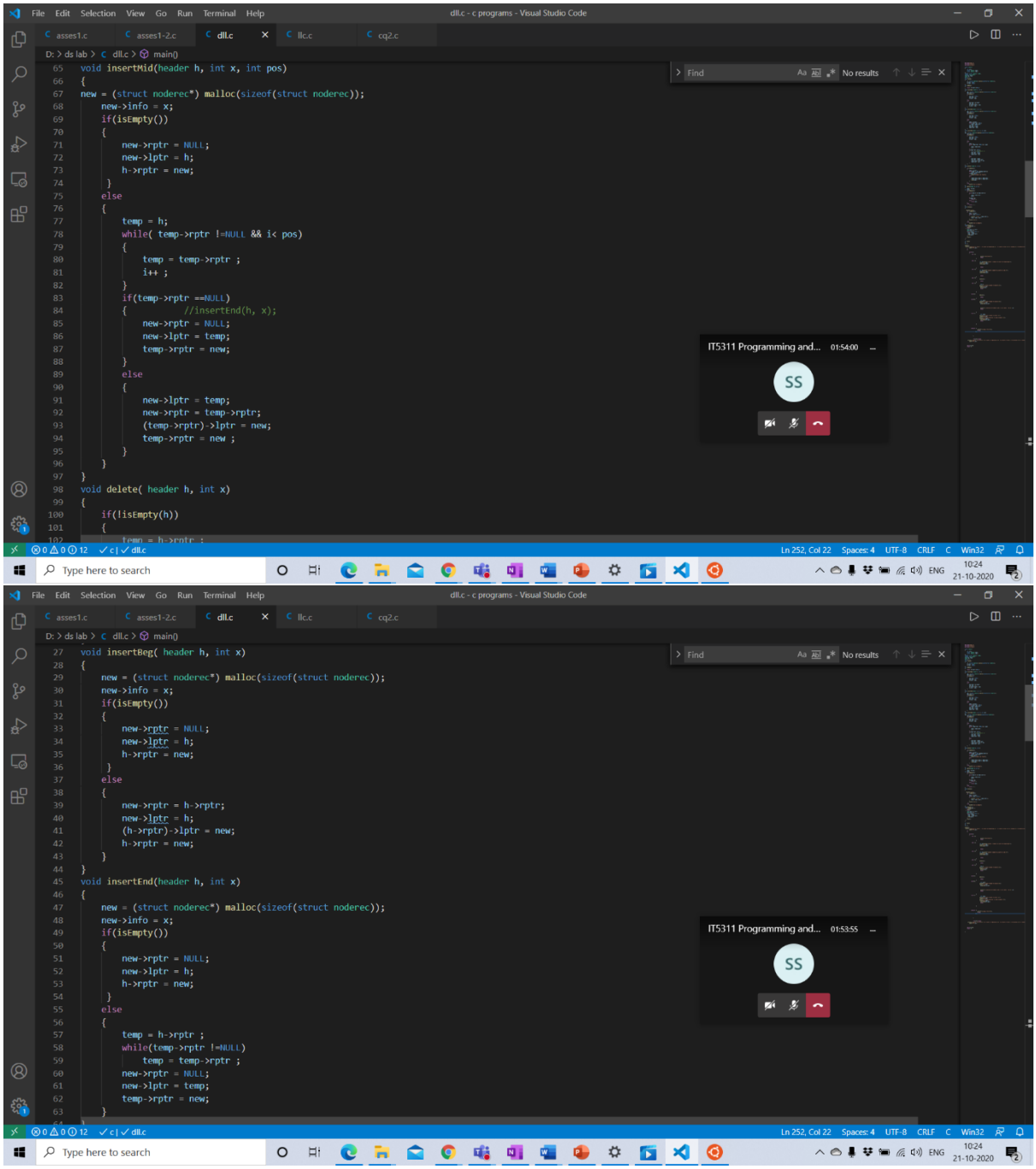

```c
}
void display()
{

   printf("\n\n");
    if( !isEmpty(h) )
    {
        temp = h->rptr ;
        while( temp != NULL )
        {
            printf(" \t %d  ", temp->info );
            temp = temp ->rptr ;
        }
        printf("\n\n");
    }
    else
        printf("list is empty");
}
void delist() {
  if (isEmpty(h)) {
    free(h);
  } else {
    node temp = h->rptr;
    node prev = h;
    while (temp != NULL) {
      prev = temp;
      temp = temp->rptr;
      free(prev);
    }
    free(h);
  }
}

int main()
{
int c;

create();
```




```c
int search(header h, int x)
{
    temp = h->rptr;
int pos=0;
    if(!isEmpty(h))
    {
        while(temp!=h && temp->info!=x)
        {
            temp = temp->rptr ;
            pos++;
        }
        if(temp ==h)
            return 0 ;
        else
            return pos;
    }
    else
        return -1 ;
}
void display()
{

   printf("\n\n");
    if( !isEmpty(h) )
    {
        temp = h->rptr ;
        while( temp != NULL )
        {
            printf(" \t %d  ", temp->info );
            temp = temp ->rptr ;
        }
        printf("\n\n");
    }
    else
        printf("list is empty");
}
void delist() {
```




```c
void delete( header h, int x)
{
    if(!isEmpty(h))
    {
        temp = h->rptr ;
        while(temp != NULL &&temp->info!=x)
            temp = temp->rptr;
        if(temp ==NULL)
            printf("element not found");
        else
        {
            (temp->rptr)->lptr = temp->lptr ;
            (temp->lptr)->rptr = temp->rptr ;
            free(temp);
        }
    }
    else
        printf("list is empty");
}
int search(header h, int x)
{
    temp = h->rptr;
int pos=0;
    if(!isEmpty(h))
    {
        while(temp!=h && temp->info!=x)
        {
            temp = temp->rptr ;
            pos++;
        }
        if(temp ==h)
            return 0 ;
        else
            return pos;
    }
    else
        return -1 ;
```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dll.c - c programs - Visual Studio Code
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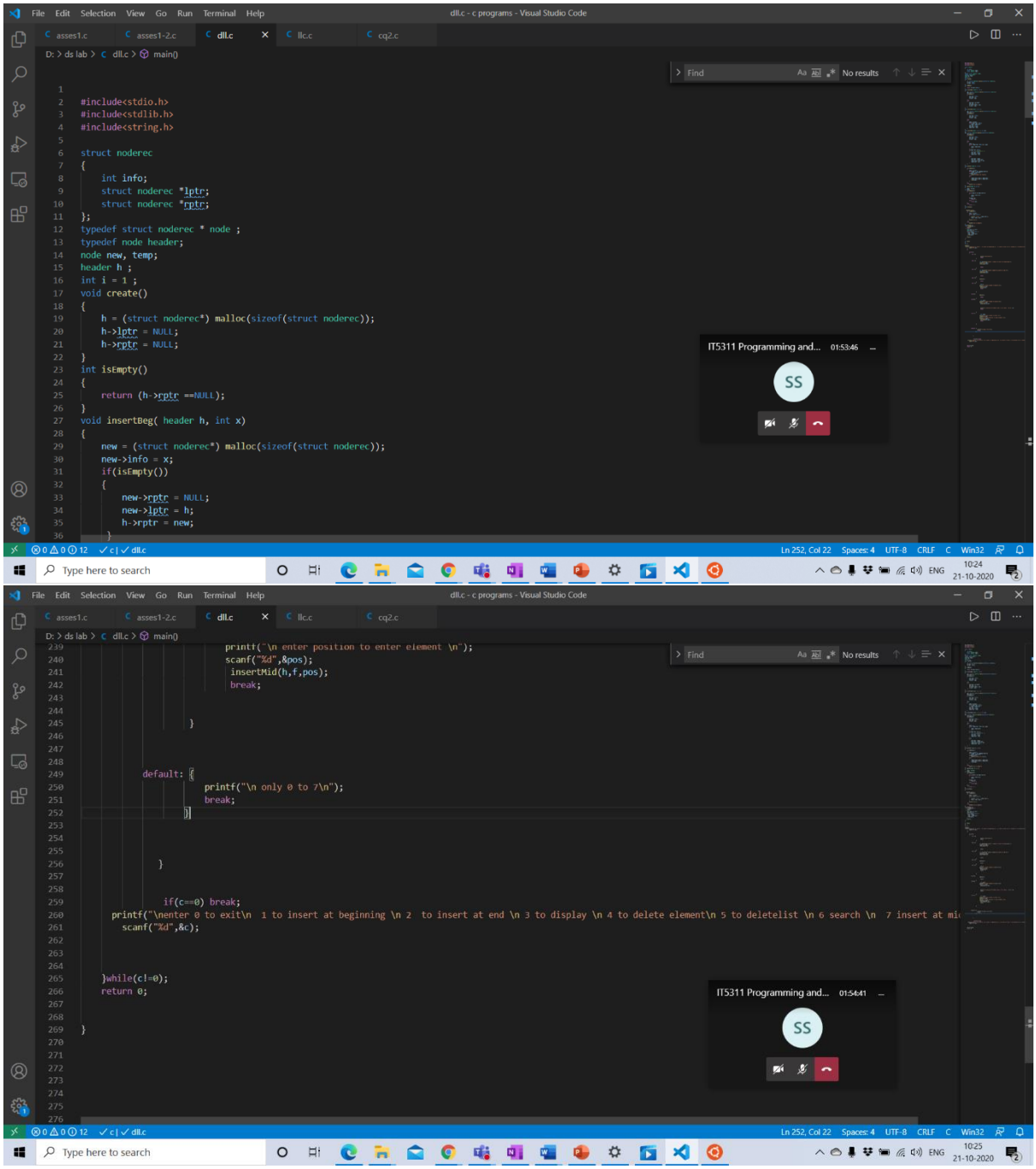
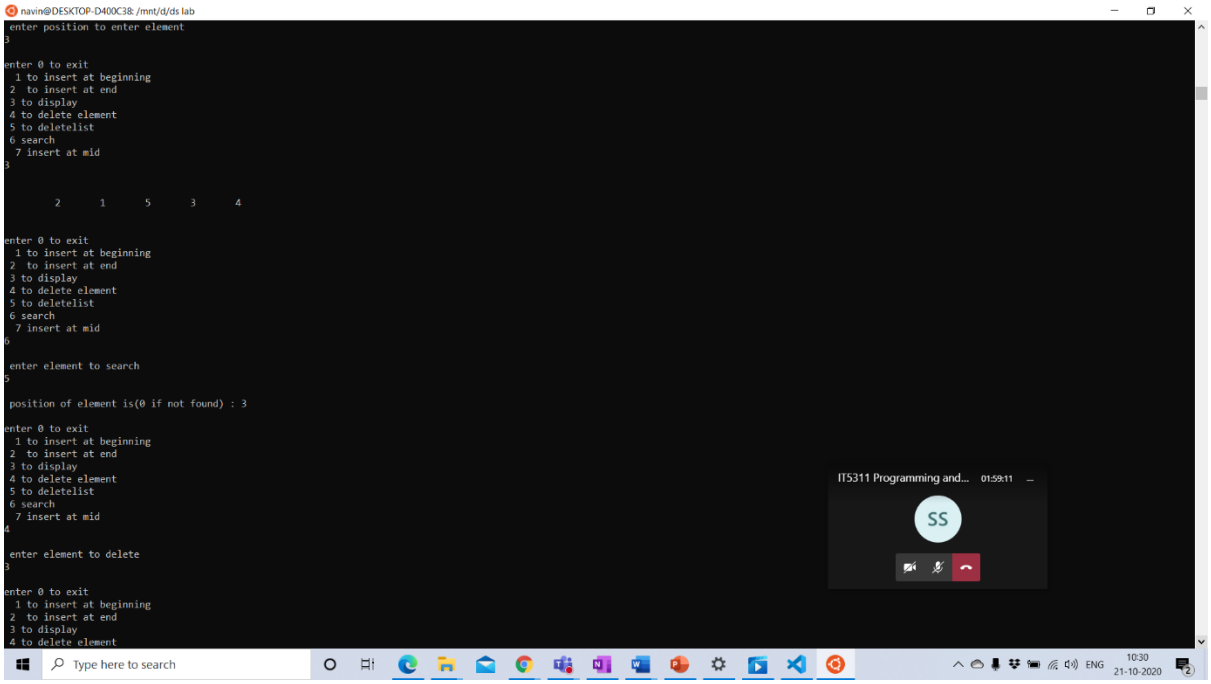
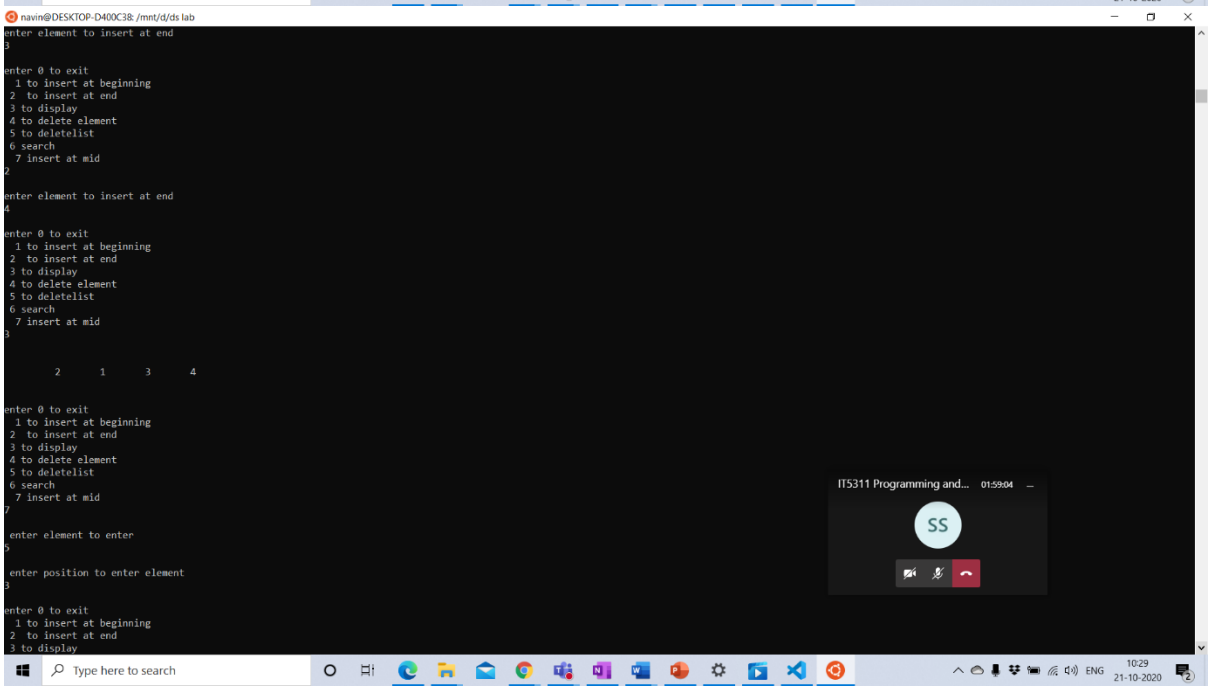
asses1-2.c
dll.c
llc.c
cq2.c
D: > ds lab > dll.c > main()
Find
No results
IT5311 Programming and... 01:54:00
SS
Ln 252, Col 22 Spaces: 4 UTF-8 CRLF C Win32
Type here to search
ENG
10:24
21-10-2020

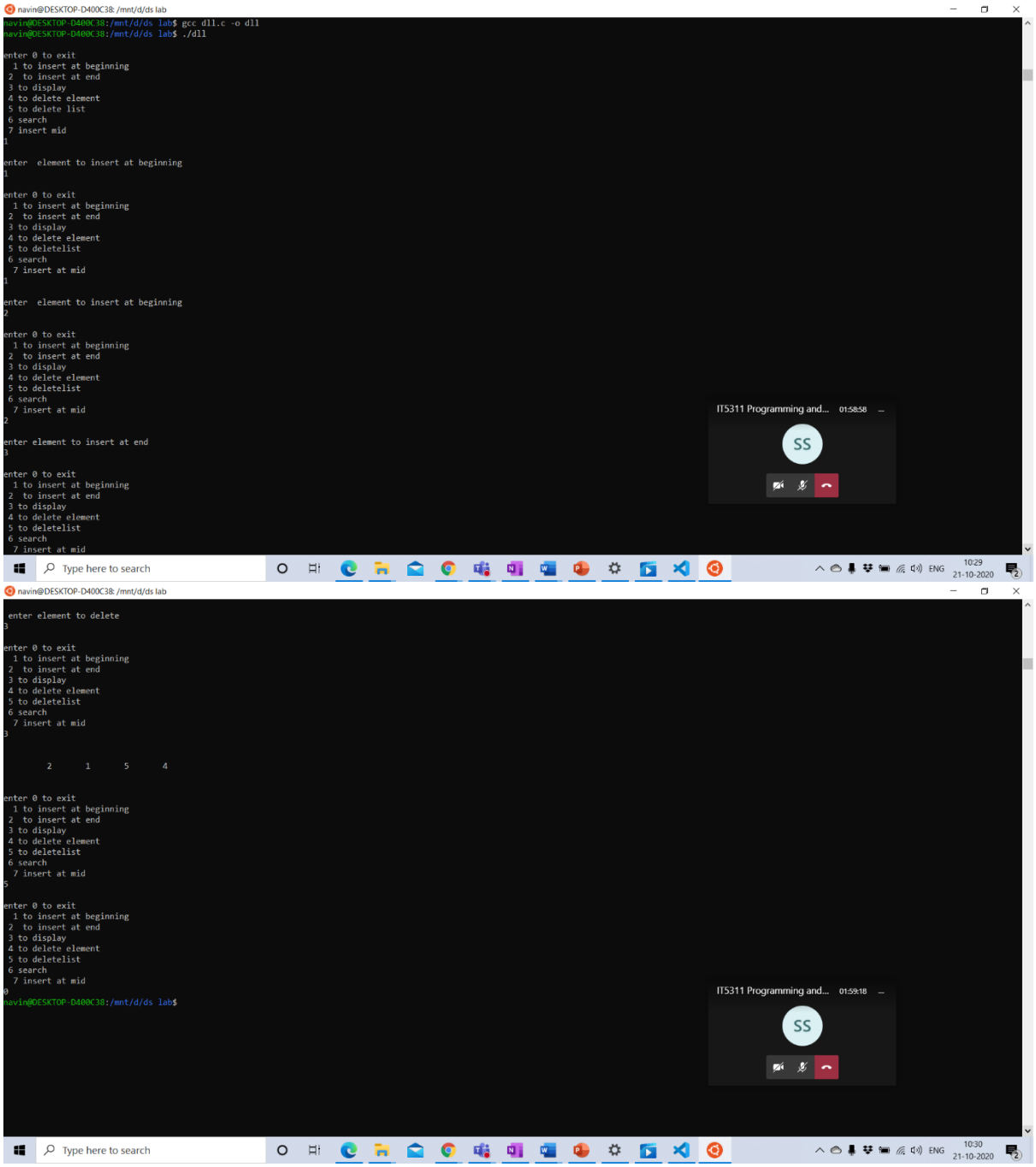
File Edit Selection View Go Run Terminal Help
dll.c - c programs - Visual Studio Code
asses1.c
asses1-2.c
dll.c
llc.c
cq2.c
D: > ds lab > dll.c > main()
Find
No results
IT5311 Programming and... 01:53:55
SS
Ln 252, Col 22 Spaces: 4 UTF-8 CRLF C Win32
Type here to search
ENG
10:24
21-10-2020



Output screenshot


navin@DESKTOP-D400C38: /mnt/d/ds lab
enter position to enter element
3
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to deletelist
6 search
7 insert at mid
3
2 1 5 3 4
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to deletelist
6 search
7 insert at mid
6
enter element to search
5
position of element is(0 if not found) : 3
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to deletelist
6 search
7 insert at mid
4
enter element to delete
3
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
IT5311 Programming and... 01:59:11
SS
Type here to search
ENG
10:30
21-10-2020


navin@DESKTOP-D400C38: /mnt/d/ds lab
enter element to insert at end
3
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to deletelist
6 search
7 insert at mid
2
enter element to insert at end
4
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to deletelist
6 search
7 insert at mid
3
2 1 3 4
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to deletelist
6 search
7 insert at mid
7
enter element to enter
9
enter position to enter element
3
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
IT5311 Programming and... 01:59:04
SS
Type here to search
ENG
10:29
21-10-2020



Circular linked list

Source code

```c
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
struct noderec
{
     int info;
      struct noderec *next ;
};
typedef struct noderec * node ;
node new, temp, prev ;
typedef node header;
header h;
void create()
{

    h = (struct noderec*) malloc(sizeof(struct noderec));
    h->next = h ;
}


int isEmpty(header h)
{
    return (h->next == h) ;
}
void insertBeg(header h, int x)
{
    new = (struct noderec*) malloc(sizeof(struct noderec));
    new->info = x;
    new->next = h->next ;
    h->next = new ;
}

void insertEnd(header h, int x)
{
    new = (struct noderec*) malloc(sizeof(struct noderec));
    new->info = x;
    temp = h->next ;
    while(temp->next != h)
    {   temp = temp->next;
    }
    new->next = h;
    temp->next = new;
}

void display(header h)
{    printf("\n\n");
    if( !isEmpty(h) )
```

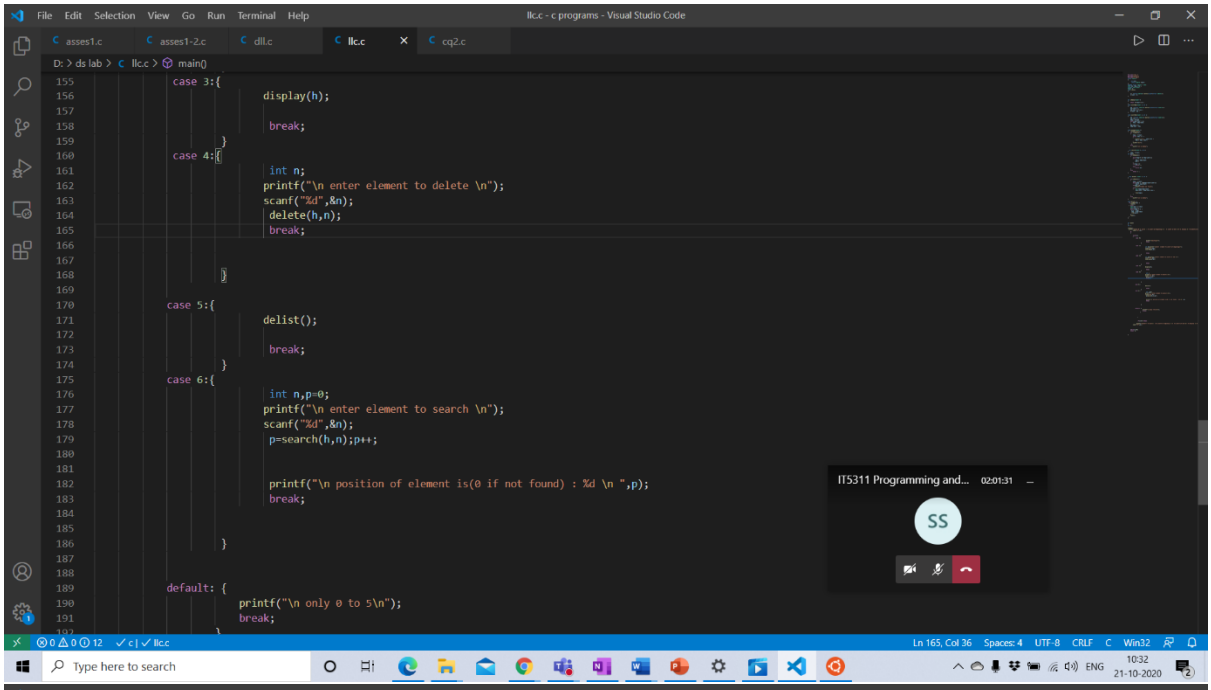
```
    {
        temp = h->next ;
        while( temp != h )
        {
            printf("\t %d ", temp->info );
            temp = temp ->next ;
        }
        printf("\n\n");
      }
    else
        printf("list is empty");
  }

  int search(header h, int x)
{
    temp = h->next;
int pos=0;
    if(!isEmpty(h))
    {
        while(temp!=h && temp->info!=x)
        {
            temp = temp->next;
            pos++;
        }
        if(temp ==h)
            return 0 ;
        else
            return pos;
    }
    else
        return -1 ;
}


  void delete( header h, int x)
{
    if(!isEmpty(h))
    {
        temp = h->next;
        while(temp != h &&temp->next->info!=x)
            temp = temp->next;
        if(temp ==h)
            printf("element not found");
        else
        {   node temp1=temp->next;
            temp->next = temp->next->next ;

            free(temp1);
        }
```

```
    }
    else
        printf("list is empty");
}

void delist() {
  if (isEmpty(h)) {
    free(h);
  } else {
    node temp = h->next;
    node prev = h;
    while (temp != h) {
      prev = temp;
      temp = temp->next;
      free(prev);
    }
    free(h);
  }
}



int main()
{
int c;

create();
 printf("\nenter 0 to exit\n  1 to insert at beginning \n 2  to insert at end
\n 3 to display \n 4 to delete element\n 5 to delete list \n  6 search\n");
        scanf("%d",&c);
    do
    {

        switch(c)
        {
             case 0:{

                              printf("\nexiting\n");
                              break;
                    }

             case 1:{
                             int me;printf("\nenter  element to insert at begin
ning\n");
                             scanf("%d",&me);
                             insertBeg(h,me);


                              break;
```

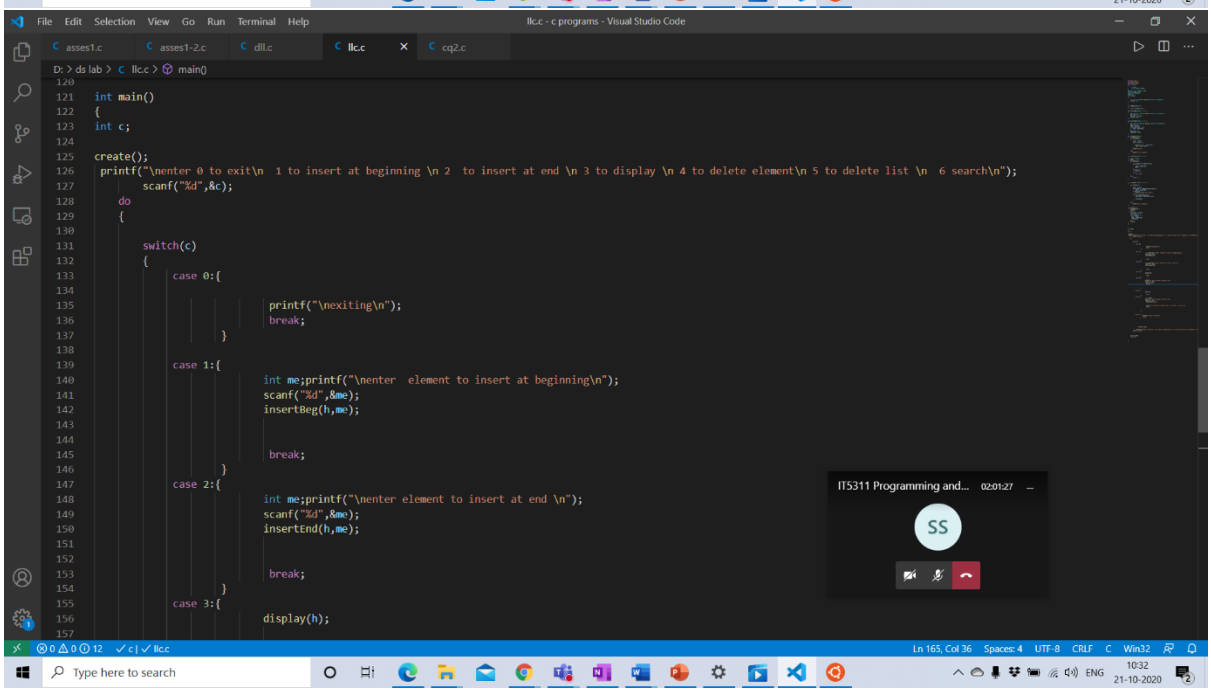
```
                    }
            case 2:{
                            int me;printf("\nenter element to insert at end \n
");
                            scanf("%d",&me);
                            insertEnd(h,me);


                             break;
                    }
            case 3:{
                            display(h);

                             break;
                    }
            case 4:{
                             int n;
                            printf("\n enter element to delete \n");
                            scanf("%d",&n);
                             delete(h,n);
                             break;


                    }

           case 5:{
                            delist();

                             break;
                    }
           case 6:{
                             int n,p=0;
                            printf("\n enter element to search \n");
                            scanf("%d",&n);
                             p=search(h,n);p++;


                             printf("\n position of element is(0 if not found)
 : %d \n ",p);
                             break;


                    }


           default: {
                       printf("\n only 0 to 5\n");
                       break;
```

```
                    }



                }


                 if(c==0) break;

              printf("\nenter 0 to exit\n  1 to insert at beginning \n 2  to i
nsert at end \n 3 to display \n 4 to delete element\n 5 to delete list\n  6 se
arch\n");
        scanf("%d",&c);



    }while(c!=0);
    return 0;


}
```

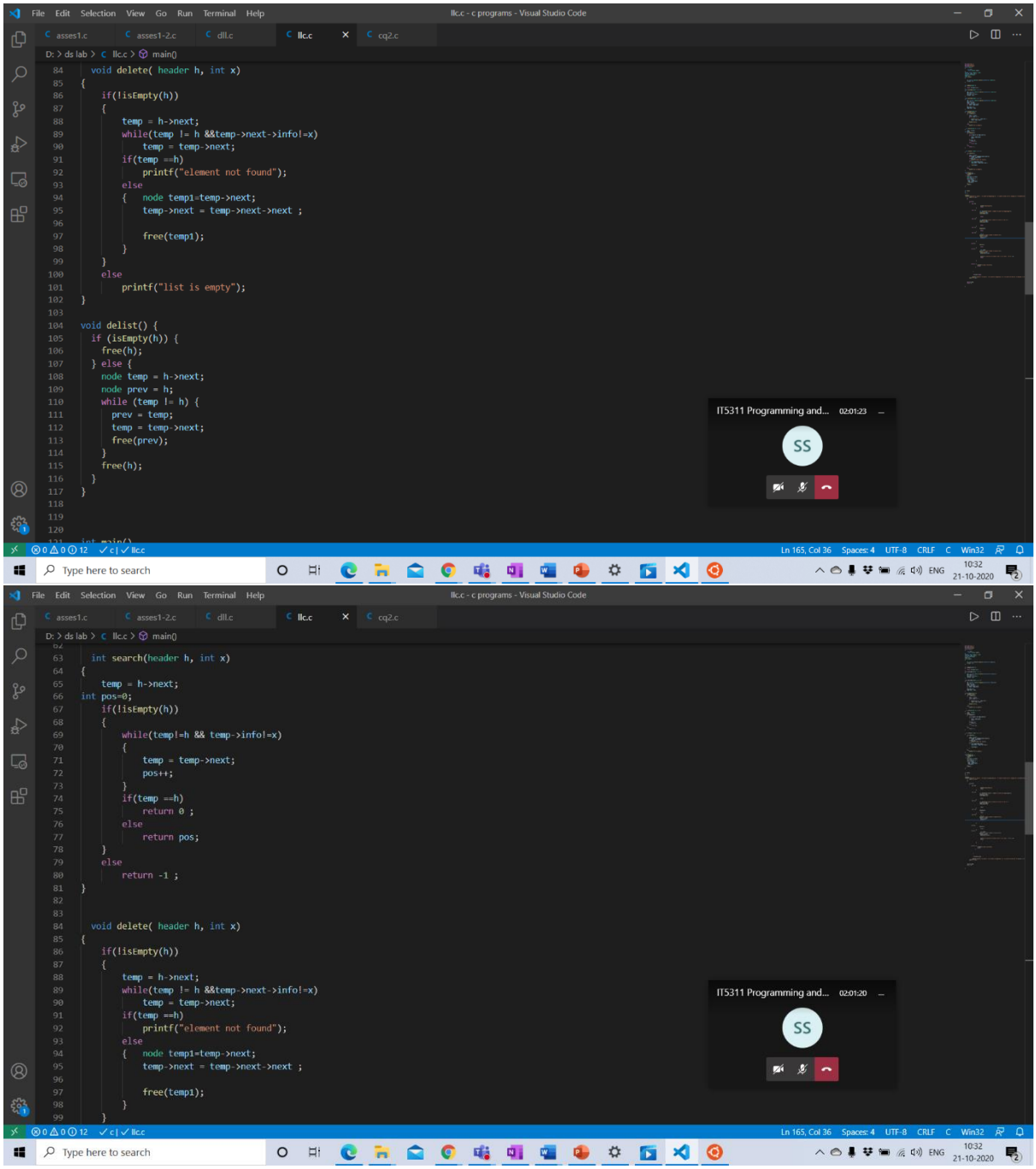
Screenshot of source code



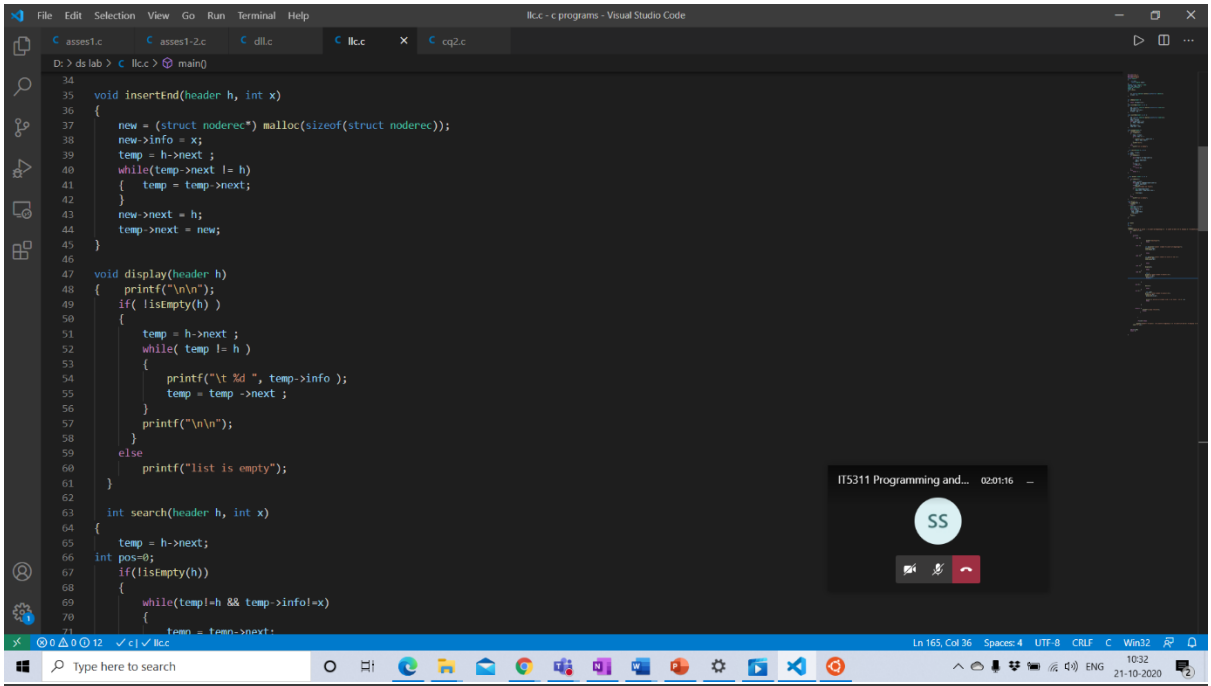
```
            case 3:{
                        display(h);

                        break;
                    }
            case 4:{
                        int n;
                    printf("\n enter element to delete \n");
                    scanf("%d",&n);
                     delete(h,n);
                     break;


                    }
            case 5:{
                        delist();

                        break;
                    }
            case 6:{
                        int n,p=0;
                    printf("\n enter element to search \n");
                    scanf("%d",&n);
                     p=search(h,n);p++;


                     printf("\n position of element is(0 if not found) : %d \n ",p);
                     break;


                    }

            default: {
                        printf("\n only 0 to 5\n");
                        break;
                    }
```

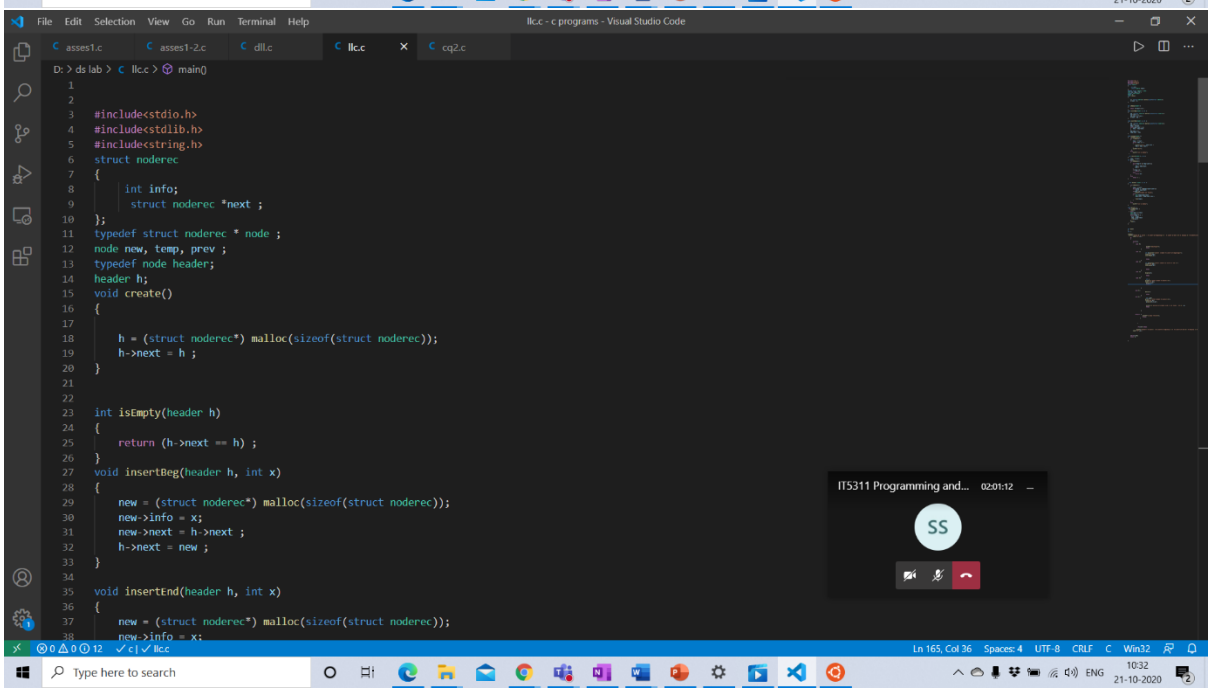


```
int main()
{
int c;

create();
 printf("\nenter 0 to exit\n  1 to insert at beginning \n 2  to insert at end \n 3 to display \n 4 to delete element\n 5 to delete list \n  6 search\n");
       scanf("%d",&c);
    do
    {

        switch(c)
        {
            case 0:{

                        printf("\nexiting\n");
                        break;
                    }

            case 1:{
                        int me;printf("\nenter  element to insert at beginning\n");
                        scanf("%d",&me);
                        insertBeg(h,me);


                        break;
                    }
            case 2:{
                        int me;printf("\nenter element to insert at end \n");
                        scanf("%d",&me);
                        insertEnd(h,me);


                        break;
                    }
            case 3:{
                        display(h);
```


File Edit Selection View Go Run Terminal Help
llc.c - c programs - Visual Studio Code
asses1.c
asses1-2.c
dll.c
llc.c
cq2.c
D: > ds lab > llc.c > main()
void delete(header h, int x)
{
if(!isEmpty(h))
{
temp = h->next;
while(temp != h &&temp->next->info!=x)
temp = temp->next;
if(temp ==h)
printf("element not found");
else
{ node temp1=temp->next;
temp->next = temp->next->next ;
free(temp1);
}
}
else
printf("list is empty");
}
void delist() {
if (isEmpty(h)) {
free(h);
} else {
node temp = h->next;
node prev = h;
while (temp != h) {
prev = temp;
temp = temp->next;
free(prev);
}
free(h);
}
}
int main()
IT5311 Programming and... 02:01:23
SS
Ln 165, Col 36 Spaces: 4 UTF-8 CRLF C Win32
Type here to search
ENG
10:32
21-10-2020

File Edit Selection View Go Run Terminal Help
llc.c - c programs - Visual Studio Code
asses1.c
asses1-2.c
dll.c
llc.c
cq2.c
D: > ds lab > llc.c > main()
int search(header h, int x)
{
temp = h->next;
int pos=0;
if(!isEmpty(h))
{
while(temp!=h && temp->info!=x)
{
temp = temp->next;
pos++;
}
if(temp ==h)
return 0 ;
else
return pos;
}
else
return -1 ;
}
void delete(header h, int x)
{
if(!isEmpty(h))
{
temp = h->next;
while(temp != h &&temp->next->info!=x)
temp = temp->next;
if(temp ==h)
printf("element not found");
else
{ node temp1=temp->next;
temp->next = temp->next->next ;
free(temp1);
}
}
IT5311 Programming and... 02:01:20
SS
Ln 165, Col 36 Spaces: 4 UTF-8 CRLF C Win32
Type here to search
ENG
10:32
21-10-2020


File Edit Selection View Go Run Terminal Help
llc.c - c programs - Visual Studio Code
asses1.c
asses1-2.c
dll.c
llc.c
cq2.c
D: > ds lab > llc.c > main()
void insertEnd(header h, int x)
{
new = (struct noderec*) malloc(sizeof(struct noderec));
new->info = x;
temp = h->next ;
while(temp->next != h)
{ temp = temp->next;
}
new->next = h;
temp->next = new;
}
void display(header h)
{ printf("\n\n");
if(!isEmpty(h))
{
temp = h->next ;
while(temp != h)
{
printf("\t %d ", temp->info);
temp = temp ->next ;
}
printf("\n\n");
}
else
printf("list is empty");
}
int search(header h, int x)
{
temp = h->next;
int pos=0;
if(!isEmpty(h))
{
while(temp!=h && temp->info!=x)
{
IT5311 Programming and... 02:01:16
SS
Ln 165, Col 36 Spaces: 4 UTF-8 CRLF C Win32
Type here to search
ENG
10:32
21-10-2020


File Edit Selection View Go Run Terminal Help
llc.c - c programs - Visual Studio Code
asses1.c
asses1-2.c
dll.c
llc.c
cq2.c
D: > ds lab > llc.c > main()
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
struct noderec
{
int info;
struct noderec *next ;
};
typedef struct noderec * node ;
node new, temp, prev ;
typedef node header;
header h;
void create()
{
h = (struct noderec*) malloc(sizeof(struct noderec));
h->next = h ;
}
int isEmpty(header h)
{
return (h->next == h) ;
}
void insertBeg(header h, int x)
{
new = (struct noderec*) malloc(sizeof(struct noderec));
new->info = x;
new->next = h->next ;
h->next = new ;
}
void insertEnd(header h, int x)
{
new = (struct noderec*) malloc(sizeof(struct noderec));
IT5311 Programming and... 02:01:12
SS
Ln 165, Col 36 Spaces: 4 UTF-8 CRLF C Win32
Type here to search
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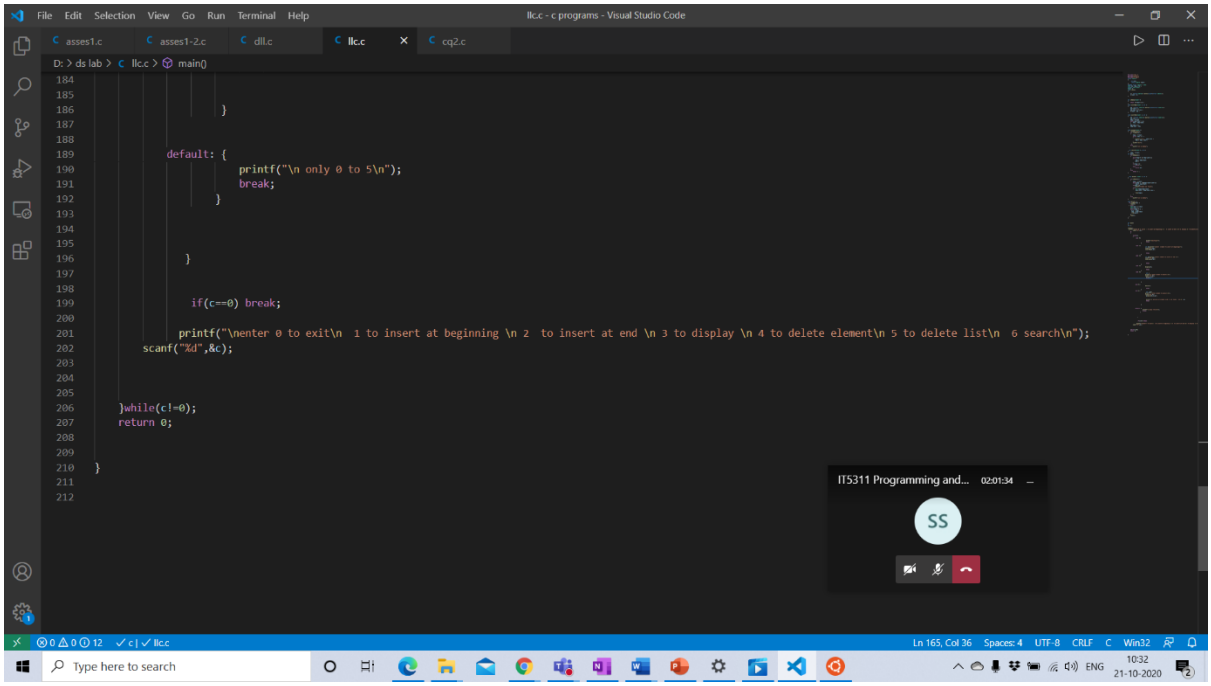
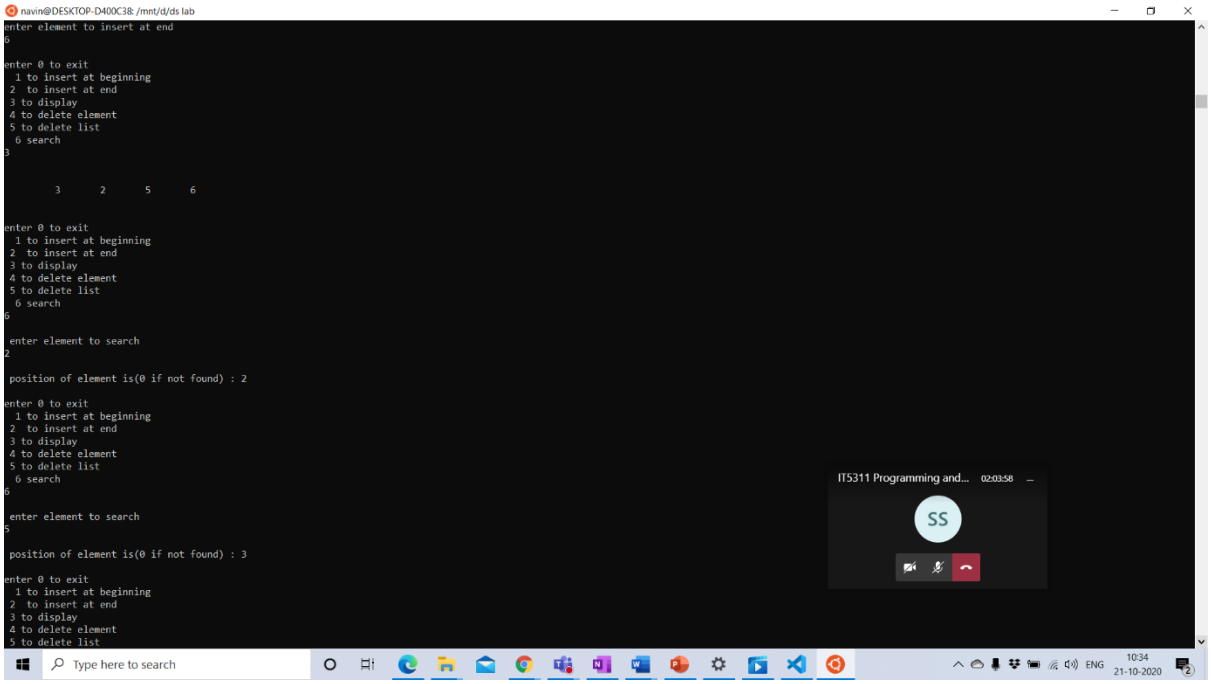
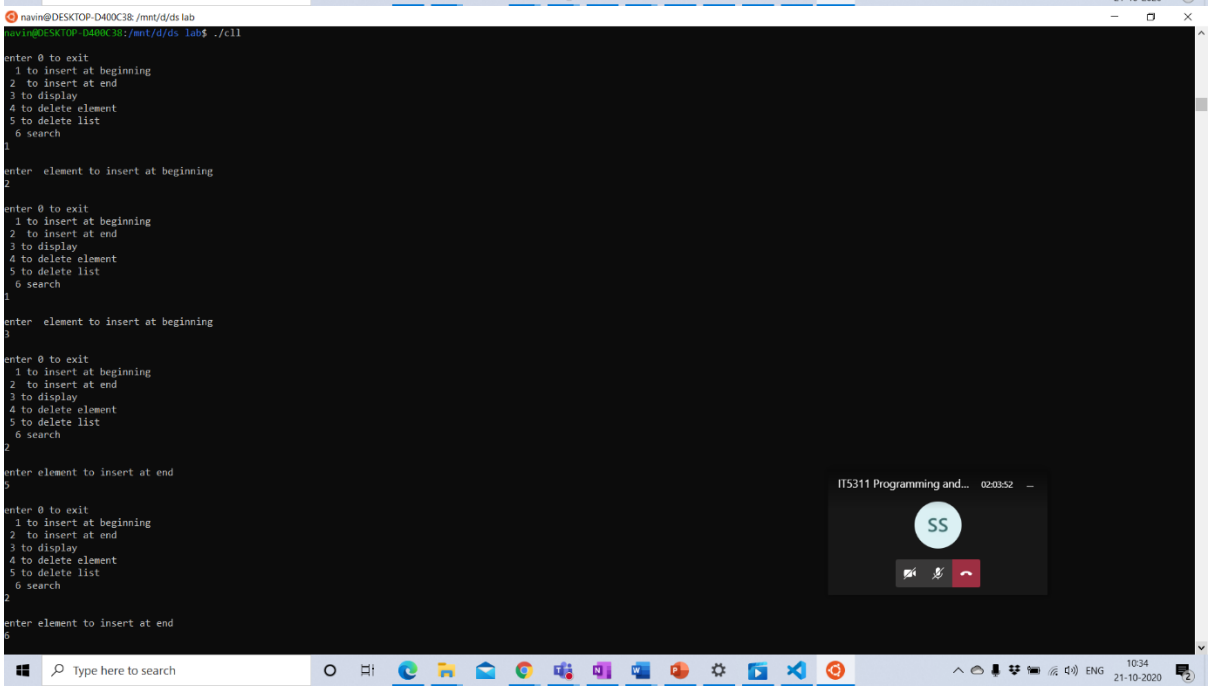
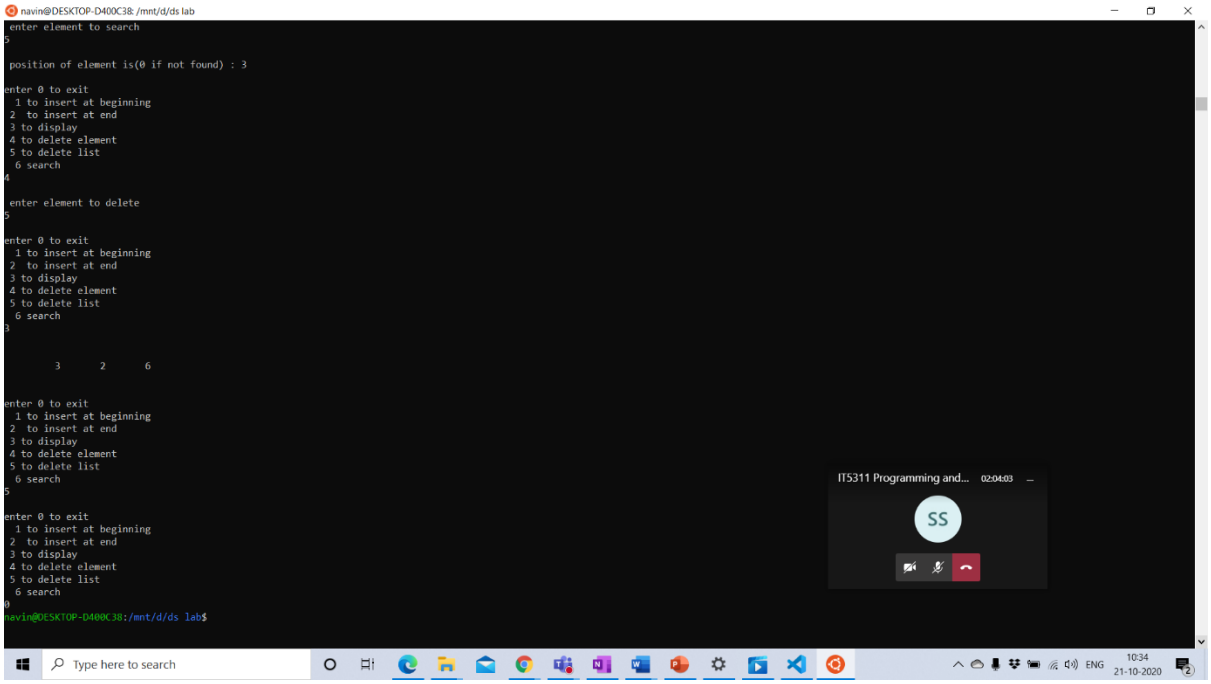
10:32
21-10-2020



Screenshot of output


navin@DESKTOP-D400C38: /mnt/d/ds lab
enter element to insert at end
6
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
6 search
3
3 2 5 6
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
6 search
6
enter element to search
2
position of element is(0 if not found) : 2
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
6 search
6
enter element to search
5
position of element is(0 if not found) : 3
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
IT5311 Programming and... 02:03:58
SS
Type here to search
ENG
10:34
21-10-2020


navin@DESKTOP-D400C38: /mnt/d/ds lab
navin@DESKTOP-D400C38:/mnt/d/ds lab$ ./cll
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
6 search
1
enter element to insert at beginning
2
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
6 search
1
enter element to insert at beginning
3
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
6 search
2
enter element to insert at end
5
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
6 search
2
enter element to insert at end
6
IT5311 Programming and... 02:03:52
SS
Type here to search
ENG
10:34
21-10-2020


navin@DESKTOP-D400C38: /mnt/d/ds lab
enter element to search
5
position of element is(0 if not found) : 3
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
6 search
4
enter element to delete
5
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
6 search
3
3 2 6
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
6 search
5
enter 0 to exit
1 to insert at beginning
2 to insert at end
3 to display
4 to delete element
5 to delete list
6 search
0
navin@DESKTOP-D400C38:/mnt/d/ds lab$
IT5311 Programming and... 02:04:03
SS
Type here to search
ENG
10:34
21-10-2020