/*doubly linked list full op*/

```
#include<stdio.h>
#include<stdlib.h>
struct node
{
	int data;
	struct node*rlink;
	struct node*llink;
};
struct node*header;
struct node*create_ll(struct node*);
struct node*display(struct node*);
struct node*insert_beg(struct node*);
struct node*insert_end(struct node*);
struct node*insert_any(struct node*);
struct node*delete_beg(struct node*);
struct node*delete_end(struct node*);
struct node*delete_any(struct node*);
void search();
struct node*sort_list(struct node*);
int main()
{
	int choice=0;
	while(choice!=11)
	{
		printf("**main menu**\n");
		printf("1.create list\n2.display the list\n3.insert at the begining\n4.insert at the end\n5.insert at any position\n6.delete from the begining\n7.delete from the end\n8.delete from any position\n9.search\n10.sort the list\n11.exit\n");
		printf("enter your choice\n");
		scanf("%d",&choice);
```

```
		switch(choice)
		{
			case 1:header=create_ll(header);
			break;
			case 2:header=display(header);
			break;
			case 3:header=insert_beg(header);
			break;
			case 4:header=insert_end(header);
			break;
			case 5:header=insert_any(header);
			break;
			case 6:header=delete_beg(header);
			break;
			case 7:delete_end(header);
			break;
			case 8:delete_any(header);
			break;
			case 9:search();
			break;
			case 10:header=sort_list(header);
			break;
			case 11:exit(0);
			default:
				printf("invalid choice\n");
		}
	}
}
struct node*create_ll(struct node*header)
{
	struct node*new_node,*ptr;
```

```
int item;
printf("enter -1 to end\n");
printf("enter the data: \n");
scanf("%d",&item);
while(item!=-1)
{
	if(header==NULL)
	{
		new_node=(struct node*)malloc(sizeof(struct node*));
		new_node->llink=NULL;
		new_node->data=item;
		new_node->rlink=NULL;
		header=new_node;
	}
	else
	{
		ptr=header;
		new_node=(struct node*)malloc(sizeof(struct node*));
		new_node->data=item;
		while(ptr->rlink!=NULL)
		{
			ptr=ptr->rlink;
		}
		ptr->rlink=new_node;
		new_node->rlink=NULL;
	}
	printf("enter the data: \n");
	scanf("%d",&item);
}
printf("the list is created\n");
return header;
```

```
}
struct node*display(struct node*header)
{
        printf("the linked list is below\n");
        struct node*ptr;
        ptr=header;
        while(ptr!=NULL)        //list is not empty
        {
                printf("%d\n",ptr->data);
                ptr=ptr->rlink;
   }
   return header;
}
struct node*insert_beg(struct node*header)
{
        struct node*new_node,*ptr;
        int item;
        if(header==NULL)
        {
                printf("overflow:insertion not possible\n");      //memory bank returns NULL
        }
        else
        {
                printf("enter the data to be inserted: \n");
           scanf("%d",&item);
                new_node=(struct node*)malloc(sizeof(struct node*));
                new_node->data=item;
                header->llink=new_node;
                new_node->rlink=header;
                new_node->llink=NULL;
                header=new_node;
```

```
                printf("node inserted at the begining\n");
                return header;
        }
        /*other process for else part
        {
          printf("enter the data to be inserted: \n");          {here,
          scanf("%d",&item);                                    header is not a node in ll}
          new_node=(struct node*)malloc(sizeof(struct node*));
          new_node->data=item;
          ptr=header->link;
          new_node->rlink=ptr;
          new_node->llink=header;
          header->rlink=new_node;
          ptr->llink=new_node;
   }
   */
}
struct node*insert_end(struct node*header)
{
        struct node*new_node,*ptr;
        int item;
        if(header==NULL)
        {
                printf("overflow:insertion not possible\n");      //memory bank returns NULL
        }
        else
        {
                printf("enter the data to be inserted: \n");
           scanf("%d",&item);
                new_node=(struct node*)malloc(sizeof(struct node*));
                new_node->data=item;
```

```
                ptr=header;
                while(ptr->rlink!=NULL)
                {
                        ptr=ptr->rlink;
                }
                ptr->rlink=new_node;
                new_node->llink=ptr;
                new_node->rlink=NULL;
                printf("node inserted at the end\n");
                return header;
        }
}
struct node*insert_any(struct node*header)
{
        struct node*new_node,*ptr;
        int loc,i,item;
        if(header==NULL)
        {
                printf("overflow:insertion not possible\n");      //memory bank returns NULL
        }
        else
        {
                printf("enter the location after which the node has to be inserted\n");
           scanf("%d",&loc);
           printf("enter the data to be inserted: \n");
           scanf("%d",&item);
                new_node=(struct node*)malloc(sizeof(struct node*));
                new_node->data=item;
                ptr=header;
                for(i=0;i<loc;i++)    //the linked list is started from 0th index here
                {
```

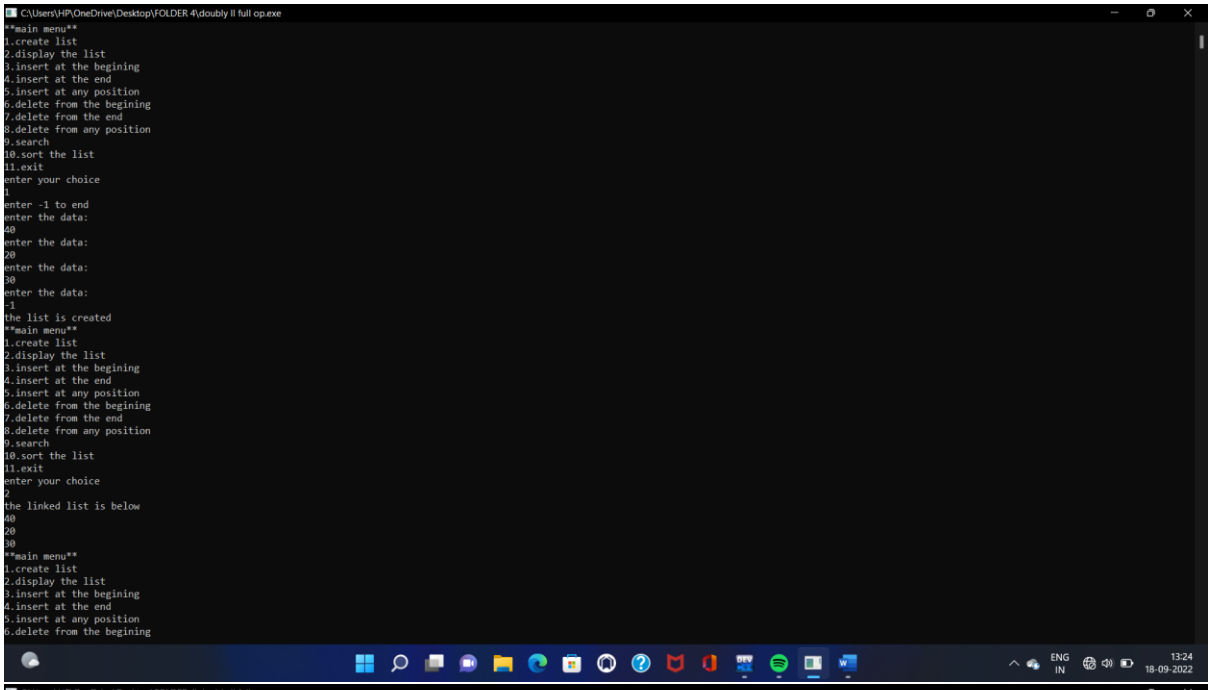
```
                ptr=ptr->rlink;
            }
            new_node->llink=ptr;
            new_node->rlink=ptr->rlink;
            ptr->rlink->llink=new_node;
            ptr->rlink=new_node;
            printf("node inserted at specific position\n");
            return header;
        }
}
struct node*delete_beg(struct node*header)
{
        struct node*ptr;
        if(header==NULL)
        {
            printf("deletion not possible\n");      //list is empty
        }
        else
        {
            ptr=header;
            header=header->rlink;
            header->llink=NULL;
            free(ptr);
            printf("node is deleted from the begining\n");
            return header;
        }
}
struct node*delete_end(struct node*header)
{
        struct node*ptr,*ptr1;
        if(header==NULL)
```

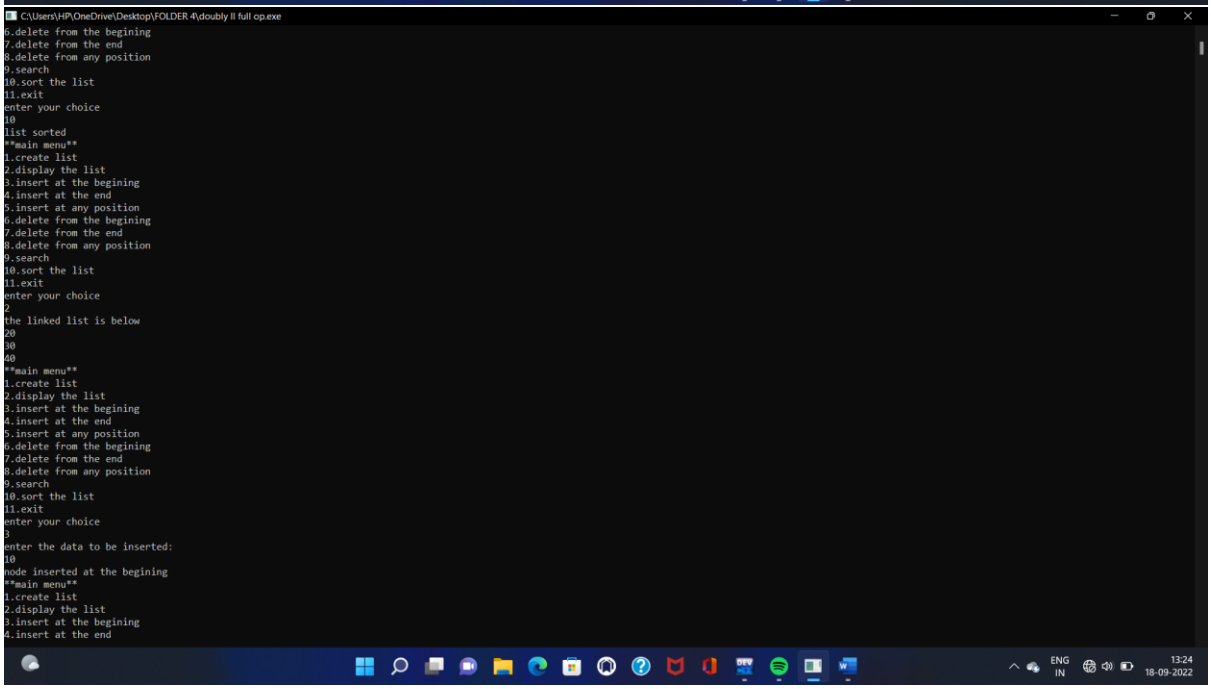
```
        {
                printf("deletion not possible\n");      //list is empty
        }
        else
        {
        ptr=header;
        while(ptr->rlink!=NULL)
        {
                ptr1=ptr;
                ptr=ptr->rlink;
        }
        ptr1->rlink=NULL;
        free(ptr);
        printf("node is deleted from the end\n");
        return header;
   }
}
struct node*delete_any(struct node*header)
{
        struct node*ptr,*ptr1;
        int i,loc,item;
        if(header==NULL)
        {
                printf("deletion not possible\n");      //list is empty
        }
        else
        {
                printf("enter the location after which the node has to be deleted\n");
           scanf("%d",&loc);
                ptr=header;
                for(i=0;i<=loc;i++)     //the linked list is started from 0th index here
```

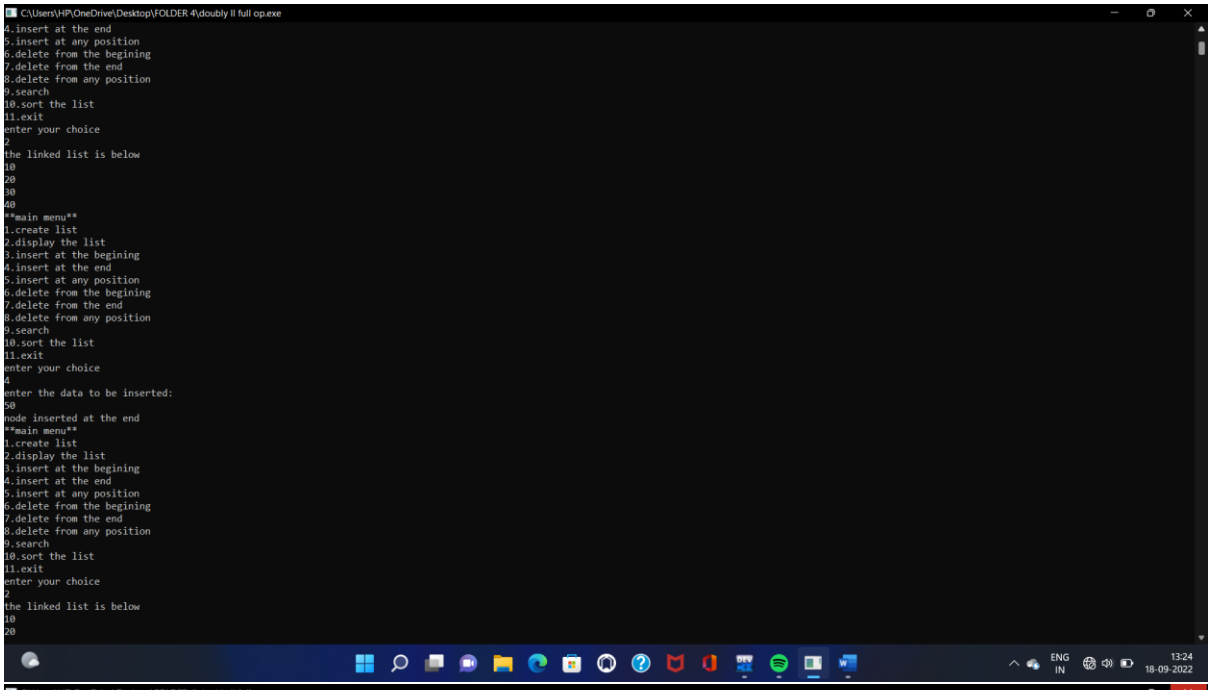
```
        {
                ptr1=ptr;
                ptr=ptr->rlink;
        }
    ptr->rlink->llink=ptr1;
    ptr1->rlink=ptr->rlink;
    free(ptr);
    printf("node deleyed from specific position\n");
    return header;
    }
}
void search()
{
    struct node*ptr;
    int item,i=0,flag=0,loc;
    if(header==NULL)
    {
        printf("empty list\n");

    }
    else
    {
        printf("enter item which you want to search\n");
       scanf("%d",&item);
        ptr=header;
        while(ptr->rlink!=NULL)
        {
            if(ptr->data==item)
            {
                flag=1;
                loc=i+1;
```

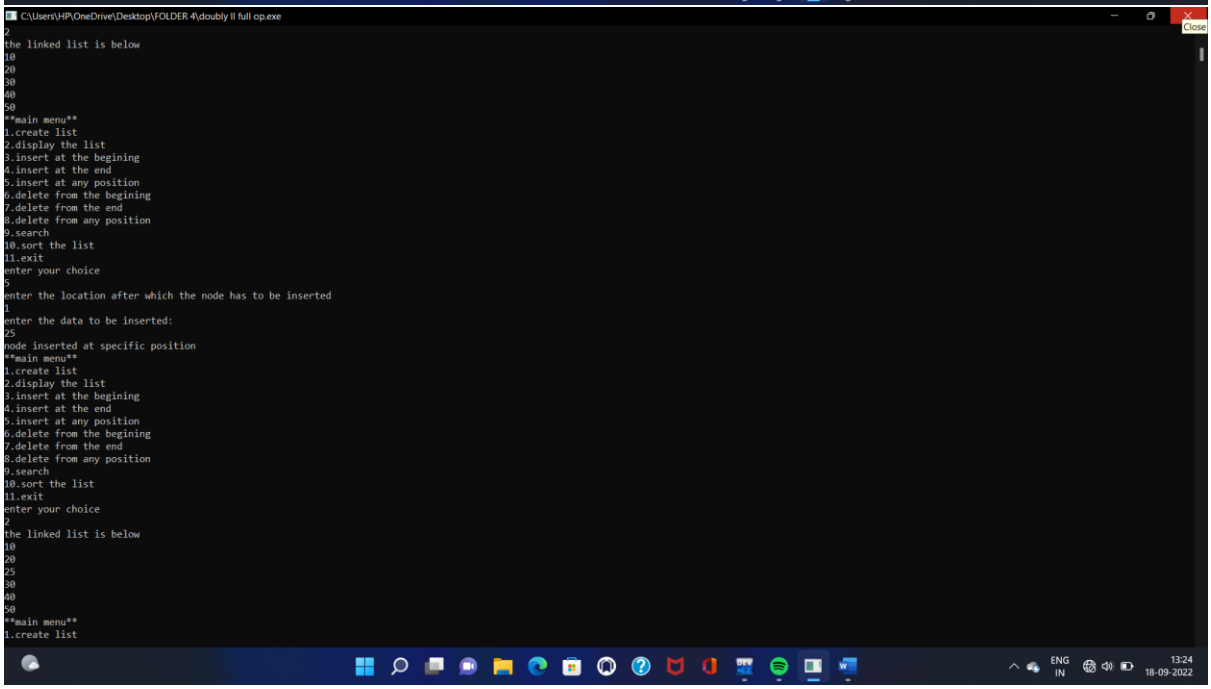
```
                        break;
                }
                else
                {
                        flag=0;
                }
                ++i;
                ptr=ptr->rlink;
        }
        if(flag==0)
        {
                printf("item not found\n");
        }
        else
        {
                printf("item found at location %d\n",loc);
        }
    }
}
struct node*sort_list(struct node*header)
{
    struct node*ptr1,*ptr2;
    int temp;
    ptr1=header;
    while(ptr1->rlink!=NULL)
    {
        ptr2=ptr1->rlink;
        while(ptr2!=NULL)      //there are atleast 2 nodes in the list
        {
                if(ptr1->data>ptr2->data)
                {
```

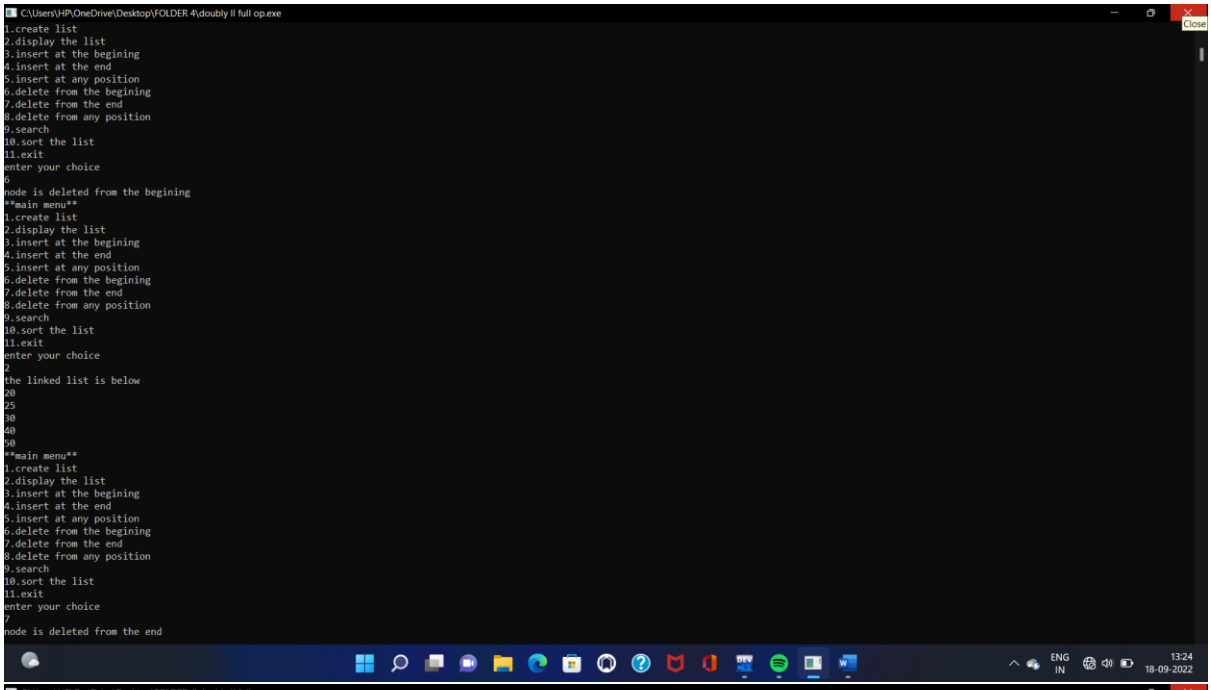
```
                    temp=ptr1->data;
                    ptr1->data=ptr2->data;
                    ptr2->data=temp;
                }
                ptr2=ptr2->rlink;
            }
            ptr1=ptr1->rlink;
        }
        printf("list sorted\n");
        return header;
}
```

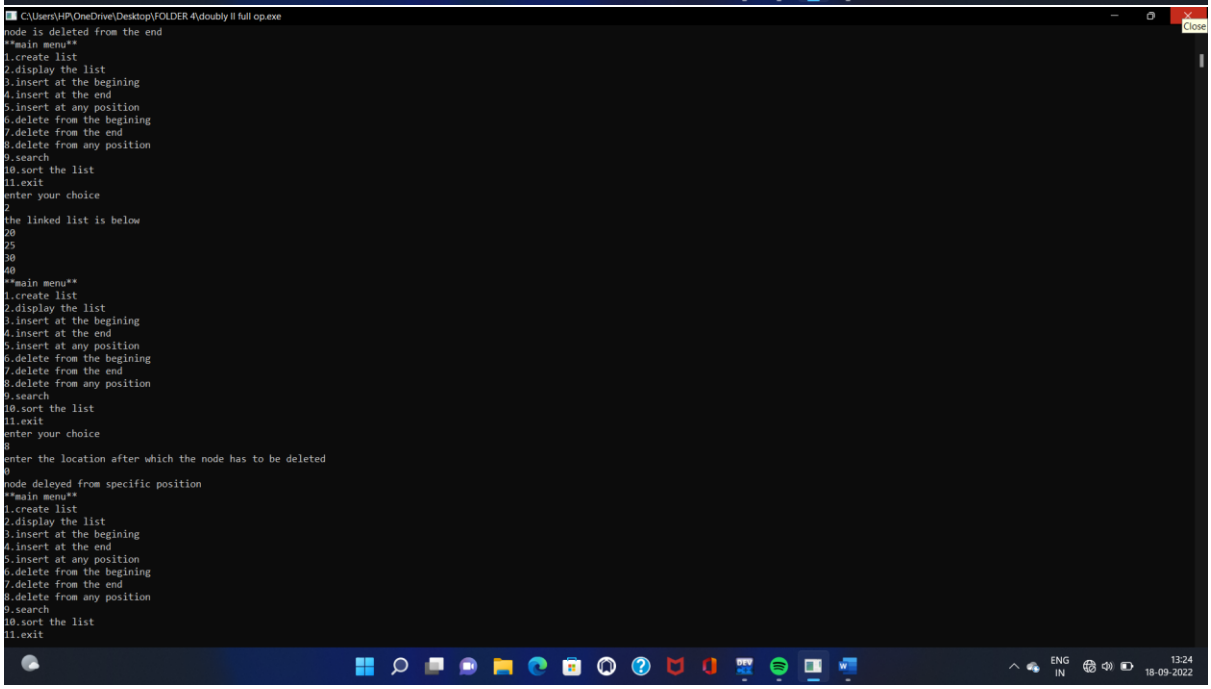

C:\Users\HP\OneDrive\Desktop\FOLDER 4\doubly ll full op.exe
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
1
enter -1 to end
enter the data:
40
enter the data:
20
enter the data:
30
enter the data:
-1
the list is created
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
2
the linked list is below
40
20
30
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
ENG
IN
13:24
18-09-2022

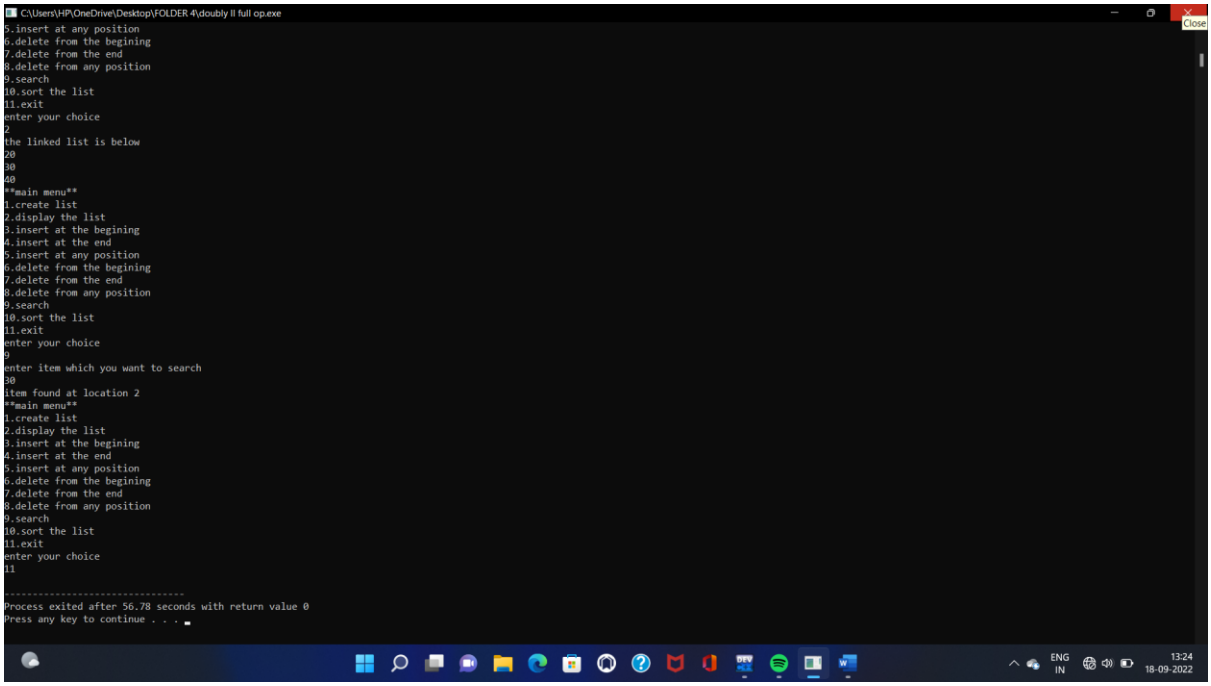

C:\Users\HP\OneDrive\Desktop\FOLDER 4\doubly ll full op.exe
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
10
list sorted
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
2
the linked list is below
20
30
40
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
3
enter the data to be inserted:
10
node inserted at the begining
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
ENG
IN
13:24
18-09-2022


C:\Users\HP\OneDrive\Desktop\FOLDER 4\doubly ll full op.exe
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
2
the linked list is below
10
20
30
40
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
4
enter the data to be inserted:
50
node inserted at the end
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
2
the linked list is below
10
20
ENG
IN
13:24
18-09-2022


C:\Users\HP\OneDrive\Desktop\FOLDER 4\doubly ll full op.exe
Close
2
the linked list is below
10
20
30
40
50
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
5
enter the location after which the node has to be inserted
1
enter the data to be inserted:
25
node inserted at specific position
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
2
the linked list is below
10
20
25
30
40
50
main menu
1.create list
ENG
IN
13:24
18-09-2022


C:\Users\HP\OneDrive\Desktop\FOLDER 4\doubly ll full op.exe
Close
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
6
node is deleted from the begining
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
2
the linked list is below
20
25
30
40
50
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
7
node is deleted from the end
ENG
IN
13:24
18-09-2022


C:\Users\HP\OneDrive\Desktop\FOLDER 4\doubly ll full op.exe
Close
node is deleted from the end
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
2
the linked list is below
20
25
30
40
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
8
enter the location after which the node has to be deleted
0
node deleyed from specific position
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
ENG
IN
13:24
18-09-2022


C:\Users\HP\OneDrive\Desktop\FOLDER 4\doubly ll full op.exe
Close
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
2
the linked list is below
20
30
40
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
9
enter item which you want to search
30
item found at location 2
main menu
1.create list
2.display the list
3.insert at the begining
4.insert at the end
5.insert at any position
6.delete from the begining
7.delete from the end
8.delete from any position
9.search
10.sort the list
11.exit
enter your choice
11

Process exited after 56.78 seconds with return value 0
Press any key to continue . . .
ENG
IN
13:24
18-09-2022