MODULE 01

1. Design, Develop and Implement a menu driven Program in C for the following Array Operations

a. Creating an Array of N Integer Elements

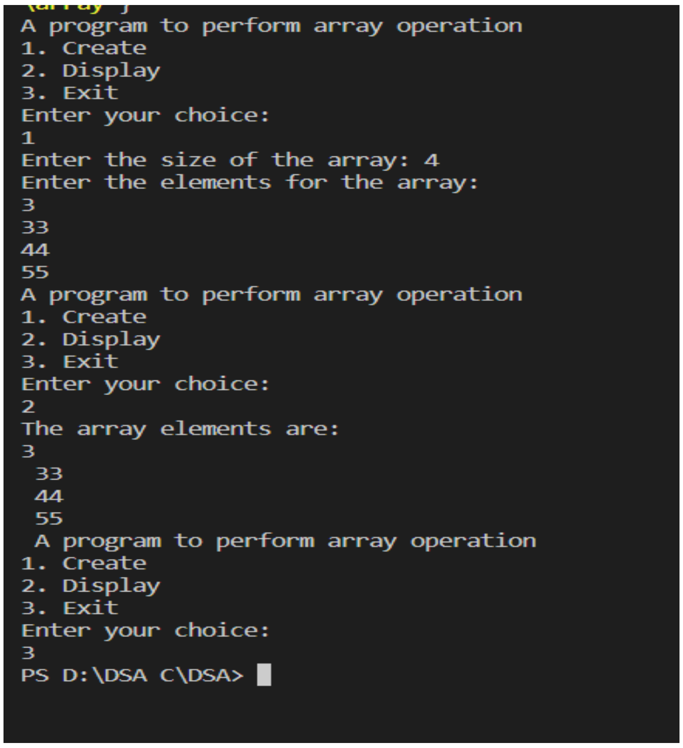
b. Display of Array Elements with Suitable Headings

c. Exit.

Support the program with functions for each of the above operations.

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

int a[20];
int n = 0;

void create()
{
     printf("Enter the size of the array: ");
     scanf("%d", &n);
     printf("Enter the elements for the array:\n");

     for(int i=0; i<n; i++)
         {
           scanf("%d",&a[i]);
          }
}


void display()
{
    printf("The array elements are:\n");
    for(int i=0; i<n; i++)
      {
       printf("%d\n ",a[i]);
      }
}


int main()
{
    int choice;
    while(1)
    {
        printf("A program to perform array operation\n");
        printf("1. Create\n");
        printf("2. Display\n");
        printf("3. Exit\n");

        printf("Enter your choice: \n");
        scanf("%d", &choice);

        switch(choice)
        {
            case 1: create();
            break;

            case 2: display();
            break;

           case 3: exit (0);

           default: printf("Invalid choice\n");

        }
    }

}
```

OUTPUT:



```
A program to perform array operation
1. Create
2. Display
3. Exit
Enter your choice:
1
Enter the size of the array: 4
Enter the elements for the array:
3
33
44
55
A program to perform array operation
1. Create
2. Display
3. Exit
Enter your choice:
2
The array elements are:
3
 33
 44
 55
 A program to perform array operation
1. Create
2. Display
3. Exit
Enter your choice:
3
PS D:\DSA C\DSA>
```

2. Design, Develop and Implement a menu driven Program in C for the following Array operations

a. Inserting an Element (ELEM) at a given valid Position (POS)

b. Deleting an Element at a given valid Position POS)

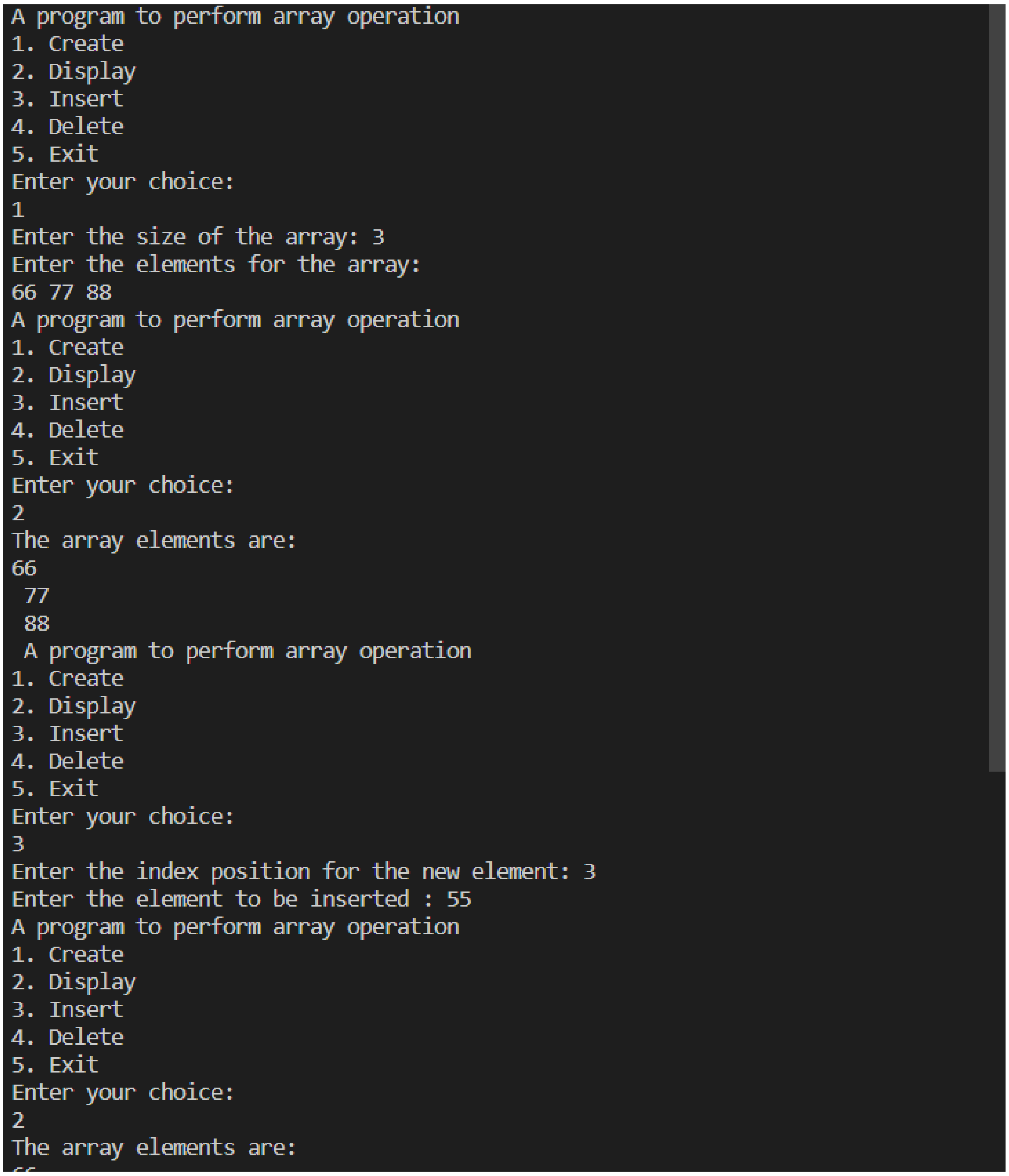
c. Display of Array Elements

d. Exit.

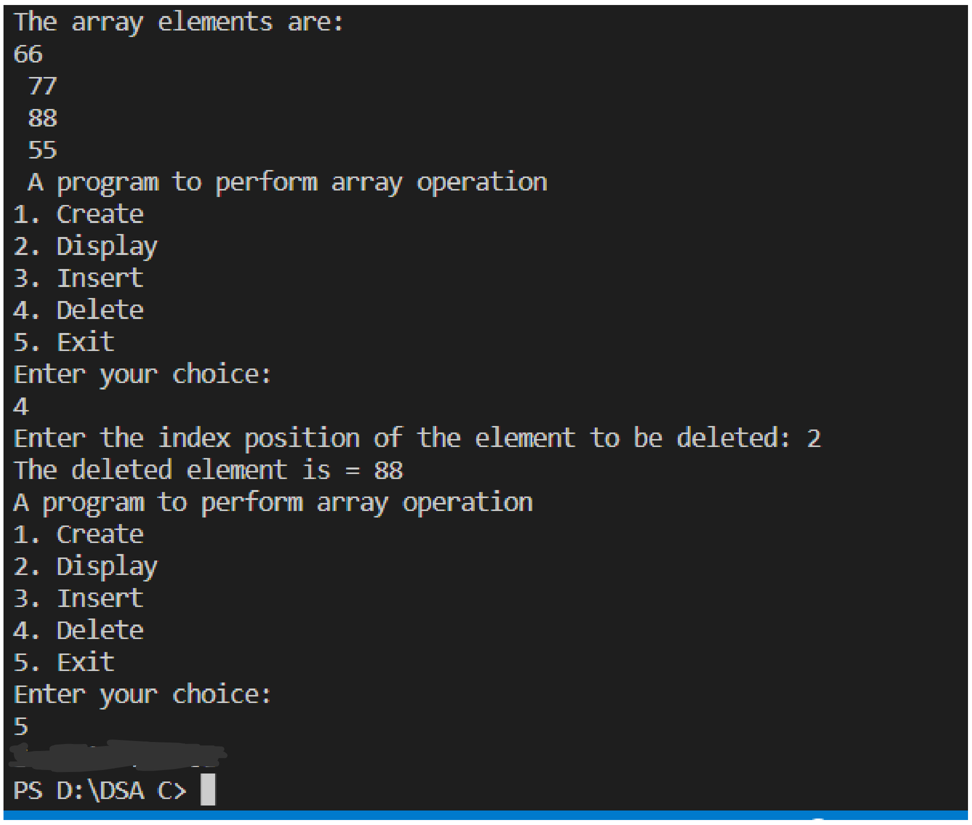
Support the program with functions for each of the above operations.

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

int a[20];
int n = 0;

void create()
{
    printf("Enter the size of the array: ");
    scanf("%d", &n);
    printf("Enter the elements for the array:\n");
    for (int i = 0; i < n; i++)
    {
        scanf("%d", &a[i]);
    }
}

void display()
{
    printf("The array elements are:\n");
    for (int i = 0; i < n; i++)
    {
        printf("%d\n ", a[i]);
    }
}

void insert()
{
    int pos, value;
    printf("Enter the index position for the new element: ");
    scanf("%d", &pos);
    printf("Enter the element to be inserted : ");
    scanf("%d", &value);
    for (int i = n - 1; i >= pos; i--)
    {
        a[i + 1] = a[i];
    }
    a[pos] = value;
    n = n + 1;
}

void delete()
{
    int pos, value;
    printf("Enter the index position of the element to be deleted: ");
    scanf("%d", &pos);
    value = a[pos];
    for (int i = pos + 1; i < n; i++)
    {
        a[i - 1] = a[i];
    }
    n = n - 1;
    printf("The deleted element is = %d\n", value);
}

void main()
{
    int choice;
    while (1)
    {
        printf("A program to perform array operation\n");
        printf("1. Create\n");
        printf("2. Display\n");
        printf("3. Insert\n");
        printf("4. Delete\n");
        printf("5. Exit\n");
        printf("Enter your choice: \n");
        scanf("%d", &choice);

        switch (choice)
        {
        case 1:
            create();
            break;

        case 2:
            display();
            break;

        case 3:
            insert();
            break;
        case 4:
            delete ();
            break;
        case 5: exit(0);
        default:
            printf("Invalid choice\n");

        }
    }
}
```

OUTPUT:



```
A program to perform array operation
1. Create
2. Display
3. Insert
4. Delete
5. Exit
Enter your choice:
1
Enter the size of the array: 3
Enter the elements for the array:
66 77 88
A program to perform array operation
1. Create
2. Display
3. Insert
4. Delete
5. Exit
Enter your choice:
2
The array elements are:
66
 77
 88
 A program to perform array operation
1. Create
2. Display
3. Insert
4. Delete
5. Exit
Enter your choice:
3
Enter the index position for the new element: 3
Enter the element to be inserted : 55
A program to perform array operation
1. Create
2. Display
3. Insert
4. Delete
5. Exit
Enter your choice:
2
The array elements are:
```



```
The array elements are:
66
 77
 88
 55
 A program to perform array operation
1. Create
2. Display
3. Insert
4. Delete
5. Exit
Enter your choice:
4
Enter the index position of the element to be deleted: 2
The deleted element is = 88
A program to perform array operation
1. Create
2. Display
3. Insert
4. Delete
5. Exit
Enter your choice:
5
[redacted]
PS D:\DSA C> 
```

MODULE 02:

1. Design, Develop and Implement a menu driven Program in C for the following operations on

STACK of Integers (Array Implementation of Stack with maximum size MAX)

a. Push an Element on to Stack

b. Pop an Element from Stack

c. Demonstrate Overflow and Underflow situations on Stack

d. Display the status of Stack

e. Exit

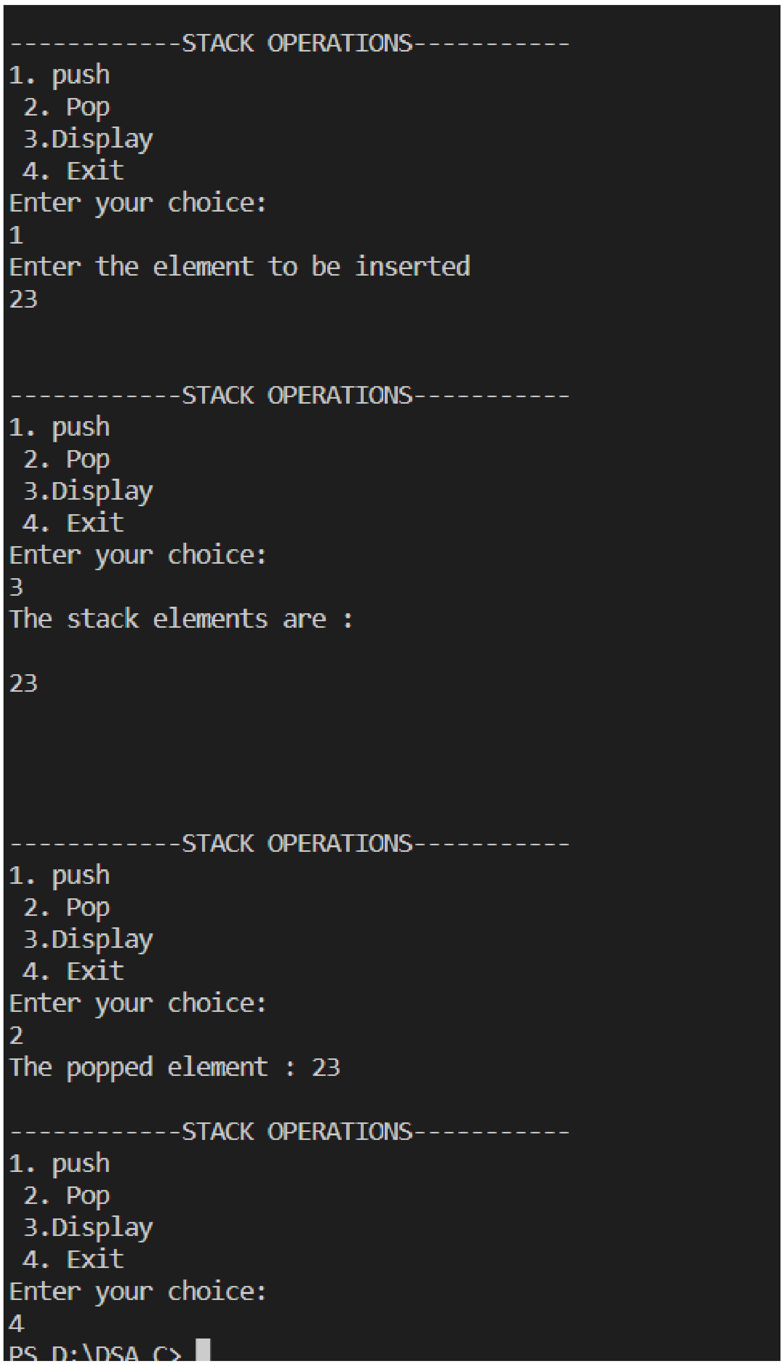
Support the program with appropriate functions for each of the above operations

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#define max_size 5
```

```
int stack[max_size], top = -1;

void push()
{
    int item;
    if (top == max_size - 1)
    {
        printf("Stack Overflow\n");
    }
    else
    {
        printf("Enter the element to be inserted\n");
        scanf("%d", &item);

        top = top + 1;
        stack[top] = item;
    }
}

void pop()
{
    int item;
    if (top == -1)
    {
        printf("Stack Underflow\n");
    }
    else
    {
        printf("The popped element : %d\t", stack[top--]);
    }
}

void display()
{
    if (top == -1)
    {
        printf("Stack is empty\n");
    }
    else
    {
        printf("The stack elements are :\n\n");
        for (int i = 0; i <= top; i++)
        {
            printf("%d\n", stack[i]);
        }
    }
    printf("\n\n");
}
```

```c
void main()
{
    int choice;
    while (choice)
    {
        printf("\n\n------------STACK OPERATIONS-----------\n");
        printf("1. push\n 2. Pop\n 3.Display\n 4. Exit\n");
        printf("Enter your choice:\n");
        scanf("%d", &choice);

        switch (choice)
        {
        case 1:
            push();
            break;
        case 2:
            pop();
            break;
        case 3:
            display();
            break;
        case 4:
            exit(0);
            break;

        default:
            printf("Invalid choice\n");
            break;
        }
    }
}
```

OUTPUT:



```
------------STACK OPERATIONS-----------
1. push
 2. Pop
 3.Display
 4. Exit
Enter your choice:
1
Enter the element to be inserted
23


------------STACK OPERATIONS-----------
1. push
 2. Pop
 3.Display
 4. Exit
Enter your choice:
3
The stack elements are :

23




------------STACK OPERATIONS-----------
1. push
 2. Pop
 3.Display
 4. Exit
Enter your choice:
2
The popped element : 23

------------STACK OPERATIONS-----------
1. push
 2. Pop
 3.Display
 4. Exit
Enter your choice:
4
PS D:\DSA C>
```

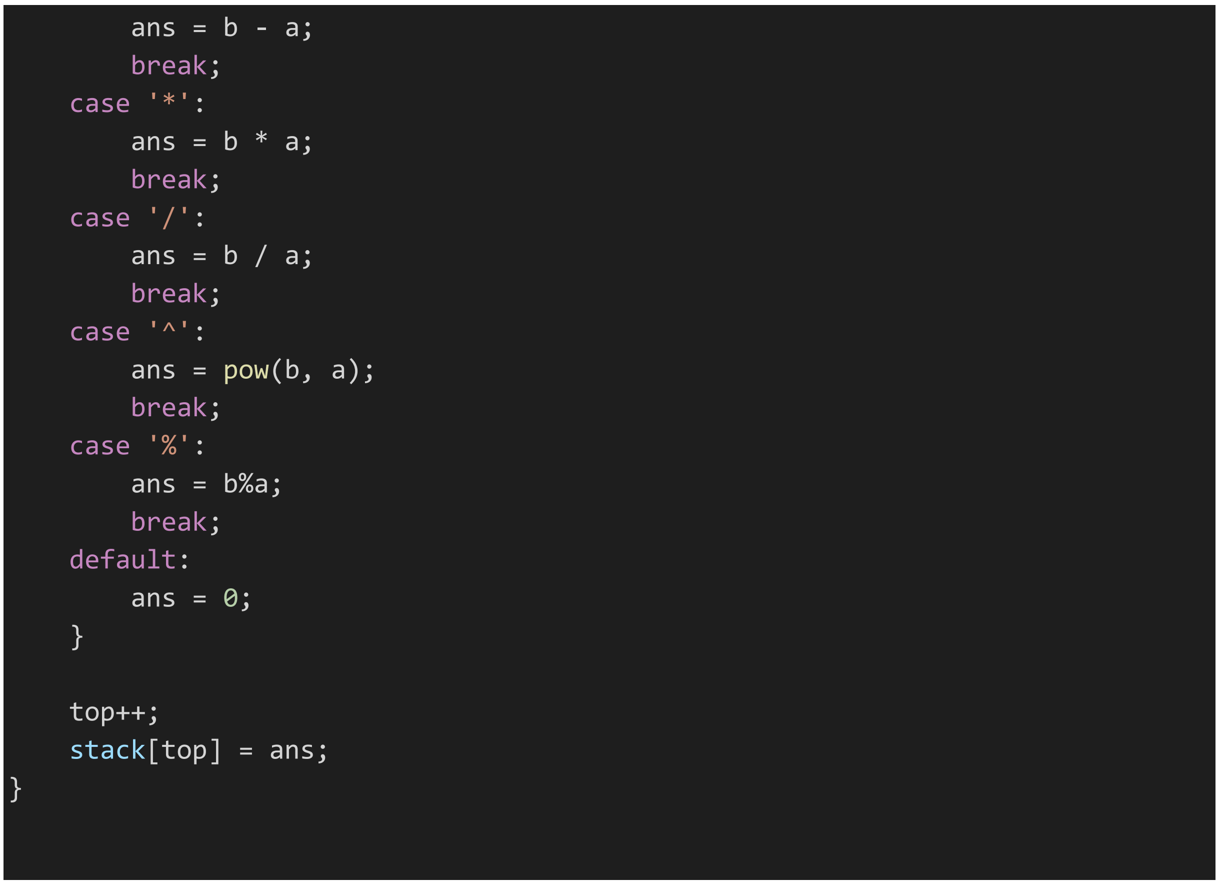
2. Design, Develop and Implement a Program in C for the following Stack Applications

a. Evaluation of Suffix expression with single digit operands and operators: +, -, *, /, %, ^

b. Solving Tower of Hanoi problem with n disks

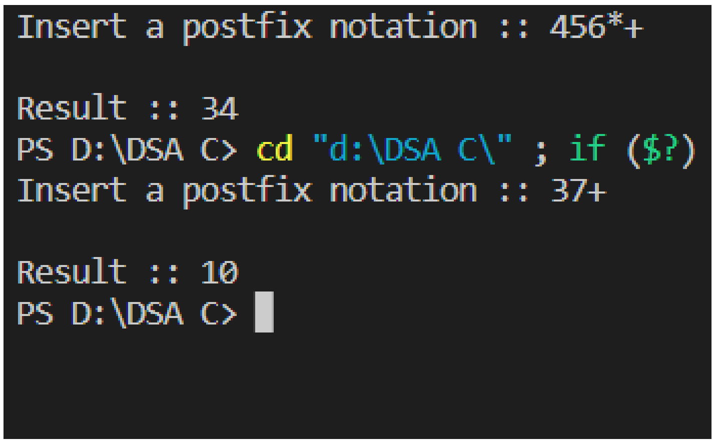
```c
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <math.h>
```

```
#define MAX 50

int stack[MAX];
char post[MAX];
int top = -1;

/*FUNCTION PROTOYPE */
void pushstack(int tmp);
void calculator(char c);

int main()
{
    int i;
    printf("Insert a postfix notation :: ");
    scanf("%s", post);
    for (i = 0; i < strlen(post); i++)
    {
        if (post[i] >= '0' && post[i] <= '9')
        {
            pushstack(i);
        }
        if (post[i] == '+' || post[i] == '-' || post[i] == '*' || post[i] ==
'/' || post[i] == '%' || post[i] == '^')
        {
            calculator(post[i]);
        }
    }
    printf("\nResult :: %d", stack[top]);
}

void pushstack(int tmp)
{
    stack[++top] = (int)(post[tmp] - 48);
}

void calculator(char c)
{
    int a, b, ans;
    a = stack[top--];
    b = stack[top--];

    switch (c)
    {

    case '+':
        ans = b + a;
        break;
    case '-':
```



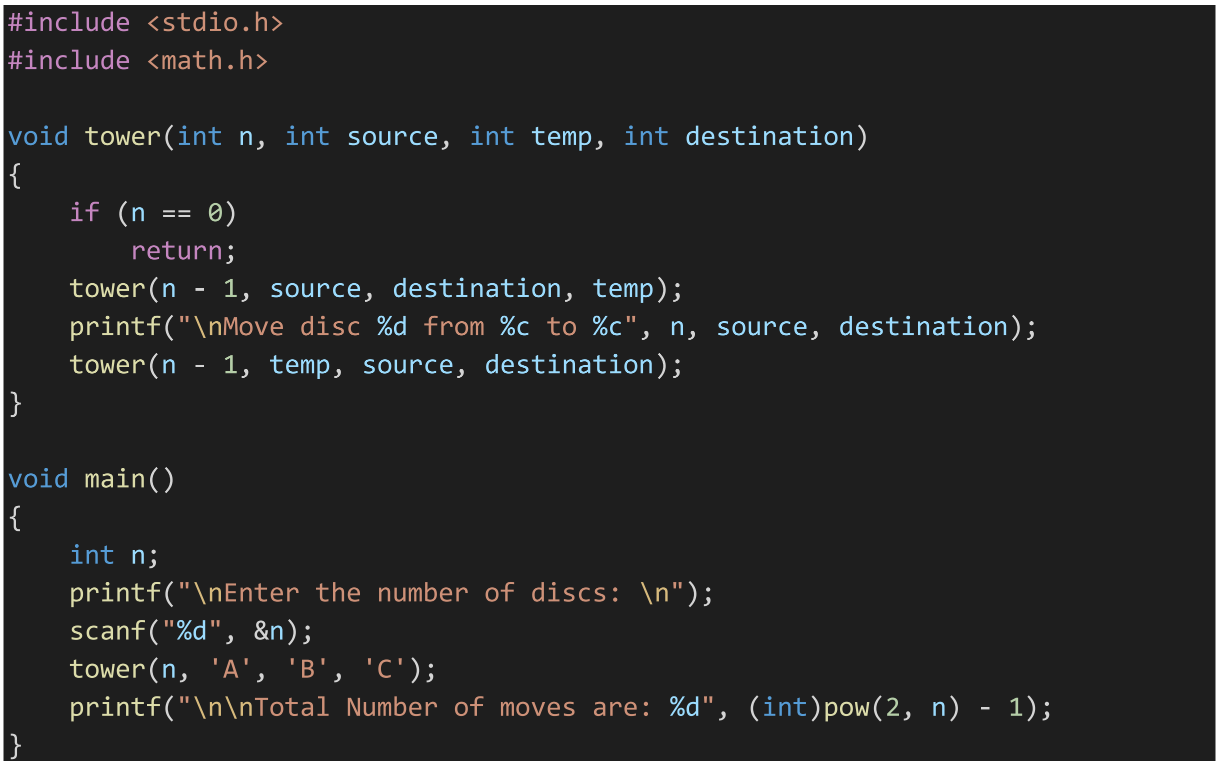
```
            ans = b - a;
            break;
        case '*':
            ans = b * a;
            break;
        case '/':
            ans = b / a;
            break;
        case '^':
            ans = pow(b, a);
            break;
        case '%':
            ans = b%a;
            break;
        default:
            ans = 0;
    }

    top++;
    stack[top] = ans;
}
```

OUTPUT:



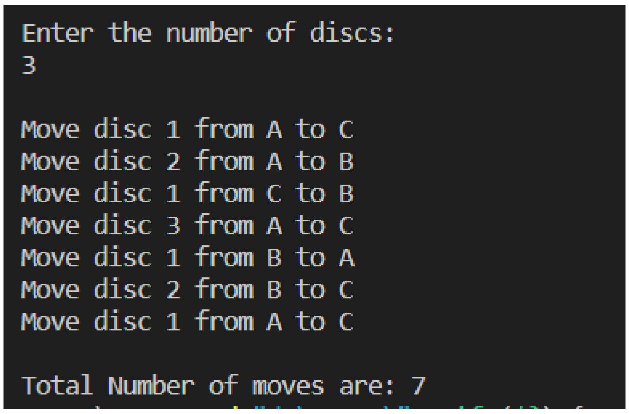
```
Insert a postfix notation :: 456*+

Result :: 34
PS D:\DSA C> cd "d:\DSA C\" ; if ($?)
Insert a postfix notation :: 37+

Result :: 10
PS D:\DSA C> 
```

b. Tower of Hanoi



```c
#include <stdio.h>
#include <math.h>

void tower(int n, int source, int temp, int destination)
{
    if (n == 0)
        return;
    tower(n - 1, source, destination, temp);
    printf("\nMove disc %d from %c to %c", n, source, destination);
    tower(n - 1, temp, source, destination);
}

void main()
{
    int n;
    printf("\nEnter the number of discs: \n");
    scanf("%d", &n);
    tower(n, 'A', 'B', 'C');
    printf("\n\nTotal Number of moves are: %d", (int)pow(2, n) - 1);
}
```

OUTPUT:



```
Enter the number of discs:
3

Move disc 1 from A to C
Move disc 2 from A to B
Move disc 1 from C to B
Move disc 3 from A to C
Move disc 1 from B to A
Move disc 2 from B to C
Move disc 1 from A to C

Total Number of moves are: 7
```

MODULE 03:

1. Singly Linked List (SLL) of Integer Data

a. Create a SLL stack of N integer.

b. Display of SLL

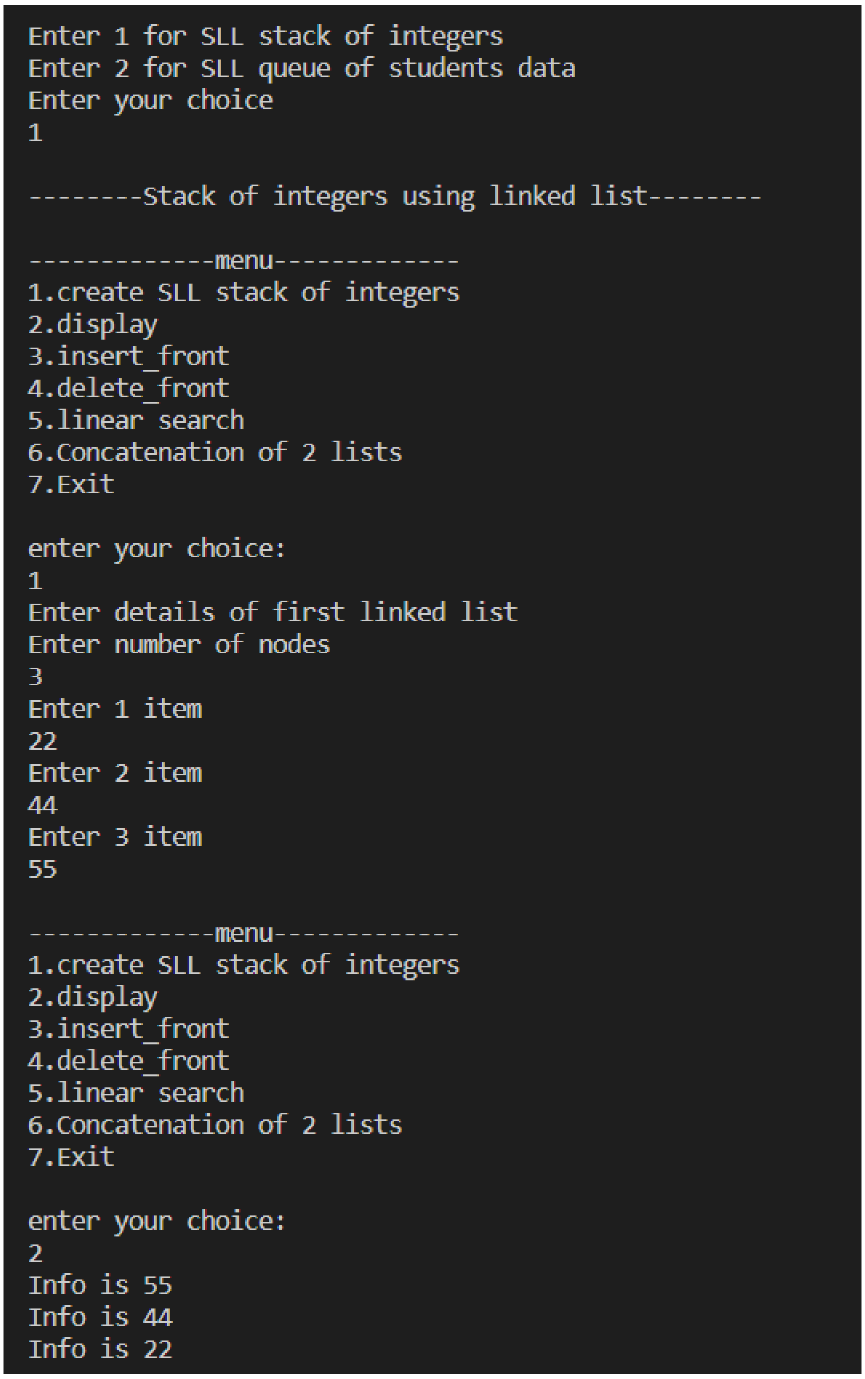
c. Linear search. Create a SLL queue of N Students Data Concatenation of two SLL of integers.

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
struct node
{
    int info;
    struct node *link;
};
typedef struct node * NODE;
struct nodes
{
    char usn[100],name[100],branch[100];
    struct nodes *next;
};
typedef struct nodes * NODES;

NODES insertRear(NODES first)
{
    NODES temp,cur;
    char usn[100],branch[100],name[100];
    temp=(NODES)malloc(sizeof(struct nodes));
    printf("Enter student's name,usn,branch respectively\n");
    scanf("%s%s%s",name,usn,branch);
    strcpy(temp->name,name);
    strcpy(temp->usn,usn);
    strcpy(temp->branch,branch);
    temp->next=NULL;
    if(first==NULL)
        return temp;
    cur = first;
    while(cur->next!=NULL)
        cur = cur->next;
    cur->next=temp;
    return first;
}

NODES DeleteFront(NODES first)
{
    NODES temp = first;
    if(first == NULL)
    {
        printf("No Student data is present in linked list\n");
        return first;
    }
    printf("\nDeleted students data is\n");
    printf("%s\t%s\t%s\t",first->name,first->usn,first->branch);
    first = temp->next;
    free(temp);
    return first;

}

void displayq(NODES first)
{
    NODES cur = first;
    if(first == NULL)
    {
        printf("No students data is present in linked list\n");
        return;
    }
    printf("\nStudents data is\nname\t\tusn\t\tbranch\t\n------\t\t------\t\t-
------\t\n");
    while(cur!=NULL)
    {
        printf("%s\t\t%s\t\t%s\t\n",cur->name,cur->usn,cur->branch);
        cur = cur->next;
    }
}

NODES createq()
{
    int n;
    NODES temp = NULL;
    printf("Enter number of nodes\n");
    scanf("%d",&n);
    for(int i=0;i<n;i++)
    {
        printf("\nEnter student %d details\n",i+1);
        temp = insertRear(temp);
    }
    return temp;
}

NODE insertFront(NODE first,int item)
{
    NODE temp = (NODE)malloc(sizeof(struct node));
    temp->info = item;
    temp->link = NULL;
    if(first==NULL)
        return temp;
    temp->link = first;
    first = temp;
    return first;
}

NODE deleteFront(NODE first)
{
    NODE temp = first;
    if(first == NULL)
    {
        printf("No Node is present in linked list\n");
        return first;
    }
    printf("Deleted item is %d\n",temp->info);
    first = temp->link;
    free(temp);
    return first;

}

void display(NODE first)
{
    NODE cur = first;
    if(first == NULL)
    {
        printf("No Node is present in linked list\n");
        return;
    }
    while(cur!=NULL)
    {
        printf("Info is %d\n",cur->info);
        cur = cur->link;
    }
}

void linearSearch(NODE first,int key)
{
    NODE cur = first;
    int count = 0;
    if(first == NULL)
    {
        printf("No Node is present in linked list\n");
        return;
    }
    while(cur!=NULL&&key!=cur->info)
    {
        cur = cur->link;
        count++;
    }
    if(cur==NULL)
    {
        printf("Unsuccessful search\n");
        return;
    }
    printf("Element found at location %d\n",count+1);
    return;
}

NODE create()
{
    int n,item;
    NODE temp = NULL;
    printf("Enter number of nodes\n");
    scanf("%d",&n);
    for(int i=0;i<n;i++)
    {
        printf("Enter %d item\n",i+1);
        scanf("%d",&item);
        temp = insertFront(temp,item);
    }
    return temp;
}

NODE concatenate(NODE first,NODE second)
{
    NODE cur = first;
    if(first == NULL)
        return second;
    while(cur->link!=NULL)
        cur = cur->link;
    cur->link = second;
    return first;
}

void stack()
{
    int ch, n, i, key, item;
    NODE first=NULL,second=NULL;
    printf("\n--------Stack of integers using linked list--------\n");

    while (1)
    {
        printf("\n------------menu------------\n");
        printf("1.create SLL stack of 
integers\n2.display\n3.insert_front\n4.delete_front\n5.linear 
search\n6.Concatenation of 2 lists\n7.Exit\n");
        printf("\nenter your choice:\n");
        scanf("%d", &ch);
        switch (ch)
        {
        case 1: printf("Enter details of first linked list\n");
                first = create();
                break;
        case 2: display(first);
                break;
        case 3: printf("Enter item to insert at first\n");
                scanf("%d",&item);
                first = insertFront(first,item);
                break;
        case 4: first = deleteFront(first);
                break;
        case 5: printf("Enter the key to be searched:\n");
                scanf("%d", &key);
                linearSearch(first,key);
                break;
        case 6: printf("Enter details of second linked list\n");
                second = create();
                first = concatenate(first,second);
                break;
        case 7: exit(0);
        default:printf("invalid choice");
        }
    }
    return;
}

void queue()
{
    int ch, n, i, key, item;
    NODES first=NULL;
    printf("\n--------Queue of students data using linked list--------\n");

    while (1)
    {
        printf("\n----------------menu----------------\n");
        printf("1.create SLL queue of students data\n2.display\n3.Insert 
Rear\n4.Delete front\n5.Exit\n");
        printf("\nenter your choice:\n");
        scanf("%d", &ch);
        switch (ch)
        {
```

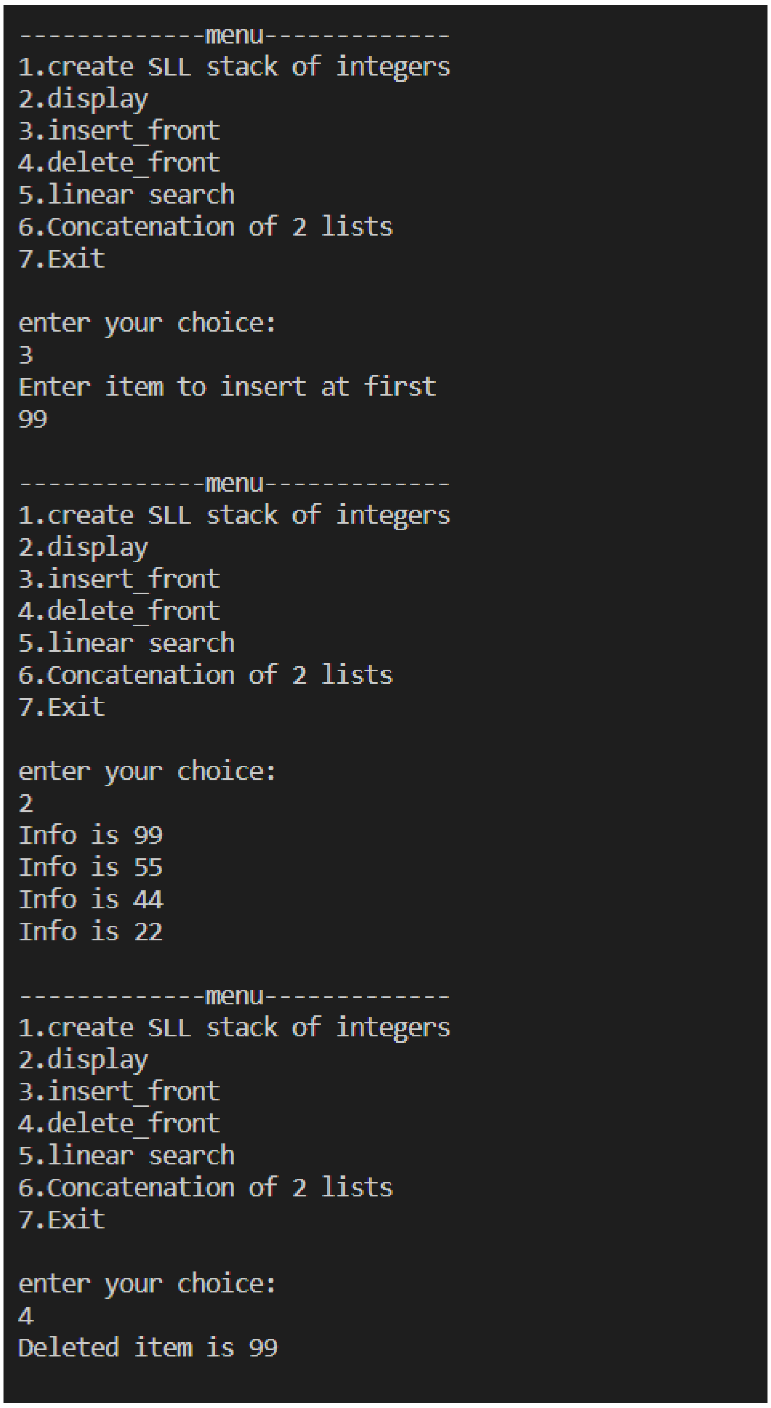
```
        case 1: first = createq();
                break;
        case 2: displayq(first);
                break;
        case 3: first = insertRear(first);
                break;
        case 4: first = DeleteFront(first);
                break;
        case 5: exit(0);
        default:printf("invalid choice");
        }
    }

}

int main()
{
    int op;
    printf("\nEnter 1 for SLL stack of integers\nEnter 2 for SLL queue of
students data\nEnter your choice\n");
    scanf("%d",&op);
    switch(op)
    {
        case 1: stack();
                break;
        case 2: queue();
                break;
    }
}
```

OUTPUT:

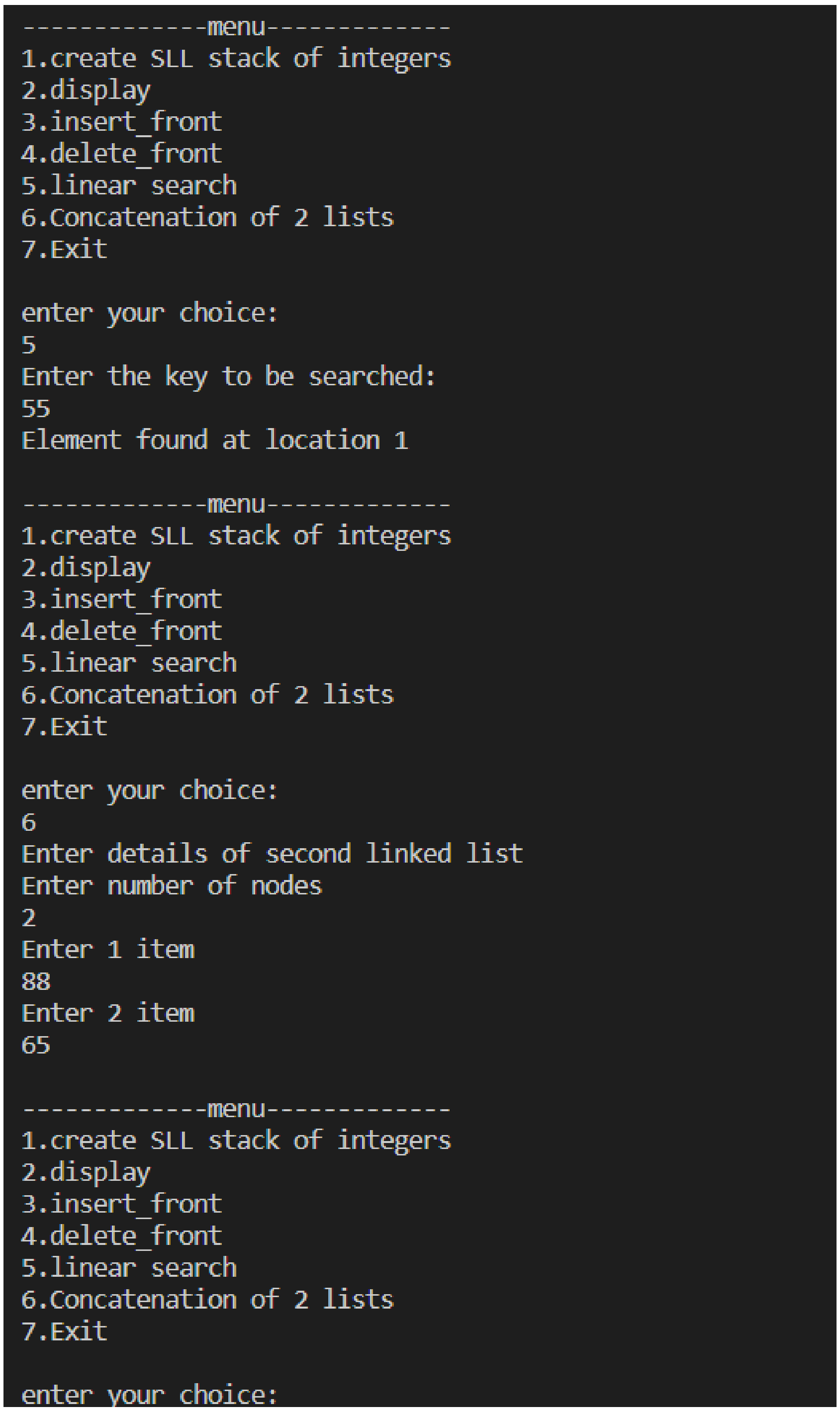
//OUTPUT OF PART 1



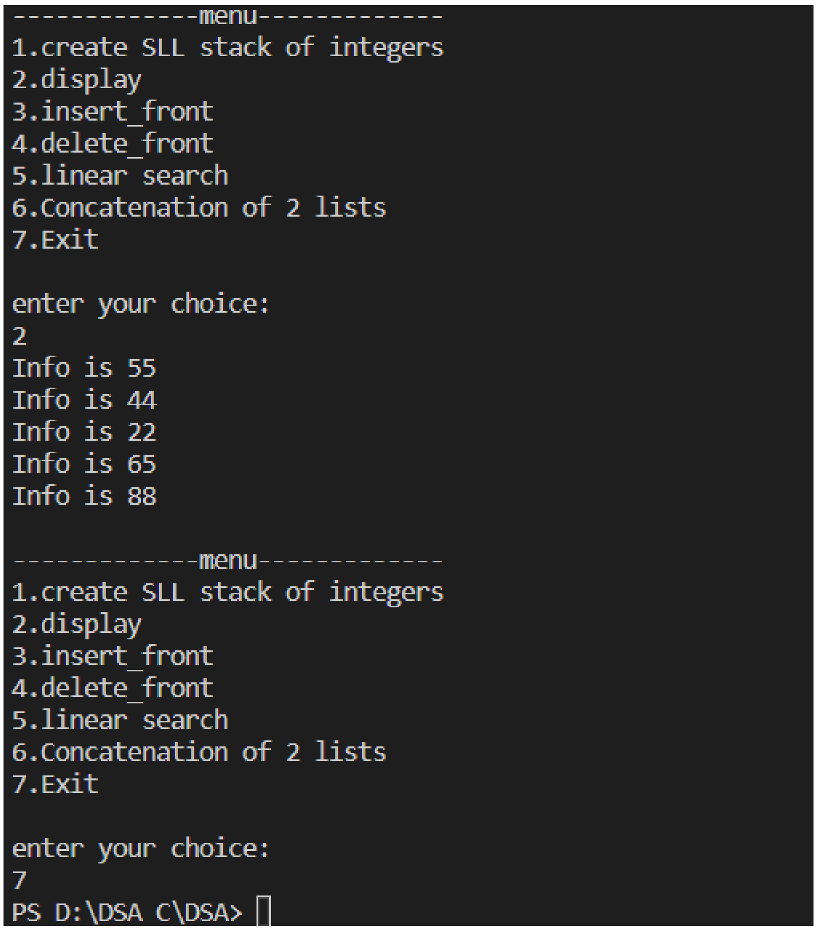
```
Enter 1 for SLL stack of integers
Enter 2 for SLL queue of students data
Enter your choice
1

--------Stack of integers using linked list--------

-------------menu-------------
1.create SLL stack of integers
2.display
3.insert_front
4.delete_front
5.linear search
6.Concatenation of 2 lists
7.Exit

enter your choice:
1
Enter details of first linked list
Enter number of nodes
3
Enter 1 item
22
Enter 2 item
44
Enter 3 item
55

-------------menu-------------
1.create SLL stack of integers
2.display
3.insert_front
4.delete_front
5.linear search
6.Concatenation of 2 lists
7.Exit

enter your choice:
2
Info is 55
Info is 44
Info is 22
```



```
-------------menu-------------
1.create SLL stack of integers
2.display
3.insert_front
4.delete_front
5.linear search
6.Concatenation of 2 lists
7.Exit

enter your choice:
3
Enter item to insert at first
99

-------------menu-------------
1.create SLL stack of integers
2.display
3.insert_front
4.delete_front
5.linear search
6.Concatenation of 2 lists
7.Exit

enter your choice:
2
Info is 99
Info is 55
Info is 44
Info is 22

-------------menu-------------
1.create SLL stack of integers
2.display
3.insert_front
4.delete_front
5.linear search
6.Concatenation of 2 lists
7.Exit

enter your choice:
4
Deleted item is 99
```

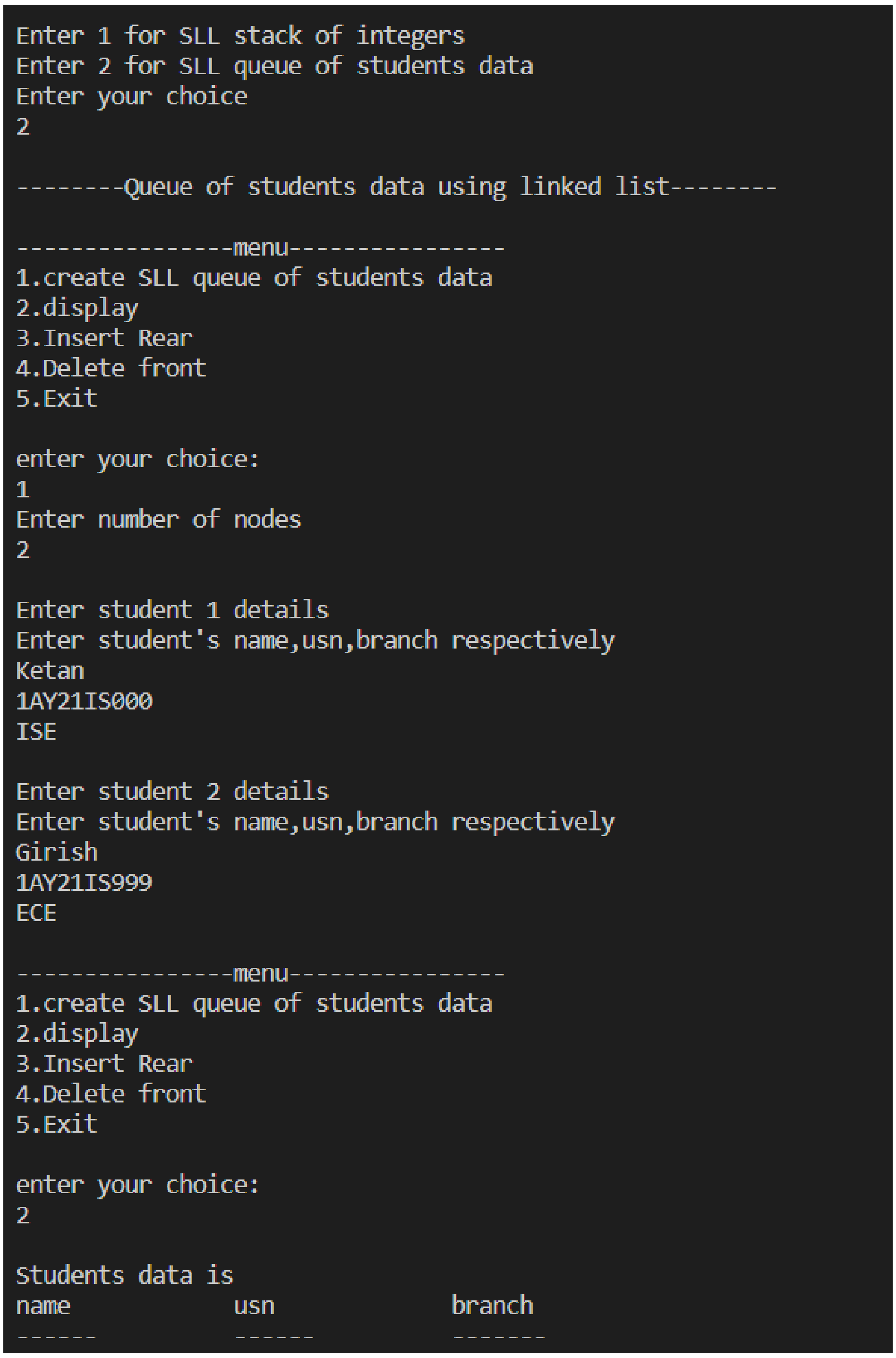


```
-------------menu-------------
1.create SLL stack of integers
2.display
3.insert_front
4.delete_front
5.linear search
6.Concatenation of 2 lists
7.Exit

enter your choice:
5
Enter the key to be searched:
55
Element found at location 1

-------------menu-------------
1.create SLL stack of integers
2.display
3.insert_front
4.delete_front
5.linear search
6.Concatenation of 2 lists
7.Exit

enter your choice:
6
Enter details of second linked list
Enter number of nodes
2
Enter 1 item
88
Enter 2 item
65

-------------menu-------------
1.create SLL stack of integers
2.display
3.insert_front
4.delete_front
5.linear search
6.Concatenation of 2 lists
7.Exit

enter your choice:
```

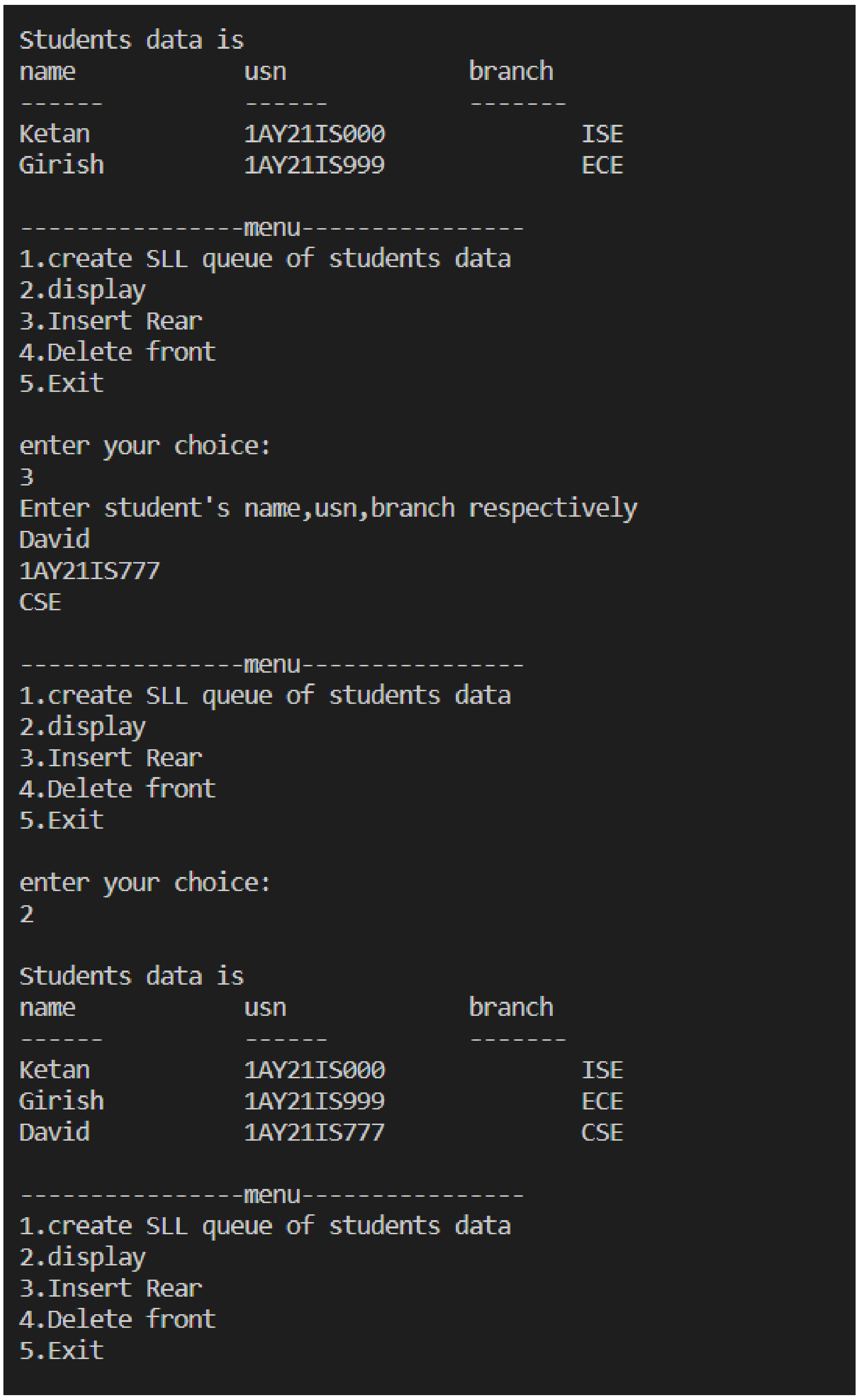


```
-------------menu-------------
1.create SLL stack of integers
2.display
3.insert_front
4.delete_front
5.linear search
6.Concatenation of 2 lists
7.Exit

enter your choice:
2
Info is 55
Info is 44
Info is 22
Info is 65
Info is 88

-------------menu-------------
1.create SLL stack of integers
2.display
3.insert_front
4.delete_front
5.linear search
6.Concatenation of 2 lists
7.Exit

enter your choice:
7
PS D:\DSA C\DSA> 
```

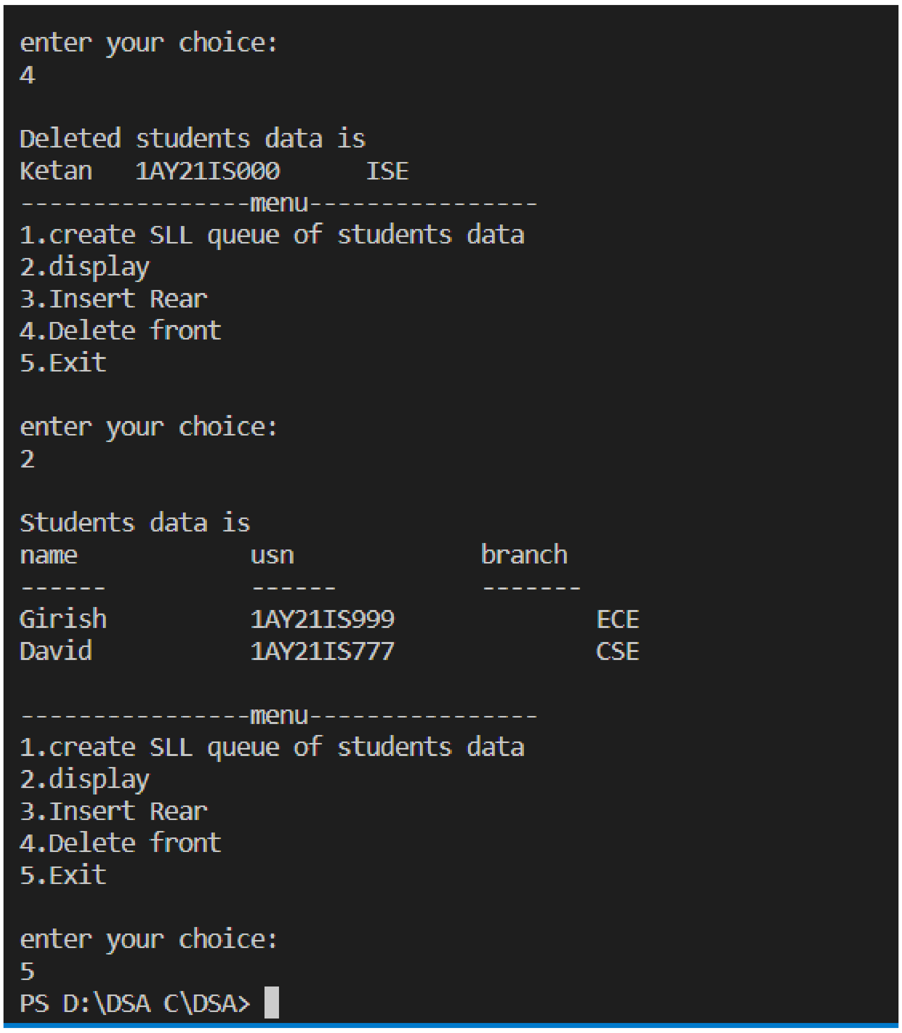
// OUTPUT FOR PART 2



```
Enter 1 for SLL stack of integers
Enter 2 for SLL queue of students data
Enter your choice
2

--------Queue of students data using linked list--------

----------------menu----------------
1.create SLL queue of students data
2.display
3.Insert Rear
4.Delete front
5.Exit

enter your choice:
1
Enter number of nodes
2

Enter student 1 details
Enter student's name,usn,branch respectively
Ketan
1AY21IS000
ISE

Enter student 2 details
Enter student's name,usn,branch respectively
Girish
1AY21IS999
ECE

----------------menu----------------
1.create SLL queue of students data
2.display
3.Insert Rear
4.Delete front
5.Exit

enter your choice:
2

Students data is
name            usn             branch
------          ------          -------
```



```
Students data is
name            usn             branch
------          ------          -------
Ketan           1AY21IS000              ISE
Girish          1AY21IS999              ECE

----------------menu----------------
1.create SLL queue of students data
2.display
3.Insert Rear
4.Delete front
5.Exit

enter your choice:
3
Enter student's name,usn,branch respectively
David
1AY21IS777
CSE

----------------menu----------------
1.create SLL queue of students data
2.display
3.Insert Rear
4.Delete front
5.Exit

enter your choice:
2

Students data is
name            usn             branch
------          ------          -------
Ketan           1AY21IS000              ISE
Girish          1AY21IS999              ECE
David           1AY21IS777              CSE

----------------menu----------------
1.create SLL queue of students data
2.display
3.Insert Rear
4.Delete front
5.Exit
```



```
enter your choice:
4

Deleted students data is
Ketan   1AY21IS000      ISE
----------------menu----------------
1.create SLL queue of students data
2.display
3.Insert Rear
4.Delete front
5.Exit

enter your choice:
2

Students data is
name            usn             branch
------          ------          -------
Girish          1AY21IS999              ECE
David           1AY21IS777              CSE

----------------menu----------------
1.create SLL queue of students data
2.display
3.Insert Rear
4.Delete front
5.Exit

enter your choice:
5
PS D:\DSA C\DSA>
```

2. Design, Develop and Implement a menu driven Program in C for the following operations on Doubly Linked List (DLL) of Professor Data with the fields: ID, Name, Branch, Area of Specialization

a. Create a DLL stack of N Professor's Data.

Display the status of DLL and count the number of nodes in it.

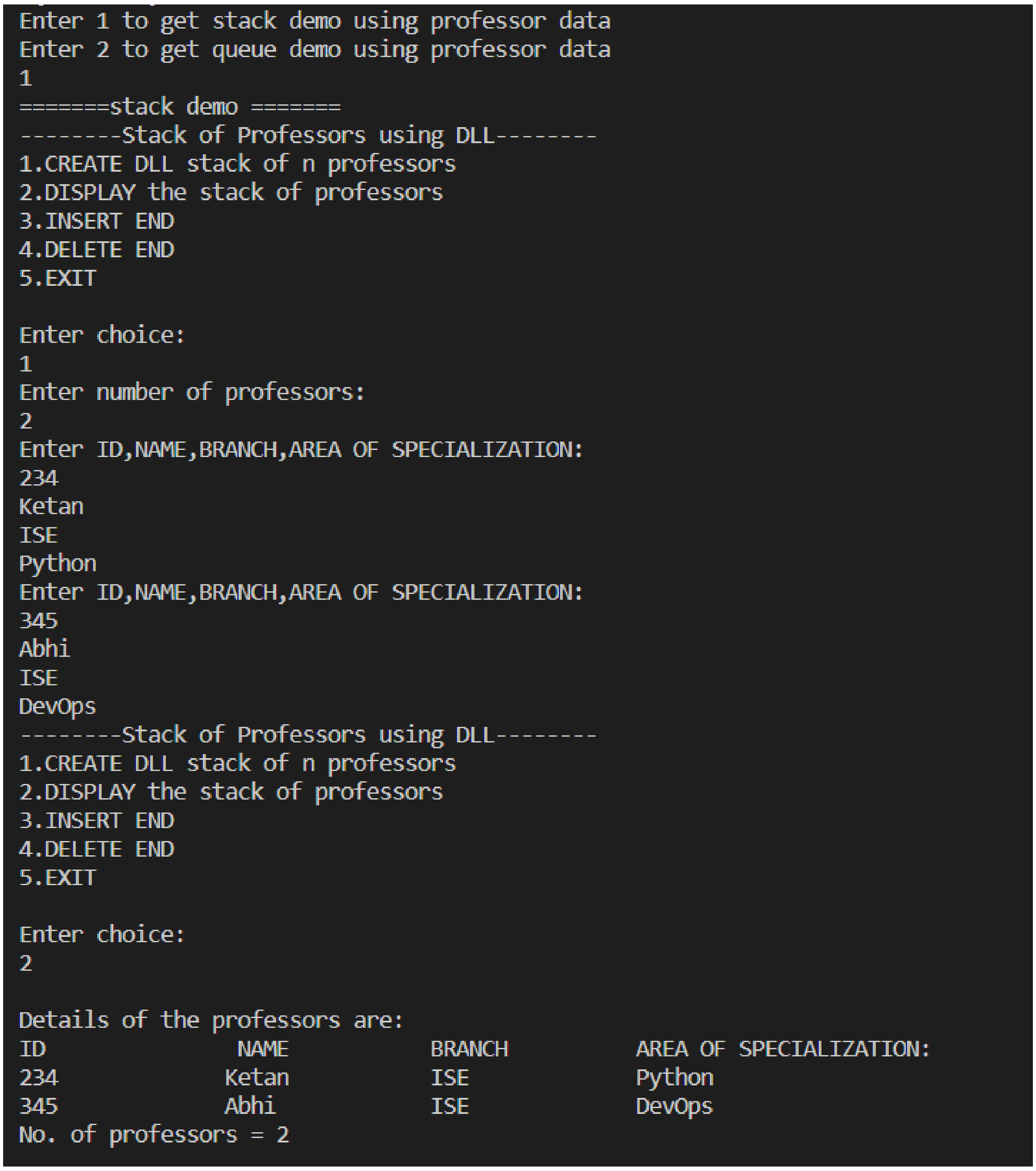
b. Create a DLL queue of N Professor's Data

Display the status of DLL and count the number of nodes in it.

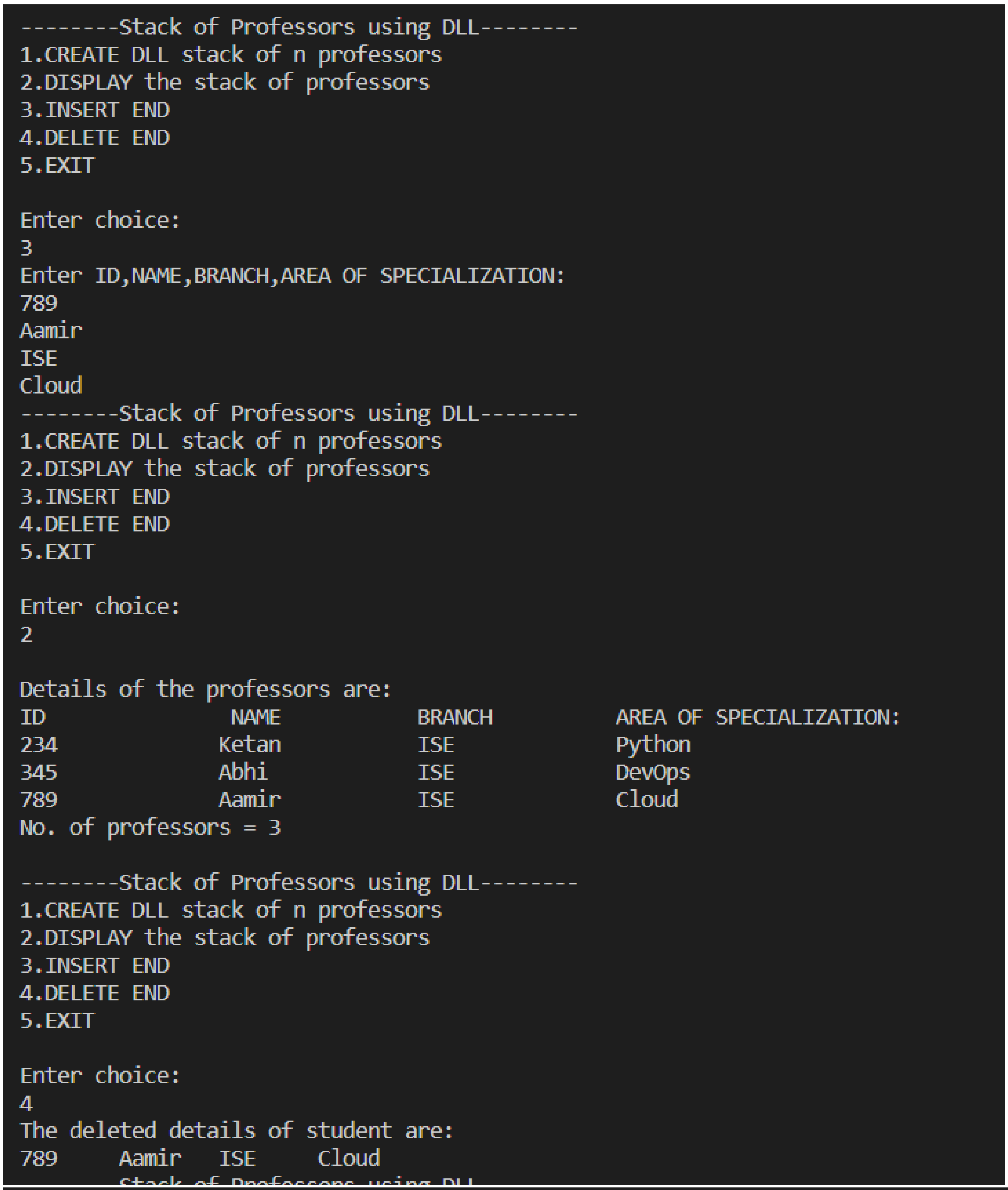
```
#include<stdio.h>
#include<stdlib.h>
#include<string.h>
int count=0;

struct node
{
    int id;
    char name[20],branch[10],aos[10];
    struct node *next;
    struct node *prev;
}*first=NULL,*last=NULL,*temp=NULL,*cur=NULL;

void create()
{
    int id;
    char name[20],branch[10],aos[10];
    temp=(struct node *)malloc(sizeof(struct node));
    printf("Enter ID,NAME,BRANCH,AREA OF SPECIALIZATION:\n");
    scanf("%d%s%s%s",&id,name,branch,aos);
    strcpy(temp->aos,aos);
    strcpy(temp->name,name);
    strcpy(temp->branch,branch);
    temp->id=id;
    temp->next=NULL;
    temp->prev=NULL;
    count++;
}
void insert_end()
{
    if(first==NULL)
    {
        create();
        first=last=temp;
    }
    else
    {
        create();
        last->next=temp;
        temp->prev=last;
        last=temp;
    }
}
void display()
{
    temp=first;
    if(first==NULL)
    {
        printf("List is empty\n");
        return;
    }
    else
    {
        printf("\nDetails of the professors are:\n");
        printf("ID\t\t NAME\t\tBRANCH\t\tAREA OF SPECIALIZATION:\n");
        while(temp!=NULL)
        {
            printf("%d\t\t%s\t\t%s\t\t%s\n",temp->id,temp->name,temp-
>branch,temp->aos);
            temp=temp->next;
        }
        printf("No. of professors = %d\n\n",count);
    }
}
void delete_end(){
    if(first==NULL){
        printf("list is empty\n");
        return;
    }
    else if(first->next==NULL){
        printf("The deleted details of student are:\n");
        printf("%d\t%s\t%s\t%s\n",temp->id,temp->name,temp->branch,temp->aos);
        free(first);
        first=NULL;
    }
    else{
        temp=last;
        last=last->prev;
        last->next=NULL;
        printf("The deleted details of student are:\n");
        printf("%d\t%s\t%s\t%s\n",temp->id,temp->name,temp->branch,temp->aos);
        free(temp);
        }
        count--;
    }
void delete_front()
{
    if(first==NULL)
    {
        printf("The list is empty\n");
        return;
    }
    temp=first;
    if(first->next==NULL)
    {
        printf("The deleted details of student are:\n");
        printf("%d\t%s\t%s\t%s\n",temp->id,temp->name,temp->branch,temp->aos);
        free(first);
        first=NULL;
    }
    else
    {

        first=first->next;
        first->prev=NULL;
        printf("The deleted details of student are:\n");
        printf("%d\t%s\t%s\t%s\n",temp->id,temp->name,temp->branch,temp->aos);
        free(temp);
    }
    count--;
}
void queuedemo(){
    printf("=======Queue demo =======\n");
        int ch,n,i;
    while(1)
    {
        printf("--------QUEUE of Professors using DLL--------\n");
        printf("1.CREATE DLL QUEUE of n professors\n");
        printf("2.DISPLAY the QUEUE of professors\n");
        printf("3.INSERT END\n");
        printf("4.DELETE FRONT\n");
        printf("5.EXIT\n");
        printf("\nEnter choice:\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1:printf("Enter number of professors:\n");
                    scanf("%d",&n);
                    for(i=0;i<n;i++)
                    {
                        insert_end();
                    }
                    break;
                    case 2:display();
                    break;
                    case 3:insert_end();
                    break;
                    case 4:delete_front();
                    break;
                    case 5:
                    exit(1);
                    default:printf("Wrong choice\n");
        }
    }
}
void stackdemo(){
    // STACK IS NOT ONLY INSERT FRONT AND DELETE FRONT ITS ALSO INSERT REAR
AND DELETE REAR
    // IF YOU WANT INSETR FORNT AND DELETE FRONT APPLY YOURSELVES
        printf("=======stack demo =======\n");
        int ch,n,i;
    while(1)
    {
        printf("--------Stack of Professors using DLL--------\n");
        printf("1.CREATE DLL stack of n professors\n");
        printf("2.DISPLAY the stack of professors\n");
        printf("3.INSERT END\n");
        printf("4.DELETE END\n");
        printf("5.EXIT\n");
        printf("\nEnter choice:\n");
        scanf("%d",&ch);
        switch(ch)
        {
            case 1:printf("Enter number of professors:\n");
                    scanf("%d",&n);
                    for(i=0;i<n;i++)
                    {
                        insert_end();
                    }
                    break;
                    case 2:display();
                    break;
                    case 3:insert_end();
                    break;
                    case 4:delete_end();
                    break;
                    case 5:
                    exit(1);
                    default:printf("Wrong choice\n");
        }
    }
}
int main()
{
    int ch;
    printf("Enter 1 to get stack demo using professor data\n");
    printf("Enter 2 to get queue demo using professor data\n");
    scanf("%d",&ch);
    if(ch==1){
        stackdemo();
    }
    if(ch==2){
        queuedemo();
    }
    return 0;
}
```

OUTPUT:

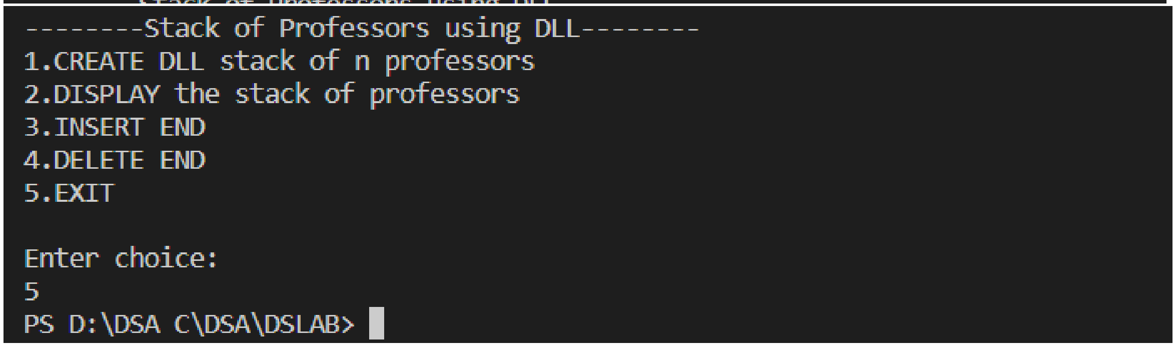
// Output of part 1 i.e. Stack demo



```
Enter 1 to get stack demo using professor data
Enter 2 to get queue demo using professor data
1
=======stack demo =======
--------Stack of Professors using DLL--------
1.CREATE DLL stack of n professors
2.DISPLAY the stack of professors
3.INSERT END
4.DELETE END
5.EXIT

Enter choice:
1
Enter number of professors:
2
Enter ID,NAME,BRANCH,AREA OF SPECIALIZATION:
234
Ketan
ISE
Python
Enter ID,NAME,BRANCH,AREA OF SPECIALIZATION:
345
Abhi
ISE
DevOps
--------Stack of Professors using DLL--------
1.CREATE DLL stack of n professors
2.DISPLAY the stack of professors
3.INSERT END
4.DELETE END
5.EXIT

Enter choice:
2

Details of the professors are:
ID                NAME           BRANCH          AREA OF SPECIALIZATION:
234              Ketan           ISE             Python
345              Abhi            ISE             DevOps
No. of professors = 2
```

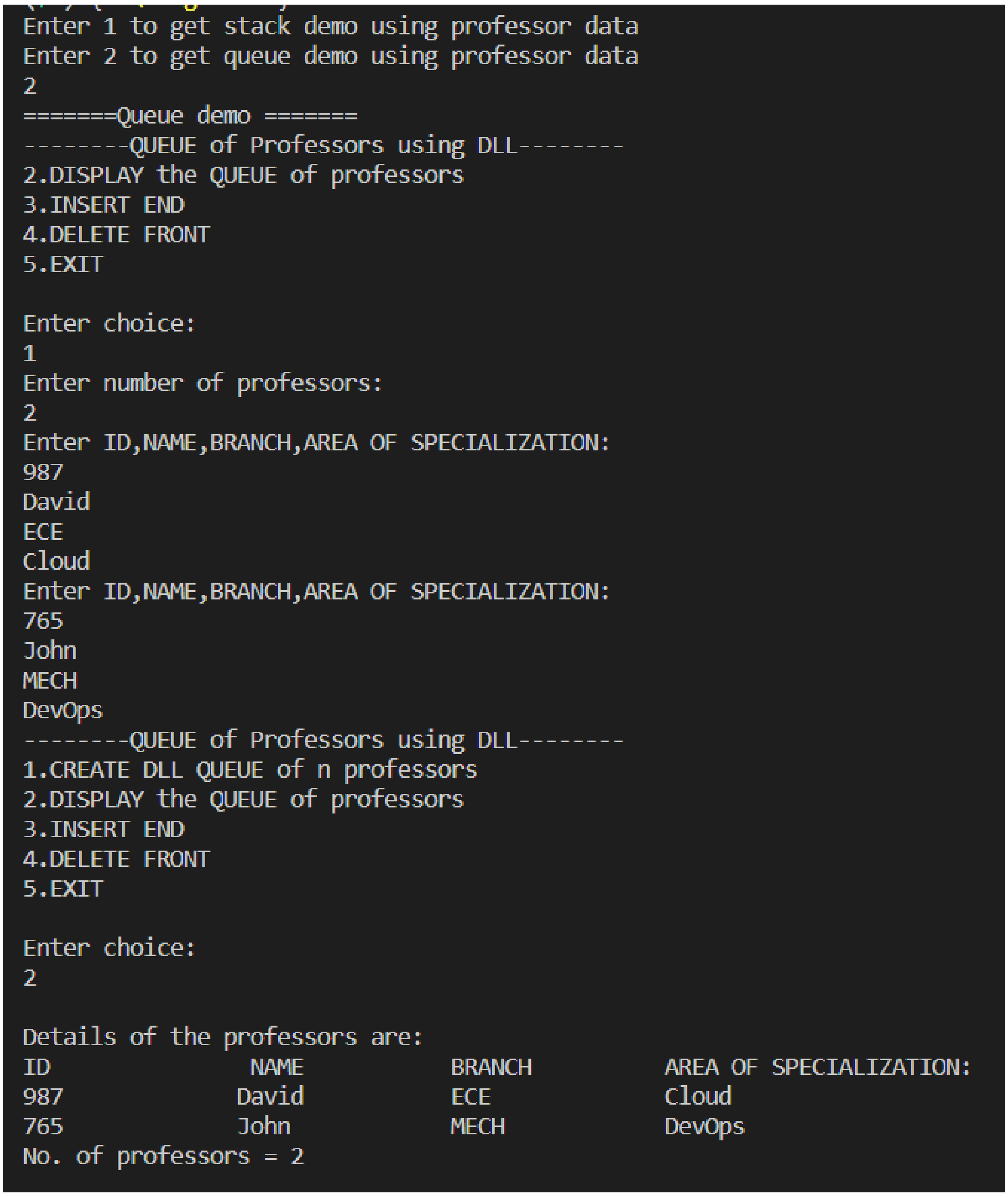


```
--------Stack of Professors using DLL--------
1.CREATE DLL stack of n professors
2.DISPLAY the stack of professors
3.INSERT END
4.DELETE END
5.EXIT

Enter choice:
3
Enter ID,NAME,BRANCH,AREA OF SPECIALIZATION:
789
Aamir
ISE
Cloud
--------Stack of Professors using DLL--------
1.CREATE DLL stack of n professors
2.DISPLAY the stack of professors
3.INSERT END
4.DELETE END
5.EXIT

Enter choice:
2

Details of the professors are:
ID                NAME           BRANCH          AREA OF SPECIALIZATION:
234              Ketan           ISE             Python
345              Abhi            ISE             DevOps
789              Aamir           ISE             Cloud
No. of professors = 3

--------Stack of Professors using DLL--------
1.CREATE DLL stack of n professors
2.DISPLAY the stack of professors
3.INSERT END
4.DELETE END
5.EXIT

Enter choice:
4
The deleted details of student are:
789      Aamir    ISE      Cloud
```

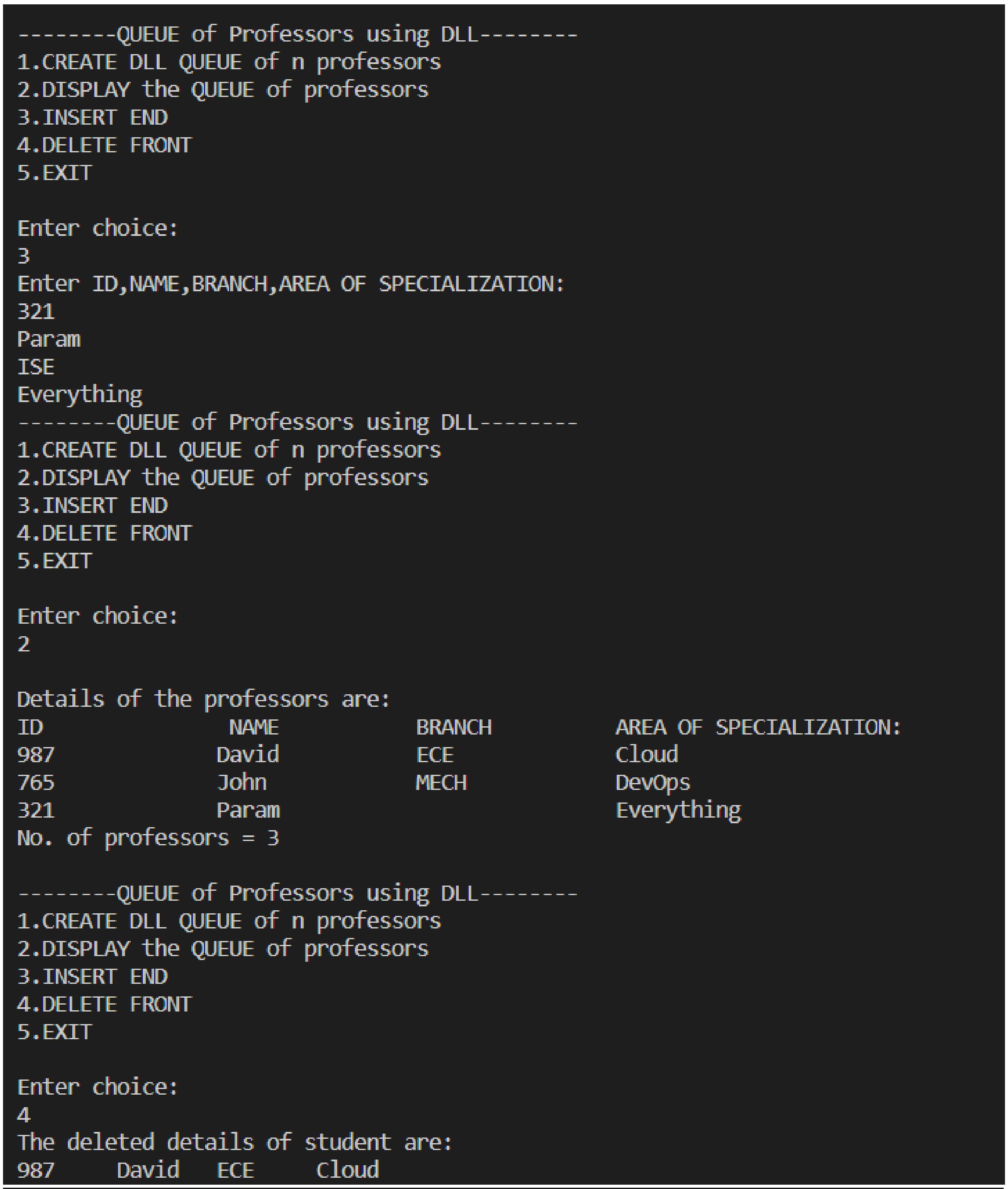


```
--------Stack of Professors using DLL--------
1.CREATE DLL stack of n professors
2.DISPLAY the stack of professors
3.INSERT END
4.DELETE END
5.EXIT

Enter choice:
5
PS D:\DSA C\DSA\DSLAB>
```

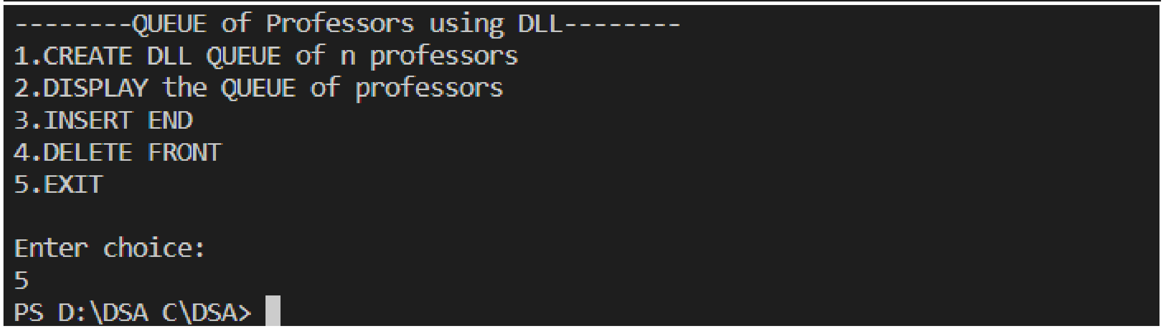
// Output of DLL using Queue



```
Enter 1 to get stack demo using professor data
Enter 2 to get queue demo using professor data
2
=======Queue demo =======
--------QUEUE of Professors using DLL--------
2.DISPLAY the QUEUE of professors
3.INSERT END
4.DELETE FRONT
5.EXIT

Enter choice:
1
Enter number of professors:
2
Enter ID,NAME,BRANCH,AREA OF SPECIALIZATION:
987
David
ECE
Cloud
Enter ID,NAME,BRANCH,AREA OF SPECIALIZATION:
765
John
MECH
DevOps
--------QUEUE of Professors using DLL--------
1.CREATE DLL QUEUE of n professors
2.DISPLAY the QUEUE of professors
3.INSERT END
4.DELETE FRONT
5.EXIT

Enter choice:
2

Details of the professors are:
ID               NAME          BRANCH          AREA OF SPECIALIZATION:
987             David          ECE             Cloud
765             John           MECH            DevOps
No. of professors = 2
```



```
--------QUEUE of Professors using DLL--------
1.CREATE DLL QUEUE of n professors
2.DISPLAY the QUEUE of professors
3.INSERT END
4.DELETE FRONT
5.EXIT

Enter choice:
3
Enter ID,NAME,BRANCH,AREA OF SPECIALIZATION:
321
Param
ISE
Everything
--------QUEUE of Professors using DLL--------
1.CREATE DLL QUEUE of n professors
2.DISPLAY the QUEUE of professors
3.INSERT END
4.DELETE FRONT
5.EXIT

Enter choice:
2

Details of the professors are:
ID                NAME           BRANCH          AREA OF SPECIALIZATION:
987              David           ECE             Cloud
765              John            MECH            DevOps
321              Param                           Everything
No. of professors = 3

--------QUEUE of Professors using DLL--------
1.CREATE DLL QUEUE of n professors
2.DISPLAY the QUEUE of professors
3.INSERT END
4.DELETE FRONT
5.EXIT

Enter choice:
4
The deleted details of student are:
987     David   ECE     Cloud
```



```
--------QUEUE of Professors using DLL--------
1.CREATE DLL QUEUE of n professors
2.DISPLAY the QUEUE of professors
3.INSERT END
4.DELETE FRONT
5.EXIT

Enter choice:
5
PS D:\DSA C\DSA>
```

// Other program will update soon…