PES UNIVERSITY

SRN: PES1UG20CS415

Name: SHRUJAN

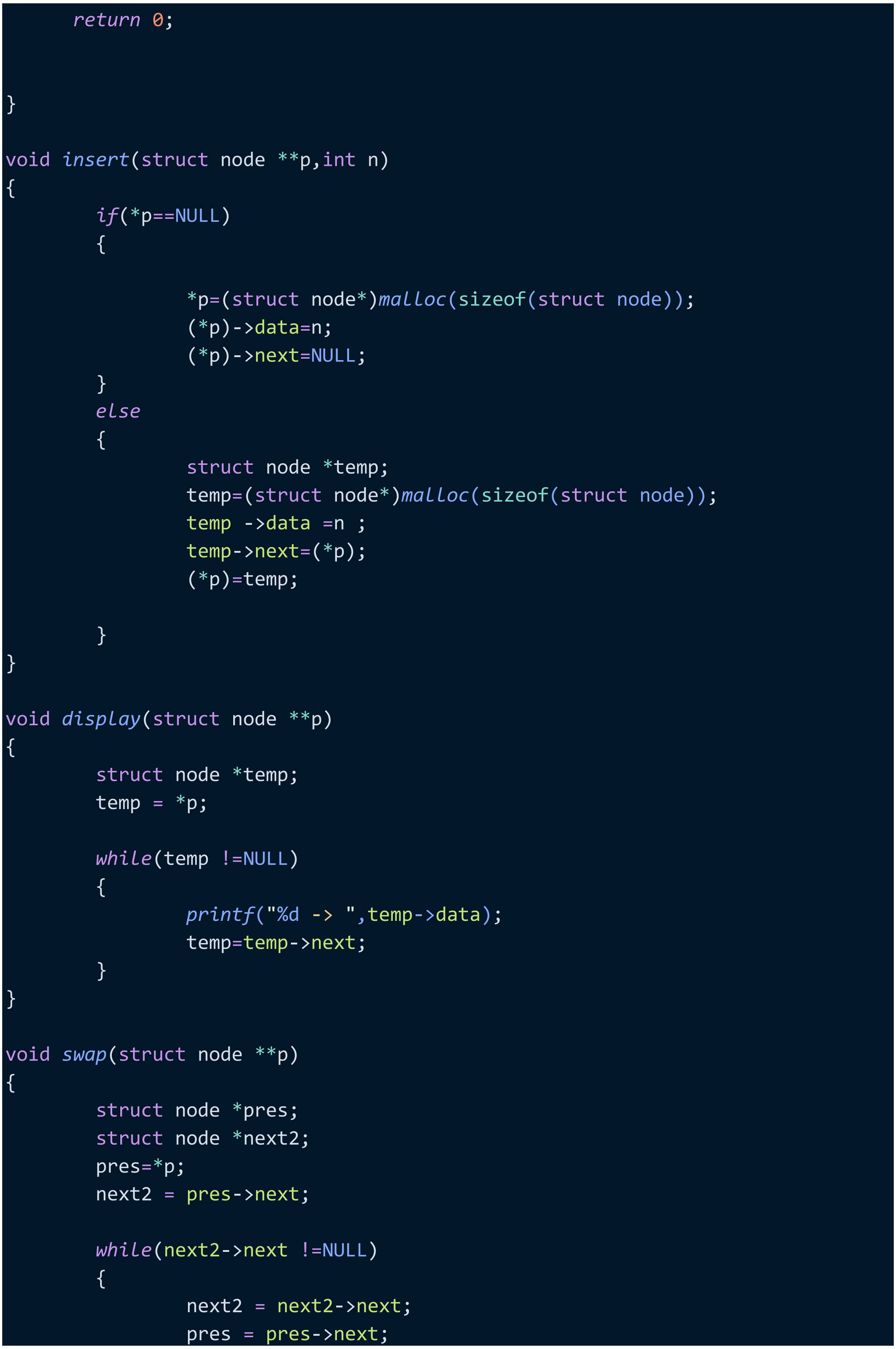
Section: G

Date: 15/9/2021

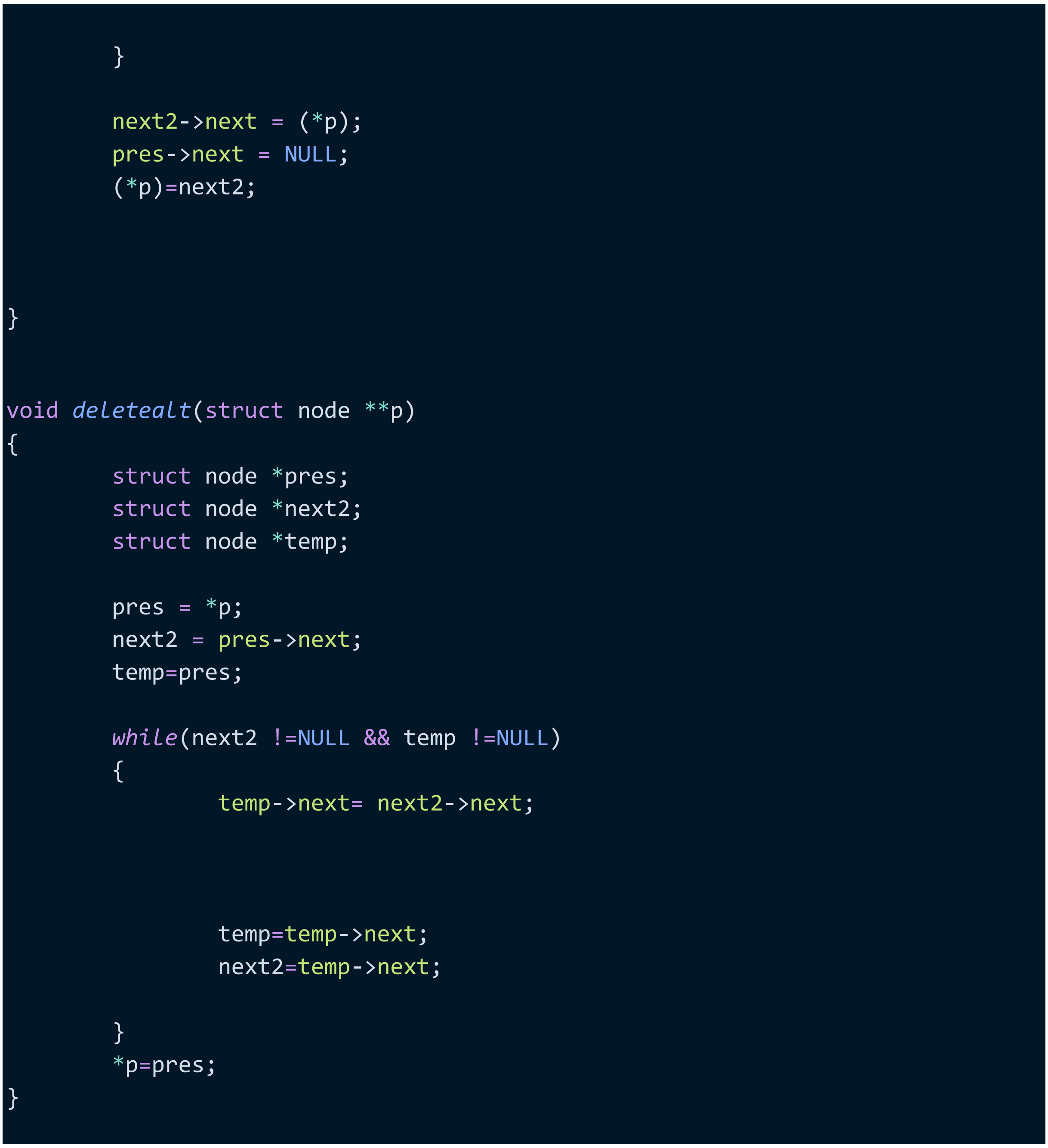
Q1) 1. Implement the following operations on singly linked list (5 + 5Marks) (ii) Swap 2 nodes without swapping the data. (iii) Delete every alternate node starting from the first node

Code:

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

struct node
{
        int data;
        struct node* next;
};
void insert(struct node **p,int n);
void display(struct node **p);
void swap(struct node **p);
void deletealt(struct node **p);
int main()
{
        int n,v;
        struct node* p;
        p=NULL;
  A:
        printf("Enter Your Choice\n1.Add Element\n2.Swap Nodes\n3.Delete Alter
nate Nodes\n0.Exit\n");
        scanf("%d",&n);

        switch(n)
        {
                case 1:printf("Enter Value to be inserted \n");
                        scanf("%d",&v);
                        insert(&p,v);
                        display(&p);
                        break;
                case 2: swap(&p);
                        printf("\n\nSwapped Successfully\n");
                        display(&p);
                        break;
                case 3: deletealt(&p);
                        printf("\n\nDeleted Successfully\n");
                        display(&p);
                        break;

                case 0: exit(0);


        }
  goto A;
```

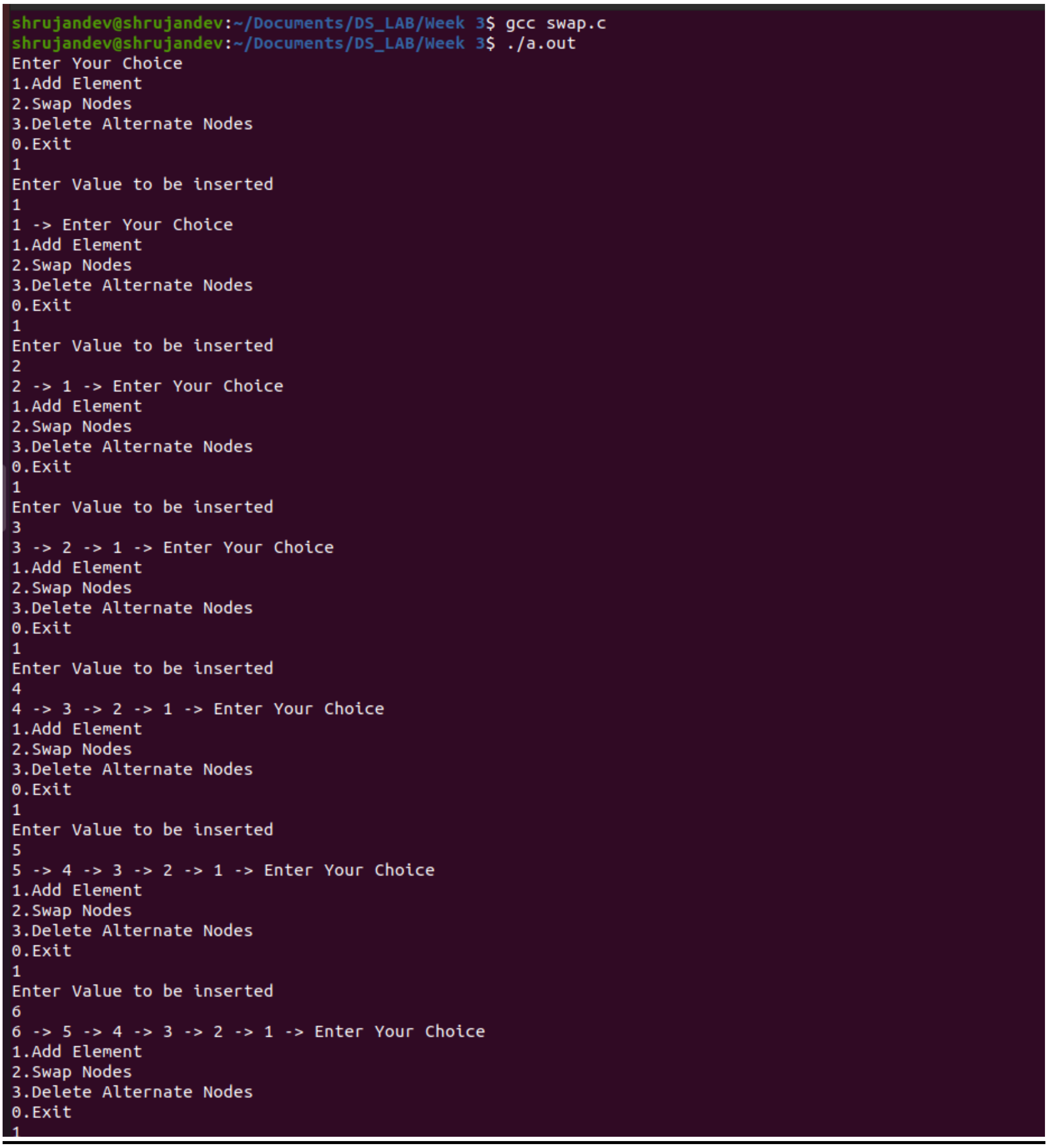


```
      return 0;


}

void insert(struct node **p,int n)
{
        if(*p==NULL)
        {

                *p=(struct node*)malloc(sizeof(struct node));
                (*p)->data=n;
                (*p)->next=NULL;
        }
        else
        {
                struct node *temp;
                temp=(struct node*)malloc(sizeof(struct node));
                temp ->data =n ;
                temp->next=(*p);
                (*p)=temp;

        }
}

void display(struct node **p)
{
        struct node *temp;
        temp = *p;

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

void swap(struct node **p)
{
        struct node *pres;
        struct node *next2;
        pres=*p;
        next2 = pres->next;

        while(next2->next !=NULL)
        {
                next2 = next2->next;
                pres = pres->next;
```

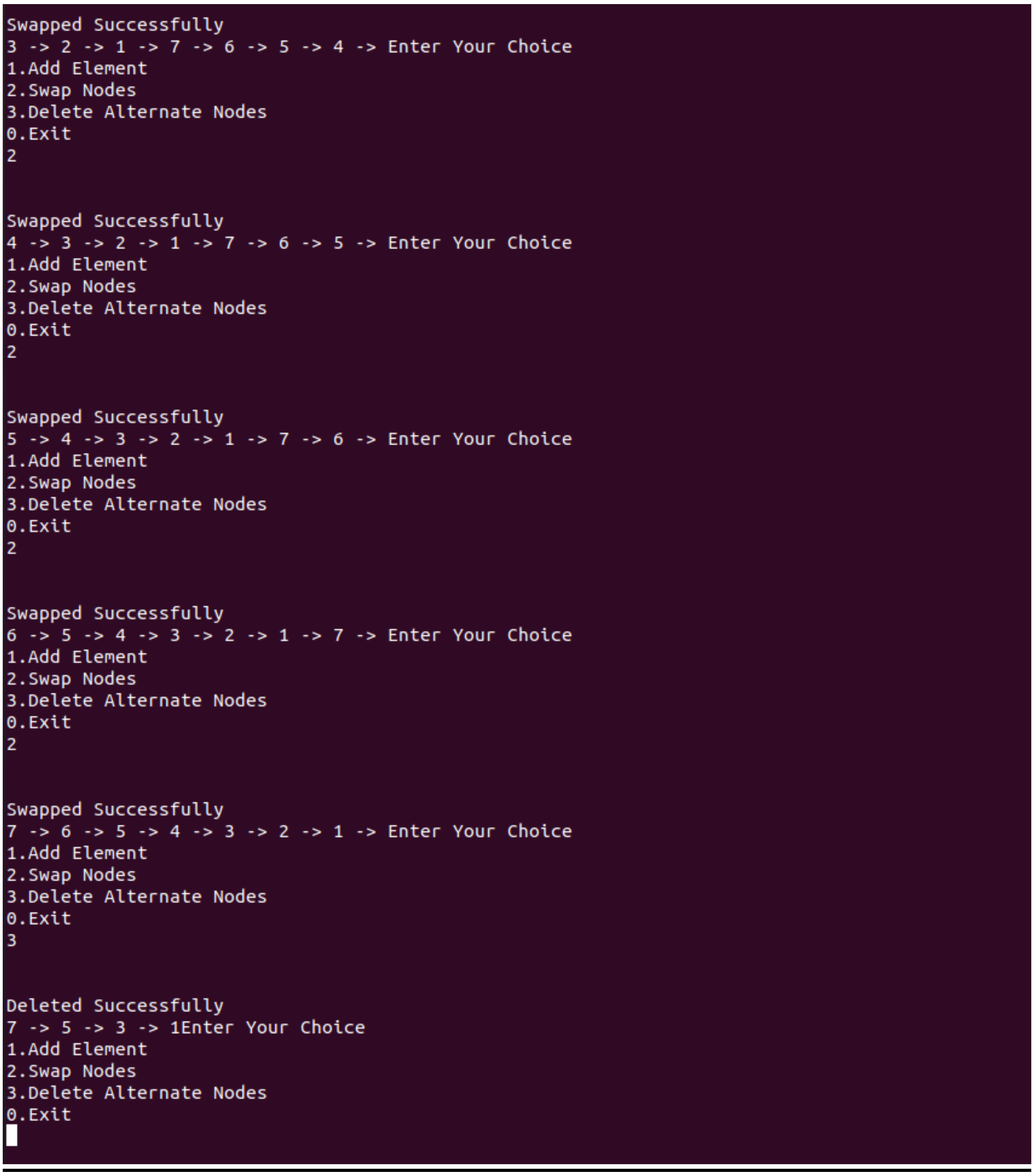


```
        }

        next2->next = (*p);
        pres->next = NULL;
        (*p)=next2;



}


void deletealt(struct node **p)
{
        struct node *pres;
        struct node *next2;
        struct node *temp;

        pres = *p;
        next2 = pres->next;
        temp=pres;

        while(next2 !=NULL && temp !=NULL)
        {
                temp->next= next2->next;



                temp=temp->next;
                next2=temp->next;

        }
        *p=pres;
}
```

Output :



```
shrujandev@shrujandev:~/Documents/DS_LAB/Week 3$ gcc swap.c
shrujandev@shrujandev:~/Documents/DS_LAB/Week 3$ ./a.out
Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
1
Enter Value to be inserted
1
1 -> Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
1
Enter Value to be inserted
2
2 -> 1 -> Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
1
Enter Value to be inserted
3
3 -> 2 -> 1 -> Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
1
Enter Value to be inserted
4
4 -> 3 -> 2 -> 1 -> Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
1
Enter Value to be inserted
5
5 -> 4 -> 3 -> 2 -> 1 -> Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
1
Enter Value to be inserted
6
6 -> 5 -> 4 -> 3 -> 2 -> 1 -> Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
1
```



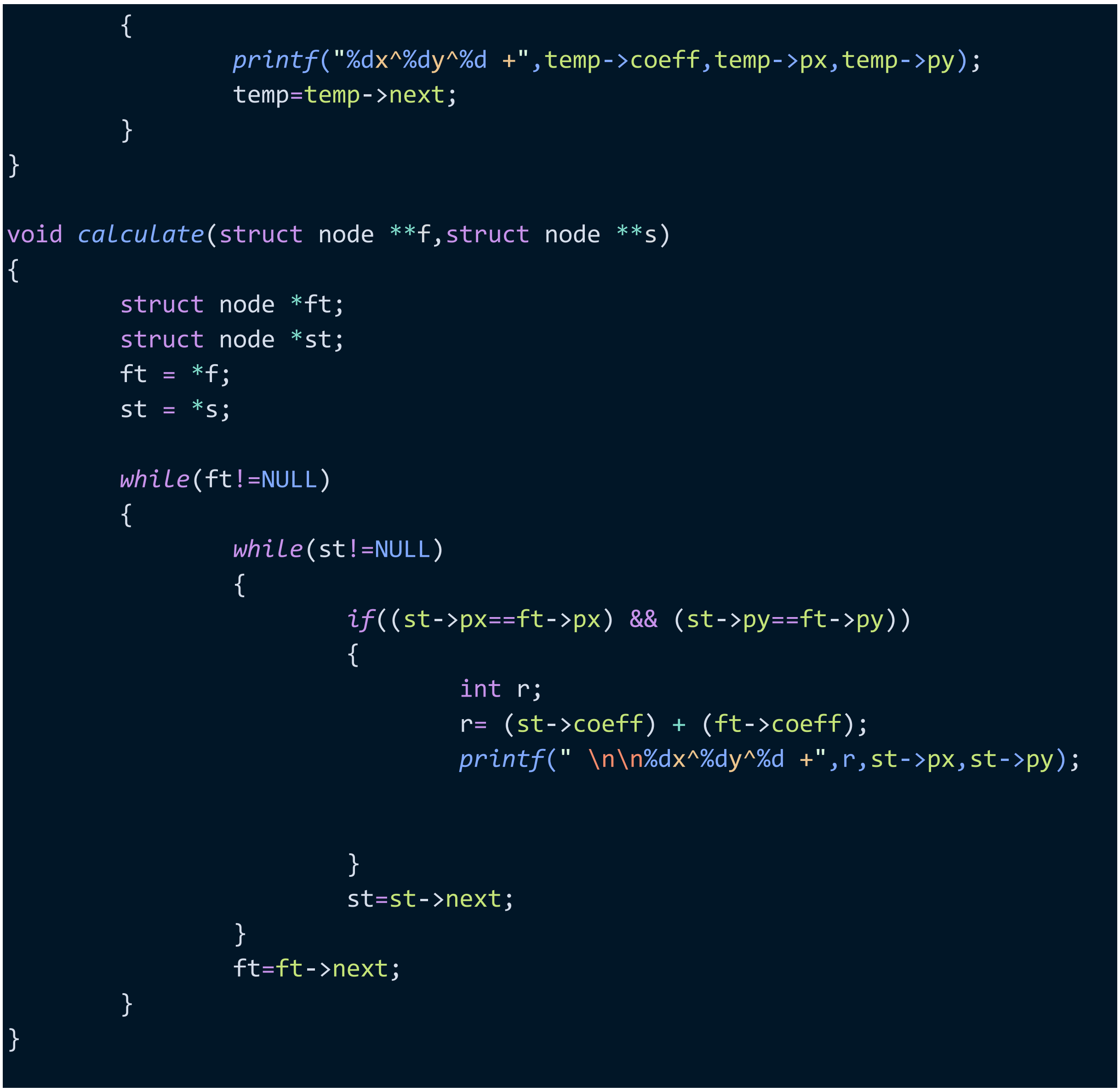
```
Swapped Successfully
3 -> 2 -> 1 -> 7 -> 6 -> 5 -> 4 -> Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
2


Swapped Successfully
4 -> 3 -> 2 -> 1 -> 7 -> 6 -> 5 -> Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
2


Swapped Successfully
5 -> 4 -> 3 -> 2 -> 1 -> 7 -> 6 -> Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
2


Swapped Successfully
6 -> 5 -> 4 -> 3 -> 2 -> 1 -> 7 -> Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
2


Swapped Successfully
7 -> 6 -> 5 -> 4 -> 3 -> 2 -> 1 -> Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
3


Deleted Successfully
7 -> 5 -> 3 -> 1Enter Your Choice
1.Add Element
2.Swap Nodes
3.Delete Alternate Nodes
0.Exit
```

Q2) Perform the addition of 2 polynomials stored as a Singly linked list.

Code:

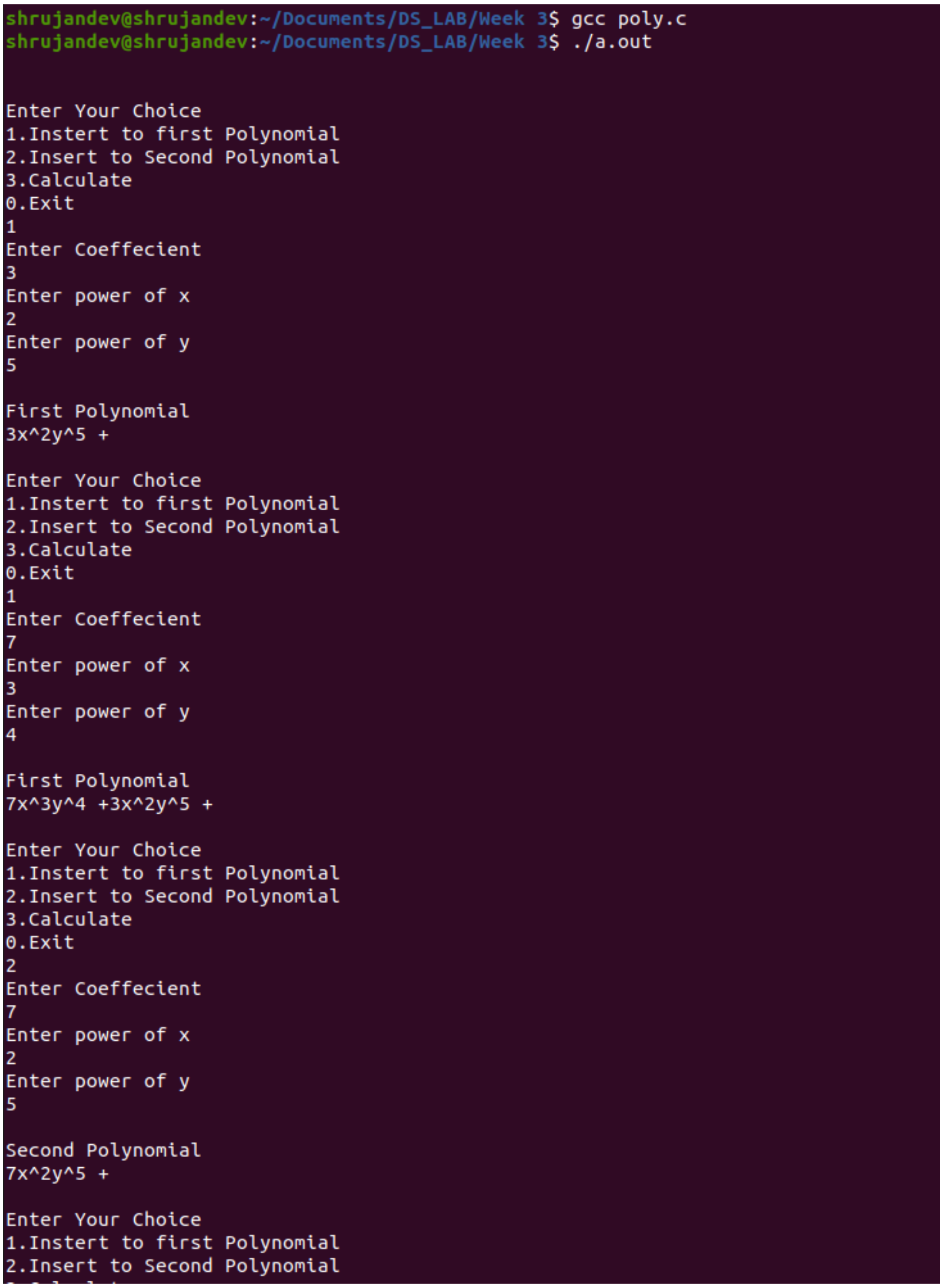
```
#include<stdio.h>

#include<stdlib.h>

struct node
{
        int coeff;
        int px;
        int py;
        struct node* next;
};
void insert(struct node **p,int c,int x,int y);
void display(struct node **p);
void calculate(struct node **f,struct node **s);
int main()
{
        int n,v;
        struct node* f;
        struct node* s;
        f=NULL;
        s=NULL;
        int c,x,y;
A:
        printf("\n\nEnter Your Choice\n1.Instert to first Polynomial\n2.Insert to Second Polynomial\n3.Calculate \n0.Exit\n");
        scanf("%d",&n);

        switch(n)
        {
                case 1:printf("Enter Coeffecient \n");
                        scanf("%d",&c);
                        printf("Enter power of x \n");
                        scanf("%d",&x);
                        printf("Enter power of y \n");
                        scanf("%d",&y);
                        insert(&f,c,x,y);
                        printf("\nFirst Polynomial\n");
                        display(&f);
                        break;
                case 2:printf("Enter Coeffecient \n");
                        scanf("%d",&c);
                        printf("Enter power of x \n");
                        scanf("%d",&x);
                        printf("Enter power of y \n");
                        scanf("%d",&y);
                        insert(&s,c,x,y);
                        printf("\nSecond Polynomial\n");
```

```
            display(&s);
            break;
        case 3: calculate(&f,&s);
            break;
        case 0: exit(0);
    }





goto A;


   return 0;



}

void insert(struct node **p,int c,int x,int y)
{
    if(*p==NULL)
    {

        *p=(struct node*)malloc(sizeof(struct node));
        (*p)->coeff=c;
        (*p)->px=x;
        (*p)->py=y;
        (*p)->next=NULL;
    }
    else
    {
        struct node *temp;
        temp=(struct node*)malloc(sizeof(struct node));
        temp->coeff=c;
        temp->px=x;
        temp->py=y;
        temp->next=(*p);
        (*p)=temp;

    }
}

void display(struct node **p)
{
    struct node *temp;
    temp = *p;

    while(temp !=NULL)
```

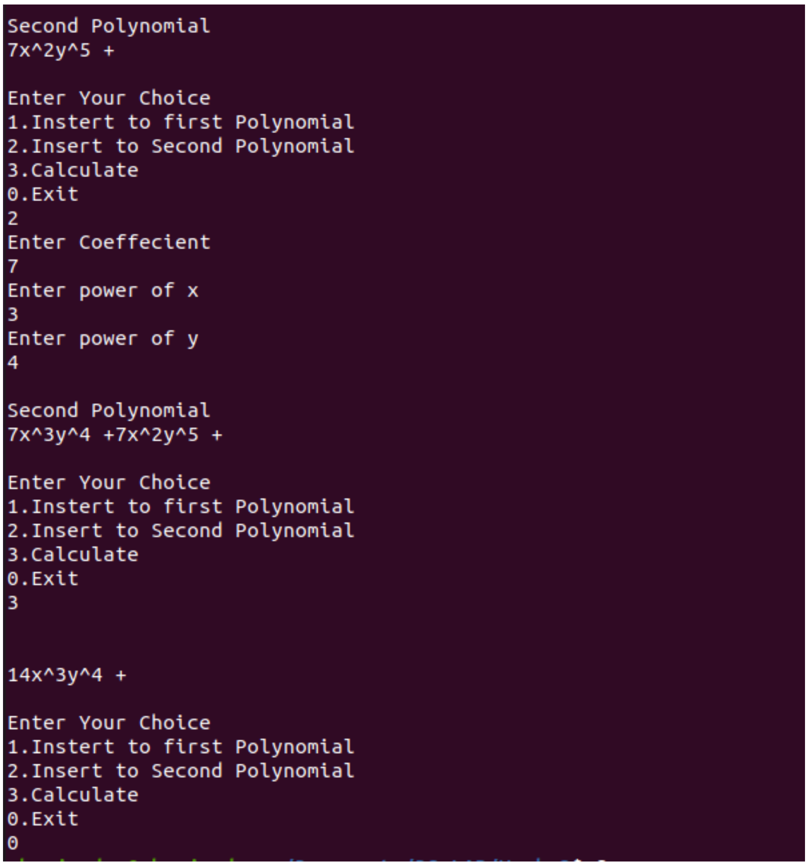


```
        {
                printf("%dx^%dy^%d +",temp->coeff,temp->px,temp->py);
                temp=temp->next;
        }
}

void calculate(struct node **f,struct node **s)
{
        struct node *ft;
        struct node *st;
        ft = *f;
        st = *s;

        while(ft!=NULL)
        {
                while(st!=NULL)
                {
                        if((st->px==ft->px) && (st->py==ft->py))
                        {
                                int r;
                                r= (st->coeff) + (ft->coeff);
                                printf(" \n\n%dx^%dy^%d +",r,st->px,st->py);


                        }
                        st=st->next;
                }
                ft=ft->next;
        }
}
```

Output:



```
shrujandev@shrujandev:~/Documents/DS_LAB/Week 3$ gcc poly.c
shrujandev@shrujandev:~/Documents/DS_LAB/Week 3$ ./a.out


Enter Your Choice
1.Instert to first Polynomial
2.Insert to Second Polynomial
3.Calculate
0.Exit
1
Enter Coeffecient
3
Enter power of x
2
Enter power of y
5

First Polynomial
3x^2y^5 +

Enter Your Choice
1.Instert to first Polynomial
2.Insert to Second Polynomial
3.Calculate
0.Exit
1
Enter Coeffecient
7
Enter power of x
3
Enter power of y
4

First Polynomial
7x^3y^4 +3x^2y^5 +

Enter Your Choice
1.Instert to first Polynomial
2.Insert to Second Polynomial
3.Calculate
0.Exit
2
Enter Coeffecient
7
Enter power of x
2
Enter power of y
5

Second Polynomial
7x^2y^5 +

Enter Your Choice
1.Instert to first Polynomial
2.Insert to Second Polynomial
```



```
Second Polynomial
7x^2y^5 +

Enter Your Choice
1.Instert to first Polynomial
2.Insert to Second Polynomial
3.Calculate
0.Exit
2
Enter Coeffecient
7
Enter power of x
3
Enter power of y
4

Second Polynomial
7x^3y^4 +7x^2y^5 +

Enter Your Choice
1.Instert to first Polynomial
2.Insert to Second Polynomial
3.Calculate
0.Exit
3


14x^3y^4 +

Enter Your Choice
1.Instert to first Polynomial
2.Insert to Second Polynomial
3.Calculate
0.Exit
0
```