Design, Develop and Implement Program in C for the following operations on Singly Linked List (SLL) with header nodes

a. Represent and Evaluate a Polynomial P(x,y,z) = 6x2y2z - 4yz5+3x3yz+2xy5z- 2xyz3

//program to add two polynomials implemented as a singly linked lists

#include<stdio.h>

#include<stdlib.h>

#include<math.h>

struct node

{

int coeff;

int px;

int py;

int flag;

struct node \*next;

};

void createpoly(struct node \*\*);

void insert\_tail(int,int,int,struct node\*\*);

void display(struct node\*);

void polyadd(struct node\*,struct node\*, struct node\*\*);

int main()

{

struct node \*first,\*second,\*third;

first = NULL;

second=NULL;

third=NULL;

int cf,px,py,result;

printf("\nCreating first polynomial..\n");

createpoly(&first);

printf("\nCreating the second polynomial..\n");

createpoly(&second);

printf("\nAdding the two polynomials & displaying the result..\n");

polyadd(first,second,&third);

display(third);

}

void createpoly(struct node \*\*p)

{

int cf,px,py;

while(1)

{

printf("\nEnter the coefficient..");

scanf("%d",&cf);

if(cf==0)

break;

printf("\nEnter the power of x..");

scanf("%d",&px);

printf("\nEnter the power of y...");

scanf("%d",&py);

insert\_tail(cf,px,py,p);

}

printf("\nThe polynomial created...\n");

display(\*p);

}

void display(struct node \*q)

{

while(q!=NULL)

{

if(q->coeff>0)

printf(" +%d ",q->coeff);

else

printf(" %d ",q->coeff);

if(q->px>0)

{

if(q->px==1)

printf("X");

else

printf("X^%d",q->px);;

}

if(q->py>0)

{

if(q->py==1)

printf("Y");

else

printf("Y^%d",q->py);

}

q=q->next;

}

}

void insert\_tail(int cf,int px,int py, struct node \*\*p)

{

struct node \*q,\*temp;

temp=(struct node\*)malloc(sizeof(struct node));

temp->coeff=cf;

temp->px=px;

temp->py=py;

temp->flag=1;

temp->next=NULL;

q=\*p;

if(q==NULL)//if it is the first node

\*p=temp;

else

{

while(q->next!=NULL)//go to the last node

q=q->next;

q->next=temp;

}

}

void polyadd(struct node \*p,struct node \*q,struct node \*\*t)

{

int x1,y1,cf,c1,x2,y2,c2;

struct node \*q1;

while(p!=NULL)

{

c1=p->coeff;

x1=p->px;

y1=p->py;

q1=q;

while(q1!=NULL)

{

c2=q1->coeff;

x2=q1->px;

y2=q1->py;

if((x1==x2)&&(y1==y2))

break;

q1=q1->next;

}

if(q1!=NULL)//still in mid of second poly and found the powers equal

{

cf=c1+c2;//add the coefficient

q1->flag=0;

if(cf!=0)

insert\_tail(cf,x1,y1,t);//add the sum coeff to the poly

}

else

insert\_tail(c1,x1,y1,t);//add the first term to poly;

p=p->next;

}

q1=q;

while(q1!=NULL)

{

if(q1->flag==1)

insert\_tail(q1->coeff,q1->px,q1->py,t);

q1=q1->next;

}

}