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**EX 3:** POLYNOMIAL MANIPULATION

#include<stdio.h>

#include<stdlib.h>

struct node

{

int coef;

int power;

struct node\*link;

};

typedef struct node NODE;

void create\_poly(NODE \*list)

{

int coef;

int power;

int choice;

NODE \*newnode;

do{

newnode=malloc(sizeof(NODE));

printf("Enter the coefficient : ");

scanf("%d", &coef);

printf("Enter the power : ");

scanf("%d", &power);

newnode->coef=coef;

newnode->power=power;

newnode->link=NULL;

if(list->link==NULL)

{

list->link=newnode;

}

else

{

while(list->link!=NULL)

{

list=list->link;

}

list->link=newnode;

}

printf("Enter 1 to continue : ");

scanf("%d", &choice);

}

while(choice==1);

}

void add(NODE \*list1,NODE \*list2,NODE \*Result)

{

NODE \*newnode,\*temp=Result;

while(list1!=NULL && list2!=NULL)

{

newnode=malloc(sizeof(NODE));

if(list1->power == list2->power)

{

newnode->coef = list1->coef+list2->coef;

newnode->power =list1->power;

newnode->link=NULL;

list1=list1->link;

list2=list2->link;

}

else if(list1->power > list2->power)

{

newnode->coef=list1->coef;

newnode->power=list1->power;

newnode->link=NULL;

list1 = list1->link;

}

else if(list1->power<list2->power)

{

newnode->coef=list2->coef;

newnode->power=list2->power;

newnode->link=NULL;

list2=list2->link;

}

temp->link=newnode;

temp=temp->link;

}

while(list2!=NULL || list2!=NULL)

{

newnode = malloc(sizeof(NODE));

if(list1->link!=NULL)

{

newnode->coef=list1->coef;

newnode->power=list1->power;

newnode->link= NULL;

list1=list1->link;

}

if(list2->link!= NULL)

{

newnode->coef=list2->coef;

newnode->power=list2->power;

newnode->link= NULL;

list2 = list2->link;

}

temp->link=newnode;

temp=temp->link;

}

}

void sub(NODE \*list1,NODE \*list2,NODE \*Result)

{

NODE \*newnode,\*temp=Result;

while(list1!=NULL && list2!=NULL)

{

newnode=malloc(sizeof(NODE));

if(list1->power==list2->power)

{

newnode->coef=list1->coef-list2->coef;

newnode->power=list1->power;

list1=list1->link;

list2=list2->link;

}

else if(list1->power>list2->power)

{

newnode->coef=list1->coef;

newnode->power=list1->power;

list1=list1->link;

}

else if(list1->power<list2->power)

{

newnode->coef= -(list2->coef);

newnode->power=list2->power;

list2=list2->link;

}

newnode->link= NULL;

temp->link=newnode;

temp=temp->link;

}

while(list1!=NULL || list2!= NULL)

{

newnode = malloc(sizeof(NODE));

if(list1!= NULL)

{

newnode->coef=list1->coef;

newnode->power=list1->power;

list1 = list1->link;

}

if(list2 != NULL)

{

newnode->coef= -(list2->coef);

newnode->power=list2->power;

list2 = list2->link;

}

newnode->link= NULL;

temp->link=newnode;

temp=temp->link;

}

}

void multi(NODE \*list1, NODE \*list2, NODE \*Result)

{

NODE \*newnode;

NODE \*t1=list1->link;

NODE \*t2=list2->link;

NODE \*t3=Result;

while(t1!=NULL)

{

t2=list2->link;

while(t2!=NULL)

{

newnode=(NODE\*)malloc(sizeof(NODE));

t3->link=newnode;

newnode->coef=t1->coef\*t2->coef;

newnode->power=t1->power+t2->power;

t2=t2->link;

newnode->link=NULL;

t3=t3->link;

}

t1=t1->link;

}

}

void display(NODE \*list)

{

NODE \*temp=list->link;

while(temp!=NULL)

{

printf("%dX^%d",temp->coef,temp->power);

temp=temp->link;

if(temp != NULL && temp->coef >= 0)

{

printf("+");

}

}

}

int main(){

int t=1,choice;

NODE \*Poly1 = malloc(sizeof(NODE));

NODE \*Poly2 = malloc(sizeof(NODE));

NODE \*Result = malloc(sizeof(NODE));

while (t==1){

Poly1->link=NULL;

Poly2->link=NULL;

printf("\n\n\nMENU\n");

printf("1.Add the polynomials\n2.Subtract the polynomials\n3.Multiply the polynomials\n4.EXIT\n");

printf("\nEnter your choice:");

scanf("%d",&choice);

if (choice!=4){

printf("Enter the values for first polynomial :\n");

create\_poly(Poly1);

printf("The polynomial equation is : ");

display(Poly1);

printf("\nEnter the values for second polynomial :\n");

create\_poly(Poly2);

printf("The polynomial equation is : ");

display(Poly2);

}

switch (choice)

{

case 1:

add(Poly1, Poly2, Result);

printf("\nThe polynomial equation addition result is : ");

display(Result->link);

break;

case 2:

sub(Poly1, Poly2, Result);

printf("\nThe polynomial equation addition result is : ");

display(Result->link);

break;

case 3:

multi(Poly1, Poly2, Result);

printf("\nThe polynomial equation addition result is : ");

display(Result);

break;

case 4:

t=0;

break;

}

}

}

OUTPUT:

