#include<stdio.h>

#include<stdlib.h>

struct node

{

int coef,exp;

struct node \*next;

};

struct node\* createnode()

{

struct node \*hd;

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

hd->next=NULL;

return hd;

}

void insert(struct node \*hda, int coefa, int expa)

{

struct node \*ptr, \*tmp;

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

ptr->coef=coefa;

ptr->exp=expa;

if(hda->next==NULL)

{

hda->next=ptr;

ptr->next=NULL;

}

else

{

tmp=hda->next;

while(tmp->next!=NULL)

tmp=tmp->next;

ptr->next=tmp->next;

tmp->next=ptr;

}

}

struct node\* add(struct node \*hd1,struct node \*hd2)

{

struct node \*tmp1, \*tmp2;

tmp1=hd1->next;

tmp2=hd2->next;

struct node \*hda;

hda=createnode();

while(tmp1!=NULL && tmp2!=NULL)

{

if(tmp1->exp>tmp2->exp)

{

insert(hda,tmp1->coef,tmp1->exp);

tmp1=tmp1->next;

}

else if(tmp2->exp>tmp1->exp)

{

insert(hda,tmp2->coef,tmp2->exp);

tmp2=tmp2->next;

}

else if(tmp1->exp==tmp2->exp)

{

if(tmp1->coef+tmp2->coef!=0)

{

insert(hda,tmp1->coef+tmp2->coef,tmp1->exp);

}

tmp1=tmp1->next;

tmp2=tmp2->next;

}

}

if(tmp1!=NULL)

{

while(tmp1!=NULL)

{

insert(hda,tmp1->coef,tmp1->exp);

tmp1=tmp1->next;

}

}

else if(tmp2!=NULL)

{

while(tmp2!=NULL)

{

insert(hda,tmp2->coef,tmp2->exp);

tmp2=tmp2->next;

}

}

return hda;

}

struct node\* multiply(struct node \*hd1,struct node \*hd2)

{

struct node \*hdm;

hdm=createnode();

struct node \*tmp1, \*tmp2, \*tmpm, \*tmp3;

tmp1=hd1->next;

while(tmp1!=NULL)

{

tmp2=hd2->next;

while(tmp2!=NULL)

{

int flag=0;

tmp3=hdm->next;

while(tmp3!=NULL)

{

if(tmp3->exp==(tmp2->exp+tmp1->exp))

{

tmp3->coef=tmp3->coef+(tmp2->coef\*tmp1->coef);

flag=1;

break;

}

tmp3=tmp3->next;

}

if(flag==0)

insert(hdm,tmp1->coef\*tmp2->coef,tmp1->exp+tmp2->exp);

tmp2=tmp2->next;

}

tmp1=tmp1->next;

}

return hdm;

}

void display(struct node \*hd)

{

struct node \*tmp;

tmp=hd->next;

while(tmp!=NULL)

{

if(tmp->exp==0&&tmp->next==NULL)

printf("(%d)",tmp->coef);

else if(tmp->exp!=0&&tmp->next==NULL)

printf("(%d x^%d)",tmp->coef,tmp->exp);

else if(tmp->exp==0&&tmp->next!=NULL)

printf("(%d)+",tmp->coef);

else

printf("(%d x^%d)+",tmp->coef,tmp->exp);

tmp=tmp->next;

}

}

int main()

{

struct node \*hd1, \*hd2, \*hdmul, \*hdadd;

hd1=createnode();

hd2=createnode();

int c,e,opt1, opt2;

printf("\nEnter the coefcients and corresponding powers for Polynomial 1(Enter -1 -1 to exit):");

do

{

printf("\nEnter: ");

scanf("%d%d",&c,&e);

if(c==-1&&e==-1)

break;

else

insert(hd1,c,e);

}while(c!=-1&&e!=-1);

printf("\nEnter the coefcients and corresponding powers for Polynomial 2(Enter -1 -1 to exit):");

do

{

printf("\nEnter: ");

scanf("%d%d",&c,&e);

if(c==-1&&e==-1)

break;

else

insert(hd2,c,e);

}while(c!=-1&&e!=-1);

do

{

printf("\nWhat do you want to do with these polynomials?\n");

printf("1. Add\t2. Multiply\n3. Display\n");

scanf("%d",&opt1);

switch(opt1)

{

case 1: hdadd=createnode();

hdadd=add(hd1,hd2);

printf("\nThe result is:");

display(hdadd);

break;

case 2:

hdmul=createnode();

hdmul=multiply(hd1,hd2);

printf("\nThe result is:");

display(hdmul);

break;

case 3: printf("The Initital Polynomials are: ");

display(hd1);

printf("\n");

display(hd2);

break;

}

printf("\nDo you want to do again?(1/0)");

scanf(" %d",&opt2);

}while(opt2!=0);

return 0;

}

OUTPUT

C:\Users\Aditya\Desktop\DS>gcc addmul.c

C:\Users\Aditya\ Desktop\DS >a

Enter the coefcients and corresponding powers for Polynomial 1(Enter -1 -1 to exit):

Enter: 2

4

Enter: 1

5

Enter: 0

7

Enter: 6

8

Enter: -1

0

Enter the coeffcients and corresponding powers for Polynomial 2(Enter -1 -1 to exit):

Enter: 8

9

Enter: 5

6

Enter: 7

4

Enter: 8

9

Enter: 0

3

Enter: -1 -1

What do you want to do with these polynomials?

1. Add 2. Multiply

3. Display

1

The result is:(8 x^9)+(5 x^6)+(9 x^4)+(8 x^9)+(1 x^5)+(0 x^7)+(6 x^8)+(0 x^3)+(-1)

Do you want to do again?(1/0)1

What do you want to do with these polynomials?

1. Add 2. Multiply

3. Display

2

The result is:(32 x^13)+(10 x^10)+(14 x^8)+(0 x^7)+(46 x^14)+(5 x^11)+(-9 x^9)+(0 x^16)+(96 x^17)+(42 x^12)+(-5 x^6)+(-7 x^4)+(0 x^3)

Do you want to do again?(1/0)1

What do you want to do with these polynomials?

1. Add 2. Multiply

3. Display

3

The Initial Polynomials are: (2 x^4)+(1 x^5)+(0 x^7)+(6 x^8)+(-1)

(8 x^9)+(5 x^6)+(7 x^4)+(8 x^9)+(0 x^3)

Do you want to do again?(1/0)0