//Polynomial multiplication

#include <stdio.h>

#include <stdlib.h>

struct node{

int coef,exp;

struct node \*link;

}\*head,\*ptr;

struct node \*getNode(int coef,int exp){

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

temp->coef=coef;

temp->exp=exp;

temp->link=NULL;

return temp;

}

struct node \*addTerms(struct node \*head,int coef,int exp){

struct node \*temp=head;

struct node \*prev=NULL;

while(temp!=NULL && temp->exp>exp){

prev=temp;

temp=temp->link;

}

if(temp!=NULL && temp->exp==exp){

temp->coef+=coef;

}

else{

struct node \*new=getNode(coef,exp);

if(prev==NULL){

new->link=head;

head=new;

}else{

new->link=prev->link;

prev->link=new;

}

}

return head;

}

struct node \*multiply(struct node \*p,struct node \*q){

struct node \*r=NULL;

struct node\*ptr1;

struct node\*ptr2;

for(ptr1=p;ptr1!=NULL;ptr1=ptr1->link){

for(ptr2=q;ptr2!=NULL;ptr2=ptr2->link){

int coef=ptr1->coef\*ptr2->coef;

int exp=ptr1->exp+ptr2->exp;

r=addTerms(r,coef,exp);

}

}

return r;

}

struct node \*read(struct node \*head){

int c,e,m;

printf("\nEnter number of terms:");

scanf("%d",&m);

printf("Enter the terms:");

for(int i=0;i<m;i++){

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

struct node \*temp=getNode(c,e);

if(head==NULL){

head=temp;

ptr=head;

}

else{

ptr->link=temp;

ptr=temp;

}

}

return head;

}

void print(struct node \*r){

ptr=r;

while(ptr!=NULL){

printf("%dx^%d",ptr->coef,ptr->exp);

if(ptr->link!=NULL)

printf("+");

ptr=ptr->link;

}

}

void main(){

struct node \*p = NULL, \*q = NULL, \*r;

printf("Enter 1st polynomial...");

p=read(p);

printf("Enter 2nd polynomial:");

q=read(q);

r=multiply(p,q);

printf("Resultant polynomial:");

print(r);

}