#include<stdio.h>

#include<stdlib.h>

struct node

{

int coef;

int exp;

struct node \*next;

};

struct node \*create(struct node \*head,int coeff,int exp){

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

newnode->coef=coeff;

newnode->exp=exp;

newnode->next=NULL;

if(head==NULL){

head=newnode;

}

else if(exp >head->exp){

newnode->next=head;

head=newnode;

}

else{

struct node \*ptr;

ptr=head;

struct node \*ptr2=head;

while( ptr!=NULL && exp < ptr->exp){

ptr2=ptr;

ptr=ptr->next;

}

ptr2->next=newnode;

newnode->next=ptr;

}

return head;

}

void display(struct node \*head){

struct node \*ptr=head;

while(ptr->next!=NULL){

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

ptr=ptr->next;

}

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

}

struct node \*add(struct node \*head1,struct node \*head2,struct node \*res){

struct node \*ptr1=head1;

struct node \*ptr2=head2;

struct node \*ptr3=res;

while(ptr1!=NULL && ptr2!=NULL){

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

if(ptr1->exp > ptr2->exp){

newnode->coef=ptr1->coef;

newnode->exp=ptr1->exp;

ptr1=ptr1->next;

}

else if(ptr1->exp < ptr2->exp){

newnode->coef=ptr2->coef;

newnode->exp=ptr2->exp;

ptr2=ptr2->next;

}

else{

ptr1->coef=ptr1->coef+ptr2->coef;

newnode->coef=ptr1->coef;

newnode->exp=ptr1->exp;

ptr1=ptr1->next;

ptr2=ptr2->next;

}

newnode->next=NULL;

if(res==NULL){

res=newnode;

ptr3=res;

}

else{

ptr3->next=newnode;

ptr3=ptr3->next;

}

}

while(ptr1!=NULL){

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

newnode->coef=ptr1->coef;

newnode->exp=ptr1->exp;

newnode->next=NULL;

ptr3->next=newnode;

ptr3=ptr3->next;

ptr1=ptr1->next;

}

while(ptr2!=NULL){

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

newnode->coef=ptr2->coef;

newnode->exp=ptr2->exp;

newnode->next=NULL;

ptr3->next=newnode;

ptr3=ptr3->next;

ptr2=ptr2->next;

}

return res;

}

int main(){

struct node \*head1=NULL;

struct node \*head2=NULL;

struct node \*res=NULL;

int n;

printf("Number of terms in 1st polynomial : ");

scanf("%d",&n);

printf("\n");

printf("\n");

while(n--){

int coeff,exp;

printf("Enter the coefficient and Exponent value : ");

scanf("%d %d",&coeff,&exp);

head1=create(head1,coeff,exp);

}

printf("\n");

printf("First Polynomial: ");

display(head1);

printf("\n\n");

printf("\n");

int n1;

printf("Number of terms in 2nd polynomial : ");

scanf("%d",&n1);

while(n1--){

int coeff,exp;

printf("Enter the coefficient and Exponent value : ");

scanf("%d %d",&coeff,&exp);

head2=create(head2,coeff,exp);

}

printf("\n");

printf("Second Polynomial is ");

display(head2);

printf("\n\n");

res=add(head1,head2,res);

printf("\n");

printf("\n");

printf("Sum of Polynomials is: ");

display(res);

}



