#include <stdio.h>

#include <stdlib.h>

struct poly

{

int coeff;

int expo;

struct poly \*link;

} \*PHead, \*QHead, \*RHead, \*P = NULL, \*Q = NULL, \*R = NULL, \*Head, \*Temp1, \*Temp2;

void create\_first(int expo, int coeff)

{

Head = (struct poly \*)malloc(sizeof(struct poly));

Head->coeff = coeff;

Head->expo = expo;

if (PHead == NULL)

{

PHead = P = Head;

P->link = NULL;

}

else

{

P->link = Head;

P = P->link;

}

}

void create\_second(int expo, int coeff)

{

Head = (struct poly \*)malloc(sizeof(struct poly));

Head->coeff = coeff;

Head->expo = expo;

if (QHead == NULL)

{

QHead = Q = Head;

Q->link = NULL;

}

else

{

Q->link = Head;

Q = Q->link;

}

}

void multi()

{

P = PHead;

Q = QHead;

RHead = NULL;

while (P != NULL)

{

while (Q != NULL)

{

Head = (struct poly \*)malloc(sizeof(struct poly));

Head->coeff = P->coeff \* Q->coeff;

Head->expo = P->expo + Q->expo;

Head->link = NULL;

if (RHead == NULL)

{

RHead = R = Head;

}

else

{

R->link = Head;

R = R->link;

}

Q = Q->link;

}

P = P->link;

Q = QHead;

}

R = RHead;

while (R != NULL)

{

Temp1 = R;

Temp2 = R->link;

while (Temp2 != NULL)

{

if (R->expo == Temp2->expo)

{

R->coeff = R->coeff + Temp2->coeff;

Temp1->link = Temp2->link;

free(Temp2);

Temp2 = Temp1->link;

}

else

{

Temp1 = Temp2;

Temp2 = Temp2->link;

}

}

R = R->link;

}

}

void traverse\_first()

{

P = PHead;

if (P == NULL)

{

printf("Empty List!");

}

else

{

P = PHead;

while (P->link != NULL)

{

printf("%d^%d + ", P->coeff, P->expo);

P = P->link;

}

printf("%d^%d\n", P->coeff, P->expo);

}

}

void traverse\_second()

{

Q = QHead;

if (Q == NULL)

{

printf("Empty List!");

}

else

{

Q = QHead;

while (Q->link != NULL)

{

printf("%d^%d + ", Q->coeff, Q->expo);

Q = Q->link;

}

printf("%d^%d\n", Q->coeff, Q->expo);

}

}

void traverse\_result()

{

R = RHead;

if (R == NULL)

{

printf("Empty List!");

}

else

{

R = RHead;

while (R->link != NULL)

{

printf("%d^%d + ", R->coeff, R->expo);

R = R->link;

}

printf("%d^%d\n", R->coeff, R->expo);

}

}

void main()

{

int n, item;

printf("Enter the first polynomial's highest degree: ");

scanf("%d", &n);

for (; n >= 0; n--)

{

printf("Enter the coefficent of degree %d : ", n);

scanf("%d", &item);

create\_first(n, item);

}

printf("Enter the second polynomial's highest degree: ");

scanf("%d", &n);

for (; n >= 0; n--)

{

printf("Enter the coefficent of degree %d : ", n);

scanf("%d", &item);

create\_second(n, item);

}

printf("\nThe Two Polynomials and the result are given below: \n");

traverse\_first();

traverse\_second();

multi();

traverse\_result();

}

OUTPUT

Enter the first polynomial's highest degree: 4

Enter the coefficent of degree 4 : 2

Enter the coefficent of degree 3 : 1

Enter the coefficent of degree 2 : 4

Enter the coefficent of degree 1 : 2

Enter the coefficent of degree 0 : 0

Enter the second polynomial's highest degree: 2

Enter the coefficent of degree 2 : 2

Enter the coefficent of degree 1 : 1

Enter the coefficent of degree 0 : 4

The Two Polynomials and the result are given below:

2^4 + 1^3 + 4^2 + 2^1 + 0^0

2^2 + 1^1 + 4^0

4^6 + 4^5 + 17^4 + 12^3 + 18^2 + 8^1 + 0^0