

## 4582 Composition of Polynomials

Given two polynomials,  $p(x)$  of degree  $M$ , and  $q(x)$  of degree  $N$ , both with integer coefficients, your problem is to write a computer program that prints the coefficients of the composition polynomial  $f(x) = p(q(x))$ .

For example, if  $p(x) = 2x^3 + 5x - 4$  and  $q(x) = 3x^2 - 4x + 1$ , then

$$\begin{aligned} f(x) &= p(q(x)) = 2(3x^2 - 4x + 1)^3 + 5(3x^2 - 4x + 1) - 4 \\ &= 54x^6 - 216x^5 + 342x^4 - 272x^3 + 129x^2 - 44x + 3 \end{aligned}$$

### Input

Input shall consist of several data sets. Each data set will be given in three lines of input. The first line will give the values of  $M$  and  $N$ , separated by one or more spaces. The second line will give the coefficients of each term of  $p(x)$ , separated by one or more spaces, and arranged in increasing powers of  $x$ . The third line will give the coefficients of each term of  $q(x)$ , separated by one or more spaces, and arranged in increasing powers of  $x$ . Both  $M$  and  $N$  will be between 0 and 10, inclusive. Each coefficient will be small, in the range -20 to 20 inclusive, but a small value raised to 10th power is not guaranteed to be a small integer. Input for the next data set will immediately follow that of the previous data set. An input of  $M = 0$  and  $N = 0$  will signify the end of input data.

### Output

For each data set, print one line of output of the form:

Data set  $N$ : *< composition polynomial >*

where  $N$  is the data set number, starting from 1, and *< composition polynomial >* is the resulting polynomial in decreasing powers of  $x$ , with zero terms omitted. If the power of a term is 1, then the power must not be printed. If the coefficient of a term is 1, you may optionally print or not print the coefficient.

### Sample Input

```
3 2
-4 5 0 2
1 -4 3
2 2
-7 0 2
5 3 2
0 0
```

### Sample Output

```
Data set 1: 54x^6-216x^5+342x^4-272x^3+129x^2-44x+3
Data set 2: 8x^4+24x^3+58x^2+60x-43
```