Problem G. Solving Equations is Easy

Description

Alice and Bob are good friends. After a math class about solving equations, they have a little conversation.

Alice : Solving equations is easy.

Bob : I don't believe it. What's the roots of $x^2 - x - 2 = 0$?

Alice : Too simple. -1 and 2 are the roots.

Bob : How about $x^3 + 2x - x + 1 = 0$?

Alice : The real root is $\frac{\sqrt[3]{2(\sqrt{93}-9)} - 2\sqrt[3]{\frac{3}{\sqrt{93}-9}}}{6^{\frac{2}{3}}}$. The complex roots are also easy to solve.

Bob : Unbelievable! You are really good at solving equations. Now I have a challenge for you. Consider the equations $x^2 - x - 2 = 0$, can you construct a new quadratic equations, whose roots are $(-1)^2$ and 2^2 ?

Alice : (After few seconds) It is $x^2 - 5x + 4 = 0$.

Bob : Excellent.

When Bob gets back to dormitory, he asks his roommates, YOU, the same questions. Since you have a computer and you are good at programming, you need to solve a more challenging problem.

Given an integer m and an equations $x^n + a_{n-1}x^{n-1} + \cdots + a_1x + a_0 = 0$, where the roots (including real roots and complex roots) are $x_1 \dots x_n$, can you construct a new equations $y^n + b_{n-1}y^{n-1} + \cdots + b_1y + b_0 = 0$, whose roots are $y_1 \dots y_n$ and satisfy $y_1 = x_1^m, \dots, y_n = x_n^m$?

Input

There are at most 15 test cases.

In each test case, there are two lines of input.

The first line contains two integers, n and m.

The second line contains n integers, $a_0 \dots a_{n-1}$, which are the coefficients of the equations $x^n + a_{n-1}x^{n-1} + \cdots + a_1x + a_0 = 0$.

The input ends with one line of two 0s.

The data ensures that $n, m \ge 1$**,** $n \le 6$**,** $n + m \le 10, |a_i| \le 120$.

Output

For every test case, output one line of integers, $b_0 \ldots b_{n-1}$, which describes the equation $y^n + b_{n-1}y^{n-1} + \cdots + b_1 y + b_0 = 0$.

The data ensures that $|b_i| < 10^{12}$.

Sample Input

1 9
2
2 2
2 -3
2 2
2 -1
0 0

Sample Output

512
4 -5
4 3

Explanation

In the first test case, Bob gives you $x + 2 = 0$, where the root is -2. The corresponding equation is $x + 512 = 0$, whose root is -2^9.

In the second test case, Bob gives you $x^2 - 3x + 2 = 0$, where the root are 1 and 2. The corresponding equation is $x^2 - 5x + 4 = 0$, whose roots are $1^2 and\ 2^2$.

In the third test case, Bob gives you $x^2 - x + 2 = 0$, where the roots are $\frac{1}{2}(1 \pm \sqrt{7}i)$.

The corresponding equation is $x^2 + 3x + 4 = 0$, whose roots are $\frac{1}{2}(-3 \pm \sqrt{7}i)$.