ACM-ICPC Live Archive

4688 Falling Factorial Form

The falling factorial function $x^{[n]}$ is defined as follows.

$$x^{[n]} = x(x-1)\dots(x-n+1)$$

For example:

$x^{[0]} = 1$ $\quad$ $x^{[1]} = x$

$x^{[2]} = x(x-1) = x^2 - x$ $\quad$ $x^{[3]} = x(x-1)(x-2) = x^3 - 3x^2 + 2x$

The falling factorial function suggests a new way to write polynomials, namely as integer combinations of falling factorial functions. For example, here are some polynomials and their falling factorial forms:

$$\begin{array}{ccccccccccc} x^3 & - & 3x^2 & + & 2x & = & x^{[3]} & & & & \\ & & 3x^2 & - & 3x & = & & & 3x^{[2]} & & \\ & & & & x & = & & & & & x^{[1]} \\ x^3 & & & & & = & x^{[3]} & + & 3x^{[2]} & + & x^{[1]} \end{array}$$

The first three examples are just the falling factorial functions defined above, the last example results by adding the first three.

You are expected to write a program which reads the coefficients of polynomials and outputs the coefficients of their falling factorial forms.

Input

Input to your program consists of lines with ≤ 25 integers, separated by white space.

Each line defines the coefficients of one polynomial, starting with the *constant* coefficient.

Output

For each input line there should be one output line with the coefficients of the falling factorial form, starting with the coefficient of $x^{[0]}$. For the input above:

Sample Input

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

Sample Output

```
0 0 0 1
0 0 3
0 1
0 1 3 1
7 6 8 1
```