

Evaluate the polynomial

Your task consists of evaluate a polynomial of degree n ($0 \leq n \leq 999$) represented by its $n+1$ coefficients of the form:

$$p_n(x) = c_n x^n + c_{n-1} x^{n-1} + \dots + c_2 x^2 + c_1 x + c_0$$

in each one of the k ($1 \leq k \leq 100$) points x_1, x_2, \dots, x_k . The coefficients of the polynomial and the values where they will be evaluated are integers in the interval $[-100, 100]$ that guarantees that the polynomial's evaluation is at the most $2^{63} - 1$.

Input

There will be multiple test cases, each one with 4 lines that are described below
 n : degree of polynomial.

$c_n c_{n-1} \dots c_2 c_1 c_0$: coefficients of the polynomial separated by a single space.

k : number of points to evaluate the polynomial.

$x_1 x_2 \dots x_{k-1} x_k$: points to evaluate the polynomial separated by a single space.

The final test case is a single line where $n = -1$ and this case should not be processed.

Output

For each test case you should print $k + 1$ lines of output, the very first line containing the case number and the following k lines with the result of the polynomial's evaluation in each one of the k given points. See the sample.

Example

Input:

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

Output:

```
Case 1:
-1
-2
2
-1
7
Case 2:
-1
0
15
```

