Real Roots

In this problem you are challenged to factor the real roots of polynomials.

You are rewarded points based on the number of testcases you solve.

Input

The first line contains the number of test cases, **T**.

The first line of each test case contains an integer **N**, the number of coeficients.

The second line contains the polynomial coeficients $a_{N-1}, ..., a_1, a_0$ such that ($P(x) = a_{N-1}x^{N-1} + ... + a_1x^1 + a_0x^0$).

Output

The roots of the polynomial, in sorted order. That is all real numbers $r_0, r_1, r_2, ...$ such that $P(r) = 0$.

Constrains

- **T** ≤ 20
- **N** ≤ 20
- All coeficients are in the inclusive range [-10^6,10^6]
- The output precision must be at least 2 decimal digits
- The roots must truly be real. No complex roots even if the imaginative part is very small.

Cases

1. Same as the example
2. ~3 random integer roots
3. ~15 random integer roots
4. ~10 Random interger coefficients
5. ~10 Random floating point roots
6. ~10 Random floating point coefficients
7. Polynomials on the form $p_0=x$, $p_{k+1}=(p_k-a_k)$^2 *e.g.* ((x-3)^2-1)^2

Example

Input:
4
3
1 0 -2 $x^2 - 2$
3
1 0 1 $x^2 + 1$
4
-1 3 -3 1 $-x^3 + 3x^2 - 3x + 1$
7
1 -1 -9 13 8 -12 0 $x^6 - x^5 - 9x^4 + 13x^3 + 8x^2 - 12x$

Output:

-1.414214 1.4142135 *-sqrt(2), sqrt(2)*

No real roots

1 1 1 *Triple root in x=1*

-3 -1 0 1 2 2 *Mixed integer roots*

Notes

1. All testcases are double checked using Mathematica with 30 digits of precision.
2. Constrains are set such that most approaches should be fine using double working precision.