Problem G. Projection

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

Given an n-dimensional hypersphere and hyperrectangle, defined as follows:

Hypersphere: $B \triangleq \{\mathbf{x} \mid \sum_{i=1}^{n} x_i^2 \le R^2; \mathbf{x} \in \mathbb{R}^n\}$;

Hyperrectangle: $C \triangleq \{\mathbf{x} \mid |x_i| \le l_i, \forall i \in [1, n]; \mathbf{x} \in \mathbb{R}^n\}$.

Let $S \triangleq B \cap C$. Given a point $\mathbf{x} = (x_1, x_2, \ldots, x_n)$, find the point in S (including the boundary) that is closest to $\mathbf{x}$, denoted by $\mathbf{y} = (y_1, y_2, \ldots, y_n)$.

A point $\mathbf{p}$ is considered closer to $\mathbf{x}$ than a point $\mathbf{q}$ if and only if $\sum_{i=1}^{n}(x_i - p_i)^2 \le \sum_{i=1}^{n}(x_i - q_i)^2$.

Input

Each test file contains multiple test cases. The first line contains the number of test cases T ($1 \le T \le 3 \times 10^4$). The description of the test cases follows.

The first line of each test case contains two integers n and a ($2 \le n \le 10^5$, $1 \le a \le 10^9$), where a is the value of R^2.

The second line contains n integers $x_1, x_2, \ldots, x_n$ ($|x_i| \le 10^9$).

The third line contains n integers $l_1, l_2, \ldots, l_n$ ($1 \le l_i \le 100$).

For each test file, it is guaranteed that the sum of n over all test cases does not exceed 10^5.

Output

For each test case, output one line containing n real numbers $y_1, y_2, \ldots, y_n$.

Your answer is considered correct if its absolute or relative error does not exceed 10^{-6}.

Formally, let your answer be y_i, and the jury's answer be y_i^*. Your answer is accepted if and only if $\frac{|y_i - y_i^*|}{\max(1, |y_i^*|)} \le 10^{-6}$ for all $i \in [1, n]$.

Example

standard input	standard output
3 2 25 1 10 4 4 2 25 10 1 4 4 3 6 3 3 3 2 2 2	1.0000000000 4.0000000000 4.0000000000 1.0000000000 1.4142135624 1.4142135624 1.4142135624