

Rejection Sampling

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 1024 megabytes

Bobo wants to use a rejection sampling algorithm to construct a random set $T \subset \{1, 2, \dots, n\}$ of size k . For parameters p_1, p_2, \dots, p_n ($0 \leq p_i \leq 1$) and integer k , the rejection sampler is defined as follows:

1. Initialize $T \leftarrow \emptyset$;
2. For each i ($1 \leq i \leq n$), add i into T with probability p_i ;
3. Output T if the size of T is exactly k ; otherwise, repeat the process.

Now you are given integers a_1, a_2, \dots, a_n and k . Bobo needs to set the parameters p_1, p_2, \dots, p_n satisfying

- $\sum_{i=1}^n p_i = k$;
- for all $S \subseteq \{1, 2, \dots, n\}$ such that $|S| = k$, the probability that the rejection sampler outputs S is proportional to $\prod_{i \in S} a_i$.

Your task is to find out the parameters p_1, p_2, \dots, p_n for Bobo. It is guaranteed that such parameters exist and **are unique**. Your answer will be considered correct if the absolute error of each p_i doesn't exceed 10^{-6} compared to the unique answer.

Input

The first line of the input contains two integers n and k ($2 \leq n \leq 10^5$, $1 \leq k \leq n - 1$).

The second line of the input contains n integers a_1, a_2, \dots, a_n ($1 \leq a_i \leq 10^9$).

Output

Output n lines. The i -th line contains a single real number p_i .

Your answer is considered correct if the absolute error of each parameter does not exceed 10^{-6} . Namely, if your answer is a , and the jury's answer is b , then your answer is accepted if $|b - a| \leq 10^{-6}$ for all parameters.

Examples

standard input	standard output
3 2 5 5 5	0.666666666667 0.666666666667 0.666666666667
2 1 1 4	0.333333333333 0.666666666667
4 2 1 2 3 4	0.310035697652 0.473324044845 0.574114878920 0.642525378583