
Problem A. Independent Events

Input file: *standard input*
Output file: *standard output*
Time limit: 2 seconds
Memory limit: 512 mebibytes

Yuuka is interested in n independent events. The probability that the i -th event occurs is p_i . Yuuka is going to perform m operations, each being one of the following:

- “0 l_i r_i ”: considering only the events from l_i to r_i (both inclusive), find the probability that none of these events occur. As the value may be too small, you need to print the natural logarithm of the probability: if the probability is p , print $\ln(p)$.
- “1 l_i r_i k_i ”: for all $l_i \leq j \leq r_i$, multiply p_j by k_i . All events remain independent.

Input

The input contains zero or more test cases, and is terminated by end-of-file. For each test case:

The first line contains two integers n and m : the number of events and the number of operations ($1 \leq n, m \leq 10^5$).

The second line contains n real numbers $p_1, p_2, \dots, p_n$ where p_i is the probability that the i -th event occurs ($10^{-5} \leq p_i \leq 0.1$).

The following m lines provide the descriptions of the operations. The i -th line starts with an integer t_i : the type of the corresponding operation. If t_i is “0”, it is followed by two integers l_i and r_i . If t_i is “1”, it is followed by two integers l_i and r_i , and a real number k_i ($1 \leq l_i \leq r_i \leq n$, $0.0001 \leq k_i \leq 100$).

Each real number in the input has exactly five digits after the decimal point. Additionally, it is guaranteed that, at every moment, every p_i lies in the interval $[10^{-5}, 0.1]$.

It is guaranteed that neither the sum of all n nor the sum of all m will exceed 10^5 .

Output

For each operation of type “0”, output a real number denoting the answer. Your answer will be considered correct if its relative error doesn’t exceed 10^{-9} .

Example

standard input	
6 5	
0.01000 0.09871 0.00005 0.00999 0.01234 0.02345	
0 1 6	
1 3 4 10.00000	
0 1 6	
1 1 2 0.05000	
0 1 6	
standard output	
-0.16021487727848477000	
-0.25587417689480757000	
-0.14734347732072095000	