



2: Surviving StatRed

Level: Medium

Time limit: 1 second

Soon, the board members of VIA will retire and go back to the regular student life. However, some board members are already attending some courses right now, to prevent having to take them next year. For example, Thies is currently attending *Statistisch Redeneren*, commonly known as *StatRed*. This is a second year Computer Science course on probability and statistics. However, since Thies is still working very hard to keep **via** running, he does not have a lot of time to actually study for the exam of the course.

Since the exam will be multiple-choice¹, Thies has decided to apply what he has learnt about statistics to calculate how likely he is to pass the exam. The exam consists of n questions, allowing for up to n total possible points. Answering a question right earns Thies +1 point, answering a question wrong -1 point, and leaving a question open leads to 0 points. A total of at least m points is needed to pass the exam.

For each question on the exam, Thies is able to say with confidence that he will answer the question correctly with probability p_i ($0.5 \leq p_i \leq 1$). By looking at all the questions in this manner, Thies would like to know how likely he is to pass the exam by scoring at least m points. If this probability is very low, it might be better to quit the exam and come back for the resit.

Input

The first line contains two integers, n and m ($1 \leq m \leq n \leq 5000$), the amount of questions on the exam (n) and the amount of points needed to pass (m). The next line contains n numbers p_i ($0.5 \leq p_i \leq 1$), the probability to answer question i ($1 \leq i \leq n$) correctly.

Output

Output the probability that Thies passes his *StatRed* exam. Your answer may have an absolute or relative error of at most 10^{-6} .

Sample input 1

```
4 1
0.8 0.8 0.8 0.5
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Sample output 1

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0.896
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¹ This may not be an accurate representation of reality