Educational DP Contest AtCoder I - Coins

Let N be a positive odd number.

There are N coins, numbered $1, 2, \ldots, N$. For each i $(1 \le i \le N)$, when Coin i is tossed, it comes up heads with probability p_i and tails with probability $1 - p_i$.

Taro has tossed all the N coins. Find the probability of having more heads than tails.

Constraints

- N is an odd number.
- $1 \le N \le 2999$.
- p_i is a real number and has two decimal places.
- $0 < p_i < 1$

Input Specification

The first line will contain the integer N.

The next line will contain N floats, $p_1, p_2, \ldots, p_N$.

Output Specification

Print the probability of having more heads than tails. The output is considered correct when the absolute error is not greater than 10^{-9}.

Sample Input 1

```
3
0.30 0.60 0.80
```

Sample Output 1

```
0.612
```

Explanation For Sample 1

The probability of each case where we have more heads than tails is as follows:

- The probability of having $(Coin1, Coin2, Coin3) = (Head, Head, Head)$ is $0.3 \times 0.6 \times 0.8 = 0.144$;
- The probability of having $(Coin1, Coin2, Coin3) = (Tail, Head, Head)$ is $0.7 \times 0.6 \times 0.8 = 0.336$;
- The probability of having $(Coin1, Coin2, Coin3) = (Head, Tail, Head)$ is $0.3 \times 0.4 \times 0.8 = 0.096$;
- The probability of having $(Coin1, Coin2, Coin3) = (Head, Head, Tail)$ is $0.3 \times 0.6 \times 0.2 = 0.036$;

Thus, the probability of having more heads than tails is $0.144 + 0.336 + 0.096 + 0.036 = 0.612$.

Sample Input 2

```
1
0.50
```

Sample Output 2

```
0.5
```

Explanation For Sample 2

Outputs such as `0.500`, `0.500000001` and `0.499999999` are also considered correct.

Sample Input 3

```
5
0.42 0.01 0.42 0.99 0.42
```

Sample Output 3

```
0.3821815872
```