

Problem D

Data Centers

Input file: *testdata.in*

Time limit: 1 second

Problem Description

In the age of cloud computing we are facing new challenges. For example, we know that we can store our file in a data center for a fee. However, these data centers may fail and we will not be able to retrieve our file. To solve this problem we can *duplicate* our file at more than one data center, so that we can always retrieve the file as long as any data centers that we store the file in survives.

We now define some terminologies. We assume that we have n data centers from d_1 to d_n . If we store our file at a data center d_i , we need to pay a fee of c_i . We also assume that data center d_i has a failure probability of p_i , and the data centers are independent from each other.

Now give a total budget of B , could you determine the most reliable way to store a file? That is, we cannot pay more than B in storage fee and we would like to minimize the failure probability that we can retrieve the file.

Technical Specification

- $2 \leq n \leq 100$
- $1 \leq c_i \leq 100$
- $0 < p_i \leq 1$
- $0 < B \leq 4000$
- n , all of the c_i , and B are integers.
- All of the p_i are floating point numbers.

Input Format

There are multiple test cases in the input. Each input case starts with an integers n and an integer budget B . Each of the following n lines contains an integers c_i as the cost of d_i , and a double precision number p_i as the failure probability of d_i .

Output Format

For each test case output a line consisting of the minimum failure probability. The probability should be in logarithmic form of base 10, with its precision to 6 digits after the decimal point.

Sample Input

```
2 10
2 0.6
9 0.4
2 11
2 0.6
9 0.4
```

Sample Output

```
-0.397940
-0.619789
```