3 Let's Win the Election

Republic of JOI consists of N states, numbered from 1 to N. In 2022, the presidential election will be held in Republic of JOI. The election will be held in each state. The winner of the election in a state will get the vote of the state.

Rie will run for the president. She is planning to win the election. Her plan is to deliver a speech in order to increase the degree of reliability. After she delivers a speech, the following will happen.

- If the total time of speech in State i ($1 \leq i \leq N$) reaches A_i hours, she will get the vote of State i.
- If the total time of speech in State i ($1 \leq i \leq N$) reaches B_i hours, she will get a collaborator from State i. After that, the collaborator will be able to deliver a speech in order to increase the total time of speech.
- It may be the case that Rie cannot get any collaborator from State i. In this case, $B_i = -1$. Otherwise, it is guaranteed that $B_i \geq A_i$ holds.

A collaborator from State i ($1 \leq i \leq N$) may deliver a speech outside State i. More than one person may deliver a speech in the same state simultaneously. For example, if two people deliver a speech in a state for x hours, the total time of speech in the state will be increased by $2x$ hours. The time of speech needs not be an integer. We will ignore the travel time between states.

Since the election day is coming soon, Rie would like to get K votes as soon as possible.

Given the number of the states and information of each state, write a program which calculate the minimum number of hours required to get K votes.

Input

Read the following data from the standard input. Given values are all integers.

N
K
A_1 B_1
A_2 B_2
$\vdots$
A_N B_N

Output

Write one line to the standard output. The output should contain the minimum number of hours required to get K votes. Your solution will be judged correct if the absolute value of the difference from correct answer is less than or equal to 0.01. The output should be written in one of the following formats.

- An integer. (Example: `123`, `0`, `-2022`)
- A sequence consisting of an integer, a period, and a sequence of digits between 0 and 9. It should not contain separating characters. There is no restriction on the number of digits after the decimal point. (Example: `123.4`, `-123.00`, `0.00288`)

The output should not be written in exponential notation. For example, `1.23456e+05` and `1.23456e5` are not allowed.

Constraints

- $1 \leq N \leq 500$.
- $1 \leq K \leq N$.
- $1 \leq A_i \leq 1\,000$ $(1 \leq i \leq N)$.
- $A_i \leq B_i \leq 1\,000$ or $B_i = -1$ $(1 \leq i \leq N)$.

Subtasks

1. (5 points) $B_i = -1$ $(1 \leq i \leq N)$.
2. (5 points) $B_i = -1$ or $B_i = A_i$ $(1 \leq i \leq N)$.
3. (11 points) $N \leq 7$.
4. (12 points) $N \leq 20$.
5. (33 points) $N \leq 100$.
6. (11 points) $K = N$.
7. (23 points) No additional constraints.

Sample Input and Output

Sample Input 1	Sample Output 1
3 3 1 5 2 3 4 5	5.500000000000000

If the election campaign is held in the following order, Rie will get the vote of every state in 5.5 hours.

1. Rie delivers a speech for 2 hours in State 2, and gets the vote of State 2.
2. Moreover, Rie delivers a speech for one hour in State 2, and gets a collaborator from State 2.
3. Rie and the collaborator deliver a speech for 2 hours in State 3, and Rie gets the vote of State 3.
4. Rie and the collaborator deliver a speech for 0.5 hour in State 1, and Rie gets the vote of State 1.

This sample input satisfies the constraints of Subtasks 3, 4, 5, 6, 7.

Sample Input 2	Sample Output 2
7 4 4 -1 11 -1 6 -1 12 -1 36 -1 11 -1 20 -1	32.000000000000000

If the election campaign is held in the following order, Rie will get 4 votes in 32 hours.

1. Rie delivers a speech for 4 hours in State 1, and gets the vote of State 1.
2. Rie delivers a speech for 11 hours in State 2, and gets the vote of State 2.
3. Rie delivers a speech for 6 hours in State 3, and gets the vote of State 3.
4. Rie delivers a speech for 11 hours in State 6, and gets the vote of State 6.

This sample input satisfies the constraints of Subtasks 1, 2, 3, 4, 5, 7.

Sample Input 3	Sample Output 3
5 3 4 -1 5 -1 6 -1 7 7 8 8	11.500000000000000

If the election campaign is held in the following order, Rie will get 3 votes in 11.5 hours.

1. Rie delivers a speech for 7 hours in State 4, and gets the vote of State 4 and a collaborator from State 4.
2. Rie delivers a speech for 4 hours in State 1, and gets the vote of State 1. At the same time, the collaborator delivers a speech for 4 hours in State 2.
3. Rie and the collaborator deliver a speech for 0.5 hour in State 2, and Rie gets the vote of State 2.

This sample input satisfies the constraints of Subtasks 2, 3, 4, 5, 7.

Sample Input 4	Sample Output 4
7 5 28 36 11 57 20 35 19 27 31 33 25 56 38 51	62.166666666666664

This sample input satisfies the constraints of Subtasks 3, 4, 5, 7.

Sample Input 5	Sample Output 5
20 14 106 277 175 217 170 227 164 245 118 254 139 261 142 270 185 200 162 241 153 239 128 264 103 299 147 248 158 236 160 232 183 205 194 197 135 260 153 234 128 260	644.203571428571422

This sample input satisfies the constraints of Subtasks 4, 5, 7.