Transfer

SEASON 10 – SIXTH ROUND

Plamen got his long-awaited promotion and now he has to move to his new office in Sofia. This, of course, is not so easy because he has to transfer all necessary files from the old workstation to the new one in the most secure way possible.

The files, which Plamen needs at the new workplace, are N in total and they are numbered with the numbers from 1 to N. For the purpose of the transfer, he has to use a crypted connection between the two workstations with a speed of V megabytes per second. Plamen knows the time T_i when the transfer of each file started and their sizes S_i in megabytes. If more than one file is being transferred, each of them has equal speed. For example, if in the same moment there are K files, then for each of them will be utilised network speed of $\frac{V}{K}$ megabytes per second.

Write a program which finds when the transfer of each file will complete. The time is measured in seconds and begins with the moment 1.

Input

The first line of the input file `transfer.in` consists of the natural numbers N and V. Each of the following N lines consists of two natural numbers, separated by a space – T_i и S_i.

Output

The output file `transfer.out` must consists of N lines. On the i-th of them print a single number, denoting the time when the transfer of the i-th file will complete. The answer will be considered correct only if the absolute or relative difference does not exceed 10^{-6}.

Constraints

$1 \leq N \leq 10^5$
$1 \leq V \leq 10^9$
$1 \leq T_i, S_i \leq 10^9$

Example

Input	Output
3 2 1 3 3 7 4 3	2.5 8 7