G. Ophelia's Flowers

time limit per test: 1.5 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

When the world is falling apart around her, Ophelia finds comfort in flowers and the powerful meaning possessed by each one. In fact, she likes to grow flowers in her garden and give them to her dearest friends as gifts.

There's rosemary, that's for remembrance...And there is pansies, that's for thoughts. There's fennel for you, and columbines. There's rue for you, and here's some for me...There's a daisy. I would give you some violets, but they wither'd all...

Ophelia has decided to plant a new garden, in which she wants to grow N unique flowers. She knows that each flower f_i takes d_i days to grow from a seed into a mature plant that Ophelia can then harvest and give away. So if she plants all N flowers starting on the same day, it will take $\max\{d_1, \ldots, d_N\}$ days for all of the flowers Ophelia planted to have finished maturing. However, Ophelia recently got her hands on F pounds of Super-Gro medieval flower fertilizer, where each pound of fertilizer, when applied to a flower, shortens the growth time for that flower by a single day. Of course, it takes any flower at least a day to fully grow, so the Super-Gro fertilizer can't shorten the growth time below one day.

Help Ophelia grow all of her flowers as quickly as possible! If she plants the seeds for all N flowers starting on the same day and makes good use of her fertilizer, what is the shortest number of days that it will take for all of Ophelia's flowers to reach maturity?

Input

The first line of input contains an integer N $(1 \leq N \leq 10^5)$, denoting the number of unique flowers Ophelia wants to plant. N lines follow, each containing the unique name (consisting of all upper-case letters and no spaces) of the i^{th} flower f_i, followed by an integer d_i $(1 \leq d_i \leq 10^6)$ which is the number of days it will take for the flower f_i to mature.

After those lines, the last line of input contains a single integer F $(0 \leq F \leq 10^{12})$ which is the number of pounds of fertilizer Ophelia can use to accelerate the growth of her plants.

Output

Output a single integer that is the minimum number of days it will take for Ophelia's flowers to all reach maturity.

Example

input Copy

```
7
ROSEMARY 10
PANSY 14
FENNEL 7
COLUMBINE 12
RUE 6
DAISY 7
VIOLET 3
37
```

output Copy

```
4
```

Note

Ophelia can achieve an optimal growth time of 4 days in this example by using 6 lbs of fertilizer on the rosemary, 10 on the pansy, 3 on the fennel, 8 on the columbine, 2 on the rue, 3 on the daisy, and 0 on the violet. This uses only 32 out of her 37 pounds of fertilizer.

Language: GNU G++17 7.3.0

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
134430160	Nov/05/2021 21:23	Accepted
134424044	Nov/05/2021 20:12	Wrong answer on test 13
134423903	Nov/05/2021 20:11	Wrong answer on test 13
134369795	Nov/05/2021 09:59	Wrong answer on test 1
134369758	Nov/05/2021 09:58	Wrong answer on test 3
134369022	Nov/05/2021 09:48	Wrong answer on test 1