Task: RAI
Rainy days

AACPP SuSe 2024 Round 1 Memory: 256MiB (Java: 512MiB) 2024.04.16 – 2024.05.07

It's been quite a rainy weather over Bytewood lately and Byteman is jumping on the occasion to go mushrooming. He's not an amateur, though, but a *competitive* mushroomer. He has a VroomShroom™ drone, model 9999, that is able to collect all mushrooms on a single forest glade and bring them back to him in a single day.s

Byteman is interested in a particular species of shrooms: *Agaricus linearis*. Its name derives from the fact that every night the same number of new mushrooms springs at each given glade.

There are n glades in the forest. At the start there are b_i shrooms on glade i and every night a_i new ones appear. For k days Byteman will, each day, send a drone to one chosen glade and collect all the shrooms on it (he can choose the same glade on multiple days). However, he hasn't decided yet how many days exactly he will spend on this activity. Your task is to help Byteman decide the **maximum possible number of collected mushrooms for each** $k \in [1, n]$.

Input

In the first line of standard input there is one integer n, the number of glades in Bytewood. The next n lines describe the glades – i-th of them contains two integers, a_i and b_i, describing respectively the number of mushrooms appearing each night on glade i and the initial number of mushrooms there.

Output

Your program should write n lines to standard output. The k-th line should contain the maximum number of mushrooms that can be collected with optimal drone usage, under the assumption that Byteman's mushrooming takes exactly k days.

Example

For the input:

```
3
5 10
16 0
5 10
```

the correct output is:

```
10
26
57
```

The strategy for a 3-day mushrooming would be to send the drone to glade 1 on first day (collecting 10 mushrooms), on the second day to glade 3 (collecting 15 mushrooms, the 10 initial ones and 5 that sprung up in the night), and finally on the third day to glade 2 (collecting 32 mushrooms that appeared in the two intervening nights).

Additional examples

The following initial tests are also available:

- `0b` – sample test for Subtask 1, $n = 250$, $\forall_i . a_i = b_i = i$;
- `0c` – sample test for Subtasks 2 and 3, $n = 2500$, $\forall_i . a_i = i, b_i = 2500$;
- `0d` – maximal test, $n = 10^6$, $\forall_i . a_i = 10^6, b_i = 10^{12}$.

Limits

Your solution will be evaluated on a number of hidden test cases divided into groups. Points for a group are awarded if and only if the submission returns the correct answer for each of the tests in the group within the allotted time limit. These groups are organised into subtasks with the following limits and points awarded.

Subtask	Limits	Points
1.	$1 \leq n \leq 250$, $\forall_i . 0 \leq a_i \leq 10^3, 0 \leq b_i \leq 10^6$	1
2.	$1 \leq n \leq 2500$, $\forall_i . 0 \leq a_i \leq 10^6, 0 \leq b_i \leq 10^{12}$	1
3.	$1 \leq n \leq 10^6$, $\forall_i . 0 \leq a_i \leq 10^6, 0 \leq b_i \leq 10^{12}$, $\forall_i . b_1 = b_i$	1
4.	$1 \leq n \leq 10^6$, $\forall_i . 0 \leq a_i \leq 10^6, 0 \leq b_i \leq 10^{12}$	7