Problem 7: Survive the Zombie

Time limit: 2 seconds

Mustafa is gathering an army to fight a demon in a videogame. The army consists of two parts: the heroes and the defensive artifacts. Each hero has his health, and each defensive artifact has its durability to consider in this game. Before the battle begins, Mustafa distributes artifacts to the heroes so that each hero receives at most one artifact. To simulate the game, the battle consists of rounds that proceed as follows:

- First, the dragon deals damage equal to $\frac{1}{a+b}$ (a real number with precision of two floating points) to each hero, where a is the number of heroes alive and b is the number of active artifacts.
- After that, all heroes with health 0 or less die. An artifact with durability is deactivated when one of the following occurs:
    - The hero holding the artifact either dies or receives x total damage (from the start of the battle).
    - If an artifact is not held by any hero, it is inactive from the beginning of new round.
    - The battle ends when there are no heroes left alive.

Initially, the army is empty. There are q queries: add a hero with health x or an artifact with durability y to the army. After each query, determine the maximum number of rounds that Mustafa can survive if he distributes the artifacts optimally.

Input

The first line contains one integer q where $1 \leq q \leq 3.10^5$ — the number of queries. In the following q lines, there are two integers t_i and v_i ($t_i \in \{1, 2\}; 1 \leq vi \leq 10^9$) — the type of the query and the value of the query parameter. If the type is 1, a hero with health v_i is added. If the type is 2, an artifact with durability v_i is added.

Output

Print q integers. After each entry of either artifact or hero, output the maximum number of rounds that Mustafa can survive if he distributes the artifacts optimally.

Sample input & output

The following is an example of a sample input and corresponding correct outputs.

Sample input	Sample Output
3 2 5 1 4 1 10	0 8 19