문제2

The routers on the network store arriving packets and transmit them into the next routers. So in the routers, there are buffers which store the arriving packets temporarily. In this problem, there are two buffers Q_1 and Q_2 in the router R. Let Q_1 and Q_2 be the upper buffer and the lower one, respectively, in Figure 1 and 2.

In the process that packets arrive and depart at router, there are two phases, input phase and output phase, at each time t ($t = 1, 2, \ldots$). In the input phase, packets arrive independently at each buffer and are stored there in the order of their arrivals. In Figure 1, at the input phase of time t, one packet p_5 arrives at Q_1 and two packets q_4 and q_5 arrive at Q_2. Assume that the size of buffers is sufficiently large to store all arriving packets. Then at the output phase of time t, one of the two buffers in the router R is selected and the front packet of that buffer is transmitted as an output. In Figure 2, the buffer Q_2 is selected and the packet q_1 is transmitted.

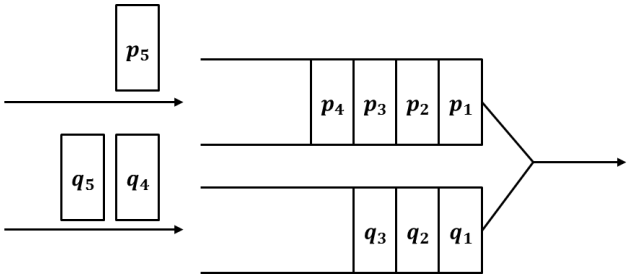

Figure 1. Input phase of time **t** in the router **R**

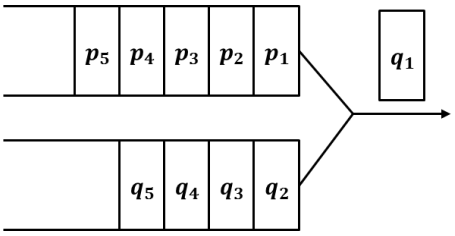

Figure 2. Output phase of time **t** in the router **R**

After the input phase of time t (before the output phase), the number of packets

stored in the buffer Q_i is called the length of Q_i, denoted by $L_i(\mathrm{t})$. Then $\mathrm{L(t)}$ is the larger of the two buffer lengths at time t, that is, $\mathrm{L(t)} = \max(L_1(t), L_2(t))$. We are concerned in the maximum of $\mathrm{L(t)}$ over all times t.

Given the number of packets arriving in the two buffers at its input phase for each time t, the problem is to determine the output of the router R at the output phase of each time t, minimizing the maximum of $\mathrm{L(t)}$ over all times t and to print the minimum value.

[Input]

The first line has a single integer $\mathrm{n}(1 \leq \mathrm{n} \leq 1{,}000{,}000)$, the number of times. In the next n lines, the i-th line contains two integers a_i and b_i. Here a_i and b_i represent the number of packets arriving in the buffers Q_1 and Q_2 at time i, respectively $(0 \leq a_i, b_i \leq 1{,}000{,}000)$.

[Output]

Single line containing the minimum value, minimizing the maximum of $\mathrm{L(t)}$ over all times t.

[I/O Example 1]

Input

```
1
1 3
```

Output

```
3
```

[I/O Example 2]

Input

```
6
1 1
```

```
1 1
1 2
1 1
1 1
6 0
```

Output

```
6
```