

# The 2019 Ethiopian Collegiate Programming Contest



## Problem L

### Two Machines

Time Limit: 0.5 Seconds

A scheduling company SOPT has tasks  $t_1, t_2, \dots, t_n$  to complete. The company has two super machines  $A$  and  $B$ . To complete a task  $t_i$ , SOPT can choose only one of  $A$  and  $B$ . It takes  $a_i$  and  $b_i$  hours to complete the task  $t_i$  on the machines  $A$  and  $B$ , respectively. A machine can run at most one task at any time, and if it starts to run a task  $t_i$  then it cannot run another task  $t_j$  until the machine completes  $t_i$ . SOPT wants to minimize the completion time for all tasks.

For example, we have three tasks  $t_1, t_2$ , and  $t_3$  with  $a_1 = 2, b_1 = 3, a_2 = 5, b_2 = 3, a_3 = 2$ , and  $b_3 = 7$ . The best way to minimize the completion time is to assign two tasks  $t_1$  and  $t_3$  to the machine  $A$  and to assign the other task  $t_2$  to the machine  $B$ . Then  $A$  needs  $2 + 2 = 4$  hours to complete  $t_1$  and  $t_3$ , and  $B$  needs 3 hours to complete  $t_2$ , so the minimum completion time is 4 hours.

Given  $n$  tasks and the times to complete the tasks on machines  $A$  and  $B$ , write a program to output the minimum completion time to complete all tasks.

### Input

Your program is to read from standard input. The input starts with a line containing one integer,  $n$  ( $1 \leq n \leq 250$ ), where  $n$  is the number of tasks. In the following  $n$  lines, the  $i$ -th line contains two integers  $a_i$  and  $b_i$  ( $1 \leq a_i, b_i \leq 250$ ) where  $a_i$  and  $b_i$  denote the time to complete the task  $t_i$  on the machines  $A$  and  $B$ , respectively.

### Output

Your program is to write to standard output. Print exactly one line. The line should contain the minimum completion time to complete all tasks.

The following shows sample input and output for two test cases.

Sample Input 1	Output for the Sample Input 1
3 2 3 5 3 2 7	4
Sample Input 2	Output for the Sample Input 2
3 9 2 10 4 5 2	6