Problem F. Number Cards

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	512 mebibytes

Snuke has N cards with numbers. The i-th card contains positive integer a_i, and the color of this card is c_i (in this problem, we represent colors by integers).

Snuke has the following hypothesis about the coloring scheme of these cards:

- Cards with $1 \le a_i \le M$ are colored by the same color.
- Cards with $M+1 \le a_i \le 2M$ are colored by the same color, and this color is different from the color used for $1 \le a_i \le M$.
- Cards with $2M+1 \le a_i \le 3M$ are colored by the same color, and this color is different from the colors used for $1 \le a_i \le 2M$.
- Cards with $3M+1 \le a_i \le 4M$ are colored by the same color, and this color is different from the colors used for $1 \le a_i \le 3M$.
- and so on.

How many positive integers M are consistent with all the cards he has? If the number of possibilities of M is infinite, print -1.

Input

First line of the input contains one integer N ($1 \le N \le 20$). Each of next N lines contains two integers a_i and c_i — number and color of one of Snuke's cards, respectively ($1 \le a_i \le 10^9$, $1 \le c_i \le 20$). It is guaranteed that the sequence a_i is strictly increasing.

Output

Print the answer in a single line.

Examples

standard input	standard output
4 27 2 2000 4 2015 4 2100 1	277
3 1 1 2 2 3 1	0