Problem J. Jeopardy

Input file:	`jeopardy.in`
Output file:	`jeopardy.out`
Time limit:	1 second
Memory limit:	256 mebibytes

Young boy Innokentiy is fond of games about dungeons. In one such game, his character is in jeopardy inside an endless empty dungeon. Every point of the dungeon might be either lit or dark. Initially, all points of the dungeon are under the veil of darkness.

There is a Cartesian coordinate system in the dungeon such that Innokentiy's character is located at the point with coordinates $(0, 0)$. We may assume that Innokentiy's character has infinitely small foot size and thus occupies an infinitely small area. In order to escape from the dungeon, Innokentiy needs to lead his character through the lit area of the dungeon to some exit.

The character of Innokentiy is able to cast N magic spells. The i-th spell can illuminate an arbitrary rectangle with sides of lengths A_i and B_i such that they are parallel to the coordinate axes. It does not matter which of the sides has length A_i and which B_i. After a spell has been cast, all points that are inside the rectangle or on its border become lit until the end of the game. Unfortunately, each spell can be used no more than once. Rectangles for different spells may overlap freely.

Innokentiy knows the coordinates of Q possible exits from the dungeon. Help him to discover which exits are reachable and which are not. For the exits that can be reached, print the minimum number of spells which have to be used.

Input

The first line of input contains the number of spells N ($1 \le N \le 20$). Each of the next N lines contain a pair of integers A_i and B_i ($1 \le A_i, B_i \le 10^7$) separated by a space: the sides of a rectangle i-th spell can light.

The next line contains the number of exits Q ($1 \le Q \le 10$). Each of the following Q lines contains a pair of integers X_j, Y_j ($1 \le X_j, Y_j \le 2 \cdot 10^9$): the j-th exit's coordinates.

Output

For each of the Q exits, print a line containing the minimum number of spells which is enough to get out from that exit, or -1 if the exit cannot be used.

Example

jeopardy.in	jeopardy.out
3 1 4 2 2 5 1 4 9 2 10 2 2 10 10 5	2 3 3 -1