

The Imaginary Girlfriend

Input file: standard input
Output file: standard output
Time limit: 3 seconds
Memory limit: 512 megabytes

It's a cold, rainy night. You are wandering aimlessly in the dark streets. The grievous news came a few days ago that your good friend TankEngineer has been burnt alive in ALU as he is a lolicon. "He just thinks little girls are lovely and likes to participate in ICPC contests." you said to yourself, "Why things have come to this?"

Walking alone, you have never found the streets of your village so strange and alien. They are either strictly South-North or strictly East-West. "Another dead end, you sighed, "This world is so cruel." The joy and happiness it offers, compared nothing to the grief and the sorrows it brings.

You don't know how long you have been in the streets. "Come on darling, what's the sad look on your face?" As you remembered the angelic voice, it's your imaginary girlfriend, a very cute loli. "He did not die, he just jumped to another dimension. Come to my place, I will show you."

You can't believe what you have heard. How could this be true? Maybe you just go insane as you never had a girlfriend in your life so you came up with an imaginary one with your imagination in your mind. Whatsoever, you begin to rush down the streets as fast as you can towards your girlfriend's place.

"As long as there are kawaii lolis and the love for them in this world, there shall be light and there shall be hope." What TankEngineer had always been saying echoes in your mind. The streets can be seen as n horizontal or vertical segments on the plane. What is the shortest route to your imaginary girlfriend's place?

Input

The first line contains a single integer n , ($1 \leq n \leq 2 \times 10^4$), the number of streets.

Each of the following n lines contains four integers $x_{i1}, y_{i1}, x_{i2}, y_{i2}$ which means the i -th street is from (x_{i1}, y_{i1}) to (x_{i2}, y_{i2}) .

The last line contains four integers sx, sy, tx, ty which are the start point (where you are now) and the terminal point (your imaginary girlfriend's place).

It is guaranteed that any segment is either horizontal ($y_{i1} = y_{i2}$) or vertical ($x_{i1} = x_{i2}$). Any two parallel segments don't intersect (they can touch). The absolute value of any coordinate is no larger than 10^9 .

Output

Print a single integer l in one line, the length of the shortest path from (sx, sy) to (tx, ty) . In case you can't reach (tx, ty) from (sx, sy) , print -1 instead.

Examples

standard input	standard output
8 0 0 0 2 0 2 2 2 2 2 2 0 2 0 0 0 -1 1 1 1 1 1 1 3 1 3 -1 3 -1 1 -1 3 2 0 -1 3	6