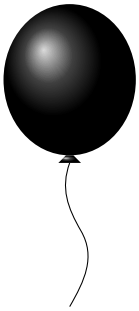
A Airline Internet



Time limit: 2.0s
Memory limit: 512MB

An airline wishes to supply passengers with Internet access on its flights. To do so, it is going to to install powerful radio transceivers on all of its aircraft and at the airports it operates from. The airports will be connected to the Internet and the aircraft will be able to access the connection via a radio link to any airport that is within the range of its tranceiver. Aircraft will also be able to relay the Internet connection on to other aircraft that are within range, so even if an aircraft cannot communicate directly with an airport, it may be able to access the Internet via another aircraft. The cost of the radio equipment is proportional to its range and the airline wishes to supply the Internet connection at minimal cost. It therefore wants your help in determining the minimum transceiver range required such that all of the aircraft can access the Internet all of the time.

The area that the airline operates in is represented as a 2D Cartesian plane. You are given co-ordinates of the locations of the airports that the airline operates from. You are also given the flight-schedule. Each flight described with the departure airport, the destination airport, take-off time and landing time. All airports are indexed from 0 to $n-1$. The aircraft takes off from the departure airport at the given time, flies in a straight line at constant speed from the departure airport to the destination airport, arriving at landing time. All radio tranceivers have the same range r and an aircraft can communicate with an airport or another aircraft if the in-plane distance between the two is no greater than r. An aircraft can access the Internet if it can either communicate with an airport, or it can communicate with another aircraft that can access the Internet (directly or indirectly). Calculate the minimum value of r which ensures that all aircraft can access the Internet at all times.

Input

The first line contains an integer n — the number of airports ($2 \le n \le 10$).

The i-th of the following n lines contains two integers x_{i-1} and y_{i-1} — the coordinates of the airport $(i-1)$. The coordinates are between 0 and 1000.

The following line contains an integer m — the number of flights ($1 \le m \le 20$).

The following m lines describe the flights. Each of these lines contains four integers s, f, t_s, t_f — the departure airport, the destination airport, the take-off time, and the landing time ($0 \le s, f \le n-1$; $s \ne f$; $0 \le t_s < t_f \le 1000$).

Output

Print a single number: the minimum value of r which ensures that all aircraft can access the Internet at all times.

Your value must be accurate to within an absolute or relative tolerance of 10^{-9}.

Samples

Sample input 1	Sample output 1
2 0 0 100 0 1 0 1 0 100	50.0000000000

Sample input 2	Sample output 2
2 0 0 100 0 4 0 1 0 100 0 1 25 125 0 1 50 150 0 1 75 175	25.0000000000

Sample input 3	Sample output 3
7 25 100 0 50 90 150 22 22 60 1 95 8 12 40 7 0 1 0 500 2 5 10 300 2 0 100 200 3 6 150 400 4 5 50 450 5 1 0 300 2 6 10 100	64.2820113001

Sample input 4	Sample output 4
3 0 0 50 0 100 0 1 0 1 0 100	25.0000000000

Sample input 5	Sample output 5
3 417 262 519 592 941 778 7 0 1 376 534 0 2 603 763 1 0 137 431 0 1 525 583 2 1 367 551 0 1 953 996 0 1 668 886	246.6187690316

Sample input 6	Sample output 6
5 101 591 283 183 346 696 436 638 738 46 8 3 0 855 890 2 0 260 698 3 4 229 743 1 2 519 898 3 1 863 955 4 0 407 993 2 4 872 969 0 3 320 663	298.1875904142

Sample input 7	Sample output 7
4 152 998 656 487 75 999 913 535 6 1 0 347 530 0 3 75 819 3 1 893 935 1 0 971 992 2 0 471 887 2 0 924 955	358.8652253981