

# Ori and Mouldwood Depths

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

In the game *Ori and the Will of the Wisps*, where the forest is dying, in order to heal this broken land, the spirit of light Ori must journey to find wisps: Eyes of the Forest.

One of the wisps is lost in the Mouldwood Depths, where there is too dark for Ori. Fortunately, however, there are some moving glowing groups of fantastic plants, which can light up a circular area.



Formally speaking, there are  $n$  groups of plants in  $xOy$  plane. The  $i$ -th group of plants can light up a circle with radius  $r_i$ . For convenience, we will use  $i$ -th circle to refer to this area below.

All circles move at a constant speed in a straight line. The center of  $i$ -th circle is at  $(Sx_i, Sy_i)$  at time 0 and will move to  $(Tx_i, Ty_i)$  at time  $T$ . Particularly,  $i$ -th circle will always stay at the same place if  $(Sx_i, Sy_i) = (Tx_i, Ty_i)$ .

At time 0, Ori is inside 1st circle and wants to move inside  $n$ -th circle, where the wisp stays, before time  $T$ . Note that Ori can move anywhere with just a single jump and Ori's jumping will be completed instantly due to Ori's superb jumping skills.

Now, Ori has decided to choose an appropriate time  $t(0 \leq t \leq T)$  to start and move to  $n$ -th circle without stopping, which means Ori will move inside  $n$ -th circle also at time  $t$ . On this basis, minimize the maximum distance Ori needs to be in the dark for a single jump. Please help Ori program the best route.

## Input

The first line of the input contains an integer, indicating  $n$  ( $2 \leq n \leq 500$ ).

The  $i + 1$  ( $1 \leq i \leq n$ ) line of the input contains five integers, indicating  $r_i, Sx_i, Sy_i, Tx_i, Ty_i$  ( $1 \leq r_i \leq 10^9, -10^9 \leq Sx_i, Sy_i, Tx_i, Ty_i \leq 10^9$ ) respectively.

## Output

Output a line containing a real number indicating the minimum of the maximum distance Ori needs to

be in the dark for a single jump.

Your answer will be accepted if the relative or absolute error does not exceed  $10^{-6}$ .

## Examples

standard input	standard output
2 1 0 0 2 2 1 3 4 7 2	2.4721360
3 2 0 0 0 0 3 0 -4 0 -104 3 -50 -54 50 -54	26.2182541

## Note

In the first test case, Ori will choose to start at time  $\frac{T}{2}$ .