

3941 Fat Xiao xingxing

Since entering university, *xxx* only does three things everyday: having a meal, sleeping and reading novels. He gains weight very quickly and looks already like a ball when he is a sophomore. He is so lazy that he leaves furniture to stand disorderly in his dormitory. When he wants to get something, he never moves furniture, but try to get through among furniture. Now please write a program to help him find out the shortest distance he has to walk in order to get the things he wants. (*xxx* can move in touch with furniture, but cannot fly over the furniture).

Input

The input file contains multiple test cases. For each test case, the first line of the file contains an integer n , the number of pieces of furniture.

In each line of the following n lines, the first number p_i means the number of vertices of the base shape of a furniture (assume that furniture is of a prism shape, so the base shapes of furniture are simple polygons, the heights of all the furniture are higher than *xxx*), the second number q_i is the height of the furniture, followed by p_i pairs of integers (x_i, y_i) , the coordinates of i th vertex of the base figure.

The last line contain 7 integers: $r_i, x_1, y_1, z_1, x_2, y_2, z_2$

- r_i : the radius of *xxx* (assuming *xxx* is a ball);
- (x_1, y_1, z_1) : the starting position of the center of the ball;
- (x_2, y_2, z_2) : the terminal position of the center of the ball.

You can assume that the center of the ball is not on or in any furniture. Assume that *xxx*'s dormitory is big enough so that he can move freely between furniture and walls. Proceed to the end of the file.

Note: Consider the following restrictions ($0 \leq n, x_i, y_i, q_i \leq 1000, 3 \leq p_i \leq 100$).

Output

For each test case, if *xxx* can move to the terminal position from the initial position without moving furniture, then output the minimum distance that *xxx* moves, keep two digits after the decimal point. Otherwise, output "TOO FAT". Please output the result as in the Sample Output.

Sample Input

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1
3 9 1 1 2 2 3 1
1 7 7 1 8 8 1
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Sample Output

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Case 1: 1.41
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