

The 28th Annual ACM International Collegiate Programming Contest ASIA Regional - Seoul

Problem I

Intelligent Robots

Input: robot.in

We have a robot and an obstacle in a 2-dimensional plane. The robot is represented as a rectilinear square, and the obstacle as a rectilinear polygon. By rectilinear, we mean that the edges of a polygon are either horizontal or vertical. Initially, the robot is located outside the obstacle; that is, it does not intersect the boundary and is not in the interior of the obstacle. The robot wants to “escape” the obstacle by moving in horizontal or vertical directions without intersecting the obstacle. We say that the robot escapes the obstacle if it moves completely out of the smallest rectangle containing the obstacle (refer to Figure 1 and Figure 2). Note that the robot can be located outside of the smallest rectangle initially. You are to write a program for determining whether or not a robot can escape the obstacle.

In Figure 1 the robot cannot escape the obstacle, but in Figure 2 it can escape the obstacle; R represents a robot and P represents an obstacle. Let (x, y) be the coordinate of a vertex of P . Both x and y are multiples of 10 and $10 \leq x, y \leq 1,000,000$. The length of an edge of R is a natural number less than 1,000,000, and its lowest digit is always 2, e.g., 2, 12, 22, 32, etc.

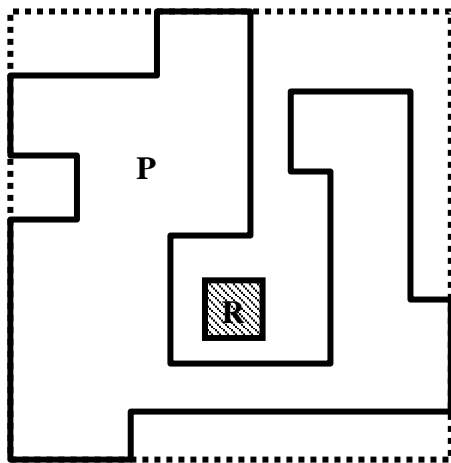


Figure 1

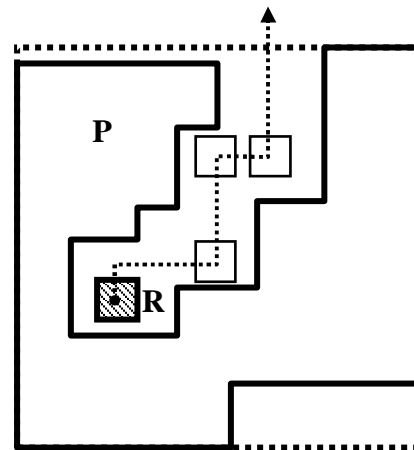


Figure 2

Input

The input consists of T test cases. The number of test cases (T) is given on the first line of the input file. The first line of each test case contains 3 integers n_x , n_y , and w ($2 \leq n_x, n_y, w \leq 1,000,000$), where (n_x, n_y) is the coordinate of the left-bottom corner of the robot R and w is the length of an edge of R with the lowest digit of w being fixed to 2. The second line contains an integer n ($4 \leq n \leq 1,000$), where n is the number of vertices of a rectilinear polygon P . The following n lines contain the coordinates of the vertices of P in counterclockwise order. Each line contains two integers n_x and n_y ($10 \leq n_x, n_y \leq 1,000,000$ and n_x and n_y are multiples of 10), where n_x is the x -coordinate and n_y is the y -coordinate of a vertex of P . A robot R is outside of P for every test case.

Output

For each test case, your program reports “YES” if the robot can escape the obstacle or “NO” otherwise. The following shows sample input and output for two test cases. The following shows sample input and output for two test cases.

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Sample Input (robot.in)

Output for the Sample Input

2	NO
30 30 12	YES
12	
10 10	
90 10	
90 60	
80 60	
80 20	
20 20	
20 70	
50 70	
50 50	
70 50	
70 90	
10 90	
200 200 52	
12	
450 500	
100 500	
100 100	
450 100	
450 250	
350 250	
350 150	
150 150	
150 300	
250 300	
250 400	
450 400	