You are working on designing a robot to navigate in a flat environment. The environment contains several obstacles that can be represented as convex polygons from a bird-eye perspective. Some obstacles may have a shape that more closely resembles a non-convex polygon; however, for your application, the input will only consist of convex polygons (non-convex ones can be split into separate polygons for the input). The robot is also represented by a convex polygon.

At the start of each test, the robot is placed at a specific location. It is then ordered to move in a straight line for a certain distance in a specified direction. The robot is not able to rotate and can only move by translationally sliding itself. Your task is to determine whether or not the robot will collide with any obstacle during its movement.

Input

The first line contains an integer O ($1 \leq O \leq 100$) for the number of obstacles. For each obstacle, there will be an input in the following format:

- The first line will begin with an integer P ($3 \leq P \leq 20$) for the number of points in the convex polygon that will represent the obstacle.
- The next P lines will contain two real numbers x and y ($-10^3 \leq x, y \leq 10^3$) representing the coordinates of a vertex on the polygon. These points are provided in counterclockwise order

After the obstacles, input for the robot is given:

- A line containing an integer R ($3 \leq R \leq 20$) for the number of points in the convex polygon representing the robot.
- The next R lines will contain two real numbers x and y ($-10^3 \leq x, y \leq 10^3$) representing the coordinates of a vertex on the polygon. These points are provided in counterclockwise order

The next line will provide a real number Θ ($0 \leq \Theta < 360$) for the angle in degrees, specifying the direction the robot will move. A degree of 0 refers to movement in the positive x direction

The last line contains a real number D ($0 < D \leq 10^3$) for the distance the robot will move.

Output

The program will print 0 if the robot will not collide with any obstacle during its movement. Otherwise, the program will print a line for each polygon the robot will collide with that contains the points of the polygon.

Details

If the robot even grazes the edge of an obstacle, this should be considered as a collision. In the event that the robot begins inside of an obstacle, this should be counted as a collision.