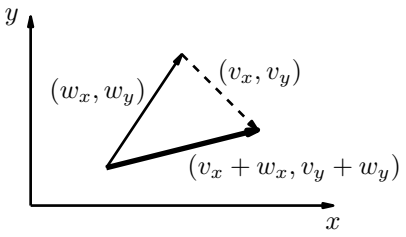
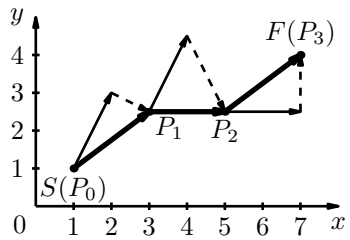
Problem J. Joy of Flight

Input file:	joy.in
Output file:	joy.out
Time limit:	2 seconds
Memory limit:	256 megabytes

Jacob likes to play with his radio-controlled aircraft. The weather today is pretty windy and Jacob has to plan flight carefully. He has a weather forecast — the speed and direction of the wind for every second of the planned flight.

The plane may have airspeed up to v_{max} units per second in any direction. The wind blows away plane in the following way: if airspeed speed of the plane is (v_x, v_y) and the wind speed is (w_x, w_y), the plane moves by $(v_x + w_x, v_w + w_y)$ each second.





Jacob has a fuel for exactly k seconds, and he wants to learn, whether the plane is able to fly from start to finish in this time. If it is possible he needs to know the flight plan: the position of the plane after every second of flight.

Input

The first line of the input file contains four integers S_x, S_y, F_x, F_y — coordinates of start and finish $(-10\,000 \le S_x, S_y, F_x, F_y \le 10\,000)$.

The second line contains three integers n, k and v_{max} — the number of wind condition changes, duration of Jacob's flight in seconds and maximum aircraft speed $(1 \le n, k, v_{max} \le 10\,000)$.

The following n lines contain the wind conditions description. The i-th of these lines contains integers t_i, w_{x_i} and w_{y_i} — starting at time t_i the wind will blow by vector (w_{x_i}, w_{y_i}) each second $(0 = t_1 < \cdots < t_i < t_{i+1} < \cdots < k;\ \sqrt{w_{x_i}^2 + w_{y_i}^2} \le v_{max})$.

Output

The first line must contain "Yes" if Jacob's plane is able to fly from start to finish in k seconds, and "No" otherwise.

If it can to do that, the following k lines must contain the flight plan. The i-th of these lines must contain two floating point numbers x and y — the coordinates of the position (P_i) of the plane after i-th second of the flight.

The plan is correct if for every $1 \le i \le k$ it is possible to fly in one second from P_{i-1} to some point Q_i, such that distance between Q_i and P_i doesn't exceed 10^{-5}, where $P_0 = S$. Moreover the distance between P_k and F should not exceed 10^{-5} as well.

Example

joy.in	joy.out
1 1 7 4 2 3 10 0 1 2 2 2 0	Yes 3 2.5 5 2.5 7 4