Problem J. Triangle

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2s

Bob draws N black points and N white points in the plane, and draws directed edges between each pair of them.

Given a distance threshold D, for each pair of points p and q, Bob can draw an edge according to the following rules:

- If these two points share the same color, put an edge $p \to q$ or $q \to p$ optionally.
- If they have different colors, suppose that p is white and q is black, then draw the edge $p \to q$ if $dist(p, q) > D$, or $q \to p$ if not.

The distance function is defined as $dist(p, q) = |p.x - q.x| + |p.y - q.y|$, where $p.x$ and $q.x$ represent the x-coordinates of p and q, and $p.y$ and $q.y$ represent the y-coordinates of p and q.

Bob thinks that it a beautiful triangle of points p, q and r (which is a triple of three points) should satisfy the the following conditions:

- At least one of them is black, and at least one of them is white.
- $p \to q, q \to r$ and $r \to p$ are all the edges between them.

Now Bob wants to know the minimum number and the maximum number of beautiful triangles could exist.

Input

The input contains several test cases, please handle it to the end of file.

For each test case, the first line contains two integers N ($N \leq 100000$) and D. In the next N lines, each line contains two integers indicating the x-coordinate and the y-coordinate of a white point. In the next N lines, each line contains two integers indicating the x-coordinate and the y-coordinate of a black point. Some points may share the same coordinate.

All numbers in input are non-negative integers and less that 2^{31}.

Output

For each test case, output two integers indicating the minimum number and the maximum number of beautiful triangles.

Example

standard input	standard output
2 1 1 2 1 1 3 1 2 2	0 2