G - Magpie Bridge

Description

On July 7, Cowherd and Weaver Girl are allowed to meet on Magpie Bridge. Because Cowherd is a human being, he can only stand on the clouds. But Weaver Girl can fly in the sky. Cowherd, Weaver Girl and clouds are considered to be on the same plane. There could be some Magpie Bridges with a weight limitation between clouds.

The King of Heaven gives an order that Weaver Girl must stay in her position， so Cowherd need to go across the Magpie Bridge to the cloud with the minimum distance to Weaver Girl. It's a pity that they may only greet each other through the air.

In total, there are n clouds on which Cowherd can stand, and the i th cloud is at the coordinate(x_i, y_i)

At the beginning, there is no Magpie Bridge between clouds. Then Q following events happen in order and there are two types of events.

$1\ u\ v\ w$ - the u th and the v th clouds are connected with a Magpie Bridge with weight limitation w (there may be multiple Magpie Bridges between two clouds)

$2\ u\ w\ x$ - Cowherd is now at the u th cloud bringing some gifts, and their total weight is w . Weaver Girl flies in the air at $(x, 0)$. Cowherd want to find the closest cloud to Weaver Girl that he can reach (He can go through Magpie Bridges with weight limitation at least w). He needs your help, so you need to answer the square of Euclidean distance between the closest cloud and the position of Weaver Girl.

Input

The first line of the input contains two integers n, q $(1 \leq n, q \leq 10^5)$, indicating the number of clouds and the number of queries.

Each of the next n lines contains two integers x_i, y_i $(|x_i|, |y_i| \leq 10^8)$, indicating the coordinate of the i-th cloud.

Then each of the next q lines describes one query. It may have one of the following forms:

$1\ u_0\ v_0\ w_0$
$2\ u_0\ w_0\ x_0$
$(0 \leq u_0, v_0, w_0, x_0 \leq 2147483647)$

We need you to answer the query online. So you need to do following calculations to get the actual parameters of this query.

$u = (u_0 + last\_ans - 1 + n)\%n + 1$
$v = (v_0 + last\_ans - 1 + n)\%n + 1$
$w = (w_0 + last\_ans - 1 + 10^9)\%(10^9) + 1$
$x = (x_0 + last\_ans + 10^8)\%(2 \cdot\ 10^8 + 1) - (10^8)$
$(1 \leq u, v \leq n, 1 \leq w \leq 10^9, |x| \leq 10^8)$

where $\%$ indicates modular operation and $last\_ans$ is the last output of your program before this query. If there is no output before this query, $last\_ans$ should be considered to 0.

It's guaranteed that all the w in queries of type 1 are incremental.

Output

For each query of type 2, output the square of the minimal Euclidean distance in a separate line.

Sample input

```
3 5
6 11
12 0
15 2
2 1 1 2
1 2 0 999999866
1 0 1 999999868
2 2 999999866 199999883
2 0 999999956 199999971
```

Sample output

```
137
49
20
```

Hint

In the sample input above, The actual queries are as follows.

```
2 1 1 2
1 1 2 3
1 2 3 5
2 1 3 19
2 1 5 19
```

The coordinates of the nearest clouds of query 1,4,5 are (6,11),(12,0),(15,2).