

Problem D. Diameter

Input file: `stdin`
Output file: `stdout`
Time limit: 2 seconds
Memory limit: 256 MB

pittoresque loves playing a game called Cover'em all. In this game, he is given some points on a 2-D grid, and he finds some straight segments that together cover all the points. Now after finishing finding the segments, **pittoresque** is bored and wants to find something interesting about the points. Specifically, he wants to know what's the maximum (square-euclidean) distance between two points among all pair of points in this grid.

Squared-euclidean distance between two points $(x_1, y_1), (x_2, y_2)$ is defined as $(x_1 - x_2)^2 + (y_1 - y_2)^2$

Input

The first line contains two integers n and k ($2 \leq n \leq 10^5$, $1 \leq k \leq 500$), the number of points and the number of segments.

In the following k sections, the first line of each section contains a single integer m_i ($1 \leq m_i$), the number of points on segment i . And the following m_i lines contains a pair of integer x_{ij}, y_{ij} ($-10^9 \leq x_{ij}, y_{ij} \leq 10^9$). It is guaranteed that these points are on a common segment.

It is also guaranteed that $\sum_{i=1}^k m_i = n$. It is **NOT** guaranteed that the points are in order on a segment, and it is **NOT** guaranteed that the points don't collide with another.

Output

Output the maximum *square*-euclidean distance among all pairs of points.

Examples

stdin	stdout
5 2 3 1 2 2 3 3 4 2 1 0 10 0	85
stdin	stdout
4 1 4 1 2 2 3 3 4 4 5	18