

K. Planetary Subspace Relay Antennas

Standard I/O | Time Limit: 2.5s | Memory Limit: 1024MB | Special Judge

To establish a comprehensive communications blanket across Sector 2026, the expedition must coordinate transmissions among n ground telemetry stations positioned on the planet's surface (modeled as a 2D Cartesian plane). The i -th telemetry station is situated at coordinates (x_i, y_i) and has an operational transmission importance (weight) denoted by w_i .

To link all stations, you are authorized to construct and position m subspace relay antennas at arbitrary locations on the 2D plane (the antenna positions need not be distinct).

For an antenna deployment configuration with coordinates $(X_1, Y_1), (X_2, Y_2), \dots, (X_m, Y_m)$, the total communication latency cost of this configuration is defined as the sum over all telemetry stations of their importance-weighted Euclidean distance to their closest antenna:

$$\text{Cost} = \sum_{i=1}^n w_i \min_{1 \leq j \leq m} \sqrt{(x_i - X_j)^2 + (y_i - Y_j)^2}$$

Determine the coordinates of the m relay antennas that minimize the total latency cost.

Input

The first line contains two positive integers n and m ($1 \leq m \leq n \leq 2,000$), denoting the number of telemetry stations and the number of relay antennas to place, respectively. Each of the next n lines contains three floating-point numbers x_i , y_i , and w_i ($|x_i|, |y_i| \leq 10^5$; $1 \leq w_i \leq 10^9$), representing the x-coordinate, y-coordinate, and importance weight of the i -th telemetry station, respectively.

Output

Print m lines. The j -th line should contain two floating-point numbers X_j and Y_j , representing the coordinates of the j -th relay antenna. All coordinates must have an absolute value of **at most 10^6** .

Evaluation and Scoring (Special Judge)

Let A be the total cost achieved by your submitted solution.

Let B be the total cost achieved by the Jury's reference solution.

Your solution will be judged as Accepted if $A \leq B$, or if the absolute or relative difference between A and B does not exceed 10^{-2} , that is: $\frac{|A-B|}{\max(1,B)} \leq 10^{-2}$.

Standard Input	Standard Output
2 1 0.0 0.0 1.0 2.0 2.0 1.0	1.0 1.0