Problem C. Convex Hull

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1.5 seconds
Memory limit:	256 mebibytes

There are n points in three-dimensional space. Consider the convex hull of these n points.

You are given q queries. Each query defines a plane in three-dimensional space. For each given plane, find the area of section of the convex hull produced by this plane.

Input

The first line of input contains two integers n and q, the number of points and the number of queries ($1 \le n, q \le 1000$).

Each of the next n lines contains three integers x, y and z: the coordinates of one of the points.

The next q lines describe queries. Each of them contains four integers a, b, c and d which specify the plane given by the equation $ax + by + cz + d = 0$.

It is guaranteed that the absolute values of x, y, z, a, b, c and d are not greater than 2000.

Output

For each query, print the answer with absolute error at most 10^{-3}.

Example

standard input	standard output
6 1 0 0 1 1 0 1 0 1 1 0 0 -1 1 0 -1 0 1 -1 0 0 1 0	0.500