

Xor Circle

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 512 megabytes

CCPC (China Collegiate Programming Contest) will be held in city A. City A can be considered as an infinity 2-dimensional plane. n contestants will take part in the competition. These n people are numbered from 1 to n , each of them has an initial position in city A and a value a_i .

The organizer needs to choose a place for the competition site. For each person i , he/she will be happy if and only if the distance from the competition site to his/her initial position is not greater than d . Note that the coordinate of the site can be any real number.

To determine whether the competition site is good or not, the organizer defines $f(P)$ as the maximum xor sum of **some** of the happy people's value if point P is considered as the competition site.

Let $S(P)$ denotes all person such that distance between P and his/her location is not greater than d , $g(T)$ denotes the exclusive OR of all a_i such that person i is in T (**Specially**, $g(\emptyset) = 0$), $f(P) = \max_{T \subseteq S(P)} g(T)$. A point P is considered good if and only if $f(P) \geq k$.

You need to find out the minimum non-negative real number d , such that there are at least one location is good.

Note that the distance between point $A(x_A, y_A)$ and $B(x_B, y_B)$ is $\sqrt{(x_A - x_B)^2 + (y_A - y_B)^2}$.

Input

The first line contains two integers $n(1 \leq n \leq 1000)$, $k(0 \leq k < 2^{20})$ - the number of the competitors and the minimum value of a good location.

For the next n lines, each line contains three integers $x_i, y_i, a_i(x_i, y_i \leq |10^4|, 0 \leq a_i < 2^{20})$ - the initial position and the value of the i -th person.

Output

A single non-negative real number d - the minimum distance such that there at least one location's value is not smaller than k .

Your answer will be considered correct if and only if the absolute or relative error is not greater than 10^{-6} .

If the answer does not exist, please output -1.

Examples

standard input	standard output
4 39 -1 -1 5 2 3 37 -1 2 2 -1 -1 14	1.5811388301
4 16 1 1 4 5 1 4 1 9 1 9 8 10	-1
2 0 11 45 14 191 98 10	0.0000000000