
Moon

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 256 megabytes

Let S be a sphere with radius 1 and center $(0, 0, 0)$. Let a_0, a_1, \dots, a_n be $n + 1$ points on the surface of S . The positions of a_1, \dots, a_n are fixed while the position of a_0 is a uniform random point on the surface of S . Let f be 1 if there exists a hemisphere of S that contains a_0, \dots, a_n (possibly on the border) and 0 otherwise. Calculate the expected value of f .

Input

The first line contains an integer n denoting the number of points ($0 \leq n \leq 100000$).

The i -th line of the next n lines contains three integers x, y, z denoting the point $a_i = \left(\frac{x}{\sqrt{x^2+y^2+z^2}}, \frac{y}{\sqrt{x^2+y^2+z^2}}, \frac{z}{\sqrt{x^2+y^2+z^2}} \right)$ ($-1000000 \leq x, y, z \leq 1000000, x^2 + y^2 + z^2 \neq 0$).

It is guaranteed that a_1, \dots, a_n are distinct.

Output

Output the answer.

The answer will be considered correct if its absolute or relative error doesn't exceed 10^{-6} .

Example

standard input	standard output
3 1 0 0 0 1 0 0 0 1	0.875000000000