Problem I. Moon

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

Let S be a sphere with radius 1 and center $(0, 0, 0)$. Let $a_0, a_1, \ldots, a_n$ be $n + 1$ points on the surface of S. The positions of $a_1, \ldots, a_n$ 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 $a_0, \ldots, a_n$ 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 $a_1, \ldots, a_n$ 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