

Problem A. Mountain Skyline

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

Sometimes a high mountain can look smaller than a lower one because it is further away. The low mountain could even hide the higher one entirely. Sometimes this makes it tricky to identify which mountain is which. Your task in this problem is to identify the mountains visible to an observer.

For this problem, assume a flat world. Each mountain is a downward-sloping cone with a slope of 45 degrees, so the radius of the base of each mountain (at altitude 0) is equal to its height. The cones of different mountains can intersect each other. The peak of each mountain is given as a triple of integer coordinates in a 3-dimensional Cartesian coordinate system, with $-10000 \leq x, y \leq 10000$, $0 < z \leq 10000$. Here, z is the altitude of the peak mountain. The observer is at coordinate location 0, 0, 0. Neither the observer nor the peak of any mountain is inside (or on the border of) the cone of any other mountain. If a peak appears to the observer precisely behind the edge or peak of another mountain, it is considered **not** to be visible.

Input

The first line contains an integer $1 \leq n \leq 1000$, the number of mountains. The next n lines each contain three space-separated integers $-10000 \leq x, y \leq 10000$, $1 \leq z \leq 10000$, the coordinates of the peak of each mountain, followed by a sequence of at most 30 uppercase letters, the name of the mountain. All mountain names are unique.

Output

Output the names of the mountain peaks visible to the observer, one per line, in clockwise order. That is, start in the direction of the positive y-axis, then move towards to positive x-axis, then to the negative y-axis, then to the negative x-axis, and finally back to the positive y-axis. A mountain peak exactly on the positive y-axis should be listed at the beginning rather than at the end of the list. If two peaks appear one exactly above the other, list the higher one first.

Examples

standard input	standard output
3 0 10000 8849 EVEREST 10000 0 5959 LOGAN 0 -10000 4808 BLANC	EVEREST LOGAN BLANC
6 8 0 5 FUJI 9 1 5 MATTERHORN 9 0 5 KEBNEKAISE 9 -1 5 FAGRADALSFJALL 16 0 10 KILIMANJARO 120 0 80 DENALI	MATTERHORN DENALI FUJI FAGRADALSFJALL