Convex hull of intersections

Problem statement

Write a C++ program that calculates the intersections of a set of line segments and circles.
From these intersection points, calculate the convex hull and its area.
The program should read from the standard input and write to the standard output.

Input:
The first line contains a number **K** (0 <= K <= 1000).
The following **K** lines contain the definition of a circle or a line segment:
- If the line starts with "L", there are 4 integers defining the start and end points of the line segment: `(x0, y0, x1, y1).`
- If the line starts with "C", there are 3 integers defining the center point and radius of the circle: `(x, y, radius).`

Note:
- All input numbers are integers, and their absolute value does not exceed 10^6.
- The input does not contain any overlapping line segments, nor circles with the same center and radius.

Output:
The first line contains **N**, the number of intersecting points.
The following **N** lines contain the coordinates of the intersecting points.
The next line contains **H**, the number of points on the convex hull.
The following **H** lines contain the coordinates of point on the convex hull.
The next line contains **A,** the area of the convex hull.

If all intersection points are collinear, then both **A** and **H** should be 0.
Give your answers rounded to 4 decimal digits.

Technical requirements:
The program should not allocate more than 100 MB of memory, time limit is 3 seconds.
You can use any C++ standard, but don't use anything else than the standard libraries.

Example input:	Example output:
8 C 0 0 5 L -2 1 12 6 C 3 2 7 C 3 10 1 L -4 9 8 -4 L 5 2 7 9 C 8 2 2 L -3 -3 -1 2	15 1.3720 -4.8081 -3.9105 3.1158 3.0000 9.0000 10.0000 2.0000 2.0496 2.4463 5.4773 3.6705 -1.3000 1.2500 3.9135 3.1120 9.3064 5.0380 4.9512 -0.6971 -0.2994 4.9910 7.4496 -3.4038 -2.0311 6.8670 6.6981 7.9434 -2.6519 -2.1298 9 -3.9105 3.1158 -2.6519 -2.1298 1.3720 -4.8081 7.4496 -3.4038 10.0000 2.0000 9.3064 5.0380 6.6981 7.9434 3.0000 9.0000 -2.0311 6.8670 140.0776