Alan is building a small 3D modeling program that aims to be extremely light-weight yet powerful enough to solve a large number of tiny programs written in ACM/ICPC competitions are usually very compact, Alan comes for your help. In this problem, you only need to deal with nice" as the point.

Knowing that programs written in ACM/ICPC competitions are too restrictive for editing), the boundary edges are violating point 7 because they are incident to only one face.

For those of you who are unfamiliar with terms in point 3, it means:

1. There will be no duplicated vertices/edges/faces.
2. Two adjacent edges on a face can be collinear (but not overlapping).
3. All vertices/edges/faces are in the closed fan, the boundary edges are violating point 7 because they are incident to only one face.

Important: coordinates will be either exact (like integers or finite real numbers like 0.5) or given with normal either point towards or away from the solid.

There will be no duplicated vertices/edges/faces.

The faces enclose a non-empty connected part of space (so we say it's "solid"), and there will be no hidden faces (i.e. no faces are invisible from outside).

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The faces are planar convex polygons, exactly three edges meeting at each vertex. The faces are guaranteed to form a closed fan, the boundary edges are violating point 7 because they are incident to only one face.

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The order of vertices in each face is either clockwise or counter-clockwise. That means the surface normal either point towards or away from the solid.

For each test case, print the case number and 5 lines. The first 3 lines are about the solids after cut. Line 1:
The number of connected solids after cut.

Line 2:
The number of connected regions in the cross-section.

Line 3:
The number of connected regions in the cross-section.

Line 4:
The number of connected solids after cut.

Line 5:
The number of connected regions in the cross-section.

Note: Diane that the axes proportion above, those "real-world" solids are still not easy to deal with.

Your task is to compute the volume, surface area of the meshes and the cross-section. The areas of these connected regions, in decreasing order.

Line 5: The number of connected regions in the cross-section.

The areas of these connected regions, in decreasing order.

Line 4: The number of connected regions in the cross-section.

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Input:
The input will contain at most 25 test cases. Each test case begins with two integers (vertices are numbered 1 to n), followed by a sequence of vertices in the face. The faces are guaranteed to form a closed fan, the boundary edges are violating point 7 because they are incident to only one face.

Sample Input:
The input will contain at most 25 test cases. Each test case begins with two integers (vertices are numbered 1 to n), followed by a sequence of vertices in the face. The faces are guaranteed to form a closed fan, the boundary edges are violating point 7 because they are incident to only one face.

Sample Output:

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