Red Socks

You have a drawer that is full of two kinds of socks: red and black. You know that there are at least 2 socks, and not more than 50000. However, you do not know how many there actually are, nor do you know how many are red, or how many are black. (Your mother does the laundry!)

You have noticed, though, that when you reach into the drawer each morning and choose two socks to wear (in pitch darkness, so you cannot distinguish red from black), the probability that you pick two red socks is exactly p/q, where $0 < q$ and $0 <= p <= q$.

From this, can you determine how many socks of each color are in your drawer? There may be multiple solutions - if so, pick the solution with the fewest total number of socks.

Input

Input consists of multiple problems, each on a separate line. Each problem consists of the integers p and q separated by a single space. Note that p and q will both fit into an unsigned long integer.

Input is terminated by a line consisting of two zeroes.

Output

For each problem, output a single line consisting of the number of red socks and the number of black socks in your drawer, separated by one space. If there is no solution to the problem, print "impossible".

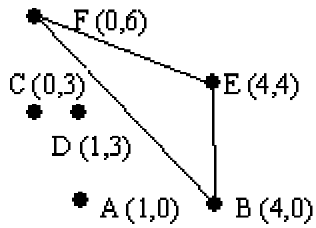
Sample Input

1 2
6 8
12 2499550020
56 789
0 0

Sample Output

3 1
7 1
4 49992
impossible

Triangles



There has been considerable archeological work on the ancient RHIT culture. Many artifacts have been found in what have been called power fields: a fairly small area, less than 100 meters square where there are from four to fifteen tall monuments with crystals on top. Such an area is mapped out above. Most of the artifacts discovered have come from inside a triangular area between just three of the monuments, now called the power triangle. After considerable analysis archeologists agree how this triangle is selected from all the triangles with three monuments as vertices: it is the triangle with the largest possible area that does not contain any other monuments inside the triangle or on an edge of the triangle. Each field contains only one such triangle.

Archeological teams are continuing to find more power fields. They would like to automate the task of locating the power triangles in power fields. Write a program that takes the positions of the monuments in any number of power fields as input and determines the power triangle for each power field.

A useful formula: the area of a triangle with vertices (x1, y1), (x2, y2), and (x3, y3) is the absolute value of

$$0.5 \times [(y3 - y1)(x2 - x1) - (y2 - y1)(x3 - x1)].$$

For each power field there are several lines of data. The first line is the number of monuments: at least 4, and at most 15. For each monument there is a data line that starts with a one character label for the monument and is followed by the coordinates of the monument, which are nonnegative integers less than 100. The first label is A, and the next is B, and so on.

There is at least one such power field described. The end of input is indicated by a 0 for the number of monuments. The first sample data below corresponds to the diagram in the problem.

For each power field there is one line of output. It contains the three labels of the vertices of the power triangle, listed in increasing alphabetical order, with no spaces.

Example input:

```
6
A 1 0
B 4 0
C 0 3
D 1 3
E 4 4
F 0 6
4
A 0 0
B 1 0
C 99 0
D 99 99
0
```

Example output:

```
BEF
BCD
```