Simple Polygon

Problem

You are given two integers, the number of vertices N and area A. You need to construct a [simple polygon](#) of N vertices such that the area of the polygon is exactly $\frac{A}{2}$, and all the vertices have non-negative integer coordinates with value up to 10^9.

A simple polygon is one that:

- Defines a closed area.
- Does not have self-intersections, even at a single point.
- No two consecutive edges form a straight angle.

Input

The first line of the input gives the number of test cases, T. T lines follow. The first line of each test case contains two integers, N denoting the number of vertices and A, denoting double the required area of the polygon.

Output

For each test case, output one line containing `Case #x:` y, where x is the test case number (starting from 1) and y is `IMPOSSIBLE` if it is not possible to construct a polygon with the given requirements and `POSSIBLE` otherwise.

If you output `POSSIBLE`, output N more lines with 2 integers each. The i-th line should contain two integers X_i and Y_i which denote the coordinates of the i-th vertex. For each i, the coordinates should satisfy the $0 \le X_i, Y_i \le 10^9$ constraints. Vertices of the polygon should be listed in consecutive order ($vertex_i$ should be adjacent to $vertex_{i-1}$ and $vertex_{i+1}$ in the polygon).

If there are multiple possible solutions, you can output any of them.

Limits

Memory limit: 1 GB.
$1 \le T \le 100$.
$1 \le A \le 10^9$.

Test Set 1

Time limit: 20 seconds.
$3 \le N \le 5$.

Test Set 2

Time limit: 40 seconds.
$3 \le N \le 1000$.

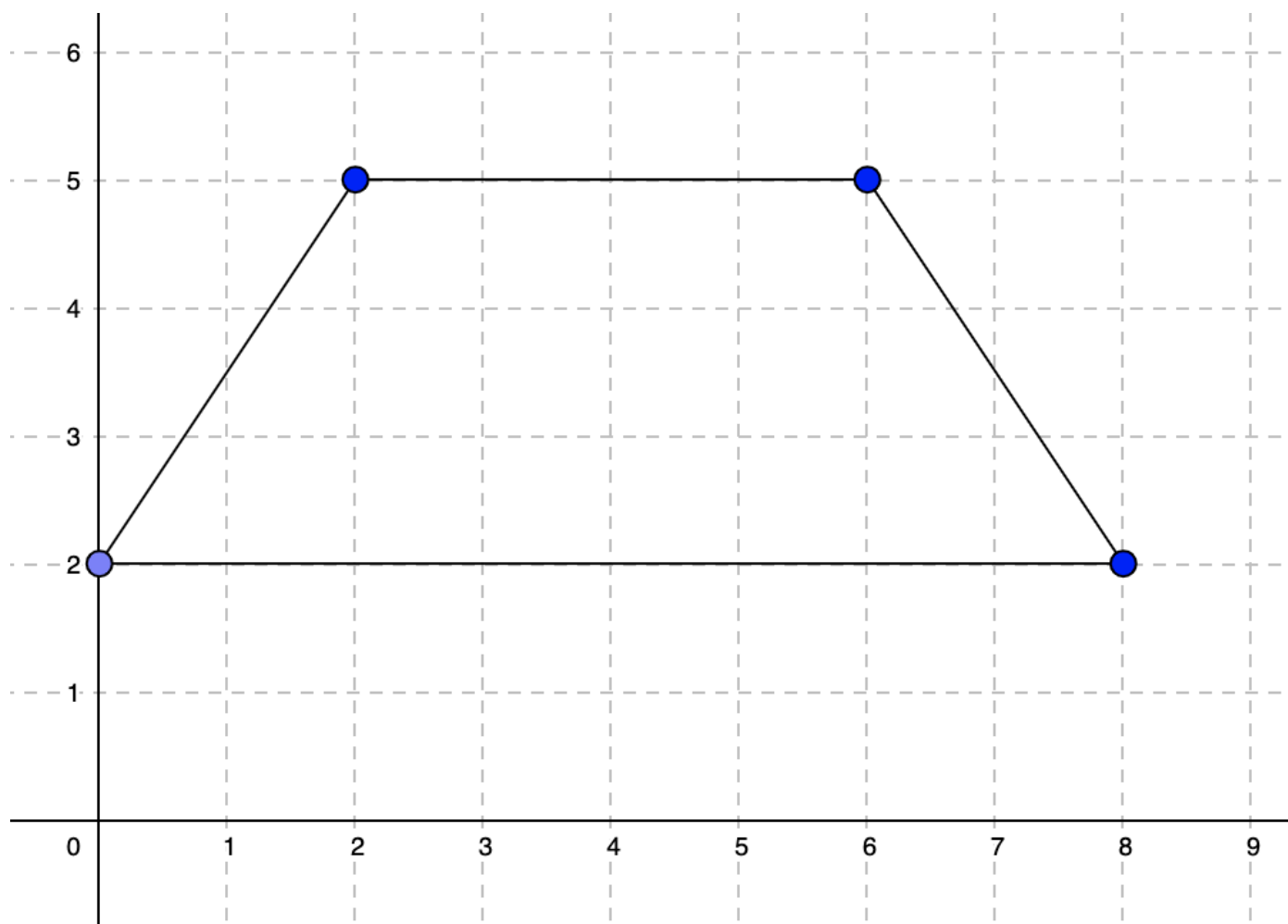## Sample

Sample Input	Sample Output
2 4 36 5 2	Case #1: POSSIBLE 2 5 6 5 8 2 0 2 Case #2: IMPOSSIBLE

In Sample Case #1, we can output the above quadrilateral with coordinates $(2, 5)$, $(6, 5)$, $(0, 2)$ and $(8, 2)$. The area of this quadrilateral is equal to 18.

In Sample Case #2, there is no way to construct a polygon with 5 vertices and area equal to 1.