Code Jam 2014 - Round 1C

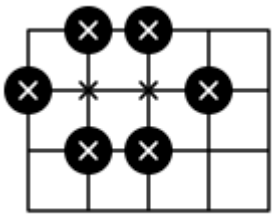
Enclosure

Problem

Your task in this problem is to find out the minimum number of stones needed to place on an N-by-M rectangular grid (N horizontal line segments and M vertical line segments) to enclose at least K intersection points. An intersection point is enclosed if either of the following conditions is true:

1. A stone is placed at the point.
2. Starting from the point, we cannot trace a path along grid lines to reach an empty point on the grid border through empty intersection points only.

For example, to enclose 8 points on a 4x5 grid, we need at least 6 stones. One of many valid stone layouts is shown below. Enclosed points are marked with an "x".



Input

The first line of the input gives the number of test cases, **T**. **T** lines follow. Each test case is a line of three integers: **N M K**.

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 the minimum number of stones needed.

Limits

Memory limit: 1 GB.
$1 \le \mathbf{T} \le 100$.
$1 \le \mathbf{N}$.
$1 \le \mathbf{M}$.
$1 \le \mathbf{K} \le \mathbf{N} \times \mathbf{M}$.

Small dataset

Time limit: 60 seconds.
$\mathbf{N} \times \mathbf{M} \le 20$.

Large dataset

Time limit: 120 seconds.
N × **M** ≤ 1000.

Sample

Sample Input

```
2
4 5 8
3 5 11
```

Sample Output

```
Case #1: 6
Case #2: 8
```