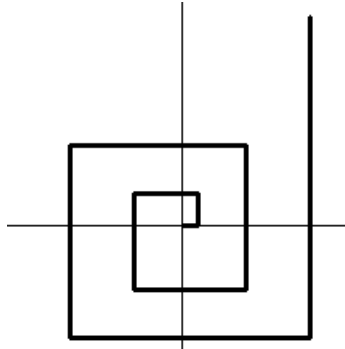# Growing Rectangular Spiral

A growing rectangular spiral is a connected sequence of straight-line segments starting at the origin. The first segment goes right (positive x direction). The next segment goes up (positive y direction). The next segment goes left (negative x direction). The next segment goes down (negative y direction) and the sequence of directions repeats. Each segment has integer length and each segment is at least one unit longer than the previous segment. In the spiral below, the segment lengths are 1, 2, 4, 6, 7, 9, 11, 12, 15, 20.

Write a program to determine the shortest growing rectangular spiral (in total length) that ends at a given integer point (x, y) in the first quadrant or determine that there is no such spiral.

Input

The first line of input contains a single integer P, ($1 \leq P \leq 1000$), which is the number of data sets that follow. Each data set should be processed identically and independently.

Each data set consists of a single line of input consisting of three space separated decimal integers. The first integer is the data set number. The next two integers are the x and y coordinates of the desired end point ($1 \leq x \leq 10000, 1 \leq y \leq 10000$).

Output

For each data set there is a single line of output. If there is no spiral solution, the line consists of the data set number, a single space and "NO PATH" (without the quotes). If there is a solution, the line consists of the data set number, a single space, the number of segments in the solution, a single space, followed by the lengths of the segments in order, separated by single spaces. The input data will be chosen so that no path requires more than 22 segments.

Sample Input 1

```
3
1 1 1
2 3 5
3 8 4
```

Sample Output 1

```
1 NO PATH
2 2 3 5
3 6 1 2 3 9 10 11
```