

2027 Island's Vegetation

An aerial photograph represents a square portion of an island's vegetation as a positive integer matrix. Each number in the matrix corresponds to a square subsection of the total area and contains relevant information about the plants that inhabit that particular place. For example, plant species that are unique to the island are represented with prime numbers, while species that can be found elsewhere are represented with non-prime numbers.

The Botanical Institute of the island wants to divide the area into regions that have unique vegetation, and those that do not. To accomplish this task, the Institute has requested you to analyze the supplied information and determine the number of different regions that exist and their sizes. Two subsections belong to the same region if they lie contiguously on the same row or column, and if they both are either prime or non-prime.

Input

The input to this problem is given out as sets of square areas. Each set contains the size of the area to analyze in a line by itself and is followed by the corresponding integer matrix, with each row occupying one line. A non-positive integer for the area size indicates that no more sets should be analyzed.

The size of the matrix will not exceed 100 units per side and integers will not be larger than 100,000,000.

Output

For each set write the set number on the first line.

On the next line output the number of regions of unique vegetation followed by the number of cells sorted in increasing order, that corresponds to each region. On the third line write the number of regions with non-unique vegetation.

Output should be formatted as in the sample and an empty line must separate output from different sets.

Sample Input

```
3
2 4 9
17 6 37
29 8 11
4
2 3 12 15
5 7 21 33
4 6 11 17
8 9 13 29
-1
```

Sample Output

```
Area 1:
2 unique vegetation regions: 2 3
1 non-unique vegetation regions
```

Area 2:

2 unique vegetation regions: 4 4

2 non-unique vegetation regions