
4. Cruise Ship

Program Name: Cruise.java

Input File: cruise.dat

To thrill his passengers, an Italian cruise ship captain wants to know how close he can get to a landmass without the cruise ship hitting the seabed, a sand bar, cliffs, or some other underwater obstacle. He has asked you to write a program to determine the closest his cruise ship can get to a particular landmass, given the ship's draft and an underwater seabed map of the region. The map will be represented by a rectangular matrix of cells.

The ship can move in any direction, including diagonally, but only above non-land cells that have a depth greater than the ship's draft (because if it's the same, you start scraping the ship along the bottom and your boss doesn't like that). The distance between the ship and the closest landmass is the number of cells between the two (including neither the ship or the landmass). Regardless of whether you are moving diagonally, horizontally or vertically across a cell, it counts as one cell.

Input

The first line of the input file will contain a single integer n that indicates the number of scenarios to follow. For each scenario:

- The first line will contain three integers r c d that indicate, in order, the number of rows in the map, the number of columns in the map, and the ship's draft. The ship's draft is the number of feet the ship floats below the surface of the water.
- The following r rows will each contain a combination of c number of integers or letters as described below, each separated by a single space:
 - An integer denotes the depth, in feet, of the water in that location.
 - The character S denotes the ship's current location (there will always be only one S in the map).
 - The character L denotes a landmass (there will at least be one L in the map)

Output

For each scenario you will print on a single line, the integer X , where X is the smallest number of cells between the ship and the closest landmass, followed by a space and the word `cell` or `cells` depending on whether X is one or not.

Example Input File

```
1
5 5 15
S 3 15 3 2
16 16 15 15 15
16 10 5 20 L
16 10 5 5 L
16 10 5 L L
```

Example Output to Screen

```
2 cells
```