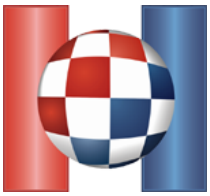


FINAL EXAM #2
April 16th, 2015
Task overview

TASK	DOSTAVA	NAFTA
input	standard input (*stdio*)	
output	standard output (*stdout*)	
time limit	1.5 second	1 second
memory limit	512 MB	512 MB
points	**100**	**100**
	total 200	

Last year, BBQ master Kosta decided to try his luck in Manhattan, where he opened a bunch of restaurants. At first, business was great, but recently a lot of his customers have been taken over by a new fast food chain that doesn't have the option of eating the food in the restaurant itself (its whereabouts are unknown), but only provides food delivery. Kosta is trying to determine possible locations of the restaurant based on the delivery times in order to begin plotting his revenge.

The streets of Manhattan are parallel to the coordinate axes so the locations of the restaurant and the customers can be described by points in the coordinate plane **with integers as coordinates**. The distance from point (x_1, y_1) to point (x_2, y_2) is equal to $|x_2 - x_1| + |y_2 - y_1|$.

Each time a customer orders food online, immediately the delivery process begins from the **closest restaurant** (if there are multiple closest restaurants, the delivery takes place from an arbitrary one). The delivery time is equal to the distance from the customer to that closest restaurant.

Kosta asked N of his friends to order food and measure the delivery time. Write a programme that will determine **one possible layout of restaurant locations** consistent to the given data. If there is more than one layout, output any of them.

Input

The first line of input contains the integer N – the number of Kosta's friends.

Each of the following N lines contains three integers x, y and t separated by a single space that represent a friend located on coordinates (x, y) and whose delivery time is t. All friends are located on different coordinates.

The input data will be such that a solution always exists.

Output

The output must contain M lines where M is the number of restaurants in the determined layout.

Each line of output must contain two integers x and y separated by a single space – the coordinates of a restaurant. The number of restaurants M has to be smaller or equal to N, and the coordinates x and y have to be integers from the interval $[-10^9, 10^9]$, inclusive.

It is allowed that there are multiple restaurants in the same location in the determined layout.

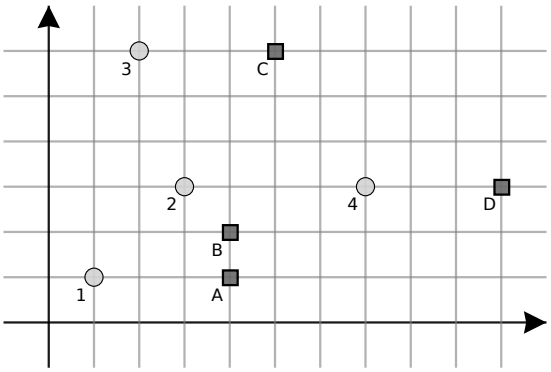
Scoring

subtask	points	constraints
1	10	$1 \leqslant N \leqslant 100$, $1 \leqslant x, y, t \leqslant 100$
2	36	$1 \leqslant N \leqslant 1\,000$, $1 \leqslant x, y, t \leqslant 5 \cdot 10^8$
3	54	$1 \leqslant N \leqslant 50\,000$, $1 \leqslant x, y, t \leqslant 5 \cdot 10^8$

Sample tests

input	**input**	**input**
4 3 4 4 2 4 3 4 1 6 2 3 2	4 1 1 3 3 3 2 2 6 3 7 3 3	5 4 2 1 1 4 4 2 1 2 0 0 5 4 0 3
output	**output**	**output**
7 4 2 7 10 1 0 3	4 1 4 2 5 6 10 3	5 2 5 4 3 2 3 -2 7 0

Clarification of the second example:

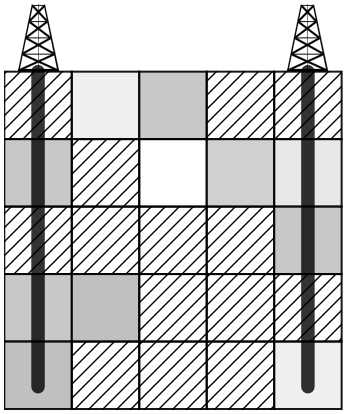


If we denote the restaurants from the determined layout with A, B, C and D, then we can see in the image that the restaurant layout corresponds to the gathered data because it holds:

- Restaurant A is closest to friend 1 and delivery time is 3.
- Restaurant B is closest to friend 2 and delivery time is 2.
- Restaurant C is closest to friend 3 and delivery time is 3.
- Restaurant D is closest to friend 4 and delivery time is 3.

The intersection of an oil field is of rectangular shape and consists of fields organized in R rows and S columns. The fields that contain oil are denoted with digits from 0 to 9 that also denote the amount of oil that can be drilled from the field, whereas the leftover fields are denoted with the character '.'.

The oil drill is built in a way that we first choose the column, build a tower in that column (above ground) and drill straight down through the whole column going through possibly one or more layers of oil.



In the third sample test below, we can pump out all the oil using two drill holes.

After we have made the drill holes, the process of pumping the oil out begins. During this time, all the oil is pumped out from each *pool* (a set of connected fields of oil) which **an oil drill goes through**. In other words, the oil will be pumped out of each field that can be used to reach the field which an oil drill goes through, moving in each step up, down, left or right so that we walk on only the fields denoted with digits.

Write a programme that will, for the given oil field and each integer $K \leqslant S$ determine the maximum possible total amount of oil that can be pumped out by making at most K oil drills.

Input

The first line of input contains integers R, S – respectively, the number of rows and columns of the intersection.

Each of the following R lines contains an array of S characters '`.`' or '`0`'-'`9`' that describe one row of the intersection.

Output

The output must contain S integers, each in its own line, where the K^{th} integer denotes the maximum possible amount of oil that can be pumped out if we can make at most K oil drills.

Scoring

subtask	points	constraints
1	11	$1 \leqslant R, S \leqslant 50$
2	23	$1 \leqslant R, S \leqslant 300$
3	66	$1 \leqslant R, S \leqslant 2\,000$

Sample tests

input

```
5 5
...3.
....1
..0.3
489..
.....
```

output

```
21
25
28
28
28
```

input

```
3 5
999.1
.....
1.999
```

output

```
54
56
56
56
56
```

input

```
5 5
.27..
7.063
....7
78...
8...2
```

output

```
48
57
57
57
57
```