

- A. Googlements
- B. Good News and Bad News
- C. Mountain Tour
- D. Slate Modern

Contest Analysis
Questions asked

Submissions	
Googlements	
3pt	Not attempted 352/362 users correct (97%)
10pt	Not attempted 233/311 users correct (75%)
Good News and Bad News	
7pt	Not attempted 179/204 users correct (88%)
19pt	Not attempted 142/158 users correct (90%)
Mountain Tour	
6pt	Not attempted 148/180 users correct (82%)
24pt	Not attempted 50/64 users correct (78%)
Slate Modern	
5pt	Not attempted 235/245 users correct (96%)
26pt	Not attempted 4/12 users correct (33%)

Top Scores	
kevinsogo	76
Gennady.Korotkevich	74
vepifanov	74
Marcin.Smulewicz	74
simonlindholm	74
mnbvmar	74
Endagorion	74
eatmore	74
XraY	74
zemen	74

Problem D. Slate Modern

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input
5 points

Solve D-small

Large input
26 points

Solve D-large

Problem

The prestigious Slate Modern gallery specializes in the latest art craze: grayscale paintings that follow very strict rules. Any painting in the gallery must be a grid with **R** rows and **C** columns. Each cell in the grid is painted with a color of a certain positive integer *brightness value*; to make sure the art is not too visually startling, the brightness values of any two cells that share an edge (not just a corner) must differ by no more than **D** units.

Your artist friend Cody-Jamal is working on a canvas for the gallery. Last night, he became inspired and filled in **N** different particular cells with certain positive integer brightness values. You just told him about the gallery's rules today, and now he wants to know whether it is possible to fill in all of the remaining cells with positive integer brightness values and complete the painting without breaking the gallery's rules. If this is possible, he wants to make the sum of the brightness values as large as possible, to save his black paint. Can you help him find this sum or determine that the task is impossible? Since the output can be a really big number, we only ask you to output the remainder of dividing the result by the prime 10^9+7 (1000000007).

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow. Each test case begins with one line with four integers: **R**, **C**, **N**, and **D**, as described above. Then, **N** lines follow; the *i*-th of these has three integers **R_i**, **C_i**, and **B_i**, indicating that the cell in the **R_i**th row and **C_i**th column of the grid has brightness value **B_i**. The rows and columns of the grid are numbered starting from 1.

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 either IMPOSSIBLE if it is impossible to complete the picture, or else the value of the maximum possible sum of all brightness values modulo the prime 10^9+7 (1000000007).

Limits

$1 \leq T \leq 100$.
 $1 \leq N \leq 200$.
 $1 \leq D \leq 10^9$.
 $1 \leq R_i \leq R$, for all *i*. $1 \leq C_i \leq C$, for all *i*. $1 \leq B_i \leq 10^9$, for all *i*. (Note that the upper bound only applies to cells that Cody-Jamal already painted. You can assign brightness values larger than 10^9 to other cells.)
 $N < R \times C$. (There is at least one empty cell.)
 $R_i \neq R_j$ and/or $C_i \neq C_j$ for all $i \neq j$. (All of the given cells are different cells in the grid.)

Small dataset

$1 \leq R \leq 200$.
 $1 \leq C \leq 200$.

Large dataset

$1 \leq R \leq 10^9$.
 $1 \leq C \leq 10^9$.

Sample

Input	Output
4	Case #1: 40
2 3 2 2	Case #2: 999999986
2 1 4	Case #3: IMPOSSIBLE
1 2 7	Case #4: IMPOSSIBLE
1 2 1 1000000000	
1 2 1000000000	
3 1 2 100	

```
1 1 1
3 1 202
2 2 2 2
2 1 1
2 2 4
```

In Sample Case #1, the optimal way to finish the painting is:

```
6 7 9
4 6 8
```

and the sum is 40.

In Sample Case #2, the optimal way to finish the painting is:

```
2000000000 1000000000
```

and the sum is 3000000000; modulo 10^9+7 , it is 999999986.

In Sample Case #3, the task is impossible. No matter what value you choose for the cell in row 2, it will be too different from at least one of the two neighboring filled-in cells.

In Sample Case #4, the two cells that Cody-Jamal filled in already have brightness values that are too far apart, so it is impossible to continue.

All problem statements, input data and contest analyses are licensed under the [Creative Commons Attribution License](#).

© 2008-2017 Google [Google Home](#) - [Terms and Conditions](#) - [Privacy Policies and Principles](#)

Powered by



Google Cloud Platform