E. Grid Coloring

time limit per test: 2 seconds
memory limit per test: 256 megabytes

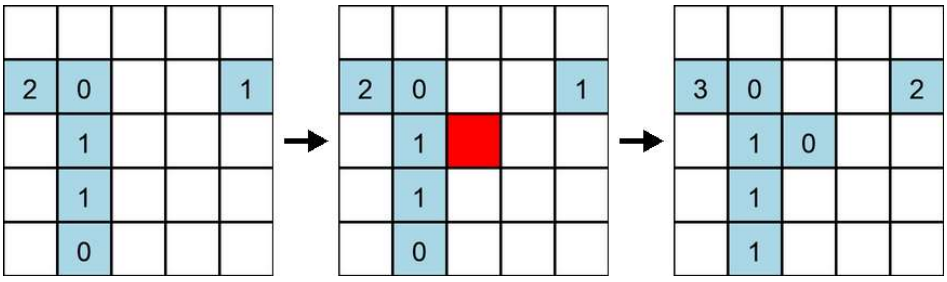
There is a $n \times m$ grid with each cell initially white. You have to color all the cells one-by-one. After you color a cell, all the **colored cells** furthest from it receive a penalty. Find a coloring order, where no cell has more than 3 penalties.

Note that n and m are both odd.

The distance metric used is the chessboard distance while we decide ties between cells with Manhattan distance. Formally, a cell (x_2, y_2) is further away than (x_3, y_3) from a cell (x_1, y_1) if one of the following holds:

- $\max\left(|x_1 - x_2|, |y_1 - y_2|\right) > \max\left(|x_1 - x_3|, |y_1 - y_3|\right)$
- $\max\left(|x_1 - x_2|, |y_1 - y_2|\right) = \max\left(|x_1 - x_3|, |y_1 - y_3|\right)$ **and** $|x_1 - x_2| + |y_1 - y_2| > |x_1 - x_3| + |y_1 - y_3|$

It can be proven that at least one solution always exists.



Example showing penalty changes after coloring the center of a 5×5 grid. The numbers indicate the penalty of the cells.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \le t \le 100$). The description of the test cases follows.

The first line of each test case contains two **odd** integers n and m ($1 \le n, m \le 4999$) — the number of rows and columns.

It is guaranteed that the sum of $n \cdot m$ over all test cases does not exceed 5000.

Output

For each test case, output $n \cdot m$ lines where the i-th line should contain the coordinates of the i-th cell in your coloring order. If there are multiple solutions, print any of them.

The empty lines in the example output are just for increased readability. You're not required to print them.

Example

input Copy

```
3
3 3
1 1
1 5
```

output Copy

```
2 1
2 3
```

Codeforces Round 1030 (Div. 2)
Finished
Practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++23 14.2 (64 bit, ms

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
324256476	Jun/13/2025 16:40	Accepted
324256337	Jun/13/2025 16:39	Wrong answer on test 1
324255977	Jun/13/2025 16:36	Wrong answer on test 1
324098650	Jun/12/2025 18:29	Wrong answer on pretest 2
324094212	Jun/12/2025 18:22	Wrong answer on pretest 2
324090407	Jun/12/2025 18:17	Wrong answer on pretest 1

→ Problem tags

constructive algorithms greedy sortings

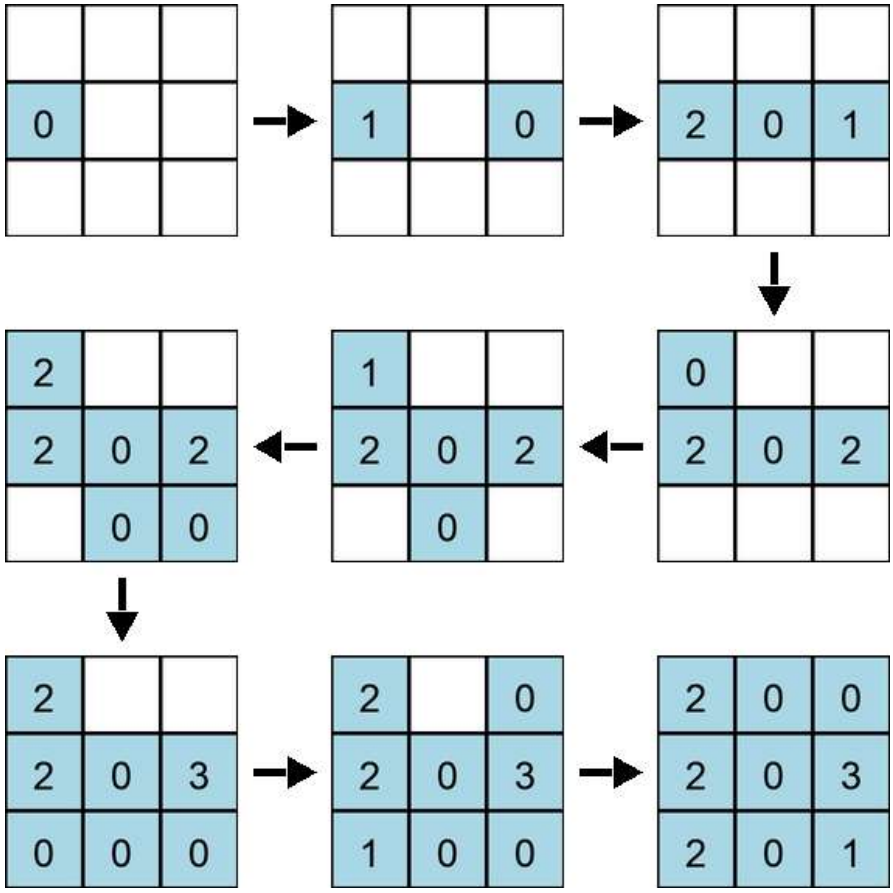
```
2 2
1 1
3 2
3 3
3 1
1 3
1 2

1 1

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

Note

In the first test case, the grid can be colored as follows:



The numbers indicate the penalty of the cells.

No tag edit access

→ Contest materials

- Announcement (en)
- Tutorial (en)