Problem F. Framboise 2

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	256 mebibytes

Your summer house plot is a rectangular area surrounded by a fence along its perimeter. The plot is divided into 2 horizontal and n vertical rows of square zones of size 1×1.

In the centers of some k square zones grow raspberry plants, each having four stems. Other square zones are empty. You want to tie the plants to the fence (being a gardener, you have your own reasons to do so).

To tie a plant, you can lay its stem in a straight line along the ground toward the fence and tie it to the corresponding segment of the fence. You may only stretch stems in directions parallel to the fence (up, down, left, or right). Such stems are called *active*.

A *tying configuration* is a set of active stems that connect the plants with the fence. Each plant can be connected more than once, or not be connected at all.

We call a tying configuration *unstable* if a stem lies on top of a plant (except the plant it originated from) or if a stem has a common point with any other stem (except when they both originate from the same plant). All other configurations are *stable*.

Several years ago, you found the optimal configuration that tied the maximum possible number of plants. But today, you asked yourself a different question: what is the total number of stable configurations? As this number might be large, find it modulo 998 244 353.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \le t \le 10^4$). The description of the test cases follows.

Each test case starts with a line containing two integers n and k ($1 \le n \le 10^9$, $1 \le k \le \min(10^6, 2 \cdot n)$): the size of the plot and the number of raspberry plants.

Each of the next k lines contains two integers r_i and c_i ($1 \le r_i \le 2$, $1 \le c_i \le n$): the row and column of the square zone containing a raspberry plant. Each pair (r_i, c_i) appears at most once per test case.

The sum of k over all test cases does not exceed 10^6.

Output

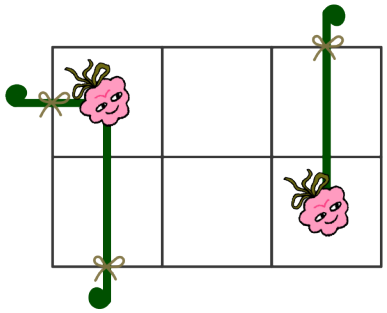
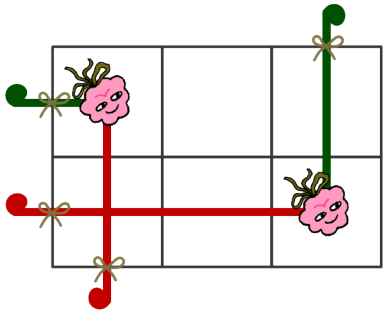
For each test case, print a single integer: the total number of stable configurations. As this number might be large, output it modulo 998 244 353.

Example

standard input	*standard output*
2 3 2 1 1 2 3 1 2 1 1 2 1	144 64

Note

We provide three illustrations for the example:

Stable configuration for the first test case	
Unstable configuration for the first test case. Two stems intersect	
Unstable configuration for the second test case. Stem from the bottom raspberry plant crosses the other raspberry plant