

6685 Gem Mining

Byteland is a famous state with precious gems. A gem field in Byteland is a square grid of $M \times N$ cells. Each cell at row x and column y , denoted by (x, y) , has a raw gem. Raw gems are useless until they are composed into refined gems.

Fine Gem Agency is one of the largest gem mining companies in Byteland. This company uses super robots to accelerate the mining time as well as to improve the quality of gems. They usually drop a robot at cell $(0, 0)$ when mining a gem field. The robot will step around to mine gems. At each step, it will move from its current cell (x, y) to a new cell (i, j) , where $|x - i| + |y - j| = 3$.

In order to compose a refined gem, a robot needs *two* raw gems. Because it cannot carry raw gems too far, it must compose them at their current cell or right at the next step. At every step, the robot can choose to collect the raw gem at that cell or to leave it there. However, if it decides to collect the gem, the next cell that it moves to must have a raw gem and the robot has to compose two raw gems into a refined gem at the next step.

The quality of the refined gem depends on the quality of its raw gems. The value of a refined gem is defined as the product of the values of its gem components.

The Byteland government just explored some gem fields and requested Fine Gem Agency for their proposal. You are supposed to write a program to find a mining path for each gem field, such that all raw gems will be mined and the total value of the refined gems is maximized.

Input

The input file consists of several data sets. The first line of the input file contains the number of data sets which is a positive integer and is not greater than 20. The following lines describe the data sets.

The first line of each data set contains two space-separated integers M and N ($2 < M, N < 101$) representing the size of the gem field. In the next M lines, the i -th line contains N space-separated integers representing the values of the gems in N cells of the i -th row of the mine.

Output

For each data set, write on a single line the maximum sum of the refined gems' values or '-1' if there is no desirable mining path.

Sample Input

```
2
3 6
5 5 5 10 5 5
5 5 5 5 5 5
5 5 10 5 5 5
3 3
10 10 10
10 10 10
10 10 10
```

Sample Output

```
300
```

