

Exercise – *New Tiles*

**Problem** Domino Magic started releasing brand new  $2 \times 2$  tiles because everybody is already tired of the  $1 \times 2$  domino tiles. To make a long story short, you are given a rectangular floor plan with some cells which you are not allowed to place tiles on, and your goal is to maximize the number of new  $2 \times 2$  tiles you can put in this rectangle without overlapping.

**Input** The first line contains  $1 \leq t \leq 20$ , the number of testcases. Each of the  $t$  testcases is described as follows:

- It starts with a single line that contains two integers  $h$   $w$ , separated by a space, specifying the height  $h$  and the width  $w$  of the floor plan at hand ( $1 \leq h \leq 100$ ,  $1 \leq w \leq 17$ ).
- The following  $h$  lines each describe one row of the floor plan, ordered from top to bottom. Each such line consists of  $w$  space-separated characters: '1' if that square can be tiled and '0' if it cannot be used. You may assume that the floor plan is surrounded by a wall, so the border cells of the input consist of 0's.

**Output** For each test case output a single line with the maximum number of new  $2 \times 2$  tiles you can place on the grid without overlapping.

**Points** There are two test sets:

1. For the first set, worth 50 points, you may assume that  $w \leq 10$ .
2. For the second set, worth 50 points, there are no additional constraints.

**Sample input**

```
2
5 5
0 0 0 0 0
0 0 1 1 0
0 1 1 1 0
0 1 1 1 0
0 0 0 0 0
5 6
0 0 0 0 0 0
0 0 1 1 0 0
0 1 1 1 1 0
0 1 1 1 1 0
0 0 0 0 0 0
```

**Sample output**

```
1
2
the bitmask is really tricky...
```