# Problem D. Divided square
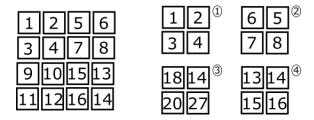
| | |
|---|---|
| Source file name: | `D.c, D.cpp, D.java` |
| Input: | Standard |
| Output: | Standard |
| Author(s): | |

Divided square is a new online puzzle. In this puzzle you have a square with size $N$ where $N$ is an even number divided in $N$ x $N$ cells, each cell has a number. You are provided with a set of $K$ tiles with size 2 x 2, these tiles have also 2 x 2 cells, and each cell has a number, each of these tiles have also a number $P_i$ of points that you won if you use the tile in the game.

In Divided square you have to select a subset of the $K$ tiles in such way that you can fill the square with the tiles, a tile can be added in a place of the square if the numbers in the tile and in the square matches the position where you want to place the tiles. You can rotate tiles in order to make the tile match the numbers in the position.



The image shows a 4 x 4 square. And 4 tiles numbered as 1, 2, 3, and 4. The tile with the number 1 matches the square in the position $(1, 1)$. The tile with the number 2 does not match the square in any position. The tile with the number 3 does not match the square in any position. The tile with the number 4 matches the square at position $(3, 3)$ after rotating it one time clockwise.

As you can guess, your task is to determine :

1. If you can fill the square with the given tiles

2. What is the maximum number of points you can get after filling the square with the tiles

## Input

The input consists of several test cases. Each test case starts with two numbers $N$ the size of the square and $K$ the number of tiles. The next 3*K lines describe the tiles in the game, the description of a tile is given in two lines with two numbers that represents the numbers that contains the 2 x 2 square of the tile. The third line in each tile description represents $P_i$ the number of points you will get if using the $i$-th tile. Each of the next $N$ lines contains $N$ numbers representing the numbers in the cells of the $N$ x $N$ square. The input ends with a case where $N = 0$ and $K = 0$. This test case should not be processed.

- $1 \le N \le 500$

- $1 \le K \le 10^5$

- The value $c$ for any cell will be in the range : $0 \le c \le 100$

## Output

For each test case print a line with a single number, the maximum number of points you can get if the square can be filled with the given tiles, print -1 if the square can not be filled with the given tiles.

## Example

| Input | Output |
|---|---|
| 4 5 | 13 |
| 1 2 | -1 |
| 3 4 | |
| 1 | |
| 5 6 | |
| 7 8 | |
| 4 | |
| 9 10 | |
| 11 12 | |
| 3 | |
| 9 10 | |
| 13 14 | |
| 3 | |
| 13 14 | |
| 15 16 | |
| 5 | |
| 1 2 5 6 | |
| 3 4 7 8 | |
| 9 10 15 13 | |
| 11 12 16 14 | |
| 4 4 | |
| 1 2 | |
| 3 4 | |
| 1 | |
| 5 6 | |
| 7 8 | |
| 4 | |
| 9 10 | |
| 11 12 | |
| 3 | |
| 9 10 | |
| 13 14 | |
| 3 | |
| 1 2 5 6 | |
| 3 4 7 8 | |
| 9 10 15 13 | |
| 11 12 16 14 | |
| 0 0 | |

## Explanation

In the first test case there is a 4 x 4 square and 5 tiles. You can fill the square taking the tiles number $1, 2, 3, 5$ the tile number 5 should be rotated to match in the square. The total number of points to earn is 13.

The second test case is exactly the same as the first test case but without the $5^{th}$ tile. The square can not be filled with the given tiles therefore the output is $-1$.