

8th South African Regional ACM Collegiate Programming Competition

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Problem B – Green balloon Peasant

A well-known problem is to determine the maximum number of queens that can be placed on a chess-board without any of them attacking any other. In this problem you have to answer this question for a new type of chess piece, the peasant.

Unlike the other pieces, a peasant's valid moves change from time to time. You will thus be given the valid moves as part of the input. Each valid move consists of a pair (R, C) , indicating that the peasant may move R rows forward and C columns right, provided that this does not take the piece off the board. Negative values indicate motion in the opposite direction. For example, a knight in chess would be described by the valid moves $(+/-1, +/-2)$ and $(+/-2, +/-1)$. Like a knight, a peasant moves directly to the target square, even if there are other pieces in between.

The input will consist of multiple cases. Each case starts with a line containing N , the width and height of the board. The second line contains M , the number of valid moves that a peasant has. The next M lines describe the valid moves for this test case. Each line consists of two space-separated integers, R and C , which have the meanings described above. The last test case is followed by a line containing only a 0.

The following constraints are in place: $1 \leq N \leq 12$; $0 \leq R \leq 1$ and $-N < C < N$. For each case, each (R, C) pair is unique and not equal to $(0, 0)$.

For each case, determine the maximum number of peasants that can be placed on a board without any peasant attacking (i.e. being able to move directly to the square occupied by) any other; write this number to the output.

Sample Input

```
3
3
1 -1
1 0
1 1
4
2
0 -1
1 0
0
```

Sample Output

```
6
8
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The drawings below show possible maximum layouts, with '*'s representing peasants and '.'s representing unoccupied squares.

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