

Problem K. King's Palace

Input file: *standard input*
Output file: *standard output*
Time limit: 6 seconds
Memory limit: 1024 mebibytes

There are N walls in the hall of the King's palace, numbered by integers from 1 to N . The King asks the Royal Painter to paint each wall in one of three colors (red, green, or blue). Additionally, the King gives M orders.

Every order has the following form: given two walls, a_i and b_i , and two colors, x_i and y_i , the order dictates that, if the wall a_i is painted with color x_i **and** the wall b_i is painted with color y_i , the Royal Painter has to be executed.

Your task is to find a number of ways to paint the walls so that the Royal Painter will not be executed.

Input

The first line of the input contains two integers N and M ($1 \leq N \leq 22$, $1 \leq M \leq 9 \cdot N \cdot (N - 1)/2$): the number of walls and the number of orders, respectively.

Each of the following M lines describes one King's order and contains an integer a_i , a letter x_i , an integer b_i , and a letter y_i , separated by single spaces ($1 \leq a_i < b_i \leq N$, x_i and y_i are letters from 'R', 'G', and 'B', denoting the red, green, and blue colors, respectively). You may assume that all M orders are pairwise distinct (no two orders have the exact same effect).

Output

Print one integer: the number of ways to paint the walls so that the Royal Painter will not be executed.

Examples

<i>standard input</i>	<i>standard output</i>
2 3 1 R 2 R 1 G 2 R 1 B 2 G	6
1 0	3
22 0	31381059609
4 12 2 R 3 R 1 B 2 B 2 R 3 B 3 R 4 R 1 B 4 G 1 R 3 B 3 G 4 B 2 G 3 G 1 B 2 R 1 G 2 R 1 R 3 G 1 G 3 B	13