Fart

2024/2025 SEASON – SECOND ROUND

Airland is made up of N cities and M two-way roads, connecting a city to another one. The roads are built in such a way that there exists a path between all cities using the roads. Between every pair of cities exists at max 1 road.

Unfortunately for the humans, a Brown Creature settled at each of the roads. Every Brown Creature exudes a certain set of gases, which are poisonous for humans. Science in Airland is sufficiently developed and they already know that there exist a total of K different gases and for each one they have created a gas mask. However, Capitalism in Airland is developed as well and the masks are not for free. To be precise, every city sells a certain set of gas masks, which a person can buy, if they are in the city.

Stiliyan lives in city 1 and wants to visit his friend Datsa in city N. Currently, he has no gas masks and he doesn't care how many cities he will have to visit to reach Datsa. What he cares about is saving money, and the fewest number of masks he needs to buy to go from city 1 to city N.

Write a program which answers his question.

Input

The first line of the file **fart.in** contains N, M and K – the number of cities, roads and gases. Each of the next N lines contains a string with length K, made from 0s and 1s. If the symbol at position i and line j is 1, then the gas mask against gas i is sold at city j, and if the symbol is 0 – the mask is not sold. Each of the next M lines contains two numbers a and b, as well as a string with length K, made from 0s and 1s. That means there is a road from a to b and the string describes what gases the Brown Creature has exuded on that road.

Output

On the only line of the file **fart.out** print 1 number: the desired amount of masks.

Constraints

$1 \leq N \leq 10$

$1 \leq K \leq 15$

Time Limit: 0.5 sec.

Memory Limit: 256 MB.

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Sample Test

Input (fart.in)	Output (fart.out)
4 4 3 011 101 100 111 1 2 010 2 3 100 1 3 011 3 4 100	2

Sample Explanation

City 1 sells masks for gases 2 and 3.
City 2 sells masks for gases 1 and 3.
City 3 sells the mask for gas 1.
City 4 sells masks for gases 1, 2 и 3.
For Stiliyan it is optimal to buy the mask for gas 2 at city 1 and to move to city 2 (the road between them has only gas 2). After that he buys the mask for gas 1 and moves to city 3 (the road between city 2 and 3 has only gas 1). After that he directly moves to city 4, because he already has the mask for gas 1. In this way, he reaches city 4 with only 2 masks purchased.
Notice that the path 1->3->4 is shorter in length, but is not optimal, as it requires 3 masks to be purchased.