

# **Ore Mining (800 points)**

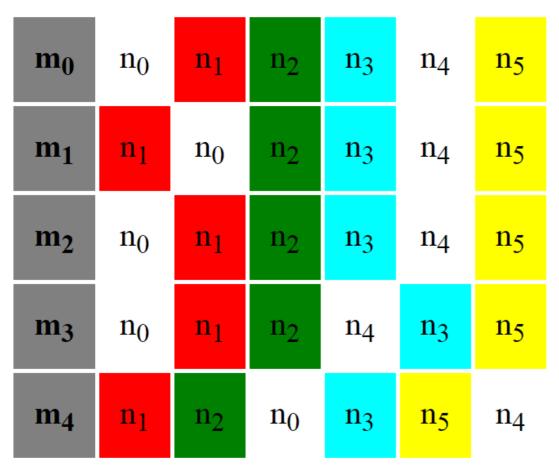
### Introduction

A mining operation has discovered deposits of N different kinds of liquid ore, which they have labeled  $n_i$  for  $0 \le i < N$ . The deposits are spread throughout M sheets of rock, which have been labeled  $m_j$  for  $0 \le j < M$ .

To simplify the problem, let us imagine we are looking at a cross section of the rock which has been divided into N columns and M rows, for a total of N\*M cells. Each type of ore  $n_i$  appears exactly once in each sheet of rock  $m_j$  (i.e. once per row).

The crew needs to drill paths from the top layer  $m_0$  to the bottom layer  $m_{M-1}$  such that each path connects deposits of one type of ore  $n_i$  across all M layers.

In the example below with N=6 and M=5, you can see the best option is to drill 4 paths, for ores  $n_1$ ,  $n_2$ ,  $n_3$ , and  $n_5$ .



Let us define a valid path for ore  $n_i$  as M-1 line segments, each of which connects a deposit of ore  $n_i$  in layer  $m_j$  to the deposit of ore  $n_i$  in layer  $m_{j+1}$ , such that no line segment intersects the line segment of another path. There should be no more than 1 path per type of ore.

What is the maximum number of valid paths that can be drilled by the above definition?

## **Input Specifications**

The first line will contain two space-seperated integers, N and M, where  $1 \le N < 1000$  and  $2 \le M < 1000$ .

The next M lines will contain N space-seperated, case-sensitive names of ore types (all names are 20 alphabetic characters or fewer). The same N names will appear on each line, although possibly not necessarily in the same order.

## **Output Specifications**

The maximum number of paths which can be drilled and considered valid by the above criteria.

## Sample Input/Output

#### Input

3 2

A B C

A C B

## **Output**

2

## **Explanation**

Here we have two ways to drill 2 paths: {A, B} or {A, C}.

## Input

3 2 Alpha Beta Gamma Alpha Beta Gamma

## Output

3

## **Explanation**

Here we have one way to drill 3 paths: {Alpha, Beta, Gamma}.

#### Input

3 3

A B C

BCA

CAB

## **Output**

1

## **Explanation**

Here we have three ways to drill 1 path: {A} or {B} or {C}.

### Input

# Output

3

# Explanation

Here we have two ways to drill 3 paths:  $\{A, B, D\}$  or  $\{A, C, E\}$ .