

Problem 3725: Count Ways to Choose Coprime Integers from Rows

Problem Information

Difficulty: Hard

Acceptance Rate: 47.35%

Paid Only: No

Tags: Array, Math, Dynamic Programming, Matrix, Combinatorics, Number Theory

Problem Description

You are given a $m \times n$ matrix `mat` of positive integers.

Return an integer denoting the number of ways to choose **exactly one** integer from each row of `mat` such that the **greatest common divisor** of all chosen integers is 1.

Since the answer may be very large, return it **modulo** $10^9 + 7$.

Example 1:

Input: `mat = [[1,2],[3,4]]`

Output: 3

Explanation:

Chosen integer in the first row | Chosen integer in the second row | Greatest common divisor of chosen integers ---|---|--- 1 | 3 | 1 1 | 4 | 1 2 | 3 | 1 2 | 4 | 2 3 of these combinations have a greatest common divisor of 1. Therefore, the answer is 3.

Example 2:

Input: `mat = [[2,2],[2,2]]`

Output: 0

****Explanation:****

Every combination has a greatest common divisor of 2. Therefore, the answer is 0.

****Constraints:****

$1 \leq m \leq 150$ $1 \leq n \leq 150$ $1 \leq mat[i][j] \leq 150$

Code Snippets

C++:

```
class Solution {
public:
    int countCoprime(vector<vector<int>>& mat) {

    }
};
```

Java:

```
class Solution {
    public int countCoprime(int[][] mat) {

    }
}
```

Python3:

```
class Solution:
    def countCoprime(self, mat: List[List[int]]) -> int:
```