Largest Non-Coprime Submatrix

Given a matrix you need to find the submatrix with the largest number of elements, where the GCD (Greatest Common Divisor) of its elements is greater than one. A submatrix of the matrix is a selection composed of contiguous rows and columns of the original matrix.

Input Two numbers n,m in the first line. Followed by n lines with m numbers in each line.

Constraints

1<=N,M<=200
1<=numbers<=10000

Output Just a largest area where GCD is greater than 1.

Sample Input

```
3 3
2 6 8
4 8 3
6 9 4
```

Sample Output

```
4
```

If you observe the following submatrix:

```
2 6
4 8
```

The GCD is 2. There is no matrix larger than this with a GCD > 1.

Python 3

```
1 import math
2 import os
3 import random
4 import re
```

```python
import sys


def gcd(a, b):
    a, b = max(a, b), min(a, b)
    while b != 0:
        a, b = b, a%b
    return a


def solve(matrix):
    best = 0
    nrows, ncols = len(matrix), len(matrix[0])
    for irow in range(nrows):
        for icol in range(ncols):
            upperrow = [matrix[irow][icol]] * (ncols - icol)
            cur = matrix[irow][icol]
            for jrow in range(irow, nrows):
                prev = matrix[irow][icol]
                goodcols = 0
                for jcol in range(icol, ncols):
                    prev = gcd(prev, gcd(upperrow[jcol-icol], matrix[jrow][jcol]))
                    if prev == 1:
                        upperrow[jcol-icol:] = [1] * (ncols - jcol)
                        break
                    goodcols += 1
                    upperrow[jcol-icol] = prev
                if best >= (nrows-irow) * goodcols:
                    break
                best = max(best, (jrow-irow+1)*goodcols)
    return best

if __name__=='__main__':


    fptr = open(os.environ['OUTPUT_PATH'], 'w')

    first_multiple_input = input().rstrip().split()

    n = int(first_multiple_input[0])

    m = int(first_multiple_input[1])

    matrix = []

    for _ in range(n):
        matrix.append(list(map(int, input().rstrip().split())))

    result = solve(matrix)

    fptr.write(str(result) + '\n')

    fptr.close()
```

Line: 1 Col: 1

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