Number of constant square submatrices X22897_en

Each case of the input in this exercise is a matrix of 0s and 1s. The program has to compute the total number of non-empty submatrices that are square and constant (same number of rows and columns and the same symbol). For instance, consider this as the input matrix:

```
00001
00011
00011
01111
```

It has 1 constant submatrix of size 3×3 (with 0s), 6 constant submatrices 2×2 (4 of them with 0s, and 2 of them with 1s), and 20 constant submatrices 1×1. Therefore, in this case the output would be 27.

Input

The input has several cases. Each case starts with a line with two positive naturals n and m. After that come n lines with m characters, either 0 or 1, which describe a matrix of size $n \times m$, followed by an empty line.

Output

For each case, the program must write the total number of non-empty square submatrices in one line.

Sample input 1

```
4 7
1011111
1101111
1111111
1010110

10 4
0010
1000
1011
0000
0000
0000
0000
0101
0000
0000

10 3
000
000
100
100
000
000

010
010
001
001

8 9
000000000
100000000
000000000
000100001
100010100
010000000
000001000
000000000

7 6
100100
000000
001000
101000
010000
000000
000000

1 8
10110001
```

```
3 1
1
1
0

7 5
11011
10111
11111
11001
01111
11111
10111

2 1
0
1

10 5
11110
01011
11111
11111
11111
11111
11111
10101
11111
11011

7 6
000000
000001
000000
001010
100100
000010
000000

6 1
0
1
0
1
1
1

2 6
100111
111111

5 5
00000
00000
11000
01000
01000

8 9
111111111
110110110
111111111
111111010
111011111
111011111
111111111
111011111

5 4
1111
0111
1111
0101
1101

10 8
10111111
11111111
11111101
11011101
11111111
11110111
11110011
11111111
11111111
11010111

5 8
11110101
01111111
11110111
11101111
11111110

2 1
1
0

1 9
100011110
```

Sample output 1

```
38
57
38
115
64
8
3
45
2
```

```
83
58
6
14
38
116
25
132
57
2
9
```

Observation

Evaluation out of 10 points:

- Slow solution: 5 points.
- Fast solution: 10 points.

A fast solution is one which is correct, of linear cost and passing the test cases, both public and private. A slow solution is one which is not fast, but it is correct and passes the public test cases.

Problem information

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