

# 1183. Maximum Number of Ones Premium

HardTopicsCompaniesHint

Consider a matrix `M` with dimensions `width * height`, such that every cell has value `0` or `1`, and any **square** sub-matrix of `M` of size `sideLength * sideLength` has at most `maxOnes` ones.

Return the maximum possible number of ones that the matrix `M` can have.

## Example 1:

**Input:** `width = 3, height = 3, sideLength = 2, maxOnes = 1`

**Output:** `4`

**Explanation:**

In a `3*3` matrix, no `2*2` sub-matrix can have more than 1 one. The best solution that has 4 ones is:

```
[1,0,1]
```

```
[0,0,0]
```

```
[1,0,1]
```

## Example 2:

**Input:** `width = 3, height = 3, sideLength = 2, maxOnes = 2`

**Output:** `6`

**Explanation:**

```
[1,0,1]
```

```
[1,0,1]
```

```
[1,0,1]
```

## Constraints:

- `1 <= width, height <= 100`
- `1 <= sideLength <= width, height`
- `0 <= maxOnes <= sideLength * sideLength`

Seen this question in a real interview before? 1/5

YesNo

Accepted **5.2K** | Submissions **7.7K** | Acceptance Rate **68.4%**

## Topics

GreedyHeap (Priority Queue)

## Companies

0 - 6 monthsQualcomm 2

## Hint 1

Think of a greedy mathematical solution.

## Hint 2

Say you choose to set some cell `(i, j)` to 1, all cells `(x, y)` such that `i % sideLength == x % sideLength` and `j % sideLength == y % sideLength` can also be set to 1 without increasing the max number of ones in a sub-matrix.

## Hint 3

In one move, choose to set all the cells with some modulus `(i % sideLength, j % sideLength)` to 1.

## Hint 4

Choose the cells with max frequency.

## Discussion (5)