Problem 3648: Minimum Sensors to Cover Grid

Problem Information

Difficulty: Medium
Acceptance Rate: 68.62%
Paid Only: No
Tags: Math

Problem Description

You are given `n x m` grid and an integer `k`.

A sensor placed on cell `(r, c)` covers all cells whose **Chebyshev distance** from `(r, c)` is **at most** `k`.

The **Chebyshev distance** between two cells `(r1, c1)` and `(r2, c2)` is `max(|r1 − r2|,|c1 − c2|)`.

Your task is to return the **minimum** number of sensors required to cover every cell of the grid.

Example 1:

Input: n = 5, m = 5, k = 1

Output: 4

Explanation:

Placing sensors at positions `(0, 3)`, `(1, 0)`, `(3, 3)`, and `(4, 1)` ensures every cell in the grid is covered. Thus, the answer is 4.

Example 2:

Input: n = 2, m = 2, k = 2

Output: 1

Explanation:

With `k = 2`, a single sensor can cover the entire `2 * 2` grid regardless of its position. Thus, the answer is 1.

Constraints:

* `1 <= n <= 103` * `1 <= m <= 103` * `0 <= k <= 103`

Code Snippets

C++:

```cpp
class Solution {
public:
int minSensors(int n, int m, int k) {


}
};
```

Java:

```java
class Solution {
public int minSensors(int n, int m, int k) {


}
}
```

Python3:

```python
class Solution:
def minSensors(self, n: int, m: int, k: int) -> int:
```