2033. Minimum Operations to Make a Uni-Value Grid

Medium Topics Companies Hint

You are given a 2D integer `grid` of size `m x n` and an integer `x`. In one operation, you can **add** `x` to or **subtract** `x` from any element in the `grid`.

A **uni-value grid** is a grid where all the elements of it are equal.

Return *the* ***minimum*** *number of operations to make the grid* ***uni-value***. If it is not possible, return `-1`.

Example 1:

2	4
6	8

```
Input: grid = [[2,4],[6,8]], x = 2
Output: 4
Explanation: We can make every element equal to 4 by doing the
following:
- Add x to 2 once.
- Subtract x from 6 once.
- Subtract x from 8 twice.
A total of 4 operations were used.
```

What makes a valid x ?

① $grid_i \bmod x$ is constant .

② $target = sum(grid_i \;//\; x) \;//\; size$

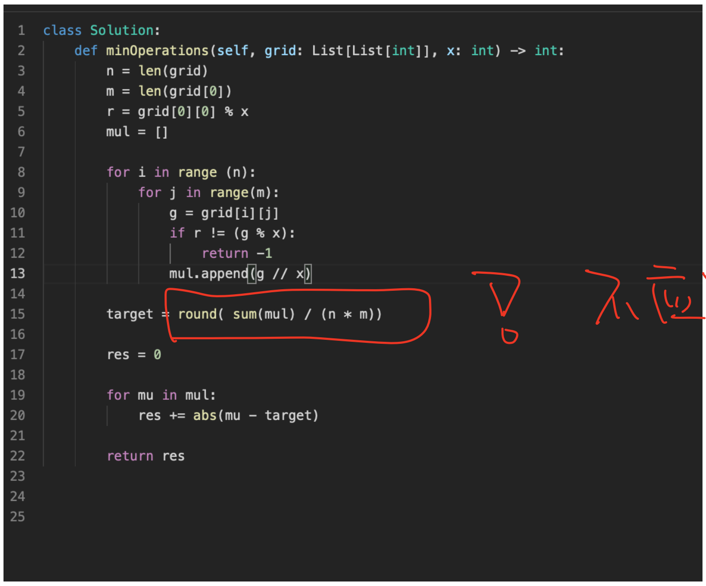
$= (1+2+3+4) \;//\; 4$

$= 2$

$count = sum(abs(\frac{grid_i \;//\; x}{target}))$

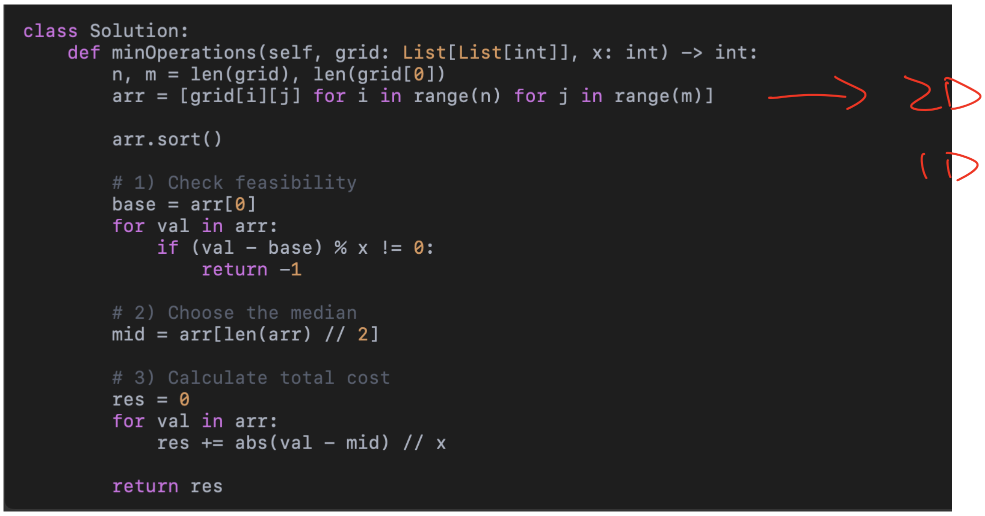
$= 1+0+1+2$

$= 4$



```python
class Solution:
    def minOperations(self, grid: List[List[int]], x: int) -> int:
        n = len(grid)
        m = len(grid[0])
        r = grid[0][0] % x
        mul = []

        for i in range (n):
            for j in range(m):
                g = grid[i][j]
                if r != (g % x):
                    return -1
                mul.append(g // x)

        target = round( sum(mul) / (n * m))

        res = 0

        for mu in mul:
            res += abs(mu - target)

        return res
```

？不应该是 avg. 用 median .



```python
class Solution:
    def minOperations(self, grid: List[List[int]], x: int) -> int:
        n, m = len(grid), len(grid[0])
        arr = [grid[i][j] for i in range(n) for j in range(m)]

        arr.sort()

        # 1) Check feasibility
        base = arr[0]
        for val in arr:
            if (val - base) % x != 0:
                return -1

        # 2) Choose the median
        mid = arr[len(arr) // 2]

        # 3) Calculate total cost
        res = 0
        for val in arr:
            res += abs(val - mid) // x

        return res
```

→ 2D arr 没有意义,
1D 而更好操作 .