Problem E - The Twin Jacks Conjecture

Time limit: 4 seconds

Jack's older twin-brother Jamie stole all of Jack's bagels, and won't give them back until Jack solves an overly-complicated puzzle.

Jamie starts by giving an n by m grid of non-negative integers, and some goal integer $v \geq 0$. At every step, Jack can take any two numbers a and b adjacent to each other in the grid (either horizontally or vertically), replace b with $\min(ab, v+1)$, and replace a with 0. Jack wants to make it so that some entry in the grid becomes equal to v, and he needs to do so in the fewest number of steps.

Jack ended up getting lost in Lucca's donut shop, so can you solve the puzzle while he's gone?

Input

The first line of the input contains three integers n, m and v ($1 \leq n, m \leq 3$, $0 \leq v \leq 10^7$). The next n lines contain m values a_{ij} ($0 \leq a_{ij} < 10^7$) each.

Output

The output should be a single integer on a line.

If it is possible to solve the puzzle, output the minimum number of steps it takes to solve.

If it is not possible to solve the puzzle, output -1.

Sample Input

```
2 2 12
2 2
3 21
```

Sample Output

```
2
```

Sample Input

```
2 2 1
2 3
4 5
```

Sample Output

```
-1
```

Sample Input

```
3 2 0
1 2
44 18
1488 1380
```

Sample Output

```
1
```