1728. Cat and Mouse II

Description

A game is played by a cat and a mouse named Cat and Mouse.

The environment is represented by a `grid` of size `rows x cols`, where each element is a wall, floor, player (Cat, Mouse), or food.

- Players are represented by the characters `'C'` (Cat) `,'M'` (Mouse).
- Floors are represented by the character `'.'` and can be walked on.
- Walls are represented by the character `'#'` and cannot be walked on.
- Food is represented by the character `'F'` and can be walked on.
- There is only one of each character `'C'`, `'M'`, and `'F'` in `grid`.

Mouse and Cat play according to the following rules:

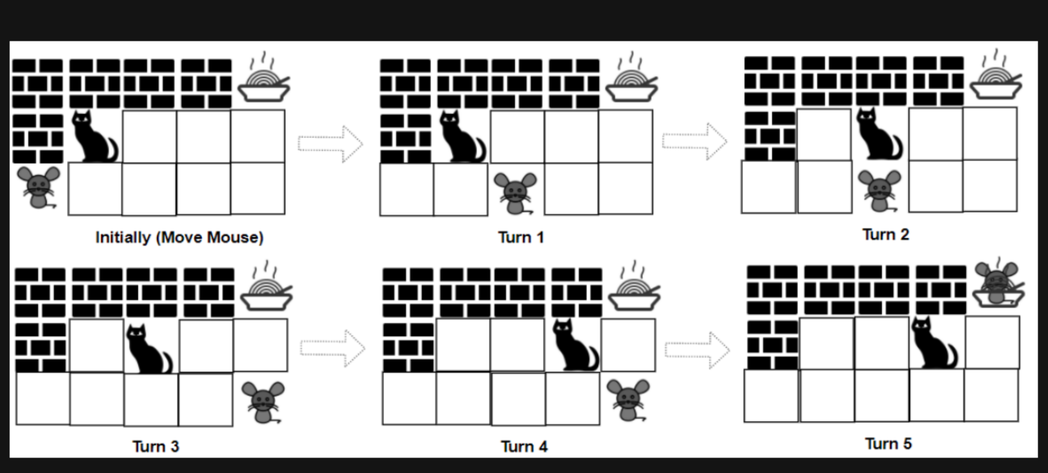
- Mouse **moves first**, then they take turns to move.
- During each turn, Cat and Mouse can jump in one of the four directions (left, right, up, down). They cannot jump over the wall nor outside of the `grid`.
- `catJump, mouseJump` are the maximum lengths Cat and Mouse can jump at a time, respectively. Cat and Mouse can jump less than the maximum length.
- Staying in the same position is allowed.
- Mouse can jump over Cat.

The game can end in 4 ways:

- If Cat occupies the same position as Mouse, Cat wins.
- If Cat reaches the food first, Cat wins.
- If Mouse reaches the food first, Mouse wins.
- If Mouse cannot get to the food within 1000 turns, Cat wins.

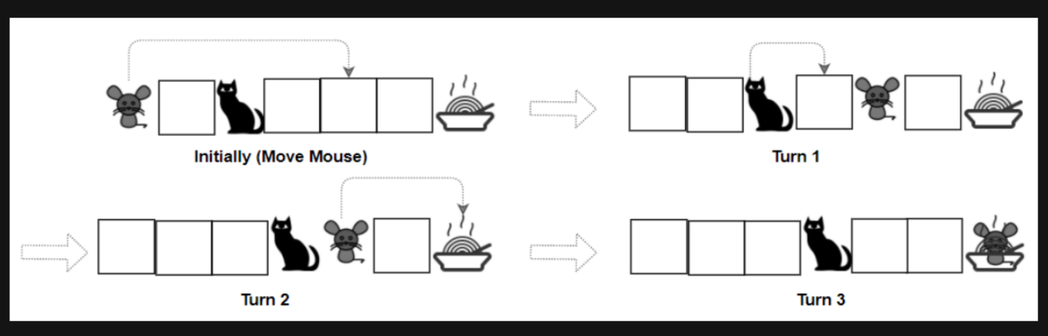
Given a `rows x cols` matrix `grid` and two integers `catJump` and `mouseJump`, return `true` *if Mouse can win the game if both Cat and Mouse play optimally, otherwise return* `false`.

Example 1:




```
Input: grid = ["####F","#C...","M...."], catJump = 1, mouseJump = 2
Output: true
Explanation: Cat cannot catch Mouse on its turn nor can it get the food before Mouse.
```

Example 2:




```
Input: grid = ["M.C...F"], catJump = 1, mouseJump = 4
Output: true
```

Example 3:

```
Input: grid = ["M.C...F"], catJump = 1, mouseJump = 3
Output: false
```

Constraints:

- `rows == grid.length`
- `cols = grid[i].length`
- `1 <= rows, cols <= 8`
- `grid[i][j]` consist only of characters `'C'`, `'M'`, `'F'`, `'.'`, and `'#'`.
- There is only one of each character `'C'`, `'M'`, and `'F'` in `grid`.
- `1 <= catJump, mouseJump <= 8`