Spiral Matrix II

For this problem we must fill an $n \times n$ matrix spiral order with numbers from 1 to n^2; the approach in layer by layer spiral fill.

Key Idea:

- Maintain four boundaries: top, bottom, left, right.
- Fill in clockwise order:
    1. Left → Right (top row)
    2. Top → Bottom (right column)
    3. Right → Left (bottom row)
    4. Bottom → Top (left column)
- After each direction, shrink the boundary.

Complexity:

- Time: $O(n^2)$ – fill every cell once
- Space: $O(n^2)$ – matrix storage