1. In 2D DP, what does each cell of the grid represent?
   1. A possible path
   2. **A state or subproblem**
   3. A grid coordinate
   4. A recursive function
2. Which type of problems are commonly solved using 2D DP?
   1. Graph traversal
   2. Sorting algorithms
   3. **Grid-based problems**
   4. String manipulation
3. What is the key idea behind dynamic programming in grid-based problems?
   1. Divide and conquer
   2. Greedy approach
   3. Memoization
   4. **Optimal substructure and overlapping subproblems**
4. Which data structure is often used to store intermediate results in grid DP?
   1. **Arrays**
   2. Linked lists
   3. Stacks
   4. Queues
5. What is the time complexity of solving a grid DP problem with dimensions n x m?
   1. O(n)
   2. O(m)
   3. **O(n \* m)**
   4. O(2^n)
6. In grid DP, what does the term "bottom-up" approach mean?
   1. **Solving problems from larger subproblems to smaller ones**
   2. Solving problems from smaller subproblems to larger ones
   3. Solving problems starting from the bottom row of the grid
   4. Solving problems starting from the top row of the grid
7. What is the purpose of initializing the DP table in grid DP problems?
   1. To make the code shorter
   2. To eliminate the need for recursion
   3. **To handle base cases and avoid errors**
   4. To improve runtime performance
8. Which of the following problems can be solved using grid DP?
   1. Finding the shortest path in a graph
   2. Calculating the Fibonacci sequence
   3. **Counting the number of ways to reach a target in a grid**
   4. Sorting an array
9. What does the "optimal substructure" property mean in DP?
   1. The problem can be divided into smaller subproblems.
   2. The solution consists of choosing the best option at each step.
   3. **The subproblem solutions can be combined to solve the original problem.**
   4. The problem has a single optimal solution.
10. Which DP approach typically uses a 2D grid to store intermediate results?
    1. Memoization
    2. Top-down
    3. **Bottom-up**
    4. Recursive
11. What is the main benefit of using a 2D DP table for grid-based problems?
    1. **Reduced time complexity**
    2. Reduced space complexity
    3. Improved readability of code
    4. Ability to handle non-grid problems
12. In a grid DP problem, what does the "overlapping subproblems" property imply?
    1. Subproblems are entirely unrelated.
    2. **The same subproblems are solved multiple times.**
    3. Subproblems have no common elements.
    4. Subproblems always have unique solutions.
13. Which approach uses function calls and recursion to solve DP problems?
    1. Memoization
    2. **Top-down**
    3. Bottom-up
    4. Greedy
14. What is the purpose of memoization in DP?
    1. To store the original problem's solution
    2. **To minimize the number of function calls**
    3. To generate random values
    4. To prevent the use of arrays
15. In grid DP, what does the "state transition" refer to?
    1. Moving from one cell to another in the grid
    2. **Transitioning between different subproblems**
    3. Changing the grid dimensions
    4. Erasing the DP table
16. Which type of problems are not suitable for solving using grid DP?
    1. Problems with optimal substructure
    2. Problems with overlapping subproblems
    3. Problems without recursive solutions
    4. **Problems with non-grid structures**
17. How do you typically initialize the DP table in a bottom-up approach for grid DP?
    1. Setting all values to 0
    2. Setting all values to 1
    3. **Initializing with problem-specific values**
    4. Leaving the table empty
18. In grid DP, what is the role of the base case(s)?
    1. To simplify the problem into smaller subproblems
    2. To initialize the DP table
    3. **To handle the smallest subproblems directly**
    4. To skip the recursive calculations
19. What is the space complexity of a bottom-up grid DP solution?
    1. O(1)
    2. O(n)
    3. O(m)
    4. **O(n \* m)**
20. What is the primary difference between a top-down and a bottom-up DP approach?
    1. The choice of programming language
    2. The use of recursion
    3. **The order in which subproblems are solved**
    4. The initialization of the DP table
21. In grid DP, what is typically represented along the horizontal axis of the DP table?
    1. Subproblem size
    2. Subproblem index
    3. Grid row
    4. **Grid column**
22. In a grid DP problem, what is a "transition function"?
    1. A function that modifies the grid dimensions
    2. A function that determines how to move between cells
    3. **A function that calculates the next state from the current state**
    4. A function that initializes the DP table
23. In grid DP, what is the primary goal when designing a transition function?
    1. To minimize the number of states
    2. To maximize the number of states
    3. **To simplify the problem**
    4. To ensure each state has only one neighbour
24. What does the "time complexity" of a DP solution refer to?
    1. The amount of memory used
    2. **The number of iterations or function calls**
    3. The size of the grid
    4. The order in which states are processed
25. In grid DP, what does the "optimal substructure" property allow you to do?
    1. **Divide the problem into smaller subproblems**
    2. Avoid recursion entirely
    3. Store all intermediate results in a single cell
    4. Skip memoization
26. What is the primary purpose of memoization in DP?
    1. To reduce time complexity
    2. To eliminate the need for a DP table
    3. To ensure the base case is always reached
    4. **To store and reuse intermediate results**
27. In a 2D grid DP problem, how are the states typically represented?
    1. As a single variable
    2. **As coordinates (row, column)**
    3. As a graph
    4. As a mathematical formula
28. What is the purpose of using a DP table in grid DP?
    1. To avoid all recursive calls
    2. **To store intermediate results for subproblems**
    3. To generate random numbers
    4. To reduce the space complexity
29. What is the primary advantage of using a bottom-up DP approach over a top-down approach?
    1. Simplicity of implementation
    2. Easier handling of base cases
    3. **Improved space efficiency**
    4. Reduced function call overhead
30. What is the main disadvantage of using a recursive (top-down) approach in grid DP?
    1. Slower execution time
    2. **Greater memory usage**
    3. Difficulty in handling base cases
    4. Inability to handle grid-based problems
31. Which of the following is a common use case for grid DP?
    1. Sorting an array
    2. Solving linear equations
    3. **Pathfinding in a maze**
    4. Calculating prime numbers
32. In grid DP, what is the primary benefit of using memoization?
    1. Reduced code complexity
    2. **Improved runtime performance**
    3. Elimination of recursion
    4. Better handling of base cases
33. In 2D DP, what is the primary reason for using a grid structure?
    1. To simplify memoization
    2. To visualize the problem
    3. To eliminate the need for a transition function
    4. **To represent the states and subproblems**
34. Which step is typically performed after populating the DP table in a bottom-up approach?
    1. Initializing the base cases
    2. **Calculating the final result**
    3. Using recursion to fill in missing values
    4. Resetting the table to its initial state
35. What is the primary goal of dynamic programming in grid-based problems?
    1. To create complex algorithms
    2. To find the optimal solution to any problem
    3. To reduce the time complexity of solving problems
    4. **To solve problems by breaking them into smaller, overlapping subproblems**