Zoho 2nd Round Coding Study Material (C++ Focus)

The Zoho coding rounds heavily emphasize Data Structures and Algorithms, with a strong focus on array, string, and matrix manipulations, along with dynamic programming. Pattern printing and logical reasoning questions are also common.

I. Arrays (Essential & Frequently Asked)

These problems test your ability to manipulate arrays efficiently, often in-place and with optimal time complexity.

1. **Find Next Greater Element:**
   - **Problem:** Given an array, find the next greater element for each element. If no such element exists, replace with -1.
   - **Common Approach:** Use a stack to keep track of elements for which the next greater element hasn't been found yet.
   - *Reference (Problem Statement):* Level 2 Practice set 1.pdf, zoho-level-2-set-qa.pdf
2. **Product of Array Except Self:**
   - **Problem:** Given an integer array nums, return an array answer such that answer[i] is equal to the product of all the elements[1] of nums except nums[i]. Do this in O(n) time without using the division operation.
   - **Common Approach:** Calculate prefix products and suffix products.
   - *Reference (Problem Statement):* Arrays Important Basic(leetcode) DSA Questions.pdf, Level 2 Practice set 1.pdf, 100.pdf
3. **Move Zeros to Left/End (Maintaining Order):**
   - **Problem:** Move all zeros to the left (or end) of an array while maintaining the relative order of the non-zero elements.
   - **Common Approach:** Two-pointer approach.
   - *Reference (Problem Statement):* Level 2 Practice set 1.pdf, 100.pdf (for move zeros to end)
4. **Largest Sum Contiguous Subarray (Kadane's Algorithm):**
   - **Problem:** Find the contiguous subarray within an array (containing at least one number) which has the largest sum.
   - **Common Approach:** Kadane's algorithm (dynamic programming approach).
   - *Reference (Problem Statement):* Arrays Important Basic(leetcode) DSA Questions.pdf, Top Leetcode Questions (Zoho,Amazon,linkedin,google).pdf (Maximum Subarray), photo_2024-08-16_08-11-27.jpg
5. **Sort Array of 0s, 1s, and 2s (Dutch National Flag Problem):**
   - **Problem:** Sort an array containing only 0s, 1s, and 2s without using any standard sorting algorithm.
   - **Common Approach:** Three-pointer approach.
   - *Reference (Problem Statement):* Arrays Important Basic(leetcode) DSA Questions.pdf
6. **Replace Duplicates with Minimum Numbers to Minimize Sum:**
   - **Problem:** Given an unsorted array with duplicate values, replace the duplicates with minimum numbers such that the sum of elements becomes minimum.
   - **Common Approach:** Sort the array and iterate, replacing duplicates with the smallest available unique number greater than the previous element.
   - *Reference (Problem Statement):* 1.docx, aug 21_level 2.pdf
7. **Find Pairs with a Given Sum (Two Sum):**
   - **Problem:** Find all pairs in an integer array whose sum is equal to a given number.
   - **Common Approach:** Hash map or two-pointer (if sorted).
   - *Reference (Problem Statement):* Arrays Important Basic(leetcode) DSA Questions.pdf, Top Leetcode Questions (Zoho,Amazon,linkedin,google).pdf

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1. **Check for Palindrome Rearrangement:**
   - **Problem:** Check if characters of a given string can be rearranged to form a palindrome.
   - **Common Approach:** Count character frequencies. At most one character should have an odd frequency.
   - *Reference (Problem Statement):* 1.docx, aug 21_level 2.pdf
2. **K'th Character of Decrypted String:**
   - **Problem:** Given an encoded string (e.g., "ab2cd2" -> "ababcdcd"), find the k-th character of the decrypted string.
   - **Common Approach:** Simulate decryption, keeping track of string length.
   - *Reference (Problem Statement):* 1.docx, aug 21_level 2.pdf
3. **Regular Expression Matching ('.' and '*'):**
   - **Problem:** Implement regular expression matching with support for '.' (any single character) and '*' (zero or more of the preceding element).
   - **Common Approach:** Dynamic Programming is often used for this.
   - *Reference (Problem Statement):* regex-matcher-1-English.pdf, Dynamic Programming .pdf
4. **Phone Dictionary Translation:**
   - **Problem:** Translate numeric keystrokes (from a phone keypad) into alphabets, handling continuous presses for different characters and spaces.
   - **Common Approach:** Map numbers to characters; iterate through the input, counting consecutive same digits.
   - *Reference (Problem Statement):* 8.pdf
5. **Reverse Words in a String (Recursively):**
   - **Problem:** Given a string, change the order of words (last word comes first).
   - **Common Approach:** Use recursion to process words from the end.
   - *Reference (Problem Statement):* ZOHO 2nd ROUND 2nd half.pdf

III. Matrices (2D Arrays)

Matrix problems in Zoho interviews often involve traversal, rotation, or finding specific points.

1. **Matrix Rotation by 90 Degrees:**
   - **Problem:** Rotate a given n x n matrix by 90 degrees (clockwise or counter-clockwise).
   - **Common Approach:** Transpose the matrix then reverse rows/columns.
   - *Reference (Problem Statement):* Matrics (2D) Array zoho samle questions.pdf
2. **Spiral Order Traversal:**
   - **Problem:** Print all elements of a matrix in spiral order.
   - **Common Approach:** Maintain boundaries (top, bottom, left, right) and shrink them after each traversal.
   - *Reference (Problem Statement):* Matrics (2D) Array zoho samle questions.pdf
3. **Search in Sorted Matrix:**
   - **Problem:** Find a value in a matrix where elements in individual rows/columns are sorted, or the entire matrix is sorted.
   - **Common Approach:** For row/column sorted, start from top-right or bottom-left. For fully sorted, binary search can be adapted.
   - *Reference (Problem Statement):* Matrics (2D) Array zoho samle questions.pdf
4. **Magic Square Check:**
   - **Problem:** Check if a given square matrix is a magic square (sum of every row, column, and both main diagonals is the same).
   - **Common Approach:** Calculate sums for all rows, columns, and diagonals, then compare.
   - *Reference (Problem Statement):* Matrics (2D) Array zoho samle questions.pdf
5. **Saddle Point in a Matrix:**
   - **Problem:** Find a saddle point (minimum in its row and maximum in its column).
   - **Common Approach:** Iterate through each row to find row minimums, then check if that minimum is also the maximum in its column.
   - *Reference (Problem Statement):* Matrics (2D) Array zoho samle questions.pdf

1. **Climbing Stairs:**
   - **Problem:** You are climbing a staircase. It takes n steps to reach the top. Each time you can either climb 1 or 2 steps.[2] In how many distinct ways can you climb to the top?
   - **Common Approach:** Fibonacci sequence (basic DP).
   - *Reference (Problem Statement):* Zoho Dynamic Programming Questions.pdf, Dynamic Programming .pdf
2. **Longest Palindromic Substring/Subsequence:**
   - **Problem:** Find the longest palindromic substring or subsequence.
   - **Common Approach:** DP table for substrings, or recursive with memoization for subsequences.
   - *Reference (Problem Statement):* Zoho Dynamic Programming Questions.pdf, Dynamic Programming .pdf, Top Leetcode Questions (Zoho,Amazon,linkedin,google).pdf
3. **Coin Change Problem:**
   - **Problem:** Given coins of different denominations and a total amount of money, compute the fewest number of coins needed to make up that amount.
   - **Common Approach:** DP (bottom-up or top-down with memoization).
   - *Reference (Problem Statement):* Zoho Dynamic Programming Questions.pdf, Dynamic Programming .pdf
4. **Word Break (Using Memoization):**
   - **Problem:** Given a string s and a dictionary of strings wordDict, return true if s can be segmented into a space-separated sequence of one or more dictionary words.
   - **Common Approach:** Recursion with memoization or DP.
   - *Reference (Problem Statement):* Zoho Dynamic Programming Questions.pdf, Dynamic Programming .pdf, Top Leetcode Questions (Zoho,Amazon,linkedin,google).pdf
5. **Longest Common Subsequence:**
   - **Problem:** Find the length of the longest common subsequence of two sequences.
   - **Common Approach:** DP table.
   - *Reference (Problem Statement):* Zoho Dynamic Programming Questions.pdf
6. **Edit Distance:**
   - **Problem:** Given two strings, find the minimum number of operations (insertions, deletions, substitutions) required to change one string into the other.
   - **Common Approach:** DP table.
   - *Reference (Problem Statement):* Zoho Dynamic Programming Questions.pdf, Dynamic Programming .pdf

V. General Logic & Other Concepts

1. **Pattern Printing:**
   - **Problem:** Print various patterns, often involving numbers or stars (e.g., diamond pattern).
   - **Common Approach:** Nested loops, careful calculation of spaces and characters.
   - *Reference (Problem Statement):* 6.pdf, Software_developer question 2022.pdf, zoho-level-2-set-qa.pdf
2. **Sorting by Number of Factors:**
   - **Problem:** Arrange numbers in decreasing order of their number of factors.
   - **Common Approach:** Implement a function to count factors, then use a custom comparator for sorting.
   - *Reference (Problem Statement):* Software_developer question 2022.pdf

Preparation Tips for Tomorrow:

- **Prioritize Understanding:** Instead of memorizing code, focus on understanding the core logic and algorithm for each problem.
- **Practice with Constraints:** Pay attention to time and space complexity requirements ($O(n)$ time, $O(1)$ space, etc.).
- **Walkthrough Solutions:** Even if you don't write full code for every problem, mentally walk through the steps of an optimal solution.
- **Test Cases:** Think about edge cases and common test cases for each problem.

Good luck with your interview! Let me know if you need any more specific information or clarification on a particular problem.