

Prompt	Scratchpad	Our Solution(s)	Video Explanation	Run Code
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Solution 1	Solution 2	Solution 3	Solution 4
<pre>1 // Copyright © 2020 AlgoExpert, LLC. All rights reserved. 2 3 using System.Collections.Generic; 4 5 public class Program { 6 // O(n^4) time O(n^3) space - where n is the height and width of the matrix 7 public static bool SquareOfZeroes(List<List<int> > matrix) { 8 int lastIdx = matrix.Count - 1; 9 Dictionary<string, bool> cache = new Dictionary<string, bool>(); 10 return hasSquareOfZeroes(matrix, 0, 0, lastIdx, lastIdx, cache); 11 } 12 13 // r1 is the top row, c1 is the left column 14 // r2 is the bottom row, c2 is the right column 15 public static bool hasSquareOfZeroes(16 List<List<int> > matrix, 17 int r1, 18 int c1, 19 int r2, 20 int c2, 21 Dictionary<string, bool> cache 22) { 23 if (r1 >= r2 c1 >= c2) return false; 24 25 string key = r1.ToString() + '-' + c1.ToString() + '-' + r2.ToString() + '-' + 26 c2.ToString(); 27 if (cache.ContainsKey(key)) return cache[key]; 28 29 cache[key] = isSquareOfZeroes(matrix, r1, c1, r2, c2) 30 hasSquareOfZeroes(matrix, r1 + 1, c1 + 1, r2 - 1, c2 - 1, cache) 31 hasSquareOfZeroes(matrix, r1, c1 + 1, r2 - 1, c2, cache) 32 hasSquareOfZeroes(matrix, r1 + 1, c1, r2, c2 - 1, cache) 33 hasSquareOfZeroes(matrix, r1 + 1, c1 + 1, r2, c2, cache) 34 hasSquareOfZeroes(matrix, r1, c1, r2 - 1, c2 - 1, cache); 35 36 return cache[key]; 37 } 38 39 // r1 is the top row, c1 is the left column 40 // r2 is the bottom row, c2 is the right column 41 public static bool isSquareOfZeroes(List<List<int> > matrix, 42 int r1, 43 int c1, 44 int r2, 45 int c2 46) { 47 for (int row = r1; row < r2 + 1; row++) { 48 if (matrix[row][c1] != 0 matrix[row][c2] != 0) return false; 49 } 50 for (int col = c1; col < c2 + 1; col++) { 51 if (matrix[r1][col] != 0 matrix[r2][col] != 0) return false; 52 } 53 return true; 54 } 55 } 56</pre>			

