NSUPS Bootcamp Week 6

Enhance your knowledge

http://bit.ly/Bootcamp06

Topics to be covered

1. Cumulative sum in 1-D Array
2. Cumulative sum in 2-D Array
3. Finding the sum of a given sub rectangle in O(1)
4. Two pointers
5. Maximum subarray sum 1-D
6. Maximum subarray sum 2-D in O(N^4)
7. Maximum subarray sum 2-D in O(N^3)

Cumulative sum in 1-D Array

1. Let’s define sum[i] = sum of elements from 0 to i
2. Subarray sum of (i,j) = sum[j] - sum[i-1]

Cumulative sum in 2-D Array

1. Let’s define sum[i][j] = sum of elements from (0,0) to (i,j)
2. How to find sub rectangle sum of (u1,v1) - (u2,v2) ?
3. Use inclusion exclusion
4. https://leetcode.com/articles/range-sum-query-2d-immutable/

Two Pointers

1. We basically maintain a window having two end pointers.
2. We move both of the pointers to the right based on our needs.
3. Never visit a cell more than twice.
4. http://www.geeksforgeeks.org/two-pointers-technique/
5. https://tp-iiita.quora.com/The-Two-Pointer-Algorithm

Maximum subarray sum 1-D

1. Keep adding the elements until the sum become negative.
2. If adding the current element decrease the total summation but the total sum is positive, continue adding. Because this positive sum can still contribute later.
3. But if it becomes negative, then only this negative value will contribute. We don’t need that. So ignore the previous sum.
4. https://www.youtube.com/watch?v=86CQq3pKSUw
5. http://www.geeksforgeeks.org/largest-sum-contiguous-subarray/

Maximum sub rectangle sum 2-D

1. https://www.youtube.com/watch?v=yCQN096CwWM
2. https://www.youtube.com/watch?v=g8bSdXCG-lA
3. http://www.geeksforgeeks.org/dynamic-programming-set-27-max-sum-rectangle-in-a-2d-matrix/
4. http://www.geeksforgeeks.org/largest-rectangular-sub-matrix-whose-sum-0/