CS1020E: DATA STRUCTURES AND ALGORITHMS I



1. Longest Sub-Array

You are given arr of integers, its size (which is very large), and a non-zero integer sum. For each index rightIdx, in increasing order, print out the pair containing the leftmost index leftIdx and that rightIdx of the longest consecutive sub-array arr[leftIdx..rightIdx], such that the sum of all numbers in arr[leftIdx..rightIdx] is equal to sum, provided such a left index exists.

```
void solve(int arr[], int size, int sum) { /* leftIdx rightIdx */ }
```

- (a) Design and implement a $O(N^2)$ algorithm, which is much better than the $O(N^3)$ brute force algorithm
- (b) The O(N²) algorithm can be **optimized**. Design and implement an **O(N log N)** algorithm
- (c) Now if the array only contains positive integers, implement an O(N) algorithm that does the job

2. Next Problem

Have you completed question 1(a) - (c)?

3. VisuAlgo Online Quiz

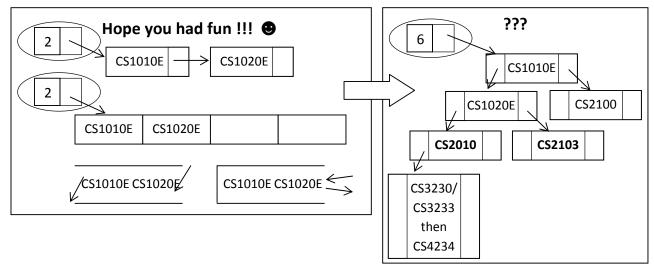
This semester, we will not do VisuAlgo Online Quiz formally as the PE2 setting is already too stressful. Therefore this part is currently optional. That is, not graded (0%).

However, Lab TA will instruct you to try the following exercise (20 minutes) as it is still very useful:

https://visualgo.net/training.html?diff=Hard&n=15&tl=20&module=list,recursion,sorting,hashtable

See how a machine (VisuAlgo) creates questions and auto grade them... instantly...: O.

TA will also spend some time discussing the solution of some random questions in VisuAlgo online quiz.



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