CSE 221

Lab Assignment 2 (Explanation)

All input/output files are taken from drive in an iterative way so that we can test all the input/output files.

Task 1:

(a) There are just 2 loops iterating throughout the whole array & checking the sum==n; and returning the values who meets that requirement. As these are 2 loops; so $O(n^2)$.

(b) As the array is sorted; we can traverse it with one loop with given some conditions. It'll look like a two pointer problem but traversing with 1 loop; so $O(n)$.

Task 2:

(a) Here in problem(a); the arrays were just added initially and then sort() built in function was called. So the total time complexity here = $O(n) + O(n) + O(n \log n) = O(n \log n)$

(b) By using two pointers, we can traverse the whole arrays (of two) with one loop and that gives us $O(n)$.

Task 3: First of all, the 2D array is being sorted using Python built in sorted() function which according to the 2nd element of the elements of the 2D array which will take $O(n \log n)$ time. And then another loop is used to traverse throughout the array to find the tasks which will take $O(n)$ times. The total time complexity here = $O(n \log n) + O(n) = O(n \log n)$.

Task 4: As task 3; we sorted the given array in $O(n \log n)$ time and these are 2 traversals done with 2 loops which altogether will take $O(n^2)$ time. So the whole time complexity = $O(n^2) + O(n \log n) = O(n^2)$