

Lab Sheet 10
Advanced Programming

1. Implement Quick select algorithm
2. Implement Merge sort
3. Implement Quick Sort
4. Implement greedy algorithm for fractional knapsack problem
5. Implement greedy algorithm for coin changing problem
6. Implement greedy algorithm for activity selection problem

7. Given an array of integers, find out whether there are two distinct indices i and j in the array such that the **absolute** difference between **nums[i]** and **nums[j]** is at most t and the **absolute** difference between i and j is at most k .

<https://leetcode.com/problems/contains-duplicate-iii/>

Example 1:

Input: nums = [1,2,3,1], k = 3, t = 0

Output: true

Example 2:

Input: nums = [1,0,1,1], k = 1, t = 2

Output: true

Example 3:

Input: nums = [1,5,9,1,5,9], k = 2, t = 3

Output: false

8. Given two strings s and t , write a function to determine if t is an anagram of s .
<https://leetcode.com/problems/valid-anagram/>

Example 1:

Input: s = "anagram", t = "nagaram"

Output: true

Example 2:

Input: s = "rat", t = "car"

Output: false

9. Say you have an array `prices` for which the i^{th} element is the price of a given stock on day i .

Design an algorithm to find the maximum profit. You may complete as many transactions as you like (i.e., buy one and sell one share of the stock multiple times).

Note: You may not engage in multiple transactions at the same time (i.e., you must sell the stock before you buy again).

<https://leetcode.com/problems/best-time-to-buy-and-sell-stock-ii/>

Example 1:

Input: [7,1,5,3,6,4]

Output: 7

Explanation: Buy on day 2 (price = 1) and sell on day 3 (price = 5), profit = 5-1 = 4. Then buy on day 4 (price = 3) and sell on day 5 (price = 6), profit = 6-3 = 3.

Example 2:

Input: [1,2,3,4,5]

Output: 4

Explanation: Buy on day 1 (price = 1) and sell on day 5 (price = 5), profit = 5-1 = 4. Note that you cannot buy on day 1, buy on day 2 and sell them later, as you are engaging multiple transactions at the same time. You must sell before buying again.

Example 3:

Input: [7,6,4,3,1]

Output: 0

Explanation: In this case, no transaction is done, i.e. max profit = 0.