2020-05-02 - Handout – Sliding Window

* The problem will involve a data structure that is ordered and iteratable like an array or a string or linked list
* You are looking for some subrange in that array/string, like a longest, shortest or target value.

Types:

* Fixed Length Window
* Dynamic Length Window
* Dynamic Length with an auxiliary data structure

1. **Problem Statement**[#](https://www.educative.io/courses/grokking-the-coding-interview/JPKr0kqLGNP#problem-statement)

Given an array of positive numbers and a positive number ‘k’, find the **maximum sum of any contiguous subarray of size ‘k’**.

**Example 1:**

Input: [2, 1, 5, 1, 3, 2], k=3   
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Output: 9  
Explanation: Subarray with maximum sum is [5, 1, 3].

**Example 2:**

Input: [2, 3, 4, 1, 5], k=2   
Output: 7  
Explanation: Subarray with maximum sum is [3, 4].

**2. Problem Statement**[#](https://www.educative.io/courses/grokking-the-coding-interview/JPKr0kqLGNP#problem-statement)

Given an array of positive numbers and a positive number ‘S’, find the length of the **smallest contiguous subarray whose sum is greater than or equal to ‘S’**. Return 0, if no such subarray exists.

**Example 1:**

Input: [2, 1, 5, 2, 3, 2], S=7.   
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Output: 2  
Explanation: The smallest subarray with a sum great than or equal to '7' is [5, 2].

**Example 2:**

Input: [2, 1, 5, 2, 8], S=7   
Output: 1  
Explanation: The smallest subarray with a sum greater than or equal to '7' is [8].

**Example 3:**

Input: [3, 4, 1, 1, 6], S=8   
Output: 3  
Explanation: Smallest subarrays with a sum greater than or equal to '8' are [3, 4, 1] or [1, 1, 6].

### Problem Statement [#](https://www.educative.io/courses/grokking-the-coding-interview/YQQwQMWLx80#problem-statement)

Given a string, find the length of the **longest substring** in it **with no more than K distinct characters**.

**Example 1:**

Input: String="araaci", K=2  
Output: 4  
Explanation: The longest substring with no more than '2' distinct characters is "araa".

**Example 2:**

Input: String="araaci", K=1  
Output: 2  
Explanation: The longest substring with no more than '1' distinct characters is "aa".

**Example 3:**

Input: String="cbbebi", K=3  
Output: 5  
Explanation: The longest substrings with no more than '3' distinct characters are "cbbeb" & "bbebi".

### Problem Statement [#](https://www.educative.io/courses/grokking-the-coding-interview/YQQwQMWLx80#problem-statement)

<https://leetcode.com/problems/grumpy-bookstore-owner/> [Fixed Length]

Example : -

Input: customers = [1,0,1,2,1,1,7,5], grumpy = [0,1,0,1,0,1,0,1], X = 3

Output: 16

Explanation: The bookstore owner keeps themselves not grumpy for the last 3 minutes.

The maximum number of customers that can be satisfied = 1 + 1 + 1 + 1 + 7 + 5 = 16.

### Problem Statement [#](https://www.educative.io/courses/grokking-the-coding-interview/YQQwQMWLx80#problem-statement)

<https://leetcode.com/problems/get-equal-substrings-within-budget/> [Dynamic Length]

**Example 1:**

Input: s = "abcd", t = "bcdf", maxCost = 3

Output: 3

Explanation: "abc" of s can change to "bcd". That costs 3, so the maximum length is 3.

**Example 2:**

Input: s = "abcd", t = "cdef", maxCost = 3

Output: 1

Explanation: Each character in s costs 2 to change to charactor in t, so the maximum length is 1.