Sliding Window Pattern

arr = [2, 4, 5, 2, 5, 7, 8, 9, 56, 23] [Subarray, Subsequence, Subset]
Subarray - Order & Contiguous
Subsequence - Order not Contiguous
Subset - Not order & contiguous

Subarray:

```
1 void printArray(int[] a, int s, int e)
2 {
3    for(int i = s; i <= e; i++)
4    {
5       System.out.print(a[i] + " ");
6    }
7 }
8
9 void printAllSubArray(int[] a, int n)
10 {
11    for(int s = 0; s < n; s++)
12    {
13       for(int e = s; e < n; e++)
14       {
15          printArray(a, s, e);
16       }
17    }
18 }
```

Method 1 (Brute Force): arr = [3, 5, -1, 8, 4, 2, -6, 10, 7] $O(n^2)$

```
1 int maxSumArray(int[] a, int k){
2 int maxSum = INT_MIN;
3    for(int i = 0; i < n-k; i++)
4    {
5       int sum = 0;
6       for(int j = 0; j < k; j++)
7       {
8          sum += a[i + j];
9       }
10      if(sum > maxSum) maxSum = sum;
11   }
12   return maxSum;
13 }
```

Method 2 (Optimize): arr = [3, 5, -1, 8, 4, 2, -6, 10, 7]   O(n)

```
 1 int sumMaxSubArr(int[] a, int k)
 2 {
 3    int winsum = INT_MIN;
 4    //SUM OF 1st WINDOW
 5    for(int i = 0; i < k; i++)
 6    {
 7       winsum += a[i];
 8    }
 9    int maxSum = winsum;
10    for(int i = 1; i < n - k; i++)
11    {
12       winsum = winsum - a[i-1] + a[k + i - 1];
13       if(winsum > maxSum) maxSum = winsum;
14    }
15    return maxSum;
16 }
```

Similarly, We can solve
1. **Min sum of subarray**
2. **Max no of prime number of subarray**
3. **Max negative number of subarray**
4. **Max even or odd number of subarray**

Similar Leetcode problem:

1) **LeetCode 3 - Longest Substring Without Repeating Characters [*medium*]**
2) **LeetCode 30 - Substring with Concatenation of All Words [*hard*]**
3) **LeetCode 76 - Minimum Window Substring [*hard*]**
4) **LeetCode 209 - Minimum Size Subarray Sum [*medium*]**
5) **LeetCode 424 - Longest Repeating Character Replacement [*medium*]**
6) **LeetCode 438 - Find All Anagrams in a String [*medium*]**
7) **LeetCode 567 - Permutation in String [*medium*]**
8) **LeetCode 904 - Fruit Into Baskets [*medium*]**
9) **LeetCode 1004 - Max Consecutive Ones III [*medium*]**