

Kandane Algorithm

Kandane Algorithm

- ✓ Used for finding subarrays inside an array or Substring in String
- ✓ Specially when you have mix of negative and positive numbers
- ✓ Subset of dynamic programming
- ✓ One of the common asked interview because of its efficiency:
 - Time Complexity : $O(n)$
 - Space Complexity: $O(1)$

Scenario

Given an array of integers, return the highest sum of any consecutive elements in the array.

Input Array :

1	-5	2	-3	7	1
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Working Behaviour

Input Array :

1	-5	2	-3	7	1
---	----	---	----	---	---

- ✓ Add the subsequent numbers
- ✓ If the sum is greater than zero, continue to add window sum
- ✓ If the sum is less than or zero, reset to window sum as zero

Lets see how it works

Input Array :

1	-5	2	-3	7	1
---	----	---	----	---	---

- ✓ Window Sum = 1
- ✓ Rule 1 says : If the sum is greater than or zero, add to window sum
- ✓ Between Max Sum and Window Sum, the bigger becomes Max Sum
- ✓ So, Max Sum = 1

Lets see how it works

Input Array :

1	-5	2	-3	7	1
---	----	---	----	---	---

- ✓ Window Sum = $1 + (-5) \Rightarrow -4$
- ✓ Rule 2 says : If the sum is less than or zero, reset to window sum zero
- ✓ Max Sum = 1 [Max between (0,1)]

Lets see how it works

Input Array :

1	-5	2	-3	7	1
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- ✓ Window Sum = 0 + 2
- ✓ Rule 1 says : If the sum is greater than or zero, add it to window sum
- ✓ Max Sum = 2 [Max between (0,1)]

Lets see how it works

Input Array :

1	-5	2	-3	7	1
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- ✓ Window Sum = $2 + (-3)$
- ✓ Rule 2 says : If the sum is less than or zero, reset window sum as 0
- ✓ Max Sum = 2 (between 2 and 0)

Lets see how it works

Input Array :

1	-5	2	-3	7	1
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- ✓ Window Sum = 0 + 7
- ✓ Rule 1 says : If the sum is greater than or zero, add to window sum
- ✓ Max Sum = 7

Lets see how it works

Input Array :

1	-5	2	-3	7	1
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- ✓ Window Sum = $7 + 1$
- ✓ Rule 1 says : If the sum is greater than or zero, add to window sum
- ✓ Max Sum = 8

Scenario 2

Given an array of integers, return the highest sum of any consecutive elements in the array.

Input Array :

1	-5	-2	-3	7	-1
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