Greedy Algorithms - 1

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Today's plan :

Q → max sum subarray in circular array

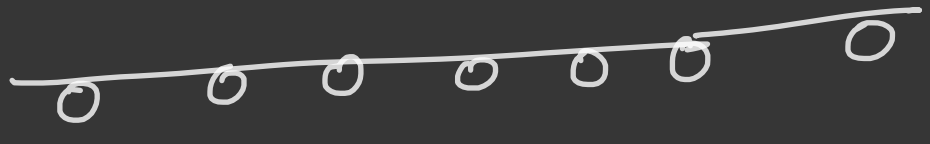
- What are Greedy Algorithms?
- Kadane's Algorithm
- Questions :
  - Jump Game 1
  - Jump Game 2
- Pair trick in Priority Queue and Set + google interview que
- Greedy on strings (lexicographically minimum/maximum)
- Greedy involving ranges
  - N meetings in 1 room

greedy

↳ choosing the most optimal option at every step

x coins

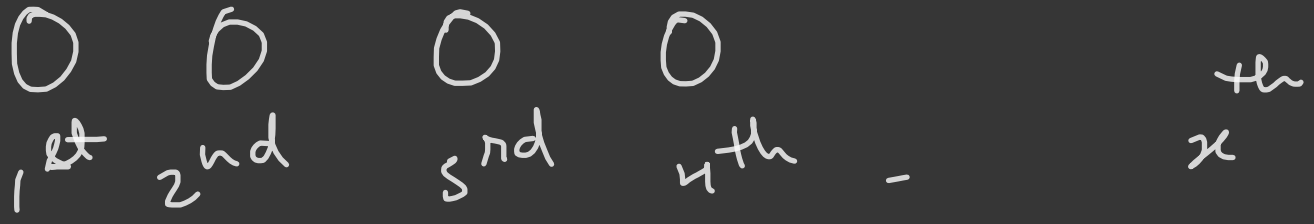
Eg:



arr[:]

(x)

value is max



Kadane's Algo.

↳ you are given an anay, pick a subanay with largest sum.

Eg: arr → [2, 4, -7, 4, 3, -2, -1, 5, -1]

sum = 8 ✗

max = 9

9

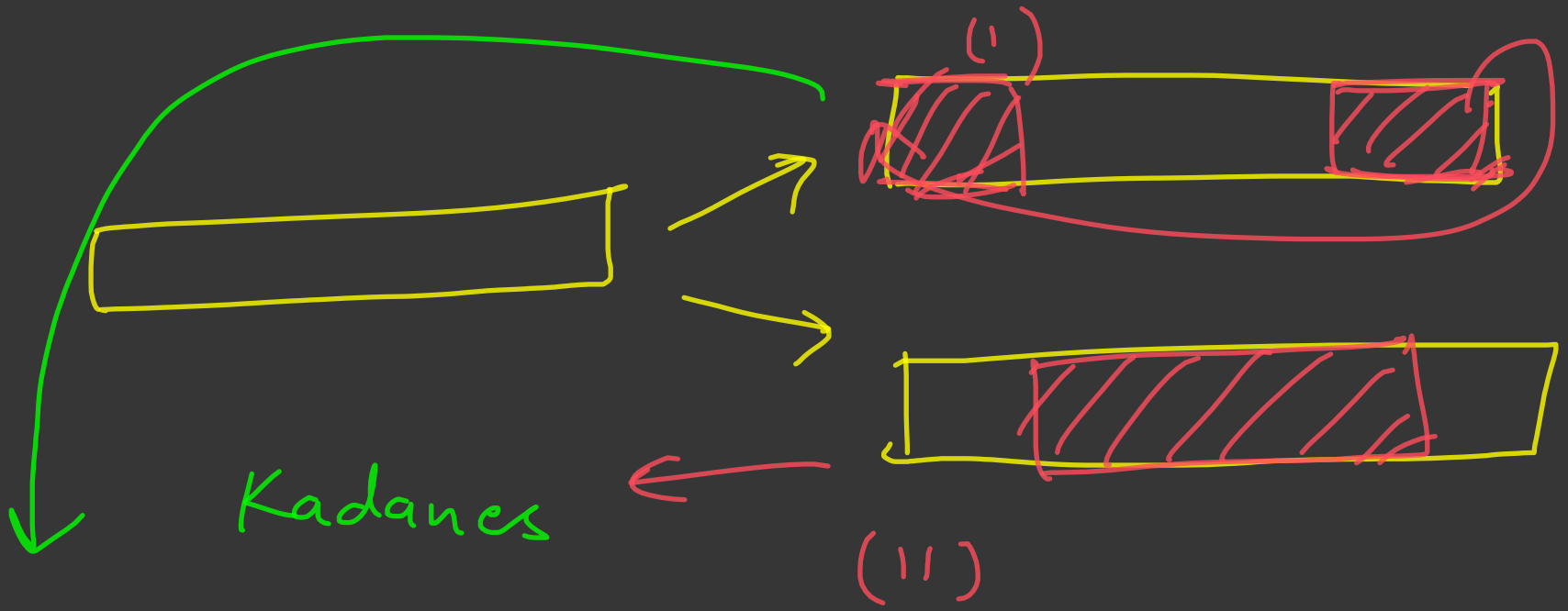
sum → 0

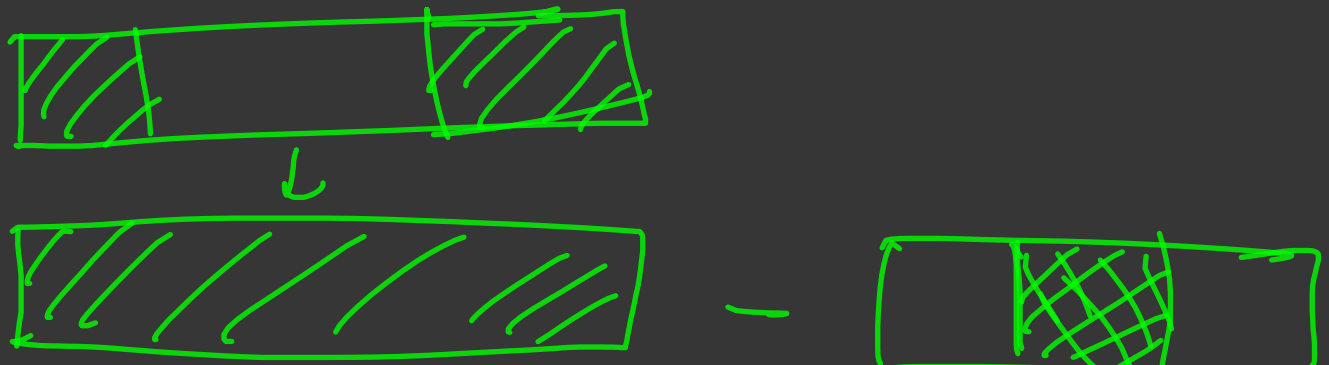
max → 6

arr → [2, 4, -7]

Q

arr → [8, -8, 9, -9, 10, -11, 12]





total = 0 [2, 3, 5] → min → 0

↳ total

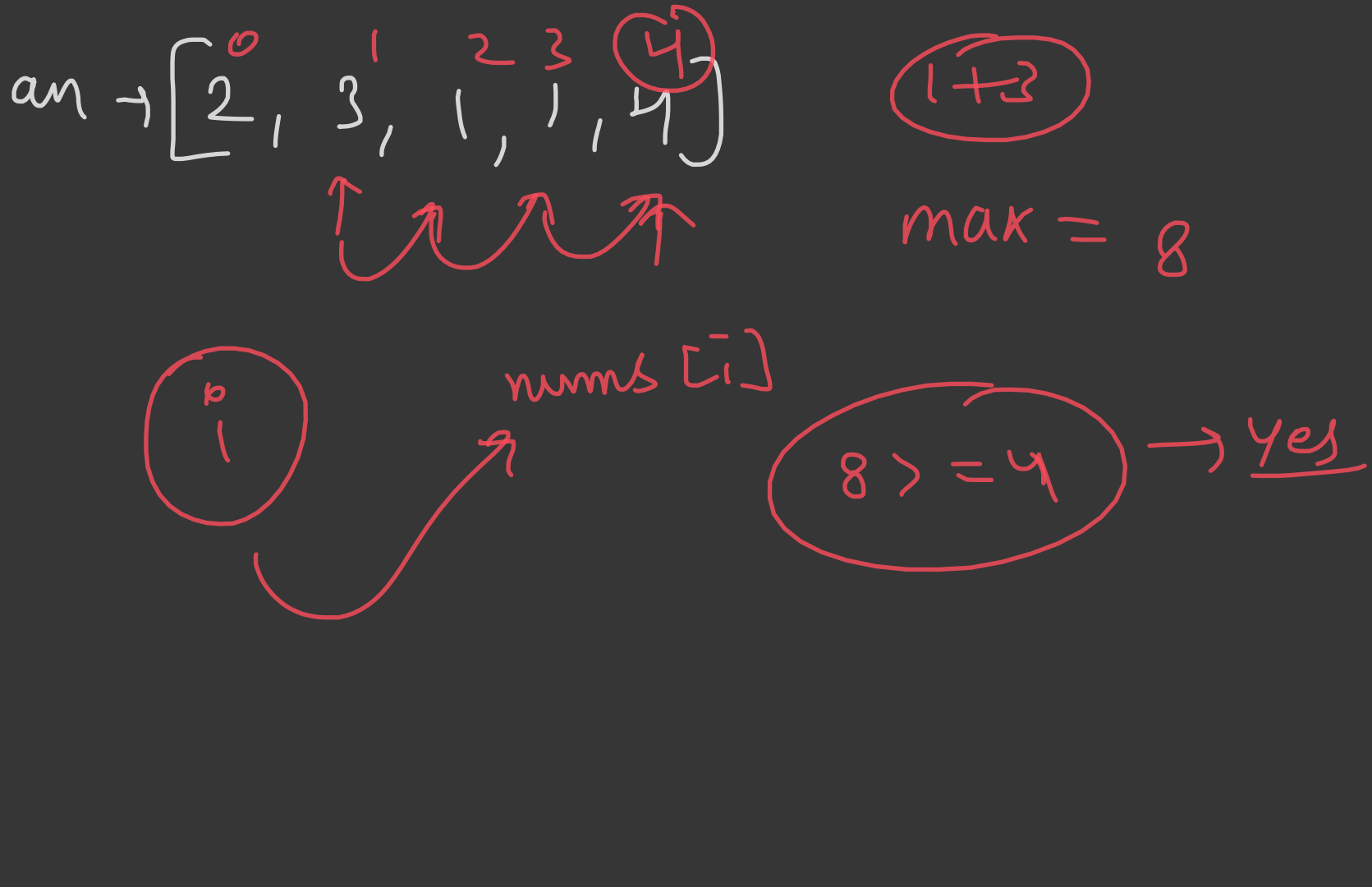
$$[-1, -3, -5]$$

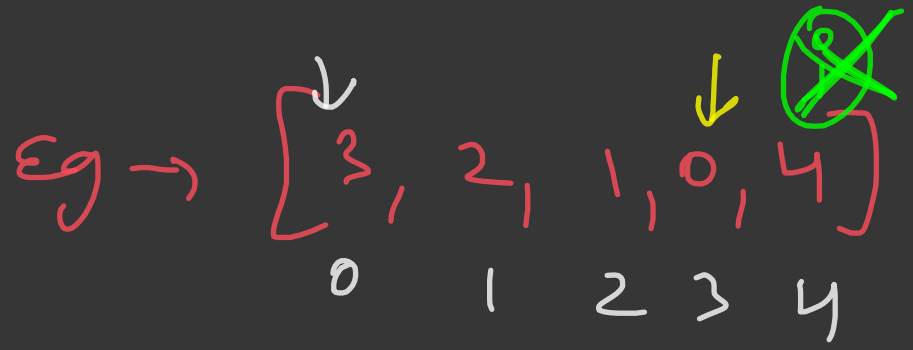
min → -9

total → -9

max → -1

max(0, -1) → 0


arr → [2, 3, 1, 1, 4]
0 1 2 3 4
1+3
max = 8
i
1
nums[i]
8 >= 4
→ Yes



max = 3

NO ✗

pair trick while sorting :

an → { {1, 3}, {2, 1}, {1, 1} {-1, 100} }

sorted array → { [-1, 100] [1, 1] [1, 3] [2, 1] }

Condition

↳ sort in descending order of first but if there is a draw use lowest value of second as priority.

→ {{1,3}, {2, 1}, {1,1} {-1, 100}}

an

→ [-1, 3] [-2, 1] [-1, 1] [1, 100)

[-2, 1], [-1, 1] [-1, 3] [1, 100]

→ [2, 1] (1, 1] [1, 3) [-1, 100]

→ [-1, -3] [-2, -1] [-1, -1) [1, -100]

→ [-1, 100] [1, 3] [1, 1) [2,])

priority_queue <pair(int, int)> pq;

Q

arr → [2, 4, 6, 12, 9, 18]

↳ [2, 4, 6, 9, 12, 18]

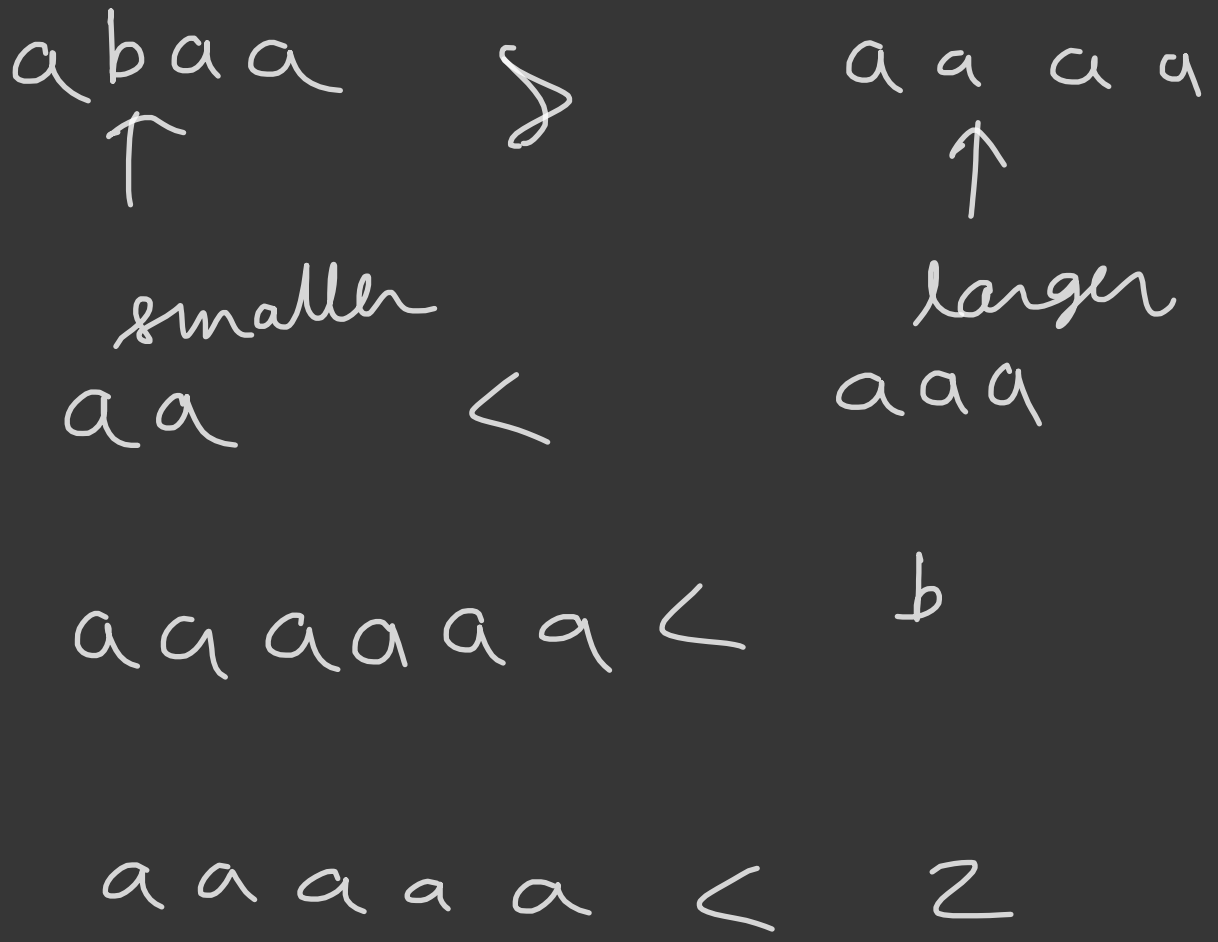
{2, 6, 9} ↳ Yes

No → { }

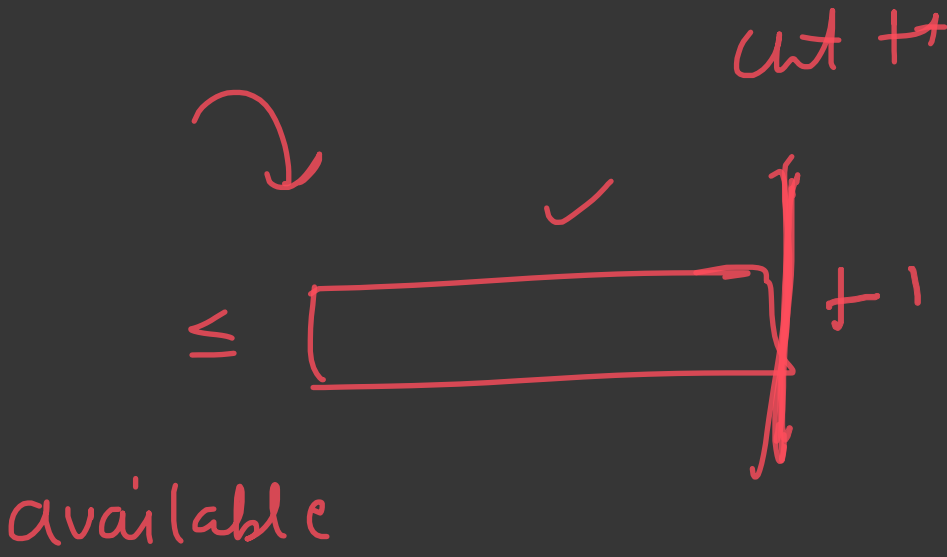
greedy on string →

n ----- tc → O(n) x 26 → O(n)

↑ a b c d e ---- x y z


abaa
aaaa
smaller
larger
aa
aaa
aaaaaaa
b
aaaaaa
2

greedy on ranges:



early
late