$$[[1,2] \ [3,10] \ [12,16]]$$

Sorted based
on start
time

→ Place this interval at it's
correct position based on start value

Merge Intervals → Sort
→ merge

Insertion Sort

$O(N)$

$O(1)$

JOIN THE DARKSIDE

closest elent
we can transfer t
to 4.

$nums \rightarrow$ [3, 2, 1, 2, 1, 7]

[1, 1, 2, 2, 3, 7] $\rightarrow$ (sort)

2
3
4
5

$nums \rightarrow$ [a_1, a_2, a_3 ...... a_{n-1}] $\leftarrow$ guan array

$\hookrightarrow$ sorted $\rightarrow$ we have **duplicates**

1   2   3   4   5

$target \rightarrow$ [t_1, t_2, t_3, t_4, t_5, t_{n-1}] $\curvearrowleft$ we want to convert
guin array to target

array

$t_i < t_j$ $i < j$

$a_1 == t_1$

$t_2 >= t_1 + 1$

$t_2 >= a_2$

$t_2 = max (t_1 + 1, a_2)$

2^2
$(1+1, 1)$

JOIN THE DARKSIDE

$t_1 = 1$

$t_2 = 2$

$[1, 2, 2]$

$[t_1 \quad t_2 \quad t_3]$

$t_3 >= 2$

$$[1, \underset{\downarrow}{\overset{2}{1}}, 2, \underset{\downarrow}{\overset{2}{2}}, 3, 7]$$

$$\overset{4}{} \qquad \overset{5}{S}$$

$$\rightarrow \enclose{circle}{3} + \enclose{circle}{3} \rightarrow \enclose{circle}{6}$$

$$\underbrace{}$$

$$[1, 4, 2, S, 3, 7]$$

$$[1, 1, 2, 2, 3, 7]$$

$$1 \quad 2 \quad 3 \quad 4 \quad S \quad 7$$

$$0 + 1 + 1 + 2 + 2 \rightarrow \enclose{circle}{6}$$

$$[a_1 \quad a_2 \quad a_3 \quad \cdots \cdots \quad a_{n-1}]$$ ← given sorted

$$[t_1 \quad t_2 \quad t_3 \quad \cdots \cdots \quad t_{n-1}]$$ 2 target sorted

$$\boxed{a_j \longrightarrow t_j}$$

$$t_i < t_j \qquad \boxed{i < j}$$

$$t_j >= t_i + 1$$

$$t_j >= a_j$$

$$\begin{array}{c} a_i \\ \cancel{t_j} = max \; (t_i + 1, \; a_j) \end{array}$$

$$no.\, g\,ops = (t_j - a_j)$$

$\rightarrow$ $\underline{\underline{sort}}$

$\rightarrow$ $[1, 1, 2, 2, 3, 7]$ $\rightarrow$ $\underline{nums}$

$[1, 2, 3, 4, 5, 7]$ $\rightarrow$ target

target $\longrightarrow$

$0 + 1 + 1 + 2 + 2 + 0 \rightarrow \underline{\underline{6}}$

$target[j] = \max (nums[j], target[j-1]+1)$

$O(N)$

$O(N) \longleftarrow$ (Space)

$count += target[j] - nums[j]$

$$prev = nums[0]$$

$$[1, 1, 2, 2, 3, 7]$$

$$\downarrow [1, 2, 3, 4, 5, 7] \times \times \times$$

$$\frac{O(N)}{O(1)}$$

$$prev = 1 \cancel{2} \cancel{3} \cancel{4} \cancel{5} 7$$

$$count = 0 \cancel{1} \cancel{2} \cancel{4} 6$$

$$tj = \cancel{2} \cancel{3} \cancel{4} \cancel{5} 7$$

$$t_j = max(nums[j], prev + 1)$$

$$count += t_j - nums[j]$$

$$prev = t_j$$

Merge $\rightarrow$ $\underline{O(N \log N) + O(N)}$

$\downarrow$

$O(N \log N)$

Sort

Sorted $\rightarrow$ $[a_0 \dots a_i \dots a_j \dots a_{n-1}]$ $(0 < i < j < n-1)$

(a_0, a_i) $(a_j, a_{n-1}) \rightarrow$

(a_0, a_{n-1}) (a_i, a_j)

(a_0, a_j) (a_i, a_{n-1})

① $(a_0 \; a_i)$ $(a_j \; a_{n-1}) \Rightarrow (a_j + a_{n-1}) > (a_0 + a_i)$

$a_j >= a_0$
$a_{n-1} >= a_i$

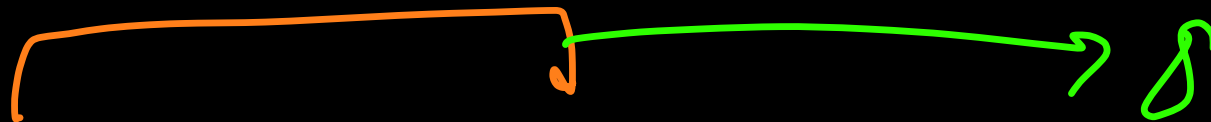$$(a_0 \ a_{n-1}) \qquad (a_i \ a_j)$$

$$(a_0 + a_{n-1})$$
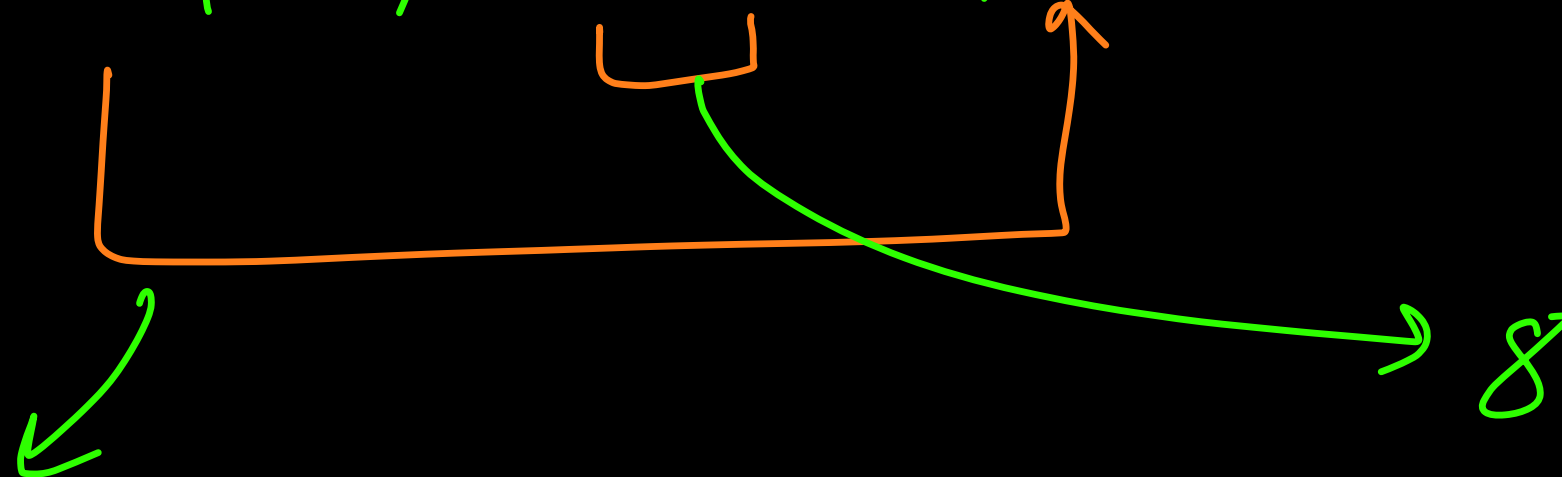
$$(a_i + a_j)$$

$$(a_j + a_{n-1}) > (a_i + a_j)$$

$$(a_j + a_{n-1}) > (a_0 + a_n - 1)$$

$$(a_0 \quad (a_i \ a_j) \quad a_{n-1})$$

3, 5, 4, 2, 4, 6

2, 3, 4, 4, 5, 6

8

8

8

log

1, 5,   2, 3,   4, 7

1, 2, 3,   4, 4, 5 → 6

6

7

[3, 5, 7, 3]

2, 3, 3, 5 → 6

4, 7