

Intuition

We only need the length of LIS & not the actual subsequence itself.

- Instead of keeping track of different subsequences, we just replace & maintain a single array

Eq: [10, 9, 2, 5, 3, 7, 101, 18]

[10, 101] longest = 4

[9 , 101]

[2, 5, 7, 101]

[2, 3, 7, 101]

[10, 18]

[9, 18]

[2, 5, 7, 18]

[2, 3, 7, 18]

so, Instead of maintaining it like this, we can use a single array.

Why use Binary Search?

use Binary Search:
If we observe, the array is sorted & we replace

Valees.

$$\text{Eq. } [10, 101] \rightarrow [10, 18]$$

$$\text{Eq: } [10, 101] \rightarrow [1 \\ [9, 101] \rightarrow [9, 18]$$

$$[2, 5, 7, 101] \rightarrow [2, 5, 7, 18]$$

so: [10, 9, 2, 5, 3, 7, 101, 18]

Initially \rightarrow [10]

* $9 < 10$, so replace 10 with 9

[9]

* $2 < 9$, replace 9 with 2

[2]

* $5 \rightarrow [2, 5]$

* $3 < 2, \text{ NO}$

$3 < 5 \text{ Yes} \rightarrow \text{replace } 5 \text{ with } 3$

[2, 3]

* $7 \rightarrow [2, 3, 7]$

* $101 \rightarrow [2, 3, 7, 101]$

* $18 < 101$, replace 101 with 18

[2, 3, 7, 18] $\rightarrow \text{length} = 4$

Eq: 0 [1, 7, 8, 4, 5, 6, -1, 9]

* [1]

* [1, 7]

* [1, 7, 8]

* $4 < 7$, Replace 7 with 4

[1, 4, 8]

* $5 < 8$, replace 8 with 5

[1, 4, 5]

* $6 \rightarrow [1, 4, 5, 6]$

* $-1 < 1$, replace -1 with 1

[-1, 4, 5, 6]

* 9
[-1, 4, 5, 6, 9]

Note: this is not the subsequence, we just capture the length