300. Longest Increasing Subsequence

Given an array A of size N

$i \in [0; N-1]$

LIS(i) = length of LIS ending strictly at position i

$$LIS(i) = \begin{cases} 1, \text{ if } \nexists\ j \in [0; i-1] : A[j] < A[i] \\ 1 + \max(LIS(j) \text{ for } j \in [0; i-1] \text{ if } A[j] < A[i]), \text{ else} \end{cases}$$

$$LIS(A) = \max(LIS(i) \text{ for } i \in [0; N-1])$$

Naive aproach solution:

A = []

```
lenghtOf LIS(nums):
    n = len(nums)
    A = nums
    maxLen = 0
    for i in range(n):
        maxlen= max(maxLen, aux(i))
    return maxLen


aux(i):
 maxlen= 0
 for j in range(i):
  if A[j] < A[i]
     maxLen = max(maxLen, aux(j))
 return 1+ maxLen
```

Recursiveness
Exponential complexity => TLE