12.4.1
Running time analysis

Running time of LIS([1..n])

```
LIS_smaller(A[1..n], x):
    if (n = 0) then return 0
    m = LIS_smaller(A[1..(n − 1)], x)
    if (A[n] < x) then
        m = max(m, 1 + LIS_smaller(A[1..(n − 1)], A[n]))
    Output m
```

```
LIS(A[1..n]):
        return LIS_smaller(A[1..n], ∞)
```

Running time of LIS([1..n])

Lemma

LIS_smaller *runs in* $O(2^n)$ *time.*

Improvement: From $O(n2^n)$ to $O(2^n)$.

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THE END

...

(for now)