16.3-5 Give an $O(n^2)$ algorithm to find the longest montonically increasing sequence in a sequence of n numbers.

Build an example first: $(5, 2, 8, 7, 1, 6, 4)$

Ask yourself what would you like to know about the first $n-1$ elements to tell you the answer for the entire sequence?

1. The length of the longest sequence in $s_1, s_2, \ldots, s_{n-1}$. (seems obvious)

2. The length of the longest sequence s_n will extend! (not as obvious - this is the idea!)

Let s_i be the length of the longest sequence ending with the ith character:

sequence	5	2	8	7	3	1	6	4
s_i	1	1	2	2	2	1	3	3

How do we compute si?

$s_i = \max_{0<j<i, seq[j]<seq[i]} s_j + 1$

$s_0 = 0$

To find the longest sequence - we know it ends somewhere, so Length $= \max_{i=1}^{n} s_i$