CSE 311: Foundations of Computing I

QuickCheck: Structural Induction (due Thursday, November 9)

Name:

0. SSttrruuccttuurraall Induction

Recall the recursive definition of a list:

$$\textbf{List} = [\,] \mid \text{Integer} :: \textbf{List}$$

And the definition of "len" on lists:

$$\begin{aligned} \text{len}([\,]) &= 0 \\ \text{len}(x :: L) &= 1 + \text{len}(L) \end{aligned}$$

Consider the following recursive definition:

$$\begin{aligned} \text{stutter}([\,]) &= [\,] \\ \text{stutter}(x :: L) &= x :: x :: \text{stutter}(L) \end{aligned}$$

Prove that $\text{len}(\text{stutter}(L)) = 2\text{len}(L)$ for all Lists L.