17-363/17-663: Programming Language Pragmatics, In-Class Exercises September 9, 2021

Andrew ID: _____

1. Show a derivation of (s s z) + (s z) = (s s s z)

2. Consider our proof that for all n_1, n_2, and n_3 such that $n_1 + n_2 = n_3$, we have $n_1 + s\ n_2 = s\ n_3$

We are doing induction over the derivation of $n_1 + n_2 = n_3$, so the base case is

---------- sum-z
z + n = n

In this base case, what are n_1, n_2, and n_3?

What do we need to show in this case?

Write a derivation that proves this case:

3. Write some rules for counting the number of operations in an expression. In particular, write the rules defining Ops(n) and for Ops(e_1 + e_2):