CSE 390Z: Mathematics for Computation Workshop

QuickCheck: Structural Induction

Please submit a response to the following questions on Gradescope. We do not grade on accuracy, so please submit your best attempt. You may either typeset your responses or hand-write them. Note that hand-written solutions must be legible to be graded.

We have created **this template** if you choose to typeset with Latex. **This guide** has specific information about scanning and uploading pdf files to Gradescope.

0. How Many Ones?

The set T is defined as follows:

- Base case: $\epsilon \in T$

- Recursive Rules:
  If $x \in T$, then $11x \in T$
  If $x \in T$ and $y \in T$, then $x0y \in T$

Given the following recursively defined function

- $\text{numOnes}(\epsilon) = 0$

- $\text{numOnes}(11x) = 2 + \text{numOnes}(x)$

- $\text{numOnes}(x0y) = \text{numOnes}(x) + \text{numOnes}(y)$

Prove that for all strings n in T, $\text{numOnes}(n)$ is even

Hint: In structural induction, the structure of your induction mirrors the recursive definition.

1. Video Solution

Watch **this video** on the solution **after** making an initial attempt. Then, answer the following questions.

(a) What is one thing you took away from the video solution?