

CS 311 Homework 8

November 26, 2013

1. Show that the function that decides if an integer is prime is primitive recursive. Things you might consider. You may use any of the primitive recursive operations discussed in home work or the class notes. Hint bounded search might be useful.
2. Sipser exercise 4.7. Let B be the set of all infinite sequences over $\{0,1\}$. Show that B is uncountable, by using a diagonalization argument. A set is uncountable if it can't be put in 1-to-1 correspondance with the natural numbers.
3. Build a Goedel numbering for regular expressions over $\{0,1\}$ using techniques of handout 8. I.e. think of regular expressions as a tree like data structure with nodes for letters of the alphabet (0 or 1), concatenation, union, emptyset, emptystring, and kleene star. A good way to start is to write down the regular expressions as an inductive set with 6 ways to form, and write down your Goedel numbering as a function over that set with 6 cases.