600.271 Automata & Computation Theory
Assignment 5
Due March 15, 2012

I. Prove that the following functions are computable by designing detailed TMs for the problems. In each case give an informal high level description of your implementation.

1. $f_1(x) = 7x + 1$, for every $x \geq 0$.
2. $f_2(x) = x^2$, for every $x \geq 0$.

II. If a TM M has s states, t tape symbols, and r transitions, what is the length of the encoding $[M]$ discussed in the class? Outline an alternative method that would result in a significantly shorter encoding. What is its length?