Homework Assignment #2
Due: October 5, 2010

1. Let $L = \{0^n 1^n 2^n : n \in \mathbb{N}\}$. Find a simple function $T(n)$ such that

(a) there is a single-tape Turing machine that decides L in worst-case time $O(T(n))$, and

(b) there is no single-tape Turing machine that decides L in worst-case time $o(T(n))$.

Prove your answer is correct. (To show that the Turing machine satisfying (a) exists, you can just describe what it does and why it works at a high-level.)