

Homework Assignment #6
Due: November 9, 4:00 p.m.

1. In this question, we consider a language over the alphabet $\{0, 1, \#\}$. If n is a natural number, let $B(n)$ be the binary representation of n (with no leading 0's). For example, $B(22)$ is the string 10110.

Let $L_1 = \{B(n)\#B(m) : n, m \in \mathbb{N} \text{ and } n > m\}$. Describe a single-tape Turing machine that decides L_1 . Do *not* give a formal definition of the Turing machine. Instead, you should break down your solution into a sequence of very simple steps, each of which can easily be implemented on a Turing machine. (The format of your answer should be similar to the 5-step description of M_2 on page 143 of the textbook or the 5-step description of M_3 on page 146.) You should also specify what the tape alphabet of your Turing machine is.

2. Problem 3.15(b) on page 161 of the textbook.