Homework Assignment #5
Due: November 2, 4:00 p.m.

1. In this question, we consider languages 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.

(a) Let $L_2 = \{B(n)B(m) : n, m \in \mathbb{N} \text{ and } n > m\}$. (Note that the $B(n)B(m)$ is the concatenation of two strings; it does not represent multiplication.) Is L_2 regular? Prove your answer is correct.

(b) Let $L_1 = \{B(n)\#B(m) : n, m \in \mathbb{N} \text{ and } n > m\}$. Is L_1 regular? Prove your answer is correct.

2. Read the definition of minimum pumping length in problem 1.55 on page 91 of the textbook. What is the minimum pumping length for the language represented by the regular expression 1^*001^*0?