Homework 6

1. Build a Turing machine to decide the language

\[ L = \{ w_1 \# w_2 \mid w_1 \text{ and } w_2 \text{ are binary numbers and } w_1 > w_2 \} \]

2. Build a Turing machine that computes substraction for unary numbers:

\[
f(x, y) = \begin{cases} 
  x - y & \text{if } x > y \\
  0 & \text{otherwise}
\end{cases}
\]

In unary, 0 is the empty string, so if \( x \leq y \), you have to halt with a blank tape.