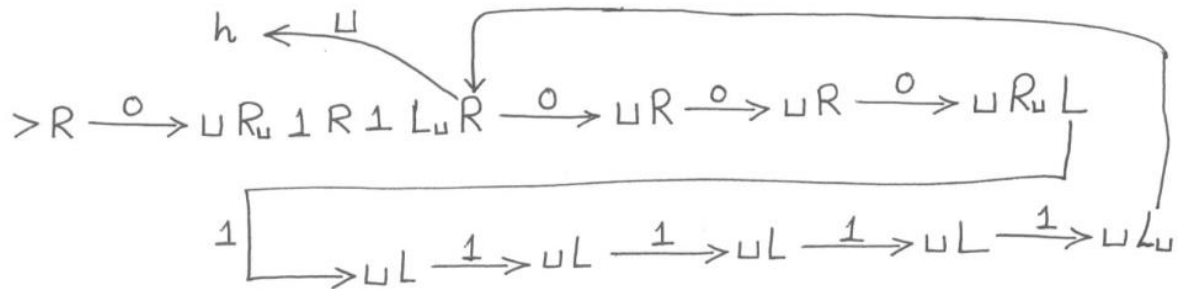


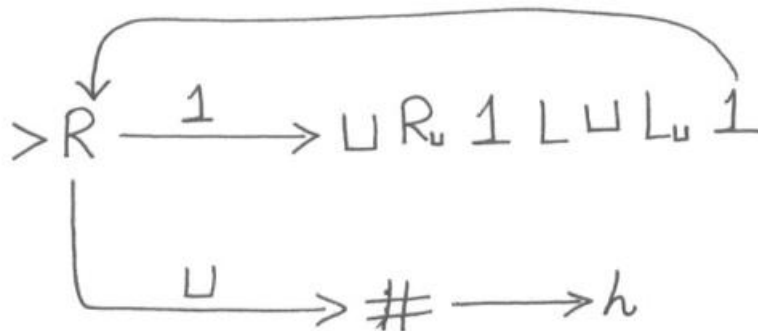
Theory of Computation (CS F351)

Q1. Over $\Sigma = \{0, 1\}$, identify the language of the following Turing Machine. Halting state is h and, initial configuration is $\triangleright \underline{\underline{w}}$, where w is a string over alphabet Σ .



Sol: $L = \{0^{3p+1} 1^{5p-2} \mid p > 0\}$

Q2. Over $\Sigma = \{1\}$, the following machine does some computation. Initial and final configuration of the machine is $\triangleright \underline{\underline{1}}w$ and $\triangleright \underline{\underline{1}}y$ respectively (w being an even length string over alphabet Σ and $\#$ being a tape symbol). If h is the halting state, what computation does the following Turing Machine do?



The Turing machine changes w to $w_1\#w_2$, such that $|w_1| = |w_2|$