

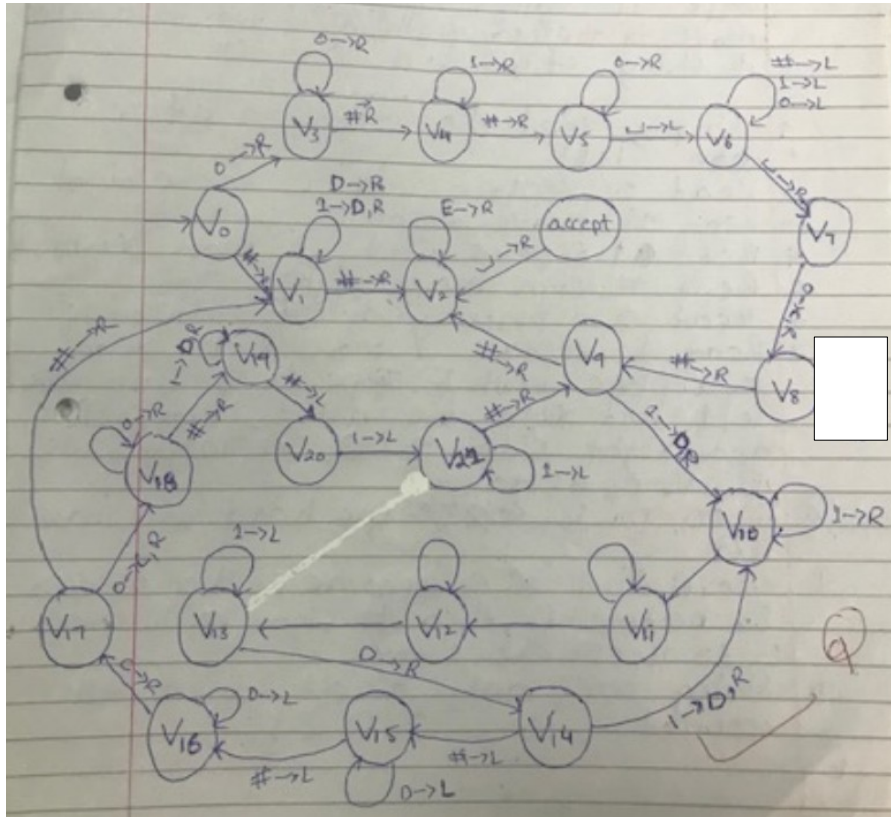
CS 301 THEORY OF AUTOMATA ASSIGNMENT 3 SAMPLE ANSWERS

Make the transition diagrams of a single tape deterministic Turing machine for the following languages. Also, describe your logic/algorithm.

- a. $L_MUL = \{0^x \# 1^y \# 0^{x*y} \mid x \geq 0, y \geq 0\}$.

Solution

- b. $L_POWER = \{0^n \# 1^x \mid n \geq 0 \text{ and } x = 2^n\}$. Hint: Use the property that with every additional zero the number of ones would double.



- c. $L_POWER = \{w \mid w \text{ has twice as many ones as zeros}\}$. Examples of strings in this language are: $\{101, 011011, 101110110, \dots\}$

