CMPSC 464: Introduction to the Theory of Computation **Date: 09/14/2022**

Recitation #3

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Problem 1

Let $\Sigma = \{0, 1\}$. Give the state diagram of a Turing machine that accepts the following language

$$L = \{0^n 10^{2n} 10^{3n} | n \geq 0\}$$

Problem 2

A 2-dimensional Turing machine has the usual finite-state control, but a tape that is a 2-dimensional grid of cells, infinite in all directions. The input is placed on one row of the grid, with the head at the left end of the input and the control in the start state. Acceptance is by entering the final state. Prove that the languages accepted by a 2-dimensional Turing machine are the same as those accepted by an ordinary Turing machine.