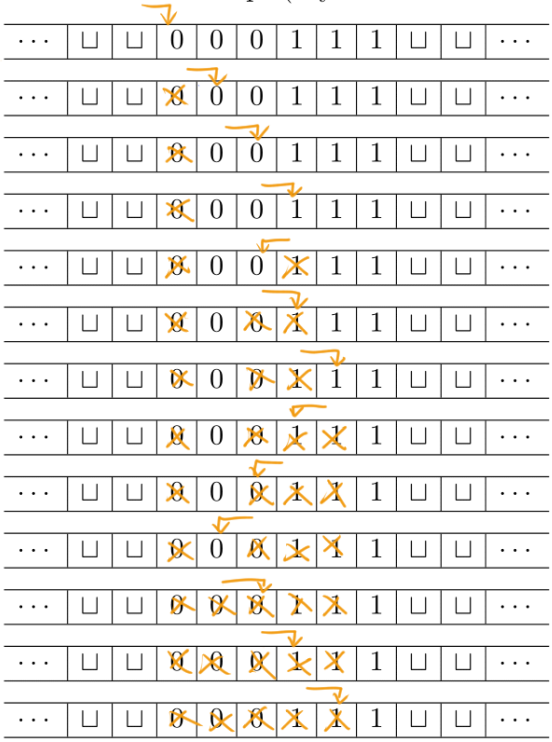
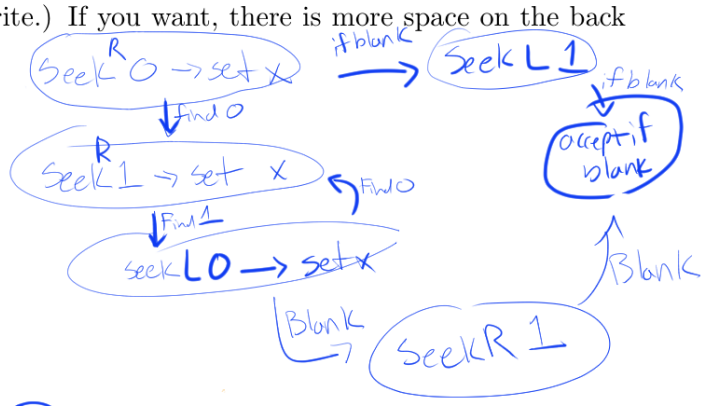
CSC 404 - Activity/Project 6 - Name: Chris Glanzer

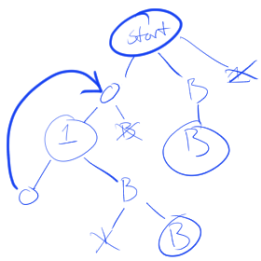
Problem 1. Consider the (non-regular) language of all bit strings that contain 0s followed by an equal number of 1s, i.e.,

$$L = \{\emptyset, 01, 0011, 000111, 00001111, ...\} = \{0^n1^n \mid n \geq 0\}$$

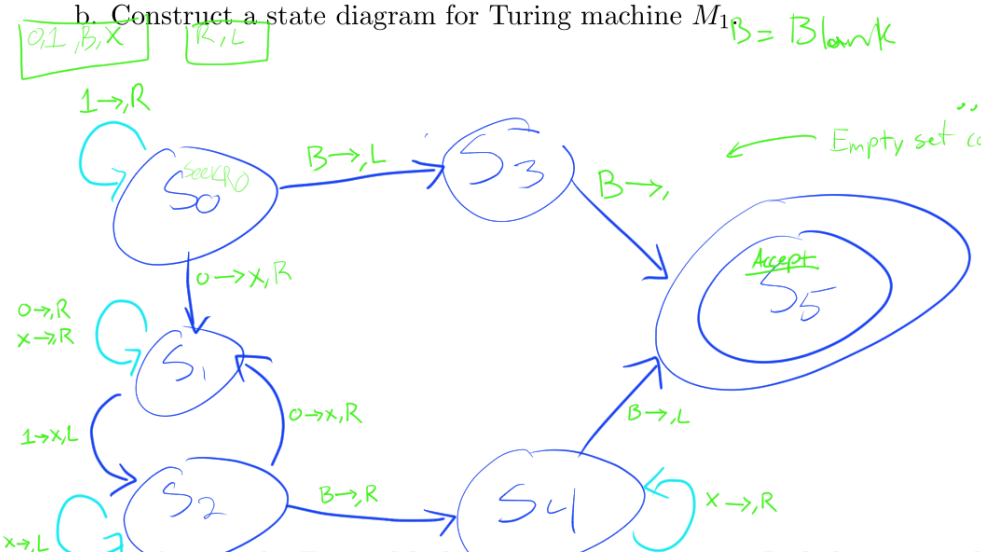
a. Describe how a Turing machine, M_1, would accept the string 000111. (I.e., sketch out how the machine would move through the string and what the head would read/write.) If you want, there is more space on the back to show additional steps (if you want to show every move).







b. Construct a state diagram for Turing machine M_1



c. Implement the Turing Machine in turingmachine.io. Include a screenshot or .yaml file.
Test it with the strings 000111 (should accept), 0000111 (should reject), and 0001111 (should reject).

yaml included

d. (Bonus) Construct another Turing Machine that recognizes L.

e. (Bonus) Construct a Turing Machine that recognizes the language of 0 followed by twice as many 1s (e.g., 001111 is accepted).

Problem 1.a - Extra Space