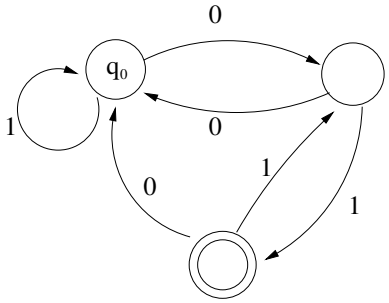
EECS 343: Theoretical Computer Science, Homework Exercise 4
due Monday, February 17, 2020 before class

Problem 1:

a. Construct a finite state automata equivalent to the regular expression

$$1[((01)^* + 1 + 01)^* + 1]^*0$$

b. Construct a regular expression that represents the language accepted by the following automata with initial state q_0:



Problem 2: Let N be a NFA with k states that accepts some language A. If A is non-empty, show that A contains some string of length at most k, and show that if $\overline{A}$ is non-empty then $\overline{A}$ contains a string of length at most 2^k.

Problem 3: Prove that each of the following languages is not regular.

a. All palindromes (strings that read the same forwards as backwards) over the alphabet $\Sigma = \{a, b, c\}$.

b. $\{0^1 10^2 10^3 1 \cdots 0^{n-1} 10^n 1 \mid n \geq 1\}$.