CSC544 Assignment #1

due Thursday 2/12 in class

Problems

1. Give the state diagrams of FAs recognizing the following languages (assume $\Sigma = \{0, 1\}$):

   (a) $\{w \mid w$ begins with a 1 and ends with a 0$\}$

   (b) $\{w \mid w$ contains at least three 1s$\}$

   (c) $\{w \mid w$ does not contain the substring 110$\}$

2. Use the construction given in the proof of Theorem 1.45 (2nd edition), Theorem 1.22 (1st edition), Slide 14 of the slide set on NFAs,

   `http://homepage.cs.uri.edu/faculty/hamel/courses/2015/spring2015/csc544/lecture-notes/03-regular-languages-NFA.pdf`

   to give the state diagram of the NFA recognizing the union of the two languages described in Problem 1a and Problem 1b, respectively.

3. Prove that the language $L = \{a^m b^n \mid a, b \in \Sigma$ and $m, n \geq 0\}$ is regular.

4. Prove that the language $L' = \{a^m b^n \mid a, b \in \Sigma$ and $m \geq 0$ and $n \geq m\}$ is not regular.