CMSC330 Fall 2009 Quiz #1

Name __________________________________________

Discussion Time (circle one): 10am 11am 12pm 1pm 2pm 3pm

Do not start this exam until you are told to do so!

Instructions

• You have 15 minutes for this quiz.
• This is a closed book exam. No notes or other aids are allowed.
• Answer essay questions concisely using 2-3 sentences. Longer answers are not necessary and a penalty may be applied.
• For partial credit, show all of your work and clearly indicate your answers.
• Write neatly. Credit cannot be given for illegible answers.

1. (4 pts) What is the output (if any) of the following Ruby program? Write FAIL if code does not execute.

   ```ruby
   a = [1,2,3]
   a[4] = 5
   # OUTPUT =
   a.each { |x| puts "#{x}" }
   ```

2. (4 pts) Is it true that every DFA is a NFA? Explain your answer.

3. (4 pts) Write a DFA that accepts the language 1(00|1)*. You do not need to use the algorithms described in class.
4. (8 pts) Begin converting the following NFA into a DFA by applying the subset construction algorithm discussed in class. You do not need to produce the entire DFA. Create at least 2 DFA states (starting state & additional state) and the transition (with label) connecting them. Be sure to list the NFA states represented by each DFA state.

![NFA Diagram]

\[
\begin{align*}
1 & \xrightarrow{\varepsilon} 2 & 2 & \xrightarrow{a} 5 & 5 & \xrightarrow{\varepsilon} 6 \\
3 & \xrightarrow{\varepsilon} 4 & 4 & \xrightarrow{b} 3 \\
6 & \xrightarrow{\varepsilon} 6
\end{align*}
\]