CMSC330 Fall 2009 Example 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. (6 pts) Programming languages
   Name a disadvantage of dynamic types in terms of program correctness. Provide a code example in Ruby showing the disadvantage.

2. (4 pts) Ruby features
   What is the output (if any) of the following Ruby programs? Write FAIL if code does not execute.
   a.   a = [ ]
       a[1] = “b”
       a[2] = 3
       a.each{ |x| puts x }

3. (4 pts) Regular expressions and finite automata
   Give a regular expression equivalent to the following finite automaton.

   0 1 1

   1 2 3 4

4. (6 pts) Regular expression to NFA

   Create a NFA for the regular expression a(bc)* using construction method from class.
5. (10 pts) NFA to DFA

Apply the subset construction algorithm to convert the following NFA to a DFA. Be sure to list the NFA states represented by each DFA state.