

CMSC330 Spring 2009 Midterm #1

Name _____

Discussion Time (circle one): 9am 10am

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

Instructions

- You have 50 minutes for to take this midterm.
- This exam has a total of 100 points, so allocate 30 seconds for each point.
- This is a closed book exam. No notes or other aids are allowed.
- If you have a question, please raise your hand and wait for the instructor.
- Answer essay questions concisely using 2-3 sentences. Longer answers are not necessary and a penalty may be applied.
- In order to be eligible for partial credit, show all of your work and clearly indicate your answers.
- Write neatly. Credit cannot be given for illegible answers.

	Problem	Score
1	REs & finite automata	/8
2	RE to NFA	/12
3	NFA to DFA	/16
4	DFA minimization	/16
5	Programming languages	/6
6	Ruby features	/12
7	Ruby programming	/30
	Extra credit	/10
	Total	/100

1. (8 pts) Regular expressions and finite automata

a. (4 pts) Explain what we are referring to when we say regular expressions and finite automata are equivalent.

b. (4 pts) Give a regular expression equivalent to the following finite automaton.



2. (12 pts) Regular expression to NFA

Create a NFA for the regular expression $a(bc)^*$ using construction method from class.

3. (16 pts) NFA to DFA

Apply the subset construction algorithm to convert the resulting NFA to a DFA. Show the NFA states associated with each state in your DFA.

