

CMSC330 Spring 2012 Quiz #2

Name _____

Discussion Time	10am	11am	12pm	1pm	2pm
TA Name (circle):	Tammy	Tammy	Jane Tim	Jane Richard	Richard

Instructions

- Do not start this test until you are told to do so! You have 20 minutes for this quiz.
- This is a closed book exam. No notes or other aids are allowed.
- Answer essay questions concisely in 2-3 sentences. Longer answers are not needed.
- For partial credit, write neatly & show all of your work.

1. (4 pts) Ruby

Ruby has two classes Array and Hash that are similar but different in important ways. Both are frequently used to store a collection of data, and answer queries on the data (e.g., whether item x is present in the collection). Consider the difference between the following usages of Array and Hash in Ruby.

Given $a[x] = y$ // if a is an array, x is the *index*, y is the *element*
 // if a is a hash, x is the *key*, and y is the *value*

The method `include?(x)` is found in both the Array and Hash classes. For arrays, `include?(x)` returns true if x is one of the elements of the array. For hashes `include?(x)` returns if x is a key in the hash.

Consider the following code:

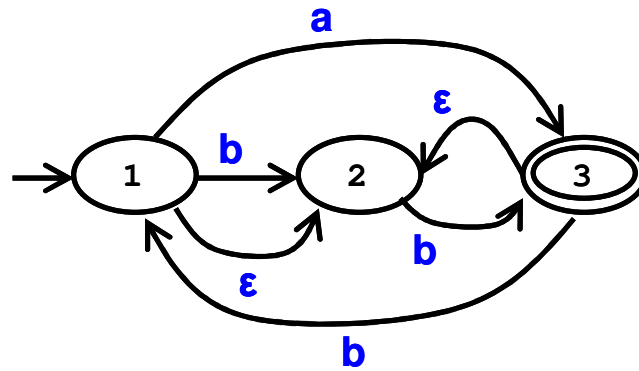
```
a[2] = 3
x = a.include?(2)
y = a.include?(3)
```

- (1 pt) If the code is preceded by the line `a = [ ]`, what are the values of x & y ?
- (1 pt) If the code is preceded by the line `a = { }`, what are the values of x & y ?
- (2 pt) What is a simple alternative to writing `a.include?(x)` when “ a ” is a Hash? I.e., write code to test whether “ x ” is a key in Hash a without using “`a.include?`”.

2. (6 pts) RE to NFA

Create a NFA for $c(ab)^*$, using the algorithm discussed in class.

3. (10 pts) Consider the following NFA.



- a. (2 pts) Does the NFA accept the string “bba”? If it accepts the string, list a sequence of state transitions (e.g., 1,2,3) that leads to acceptance of “bba”.

- b. (8 pts) Convert the NFA to a DFA using the subset construction algorithm discussed in class. Be sure to label each state in the DFA with the corresponding state(s) in the NFA.