CMSC330 Spring 2014 Quiz #1 Solution

Name ________________________________

Discussion Time    10am  11am  noon  1pm  2pm
TA Name (circle):   Tammy  Tammy  Tammy  Daniel  Daniel
                   Ilse    Casey    Ian

Instructions
- Do not start this test until you are told to do so!
- You have 15 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, show all of your work and clearly indicate your answers.
- Write neatly. Credit cannot be given for illegible answers.

1. (2 pts) What is the output (if any) of the following Ruby program? Write FAIL if code does not execute.

```ruby
a = "Adama"  # Output = Star
b = "Adama"  OK
if a.equal? b then puts "BSG" else puts "Star" end
puts "OK" if a.length - b.length
```

2. (8 pts) Write a Ruby method `get_request_number` that given a string `str`, uses regular expressions and back references to find and return a request number (integer) associated with a request. A valid request has the letters `Req`, followed by a #, followed by two digits. For instance, `get_request_number("please use Req#12 after 6 pm or dial 457")` should return the integer value 12. The method will return -1 if no request is found.

```ruby
def get_request_number(str)
  if str =~ /Req#\d\d/  # Alternative REs: /Req#\d\d/, /Req#[0-9][0-9]/, etc.
    return $1.to_i
  end
  return -1
end
```

3. (10 pts) Consider the following NFA.

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

// 1,3,2,3,2,3,3

(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.