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 =
   b = "Adama"
   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)
  # Some helpful functions (not all need to be used)
  a.each { … }  // apply code block to each element in array
  puts b  // print b followed by a newline
  s.to_i  // returns integer value for string s
  n.to_s  // returns string for integer n
end
```

There is another problem on the back
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”.

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.