CMSC 330 Fall 2016 Quiz #1 Solution

Name ______________________________

Discussion Time (circle one)  10am  11am  12noon  1pm  2pm  3pm

Discussion TA (circle one)  Alex  Austin  Ayman  Brian  Damien  Daniel K.
                               Daniel P.  Greg  Tammy  Tim  Vitung  Will K.

Instructions
- Do not start this quiz until you are told to do so.
- You have 20 minutes for this quiz.
- This is a closed book quiz. No notes or other aids are allowed.
- For partial credit, show all of your work and clearly indicate your answers.

1. (4 points) Write a Ruby regular expression to match only strings which represent timestamps, which represent a date and an optional time. The format of these timestamps is YYYY-MM-DD HH:MM:SS, where the date and time are separated by a single space. Here are some strings which your regex should and should not match:

<table>
<thead>
<tr>
<th>Should match</th>
<th>Should not match</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;2016-09-10 20:26:56&quot;</td>
<td>&quot;abc2016-09-10 20:26:56def&quot;</td>
</tr>
<tr>
<td>&quot;2017-04-30&quot;</td>
<td>&quot;2016-09-10 &quot;</td>
</tr>
<tr>
<td>&quot;0001-40-77 46:99:00&quot;</td>
<td>&quot;201-069-10 :20:26:56&quot;</td>
</tr>
</tbody>
</table>

Note that you do not need to validate the dates and times themselves, just their format.

   Solution: /\d{4}\(\-\d\d\-\d\d\)\(\d\d:\d\d:\d\d\)\?$/

2. (9 points) What is the output of the following Ruby programs? If there is no output, please write only NO OUTPUT. Recall that foo.inspect gives the representation of foo as it would appear in source code, e.g. [1,2,3].inspect is "[1,2,3]."

   a) (3 points)  
      Solution: [nil, nil, nil, "foo"]
      ```ruby
      arr = []
      arr[3] = "foo"
      puts arr.inspect
      ```

   b) (3 points)  
      Solution: [4, 8, 15, 16, 23, 42]
      ```ruby
      arr = [15, 23, 4, 16, 8, 42]
      arr.sort!
      arr.select { |x| x.even? }
      puts arr.inspect
      ```

   c) (3 points)  
      Solution: 4
      ```ruby
      foo = "abcd45efghi" =~ /..(\d)/
      puts $1.inspect
      ```
3. (7 points) Given the following Ruby Set class declaration, implement the indicated methods:

```ruby
class Set
  include Enumerable

  def initialize
    @s = Hash.new(false)
  end

  def insert(val)
    @s[val] = true
  end

  # Your methods are here.
end
```

a) (3 points) Implement `contains?` for `Set`. It should return `true` if `val` is in the set, and false otherwise.

   **Solution:**
   ```ruby
   def contains?(val)
     @s[val]
   end
   ``

b) (4 points) Implement the `each` method for `Set`. Recall that `each` takes a code block and yields each member of a collection to it in turn. You may iterate over the elements in any order.

   **Solution:**
   ```ruby
   def each
     @s.keys.each { |key|
       yield key
     }
   end
   ```