CMSC 330, Spring 2018 Quiz 3

Name

Discussion Time (circle one) 10am 11am 12pm 1pm 2pm 3pm
Discussion TA (circle one) BT Daniel Chris Alex Derek Pei-Jo Akbar Justin L. Tal Shriraj Cameron Eric Kesha Kameron Michael S. Michael P.

Instructions

- Do not start this quiz until you are told to do so.
- You have 15 minutes for this quiz.
- This is a closed book quiz. No notes or other aids are allowed.
- For partial credit, show all your work and clearly indicate your answers.

1a. (4 points) Write a grammar for:

$s^y e^z$, where $z = 2y + 1$ and $y \geq 0$

$S \Rightarrow sS e | e$

1b. (3 points) Write a left-most derivation of “(boots and cats) and boots” from the following grammar:

$S \Rightarrow S and S \mid S xor S \mid (S) \mid boots \mid cats$

$S \Rightarrow S and S \Rightarrow (S) and S \Rightarrow (S and S) and S \Rightarrow (boots and S) and S \Rightarrow (boots and cats) and S$

$\Rightarrow (boots and cats) and boots$

2. (3 points) Circle "Accept" if the NFA accepts the given string. Circle "Reject" otherwise.

<table>
<thead>
<tr>
<th>String</th>
<th>Accept</th>
<th>Reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;0001&quot;</td>
<td>Accept</td>
<td>Reject</td>
</tr>
<tr>
<td>&quot;01011&quot;</td>
<td>Accept</td>
<td>Reject</td>
</tr>
<tr>
<td>&quot;01100101&quot;</td>
<td>Accept</td>
<td>Reject</td>
</tr>
</tbody>
</table>
3. (10 points) Convert the following NFA to a DFA (make sure to show your work for partial credit):

Sol:

![Diagram of NFA and DFA]