CSCE 222: Discrete Structures for Computing
Section 503
Fall 2016

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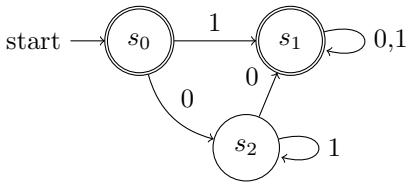
October 23, 2016

Problem Set 8

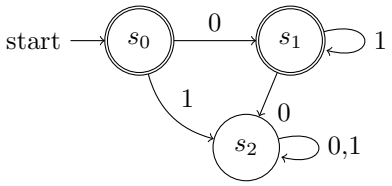
Due: 23 October 2016 (Sunday) before 11:59 p.m. on eCampus (`ecampus.tamu.edu`).
You must show your work in order to recieve credit.

Problem 1. (30 points)
Find the language recognized by the given DFA:

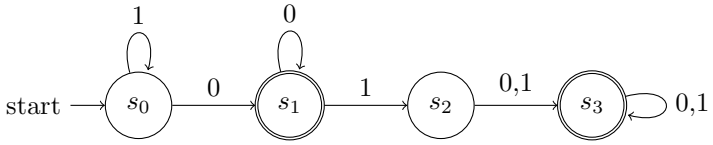
1.



2.



3.



Solution.

1.

$$L(m) = 1(0,1)^* \big| \lambda \quad \begin{matrix} (0,1)^* & \text{From } s_1 \\ \lambda & \text{From } s_0 \end{matrix}$$

2.

$$\begin{aligned} & 1^* \quad \text{from } s_2 \\ & \lambda \quad \text{from } s_0 \\ L(m) = & 01^* \mid \lambda \end{aligned}$$

3.

$$\begin{aligned} 1^*0 \quad & \text{from } s_0 \\ & 0+ \quad \text{from } s_1 \\ & (0,1)+ \quad \text{from } s_3 \\ L(m) = & 1^*0^+ \mid 1^*0^+1(0,1)^+ \end{aligned}$$

Problem 2. (20 points)
Show that the following grammar generates the language $\{a^n b^n c^n \mid n \geq 0\}$.

$$\begin{aligned} S &::= aST \mid \lambda \\ T &::= BC \\ CB &::= BC \\ aB &::= ab \\ bB &::= bb \\ bC &::= bc \\ cC &::= cc \end{aligned}$$

Solution.

$S ::= aST \mid \lambda$	from this it can be seen the case when $n = 0$ for a, b, c is true. Also, if not	(1)
	λ the S string will continue to repeat itself thus the string must start with a^n	(2)
$a^n B^n C^n$	from $T ::= BC$	(3)
$a^n b^n C^n$	from $aB ::= ab$	(4)
$a^n b^n c^n$	from $bC ::= bc$	(5)

Aggie Honor Statement: On my honor as an Aggie, I have neither given nor received any unauthorized aid on any portion of the academic work included in this assignment.

Checklist: Did you...
1. abide by the Aggie Honor Code?
2. solve all problems?
3. start a new page for each problem?
4. show your work clearly?
5. type your solution?
6. submit a PDF to eCampus?