CS 381 Homework 5 solutions

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Problem 12.1

a) States 1, 4, 3, 5, 2, and 6 are accessible (7 and 8 are inaccessible); states 1-8 are accessible (none are inaccessible)

b) $3 \approx 4, 2 \approx 5, 1 \approx 6; 1 \approx 2, 3 \approx 4 \approx 8, 5 \approx 6 \approx 7$

c)

	a	b
→ [1]	[1]	[3]
[2]	[3]	[1]
[3]F	[3]	[2]

	a	b
→ [1]F	[3]	[5]
[3]	[5]	[1]
[5]	[1]	[3]

Problem 13.1

One can consider drawing the 15-by-15 equivalence matrix, and end up filling in every node. A simpler method to show this is that, since we need to remember whether the number of input characters is divisible by 3 and whether it is divisible by 5, we need a number of states equal to the least common multiple of those, or 15 states.

Problem 13.2 a)

	a	b
→ [1]	[1]	[3]
[2]	[2]	[1]
[3]F	[3]	[2]

f)

	a	b
→ [0]	[1]	[4]
[1]	[1]	[1]
[4]F	[4]	[0]

g)

	a	b
→ [1]F	[6]	[3]
[3]	[1]	[6]
[6]	[3]	[1]

Problem 14.1

	0	1
→ [0]F	[0]	[1]
[1]	[1]	[2]
[2]	[1]	[0]

Problem 14.2

	a	b
→ 0F	1	3
1F	1	2
2F	5	2
3F	4	3
4F	4	5
5	5	5