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Homework #12

This homework is **just for practice, do not turn it in**. The solutions follow the questions.

FSM state reduction: Katz 9.1, 9.2, 9.3

State assignment: Katz 9.6, 9.7

Solutions:

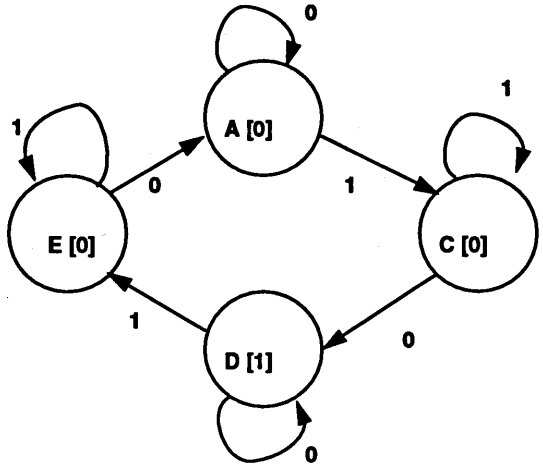
9.1

	A	B	C	D	E	F
B	B - A C - C					
C	B - D C - C	A - D C - C				
D	X	X	X			
E	B - A C - F	A - A C - F	D - A C - F	X		
F	B - B C - G	A - B C - G	D - B C - G	X	A - B F - G	
G	B - A C - E	A - A C - E	D - A C - E	X	A - A F - E	B - A G - E

	A	B	C	D	E	F
B	B - A C - G					
C	X	X				
D	X	X	X			
E	X	X	X	X		
F	X	X	X	X	A - B F - G	
G	X'	X	X	X	A - A F - E	B - A G - E

9.2

The state tables are above. State A = B, and E = F = G. The diagram is below.



9.3

S1	S1 - S2 S1 - S4					
S2	S1 - S1 S4 - S6	S1 - S2 S1 - S6				
S3	S1 - S1 S3 - S4	S1 - S2 S1 - S3	S1 - S1 S3 - S6			
S4	S1 - S5 S4 - S4	S2 - S5 S1 - S4	S1 - S5 S4 - S6	S1 -S5 S3 - S4		
S5	S1 - S2 S1 - S4	S2 -S2 S1 - S1	S1 - S2 S1 - S6	S2 - S1 S1 - S3	S2 - S5 S1 - S4	
S6	X	X	X	X	X	X
	S0'	S1	S2	S3	S4	S5

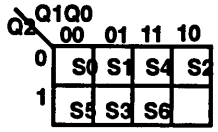
S0 = S4, S1 = S5.

9.6

a.) Minimum bit change heuristic

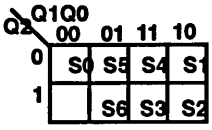
7 states, 3 variable K-map

Assign S0 = 000 = (Q2, Q1, Q0)
S0 adjacent to S1, S2
Either S4 adjacent to S1, S2, or S3 adjacent to S1, try both cases.



b.) State assignment guidelines

Highest priority: 2x (S5, S6), 2x (S1, S2) (S3, S4)
Medium priority: 2x (S3, S4), (S1, S2), (S5, S6)
Lowest priority: 0/0: (S4, S0, S6, S5)
1/0: (S0, S2, S1, S4, S5)
0/1: (S1, S2, S3)
1/1: (S6, S3)



Satisfy all high and medium priority.
Try to satisfy as many lowest priority as possible.

9.7

High Priority: (B, C), (E, A)
Medium Priority: (A, D), (D, C)
Lowest Priority: 0/0: (E, D, C, B)
1/0: (B, C, A)