Quiz 6 60 minutes

Blank Maps for first three problems provided on page 4, but write answers on the page with the problem statement.

1. For the following state table,

$q_1\ q_2$	$q_1^*\ q_2^*$		z	
	x = 0	x = 1	x = 0	x = 1
0 0	0 1	1 1	0	1
0 1	0 0	1 0	0	0
1 0	1 1	1 0	0	1
1 1	0 0	1 1	0	1

Show the flip flop input equations and the output equation if the first flip flop is a D flip flop and the second is JK.

D_1 =

J_2 =

K_2 =

z =

2. For the following state table and state assignment, show the equations and a block diagram for a system using an SR flip flop for q_1 and a T flip flop for q_2 and AND, OR and NOT gates. (Show only one of the solutions for R_1.)

q	q *		z	
	x=0	x=1	x=0	x=1
A	B	C	1	1
B	A	B	1	0
C	B	A	1	0

q	q_1 q_2
A	1 0
B	0 1
C	1 1

x	q_1	q_2	q_1*	q_2*	z
0	0	0			
0	0	1			
0	1	0			
0	1	1			
1	0	0			
1	0	1			
1	1	0			
1	1	1			

S_1 =

R_1 =

T_2 =

z =

3. Design a counter that goes through the sequence

1 0 7 3 4 2 and repeat

using a D flip flops. Just show the equations.

A	B	C	A*	B*	C*
0	0	0			
0	0	1			
0	1	0			
0	1	1			
1	0	0			
1	0	1			
1	1	0			
1	1	1			

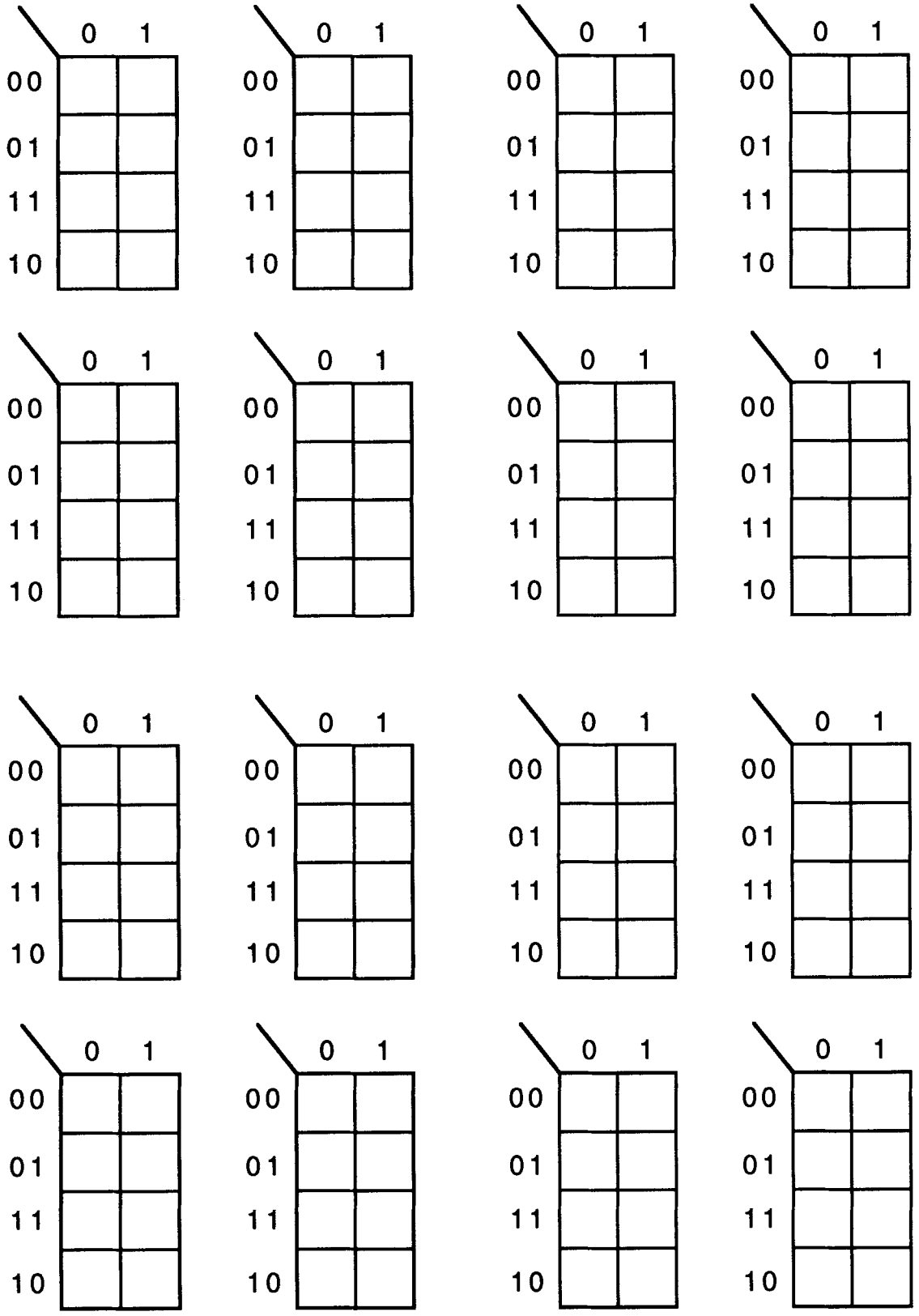
D_A =

D_B =

D_C =

BONUS: Show a state diagram, including what happens if the system begins in state 5 or 6.

For problems 1 to 3



4. Show a state table or a state diagram for a system with one input, x, and one output, z, such that z = 1 if and only if the input has been at least three consecutive 1's followed by two 0's. (Full credit for a system with 5 states.)

Example

x	1	1	1	1	0	0	0	1	1	0	0	1	1	1	0	0		
z	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0