

Test 8

1. (30) Design a counter that goes through the sequence

1 3 5 6 7 and repeat

using an SR flip flop for A, a JK flip flop for B and a T flip flop for C.

5-point BONUS: Show a state diagram, including what happens if the system is initially in state 0, 2, or 4.

2. a) (10) Show the state table or state diagram for a Mealy system that produces a 1 output if and only if the input has been exactly two 0's followed by at least two 1's. (5 states)

b) (10) Show the state table or state diagram for a Mealy system that produces a 1 output if and only if the input has been exactly two 0's followed by exactly two 1's. (6 states)

c) (10) Show the state table or state diagram for a Moore system that produces a 1 output if and only if the input has been exactly two 0's followed by at least two 1's. (6 states)

Example:

x	0	0	0	1	1	0	1	0	0	1	1	0	0	1	1	1	0	0	1	1	0	
z - a	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0	0
z - b	?	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
z - c	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0

3. (40) We wish to implement the following state table.

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

To implement this, we have the PAL shown below. Two of the outputs are connected to the input of a D flip flop; the third is available for an output. Label the diagram and show the connections either with dots or X's. Note that the PAL has more inputs and gates than you need; you can ignore the extras.

