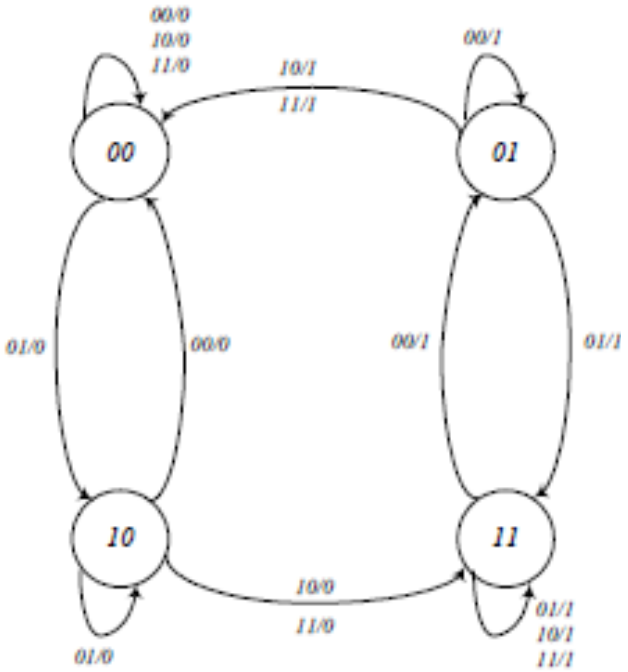
The University of Alabama in Huntsville
ECE Department
EE 202 – 02
Test 3
November 26, 2013

Name: _____

1. (1 point) Storage elements that operate with signal levels (rather than signal transitions) are referred to as _____
2. (1 point) A _____ defines the logical properties of a flip-flop by describing its operation in tabular form.
3. (1 point) Some flip-flops have _____ inputs that are used to force the flip-flop to a particular state independent of the clock.
4. (1 point) The time sequence of inputs, outputs, and flip-flop states can be enumerated in a _____.
5. (1 point) In Verilog, behavior declared by the keyword **initial** is called _____ behavior.
6. (15 points) Starting from state 00 in the state diagram shown, determine the state transitions and output sequence that will be generated when an input sequence of 00, 11, 10, 01, 11, 10, 01, 00, 10, 10, 00, 01, 01, 11, 11, 00, 00



Current State	Input	Next State	Output

J	K	Q(t+1)
0	0	Q(t)
0	1	0
1	0	1
1	1	Q'(t)

D	Q(t+1)
0	0
1	1

T	Q(t+1)
0	Q(t)
1	Q'(t)

7. (20 points) Design a 3-bit counter which counts in the sequence 000, 010, 100, 110, 000 using clocked JK flip-flops. You do not have to draw the circuit diagram. What will happen if the counter is started in state 101?

8. (10 points) Reduce the number of states in the following state table, and tabulate the reduced state table:

	Next State		Output	
Present State	x = 0	x = 1	x = 0	x = 1
S0	S1	S4	0	0
S1	S2	S1	0	0
S2c	S1	S6	0	0
S3	S1	S3	0	0
S4	S5	S4	0	0
S5	S2	S1	0	0
S6	S5	S3	0	1

9. (15 points) Construct a 5-to-32 line decoder with as many 2-to-4 line decoders with enable and any additional logic that you might need. Use block diagrams for the components.

10. (10 points) Construct a 32×1 multiplexer with as many 8×1 multiplexers and any additional logic that you might need. Use block diagrams for the components.

11. (25 points) Design a Mealy sequential circuit that has an output of 1 whenever its input string has the sequence 0101 and otherwise has an output of 0. These sequences can overlap. Use T flip-flops. You do not have to draw the circuit diagram.

Input: 00101011101000111110101010111000011001
Output: 00001010000000011110001010100000000001000