

ELEC 457



ASSIGNMENT – 1

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It took 7-8 hour for prepare.

1-

Full Adder: Which is add two numbers and also can get a carried input and gives a sum and carry out.

2's complement: Turns all bits into opposite then add 1.

Carry-Lookahead : Circuit which does a add process.

Register: It is small set of data holding places that are part of the processor.

Latch: It is a device which has two stable states namely high output and low output. Probably we will never use because of it is behaviour.

Flip Flop: It is an electronic circuit with two stable states that can be used to store binary data.

Abstraction: Let user know how to use it but don't know how to do it.

Demux: It is opposite of the multiplexer and it is one-to-many circuit. The binary data can be bypassed to one of its many output data lines.

Frequency Division: Signals are transmitted at the same time, and each source transfers its signals in the allotted frequency range.

Active-low: An active-low is a device that either outputs 0V when triggered on or that accepts 0V as input to turn on.

Timing Diagram: A timing diagram is the graphical representation of input and output signals as functions of time. Since the inputs and outputs can only take the values 0 or 1.

Decoder: A decoder is a circuit that changes a code into a set of signals.

2-

-Draw the truth table for output X and Y.

	B0	B1	B2	B3	Output
0	0	0	0	0	0
1	0	0	0	1	0
2	0	0	1	0	1
3	0	0	1	1	1
4	0	1	0	0	0
5	0	1	0	1	0
6	0	1	1	0	0
7	0	1	1	1	0
8	1	0	0	0	0
9	1	0	0	1	1

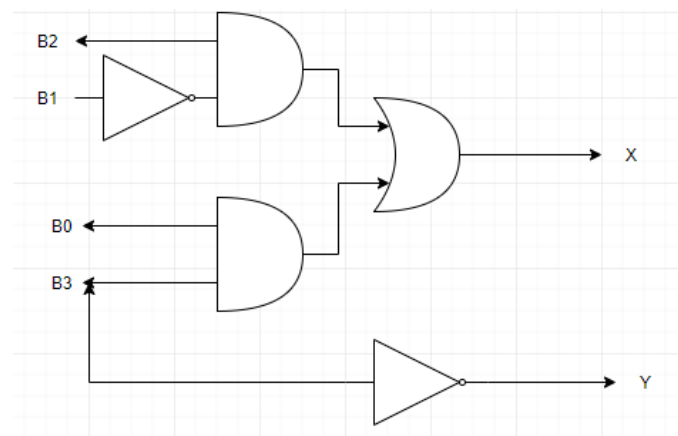
-Draw the K-Map for the output.

	B2'.B3'	B2'.B3	B2.B3	B2.B3'
B0'.B1'	0	0	1	1
B0'.B1	0	0	0	0
B0.B1	x	x	x	x
B0.B1'	0	1	x	x

-Give the most simplified Boolean equation for the outputs.

$$\text{Output} = B1' \cdot B2 + B0.B3$$

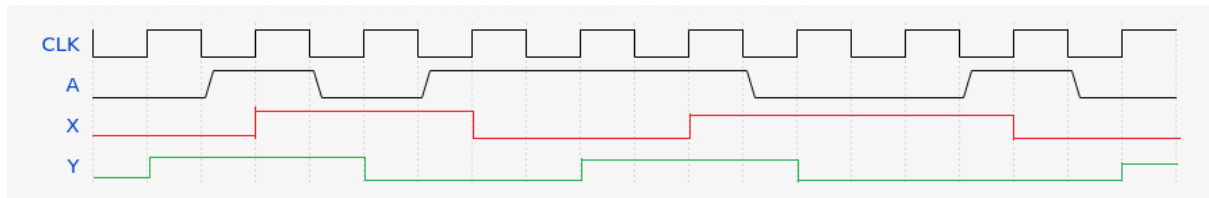
-Sketch the final circuits.



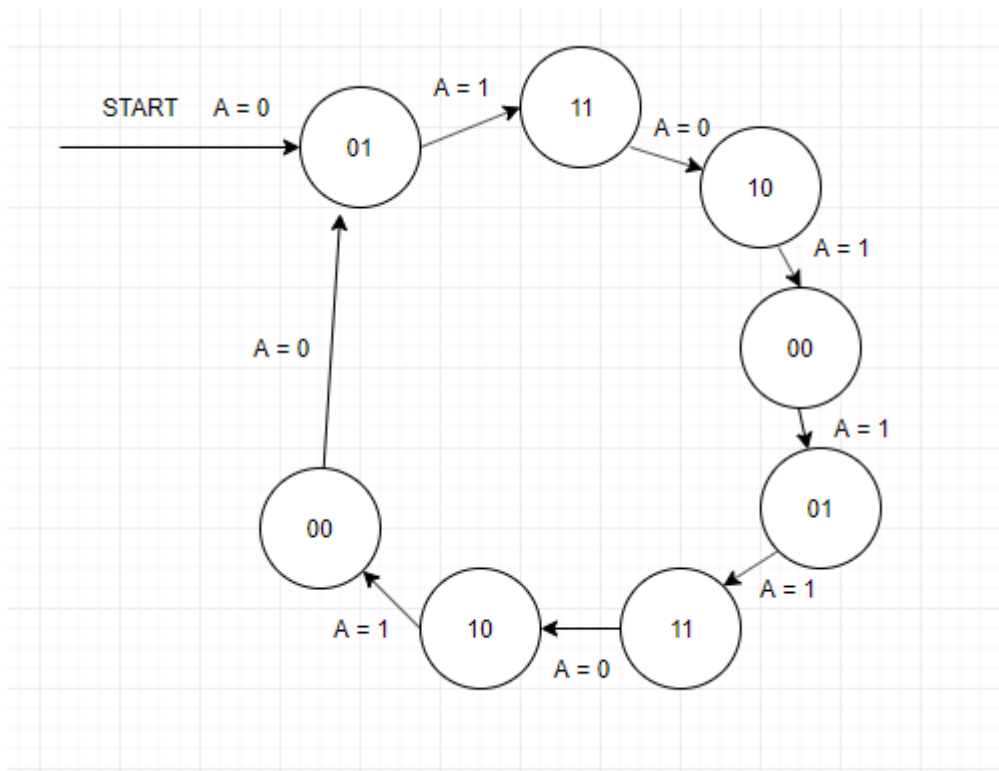
3-

Analyze the circuit and derive outputs X and Y on the timing diagram below for the given A input. (Assume both outputs are logic 0 initially).

Answer:



Draw the state diagram.



4-

-Clearly state your state encodings.

$S_0 = 00$, $S_1 = 01$, $S_2 = 11$

5-

Draw a **state machine diagram** and a **circuit** that unlocks the door when it receives the serial input sequence of 01101 from an input called B.

