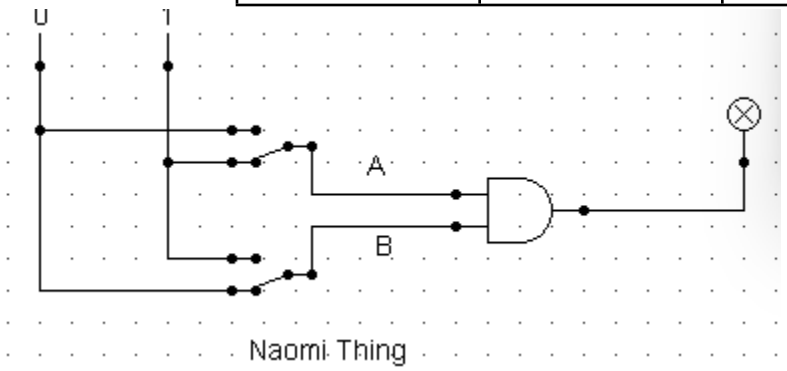
Instruction:

Complete all questions in **1 hour.**

1. Draw the logic diagram of the following gates using logsim and complete the Truth tables.

a) AND

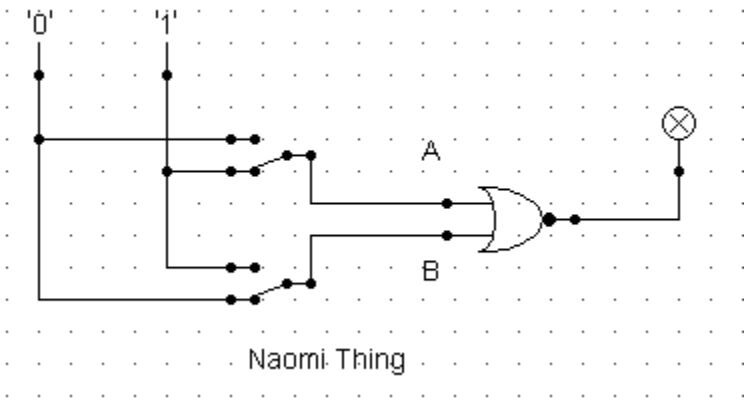
A	B	A.B
0	0	0
0	1	0
1	0	0
1	1	1



[Insert your gif image here]

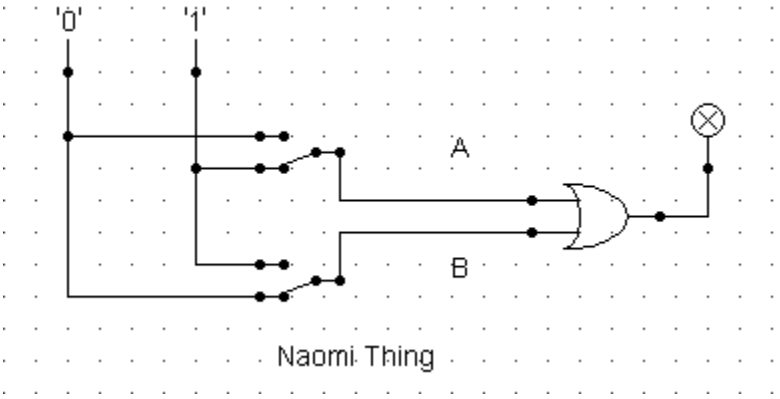
b) NOR (do the same as in Q No a for all of the following)

A	B	(A+B)'
0	0	1
0	1	0
1	0	0
1	1	0



c) OR

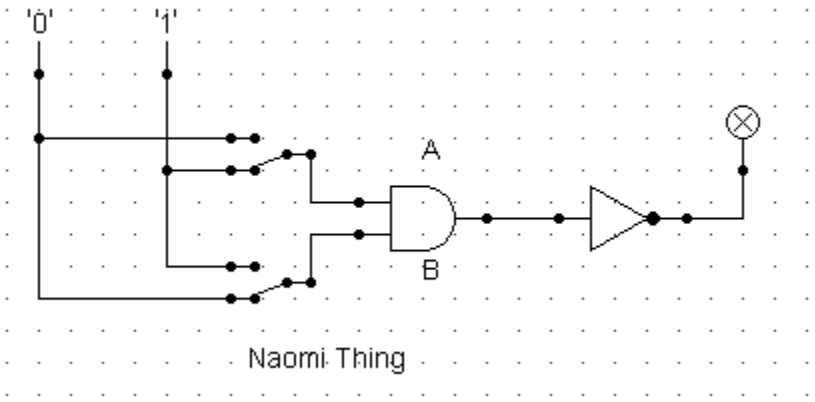
A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1



d) NAND (using NOT and AND)

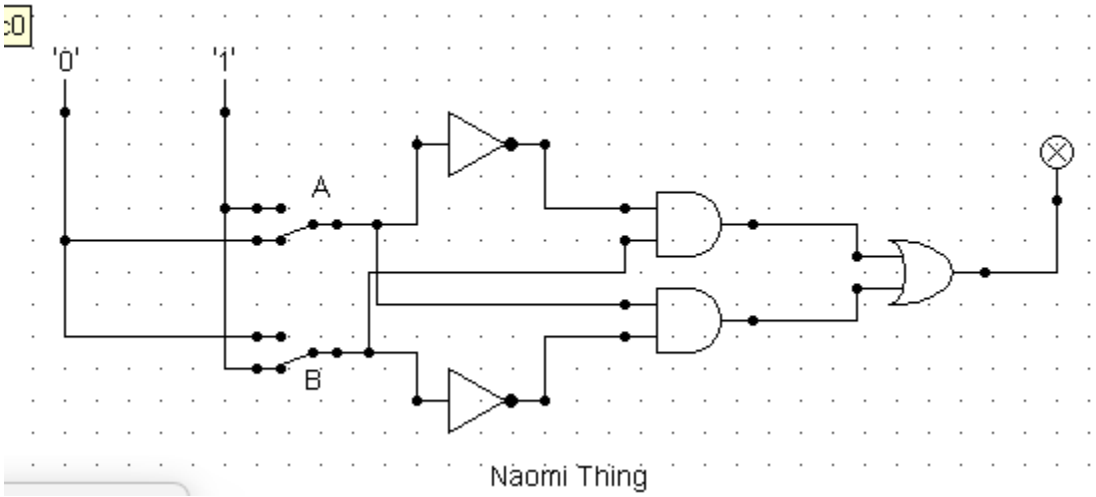
A	B	(A.B)'
0	0	1
0	1	1
1	0	1

1	**1**	**0**



e) XOR using AOI

A	**B**	**A'B+AB'**
0	**0**	**0**
0	**1**	**1**
1	**0**	**1**
1	**1**	**0**

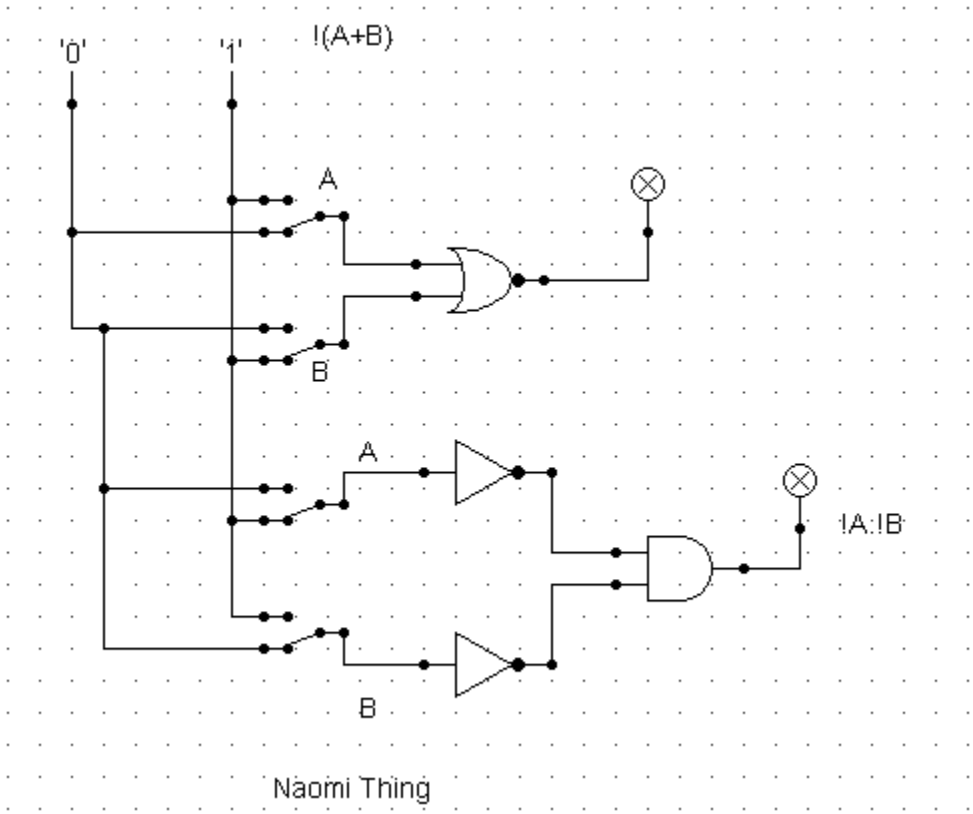


2. Use LogSim to build the equivalent circuit for the following Boolean equations. Prove that the expressions are equivalent by computing truth table.

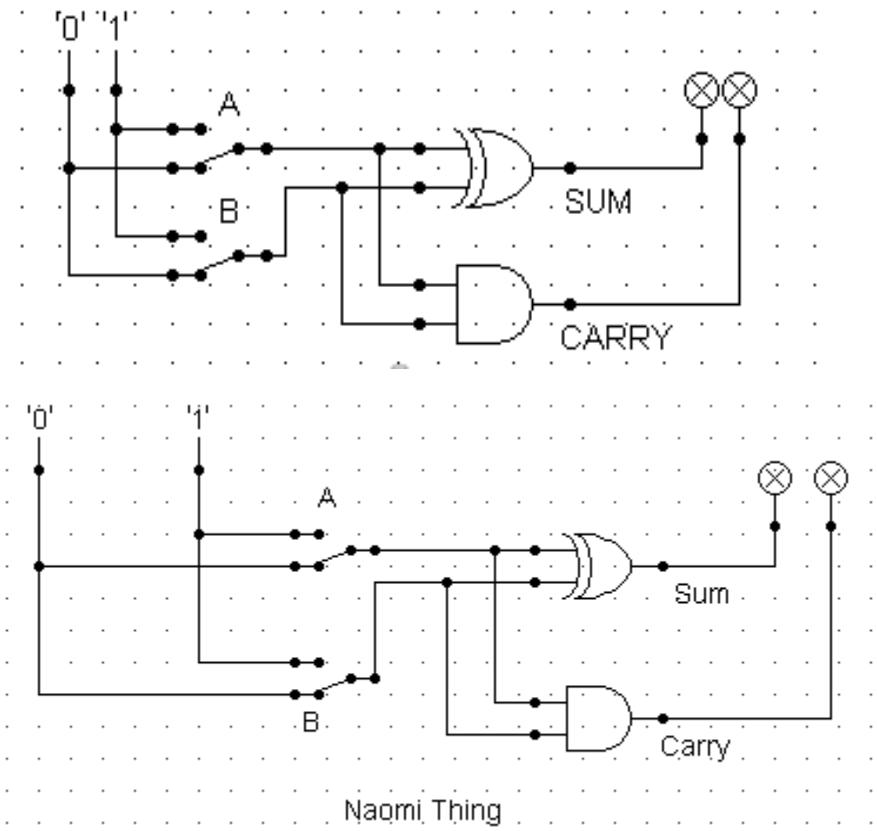
$$!(A + B) = !A.!B$$

A	B	!(A+B)	!A . !B
0	0	1	1
0	1	0	0
1	0	0	0
1	1	0	0

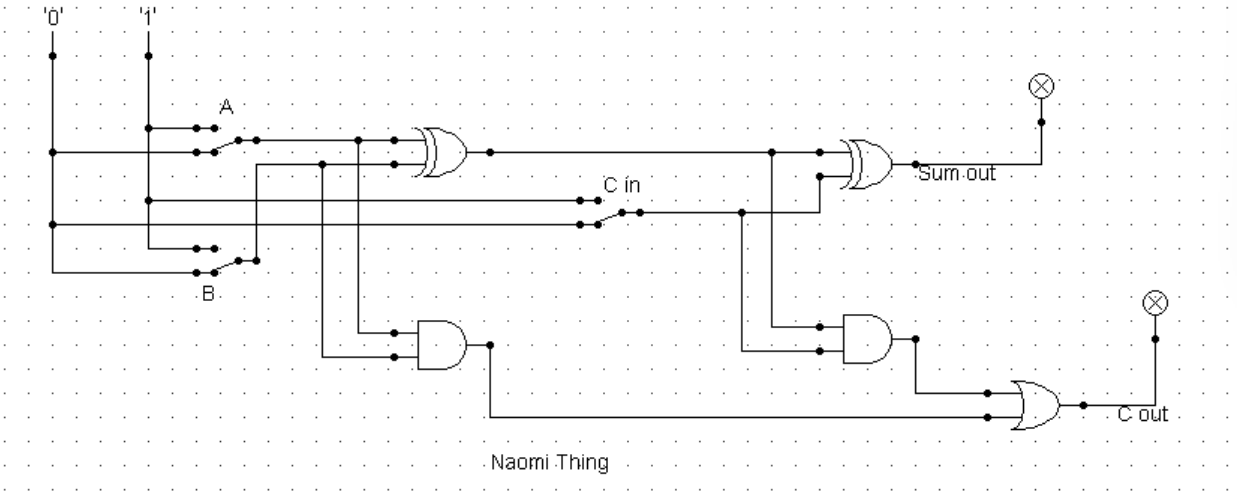
[Insert your gif image here]



3. Draw the following circuit of half adder using LogSim.

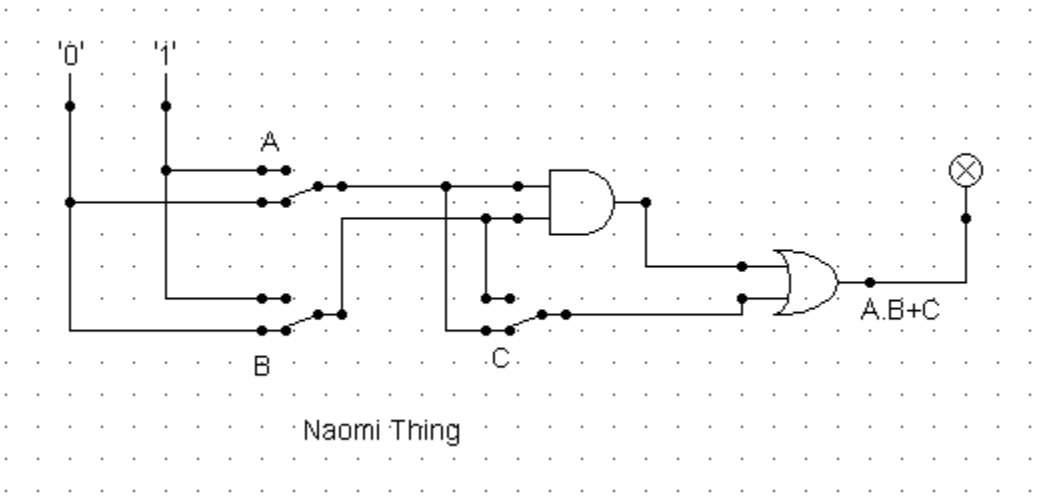


4. Draw full adder using Logsim and construct truth table.

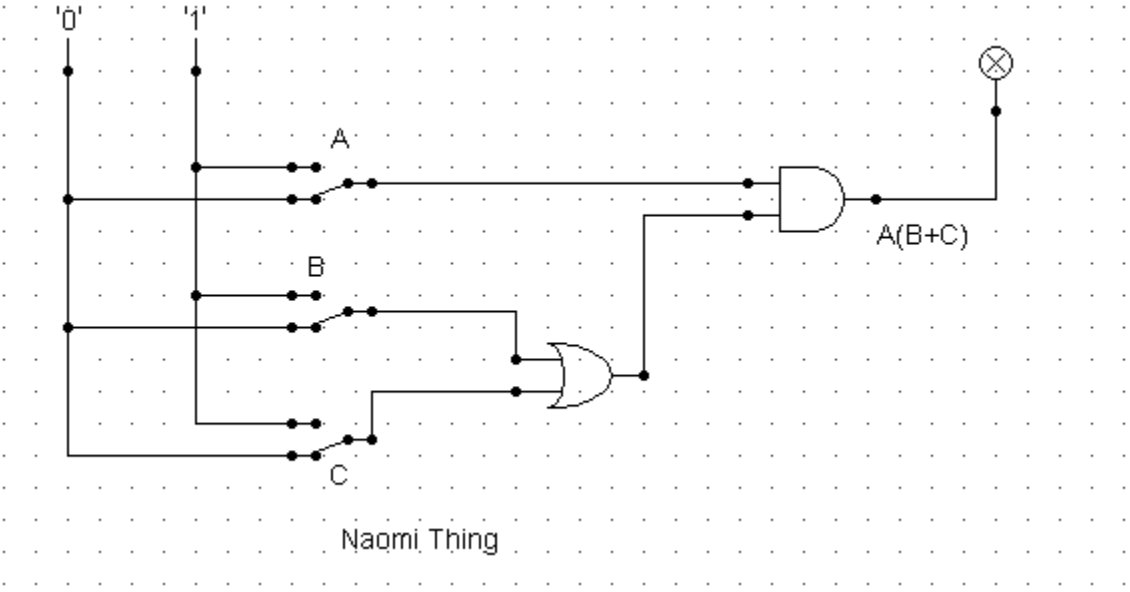


A	B	C	Sum	Carry
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	0	1	1

5. Draw the logic circuit for the following Boolean equations using logsim simulator.
   a. AB+C



   b. A(B+C)



c. X’Y’Z’