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ECE 5484, Homework 2

1. Construct a truth table for the following:

F = (x + y)(x' + z')(y' + z')

x	y	z	x+y	x' + z'	y' + z'	F(x + y)(x' + z')(y' + z')
0	0	0	0	1	1	0
0	0	1	0	1	1	0
0	1	0	1	1	1	1
0	1	1	1	1	0	0
1	0	0	1	1	1	1
1	0	1	1	0	1	0
1	1	0	1	1	1	1
1	1	1	1	0	0	0

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2. Using truth tables, show that: xz = (x+y)(x+y')(x'+z)

(x+y)(x+y')(x'+z) truth table:

x	y	z	x'	y'	x+y	x+y'	x'+z	F(x+y)(x+y')(x'+z)	F(xz)
0	0	0	1	1	0	1	1	0	0
0	0	1	1	1	0	1	1	0	0
0	1	0	1	0	1	0	1	0	0
0	1	1	1	0	1	0	1	0	0
1	0	0	0	1	1	1	0	0	0
1	0	1	0	1	1	1	1	1	1
1	1	0	0	0	1	1	0	0	0
1	1	1	0	0	1	1	1	1	1

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3. The truth table for a Boolean expression is shown. Write the Boolean expression in sum-of-products form.

x	y	z	F
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	0

F = x'y'z' + x'y'z + x'yz' + xy'z' + xy'z

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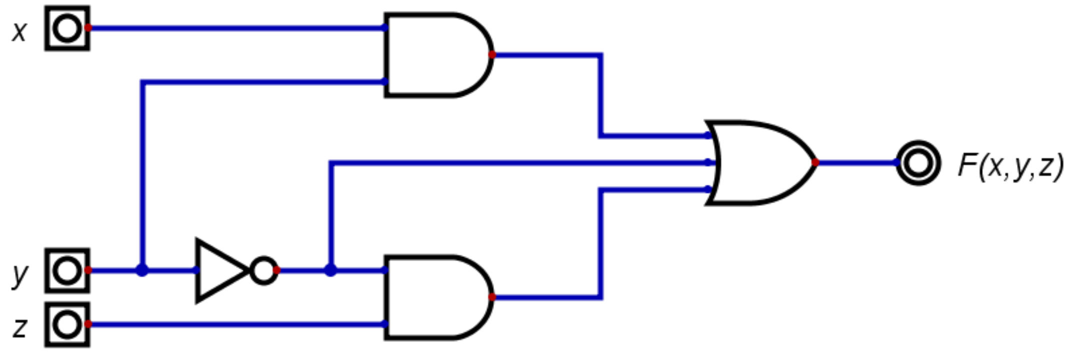
4. Draw the combinational circuit that directly implements the following Boolean expression:
F(x,y,z) = y’ + xy + y’z.



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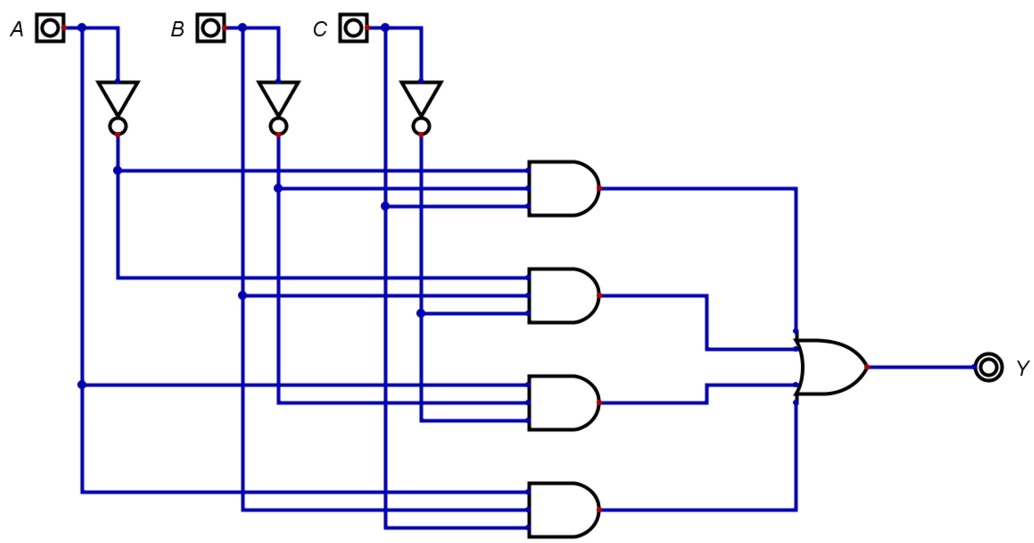
5. Consider the parity generator (even parity) shown in the truth table below. The parity bit Y is a function of Boolean variables A, B, and C. Represent this parity function in the following ways:

1. As a Boolean algebraic expression.

    A’B’C + A’BC’ + AB’C’ + ABC

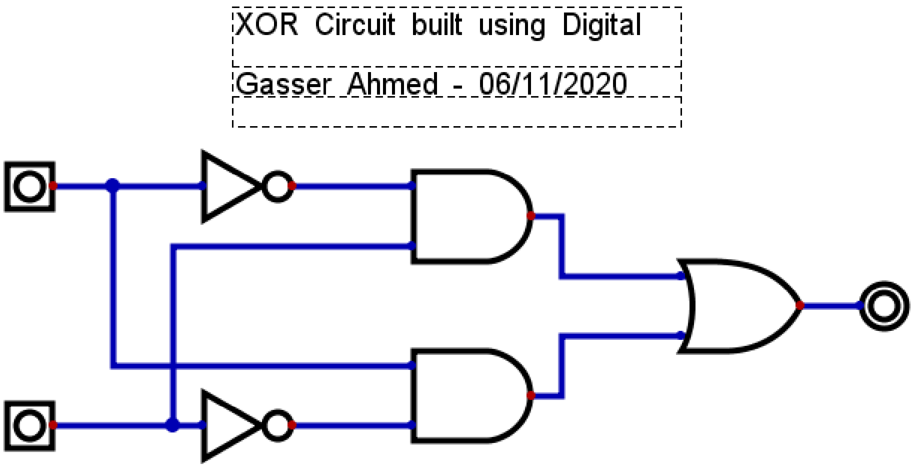
2. As a combinational logic diagram (logic circuit).



6.

Input				Output	
A	B	X(K)	J	A(t+1)	B(t+1)
0	0	0	1	0	1
0	0	1	1	0	1
0	1	0	0	1	1
0	1	1	0	1	0
1	0	0	0	0	0
1	0	1	0	0	0
1	1	0	1	1	1
1	1	1	1	1	0

7.



8.1.

I_2	I_1	Z_1	Z_0
0	0	0	0
0	1	0	1
1	0	1	0
1	1	1	0

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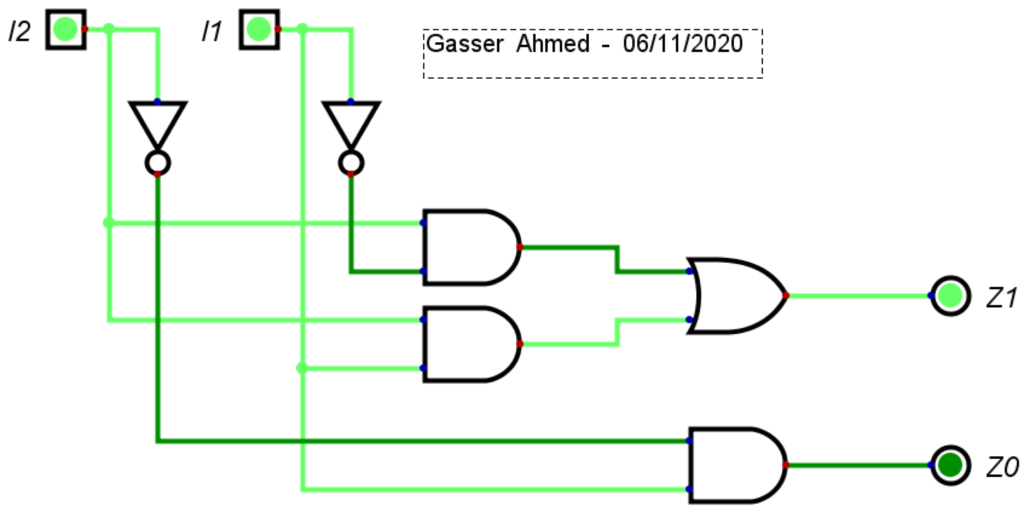
2. $Z_1 = I_2I'_1 + I_2I_1$

$Z_0 = I'_2I_1$

3.



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9. 1. Jack Kilby

2. He received the Nobel Prize in Physics in 2000 for his part in the invention of the integrated circuit.
