

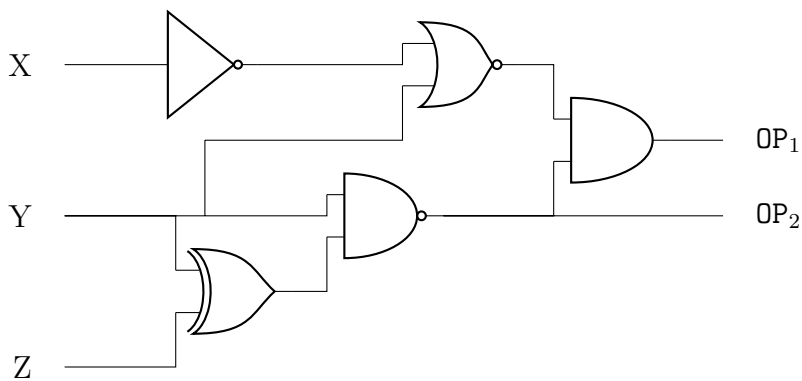
# CS 31 Homework 2: Circuits

Due at the start of class Tuesday, October 10, 2023

Your names (include **all members of your group**):

1. Fill in the truth table for the following circuit. Note that this circuit is using NOT, XOR, NOR, NAND, and AND gates.

x	y	z	OP <sub>1</sub> (x, y, z)	OP <sub>2</sub> (x, y, z)
0	0	0		
0	0	1		
0	1	0		
0	1	1		
1	0	0		
1	0	1		
1	1	0		
1	1	1		



2. Construct a circuit that implements the following truth table. You may use any of the following one- or two-input gates: NOT, AND, OR, XOR, NAND, NOR, XNOR. Write out the boolean expression for  $OP_1$  and  $OP_2$  before attempting to draw the circuit.

HINT: For  $OP_1$ , can you describe each case when the output is 1? How would you combine all the cases into a single circuit? Repeat this for  $OP_2$ .

x	y	z	$OP_1(x, y, z)$	$OP_2(x, y, z)$
0	0	0	0	0
0	0	1	1	1
0	1	0	1	0
0	1	1	1	0
1	0	0	0	0
1	0	1	0	1
1	1	0	0	0
1	1	1	1	1

(Scratch space in case you want it.)