BLG 231E Homework 4

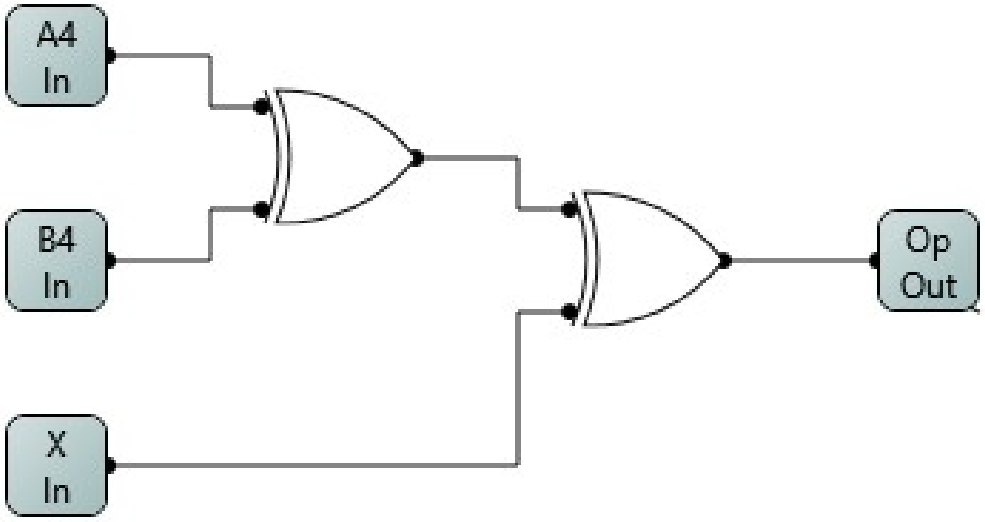
a)

A_4	B_4	X	C_4	R_4	Op	Overflow
0	0	0	0	0	0	0
0	0	0	1	Φ	0	1
0	0	1	0	1	1	0
0	0	1	1	0	1	0
0	1	0	0	1	1	0
0	1	0	1	0	1	0
0	1	1	0	0	0	0
0	1	1	1	Φ	0	1
1	0	0	0	0	1	0
1	0	0	1	1	1	0
1	0	1	0	1	0	0
1	0	1	1	Φ	0	1
1	1	0	0	1	0	0
1	1	0	1	Φ	0	1
1	1	1	0	1	1	0
1	1	1	1	0	1	0

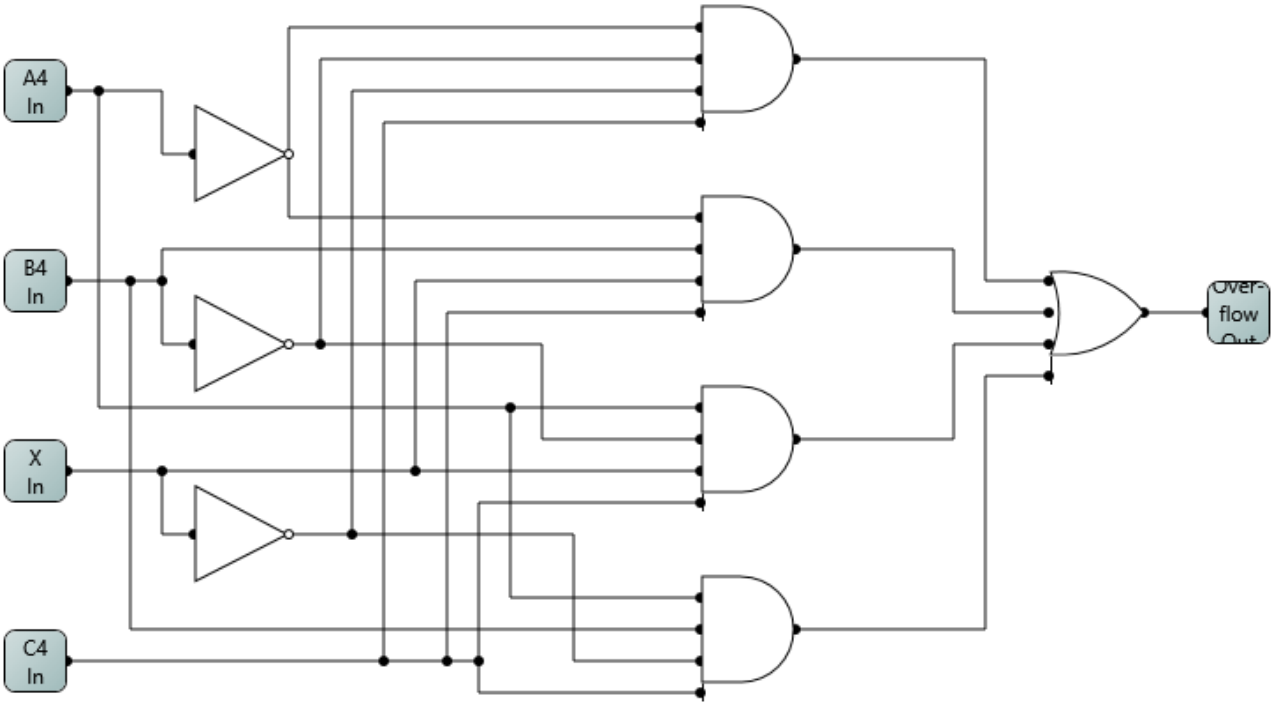
Op = X ⊕ (A_4 ⊕ B_4)

Overflow = $\overline{A}_4\overline{B}_4\overline{X}C_4 + \overline{A}_4B_4XC_4 + A_4\overline{B}_4XC_4 + A_4B_4\overline{X}C_4$

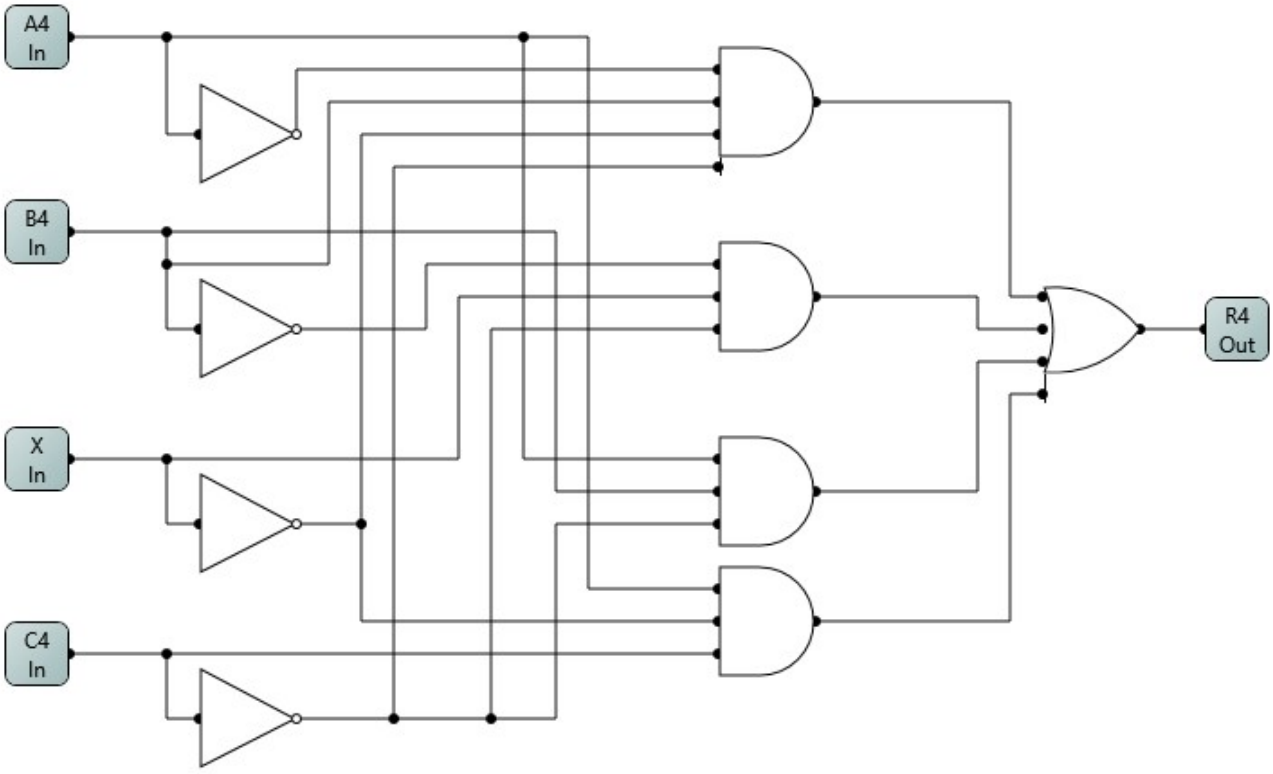
R_4 (Sign) = $\overline{A}_4B_4\overline{X}\overline{C}_4 + \overline{B}_4X\overline{C}_4 + A_4B_4\overline{C}_4 + A_4\overline{X}C_4$



Logic Circuit for Op

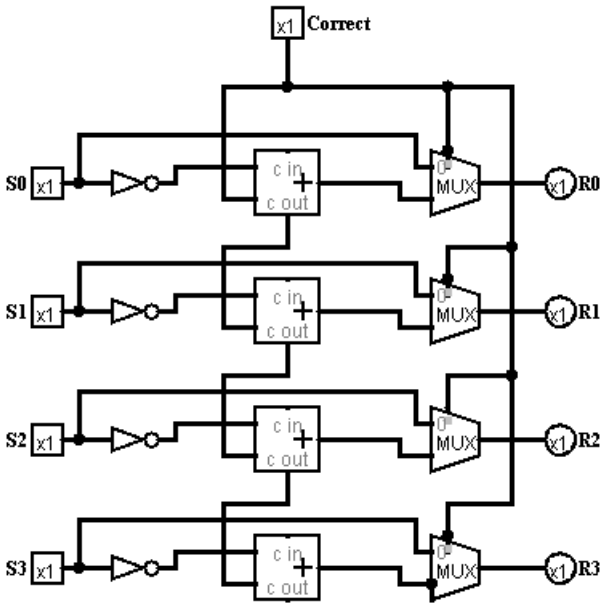


Logic Circuit for Overflow

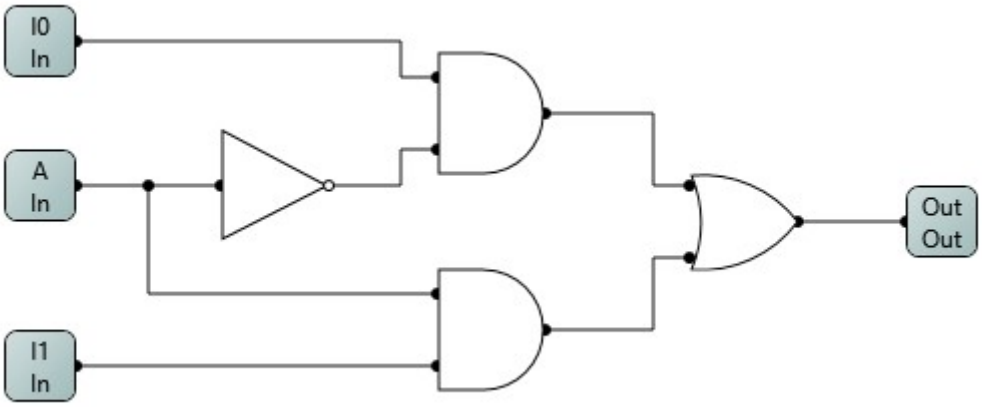


Logic Circuit for R4

b)

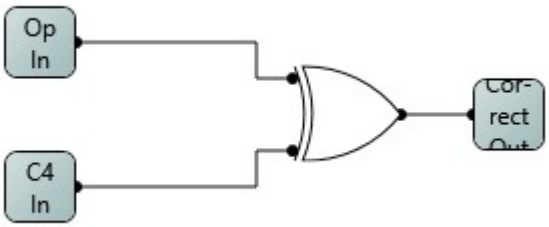


Logic Circuit for Circuit C



Logic Circuit for a 2:1 Multiplexer (I used a ready one because circuit c became too hard to see)

c) Correct = Op ⊕ C_4



Logic Circuit for Circuit D