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CMPE 240 2022 Experiment 2 Preliminary Work

Truth Table

#	i2	i1	i0	b
0	0	0	0	0
1	0	0	1	0
2	0	1	0	1
3	0	1	1	0
4	1	0	0	0
5	1	0	1	1
6	1	1	0	1
7	1	1	1	1

Sum of Products (SOP)

b = (i2 * i1 * i0) + (i2 * i1' * i0) + (i2' * i1 * i0') + (i2 * i1 * i0')

Minimized SOP

b = (i2 * i1 * i0) + (i2 * i1' * i0) + (i2 * i1 * i0') + (i2' * i1 * i0') Commutative
= (i2 * i0) * (i1 + i1') + (i2 * i1 * i0') + (i2' * i1 * i0') Distributivity
= (i2 * i0) * 1 + (i2 * i1 * i0') + (i2' * i1 * i0') Complement Element
= (i2 * i0) + (i2 * i1 * i0') + (i2' * i1 * i0') Identity Element
= (i2 * i0) + (i2 + i2') * (i1 * i0') Distributivity
= (i2 * i0) + 1 * (i1 * i0') Complement Element
= (i2 * i0) + (i1 * i0') Identity Element

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Product of Sums (POS)

b = (i2 + i1 + i0) * (i2' + i1 + i0) * (i2 + i1' + i0') * (i2 + i1 + i0')

Minimized POS

b	= ((i1 + i0) + (i2 * i2')) * (i2 + i1' + i0') * (i2 + i1 + i0')	Distributive
	= ((i1 + i0) + 0) * (i2 + i1' + i0') * (i2 + i1 + i0')	Complement
	= (i1 + i0) * (i2 + i1' + i0') * (i2 + i1 + i0')	Identity
	= (i1 + i0) * (i0' + (i2 + i1) * (i2 + i1'))	Distributive
	= (i1 + i0) * (i0' + i2 * (1 + i1 + i1'))	Distributive
	= (i1 + i0) * (i0' + i2 * 1)	Complement
	= (i1 + i0) * (i0' + i2)	Complement

Circuit