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CMPE 240 Experiment 1 Lab Work

Truth Table

#	x2	x1	x0	Y
0	0	0	0	0
1	0	0	1	1
2	0	1	0	1
3	0	1	1	1
4	1	0	0	0
5	1	0	1	1
6	1	1	0	0
7	1	1	1	1

Sum of Products (SOP)

y = (x2'.x1'.x0) + (x2'.x1.x0') + (x2'.x1.x0) + (x2.x1'.x0) + (x2.x1.x0)

Minimized SOP

y = (x2'.x1.x0')+x0.((x2'.x1')+(x2'.x1)+ (x2.x1')+(x2.x1)) [DISTRIBUTIVE]
= (x2'.x1.x0')+x0.(x2'.(x1'+x1) +(x2.x1')+(x2.x1)) [DISTRIBUTIVE]
= (x2'.x1.x0')+x0.(x2'.(x1'+x1) +x2.(x1'+x1)) [DISTRIBUTIVE]
= (x2'.x1.x0')+x0.(x2'.(1) +x2.(x1'+x1)) [COMPLEMENT]
= (x2'.x1.x0')+x0.(x2'.(1) +x2.(1)) [COMPLEMENT]
= (x2'.x1.x0')+x0.(x2' +x2.(1)) [IDENTITY]
= (x2'.x1.x0')+x0.(x2' +x2) [IDENTITY]
= (x2'.x1.x0')+(x0.x2')+(x0.x2) [DISTRIBUTIVE]
= x2'.((x1.x0')+x0)+(x0.x2) [DISTRIBUTIVE]
= x2'.((x0+x0').(x0+x1))+(x0.x2) [DISTRIBUTIVE]
= x2'.(1.(x0+x1))+(x0.x2) [COMPLEMENT]
= x2'.(x0+x1)+(x0.x2) [IDENTITY]
= (x2'.x0)+(x2'.x1)+(x0.x2) [DISTRIBUTIVE]

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Product of Sums (POS)

y = (x2+x1+x0).(x2'+x1+x0).(x2'+x1'+x0)

Minimized POS

y	= (x2.x2'+x1+x0).(x2'+x1'+x0)		[DISTRIBUTIVE]
	= (0+x1+x0).(x2'+x1'+x0)		[COMPLEMENT]
	= (x1+x0).(x2'+x1'+x0)		[IDENTITY]
	= (x0+x1.(x1'+x2'))		[DISTRIBUTIVE]
	= x0+(x1.x1') + (x1.x2')		[DISTRIBUTIVE]
	= x0 + 0 + (x1.x2')	**s**	[COMPLEMENT]
	= x0 + (x1.x2')		[IDENTITY]
	= (x0+x1).(x0+x2')		[DISTRIBUTIVE]

Circuit

Please note that the circuit below has the minimum number of gates (SOP solution gives us 7 gates, there are 4 gates here.), hence the cost of the circuit is minimized by choosing this circuit.

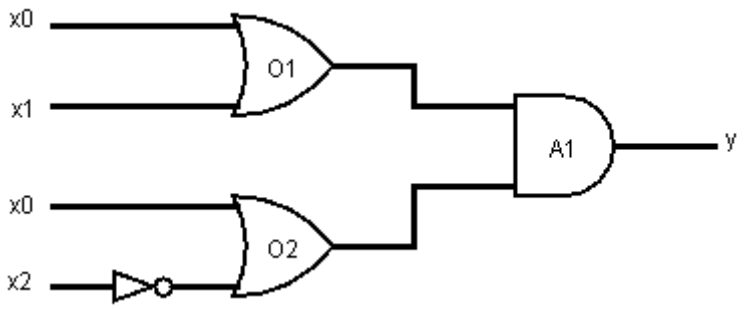

Figure 1 - The circuit for the minimized POS