4 Realization of Combinatorial Logic

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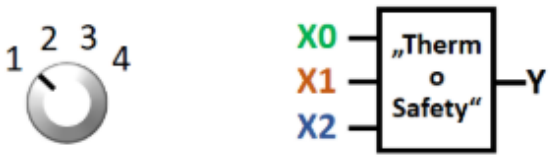
In the last chapter we investigated the Therm-o-Safety example. From this, it was possible to create the logic formula via sum of products of products of sums (see figure 1).

Fig. 1: gate logic from Therm-o-Safety example: Formula



Input	X2	X1	X0	Y0	Minterms	Sum of Products
	0	0	0	-		
1	0	0	1	0		
2	0	1	0	0		
3	0	1	1	1	$\overline{X2}$ & X1 & X0	$Y0 = (\overline{X2}$ & X1 & X0) +
4	1	0	0	1	X2 & $\overline{X1}$ & $\overline{X0}$	+ (X2 & $\overline{X1}$ & $\overline{X0}$) +
	1	0	1	-		+ (X2 & X1 & X0)
Off	1	1	0	0		
On	1	1	1	1	X2 & X1 & X0	

It is simple to derive the gate logic from the formula (figure 2). For each of the three (min)terms an AND-gate combines the needed inputs. As shown in the image, usually parallel to the inputs also the inverted inputs are drawn.

Fig. 2: gate logic from Therm-o-Safety example: Gate Logic

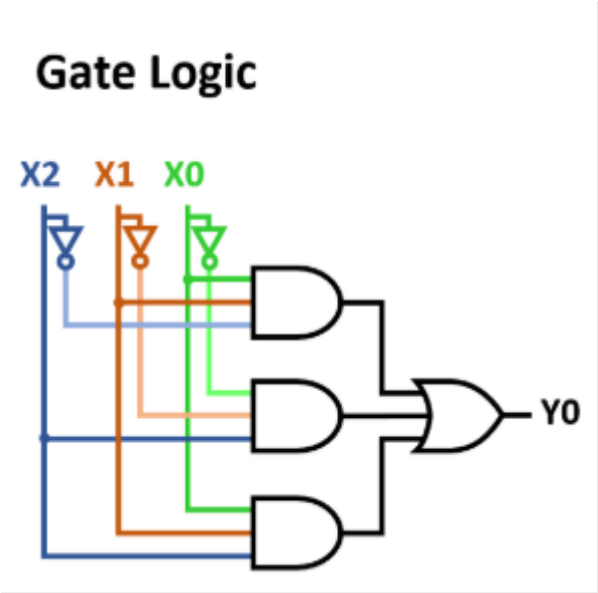


Fig. ##: Simulation of an Inverter