Homework 1

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2.2 **(b)** $(x+y)(x+\overline{y}) = x(y+\overline{y}) = x(1) = x$

(c) $xyz + \overline{x}y + xy\overline{z} = y(xz + \overline{x} + x\overline{z}) = y(\overline{x} + x(z+\overline{z})) = y(\overline{x} + x(1)) = y(1) = y$

(d) $(A+B)(\overline{A}+\overline{B}) = (A+B)\overline{(AB)} = A\overline{B} + \overline{A}B = A \oplus B$

(e) $(a+b+\overline{c})(\overline{a}.\overline{b}+c) = (a+b+\overline{c})(\overline{a+b}+c) = (a+b) \oplus c$

(f) $\overline{a}bc + ab\overline{c} + abc + \overline{a}b\overline{c} = b(\overline{a}c + a\overline{c} + ac + \overline{a}\overline{c}) = b(1) = b$

2.10 **(a)** The Boolean function $E = F_1 + F_2$ is true when either F_1 or F_2 or both are true. Thus it contains the union of their minterm sets.

(b) The Boolean function $G = F_1F_2$ is true only when both F_1 and F_2 are true. Thus it contains the intersection of their minterm sets.

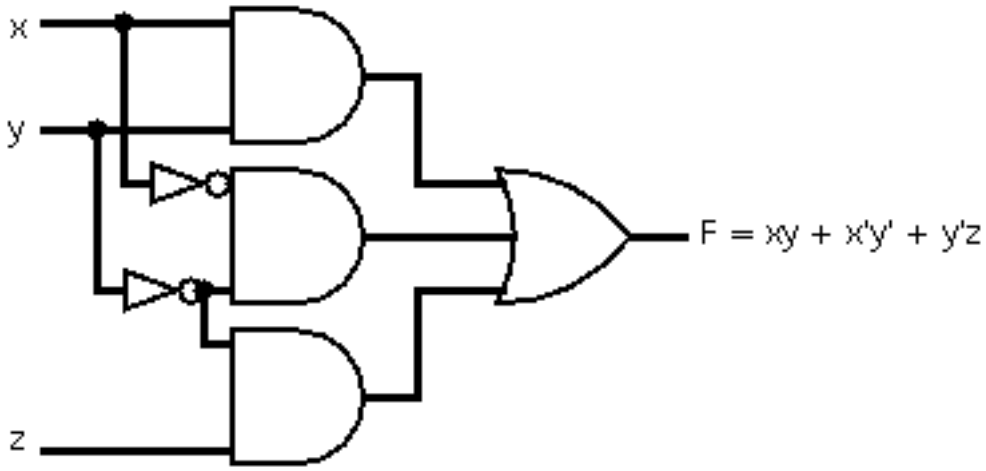
2.11 **(a)** $F = xy + x\overline{y} + \overline{y}z$

x	y	z	xy	$x\overline{y}$	$\overline{y}z$	$xy + x\overline{y} + \overline{y}z$
0	0	0	0	0	0	0
0	0	1	0	0	1	1
0	1	0	0	0	0	0
0	1	1	0	0	0	0
1	0	0	0	1	0	1
1	0	1	0	1	1	1
1	1	0	1	0	0	1
1	1	1	1	0	0	1

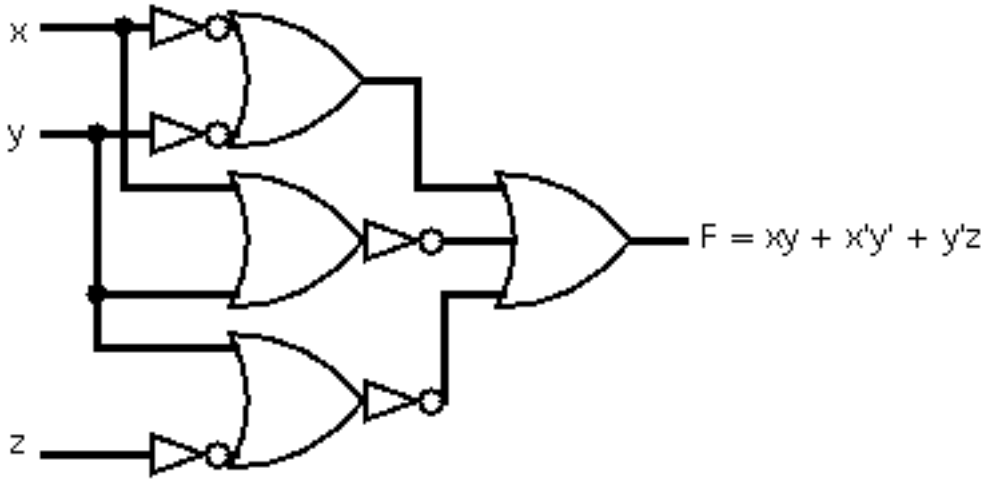
(b) $F = bc + \overline{a}.\overline{c}$

a	b	c	bc	$\overline{a}.\overline{c}$	$bc + \overline{a}.\overline{c}$
0	0	0	0	1	1
0	0	1	0	0	0
0	1	0	0	1	1
0	1	1	1	0	1
1	0	0	0	0	0
1	0	1	0	0	0
1	1	0	0	0	0
1	1	1	1	0	1

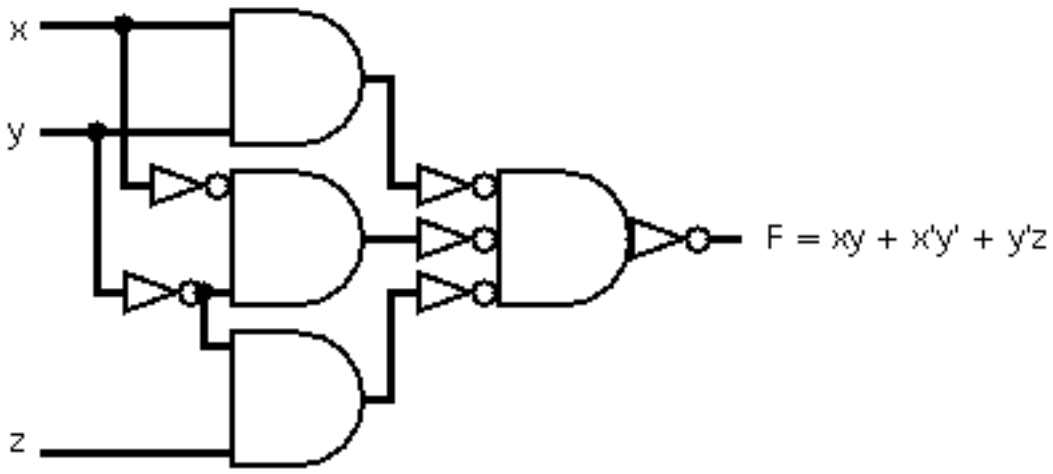
2.14 **(a)** With AND, OR, and inverter gates



(b) With OR and inverter gates



(c) With AND and inverter gates



Homework Problem Write a Python or Java program (whichever language is easier for you to use), to generate the truth table of the function F3 of Figure 2.4 in Mano.