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$$xy + yz + \bar{x}z = xy + \bar{x}z$$

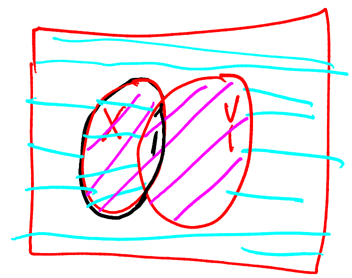
LHS RHS

$$\text{LHS} = xy + yz\underbrace{(x+\bar{x})}_{1} + \bar{x}z$$

$$= xy + xyz + \bar{x}yz + \bar{x}z$$

$$= xy(1+z) + \bar{x}z(y+1)$$

$$= xy + \bar{x}z$$



problem 2.2

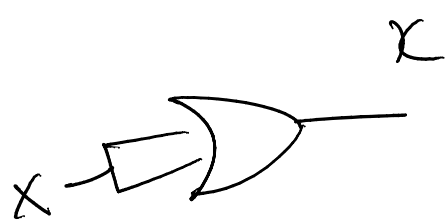
$$\underbrace{(x+y)(x+\bar{y})} = x$$

$$\text{LHS} = \underbrace{xx}_{x} + x\bar{y} + xy + \cancel{\bar{y}y} \to 0$$

$$= x + x\underbrace{(\bar{y}+y)}_{1}$$

$$= x + x$$

$$= x$$



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(17b) $\overline{(x+y)(y+z)(\bar{x}+z)} = \overline{(x+y)(\bar{x}+z)}$

DeMorgan's $\overline{x+y} = \bar{x}\bar{y}$

$(\overline{x+y}) + (\overline{y+z}) + (\overline{\bar{x}+z}) = (\overline{x+y}) + (\overline{\bar{x}+z})$

$\bar{x}\bar{y} + \bar{y}\bar{z} + x\bar{z} = \bar{x}\bar{y} + x\bar{z}$

LHS RHS

$$
\begin{aligned}
LHS &= \bar{x}\bar{y} + \bar{y}\bar{z}(\bar{x}+x) + x\bar{z} \\
&= \bar{x}\bar{y} + \bar{x}\bar{y}\bar{z} + x\bar{y}\bar{z} + x\bar{z} \\
&= \bar{x}\bar{y}(1+\bar{z}) + x\bar{z}(\bar{y}+1) \\
&= \bar{x}\bar{y} + x\bar{z}
\end{aligned}
$$

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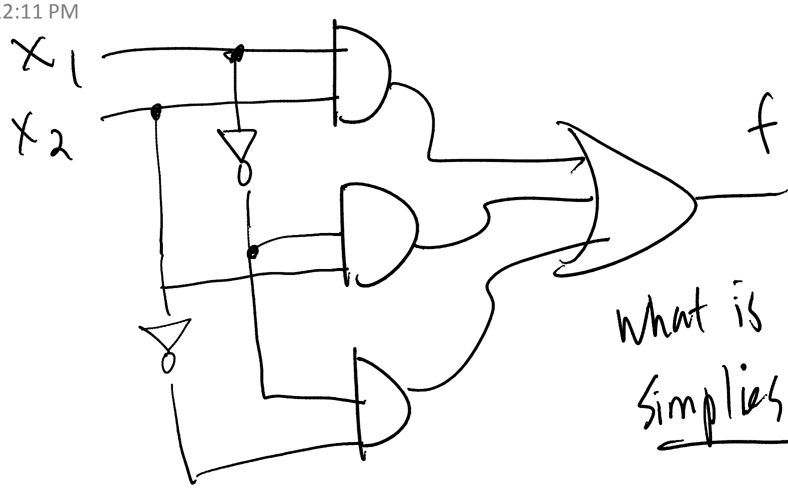

What is f ? Find the simpliest implementation.

$$f = x_1x_2 + \bar{x}_1x_2 + \bar{x}_1\bar{x}_2$$

$$= x_1x_2 + \bar{x}_1(x_2 + \bar{x}_2)$$

$$= \bar{x}_1 + x_1x_2$$

$$f = x_1x_2 + \bar{x}_1x_2 + \bar{x}_1x_2 + \bar{x}_1\bar{x}_2$$

OR

$$f = x_1x_2 + \boxed{\bar{x}_1x_2} + \bar{x}_1\bar{x}_2$$

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$$= (x_1 + \bar{x}_1)x_2 + \bar{x}_1(x_2 + \bar{x}_2)$$

$$= x_2 + \bar{x}_1$$

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Truth table

$f = \bar{x}\bar{y} + xy$

	x	y	f
0	0	0	1
1	0	1	0
2	1	0	0
3	1	1	1

3-input → 8

4-input → 16

5-input → 32

16 8 4 2 1

0 1 0 0 4

0 0 1 1 3

4 2^2 2 2^1 1 2^0

$n_{n-1} \cdots n_3 \; n_2 \; n_1 \; n_0$

$\boxed{\sum m(0,3)}$

x	y	z	f
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	0

$\sum m(0,3,5,6)$

K-map