

Digital Logic

$$B = \{0, 1\}$$

0 are also the identity

$$0 + x = x$$

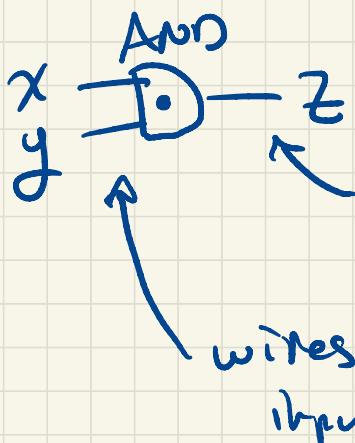
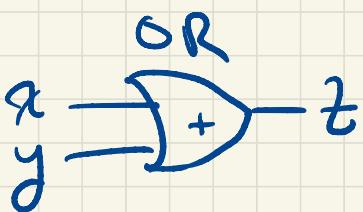
$$1 \cdot x = x$$

$$\begin{array}{c|c} X \cdot Y & \\ \hline 00 & 0 \\ 01 & 0 \\ 10 & 0 \\ 11 & 1 \end{array}$$

$$\begin{array}{c|c} X + Y & + \\ \hline 00 & 0 \\ 01 & 1 \\ 10 & 1 \\ 11 & 1 \end{array}$$

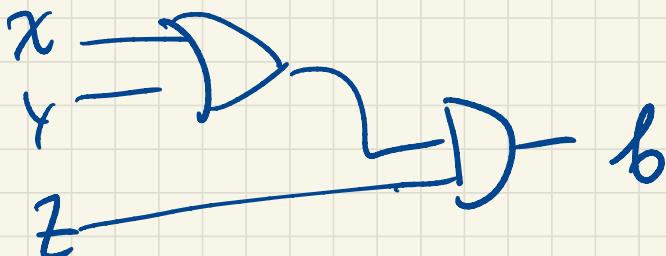
$$\begin{array}{c|c} X & \\ \hline 0 & 1 \\ 1 & 0 \end{array}$$

Digital Circuit

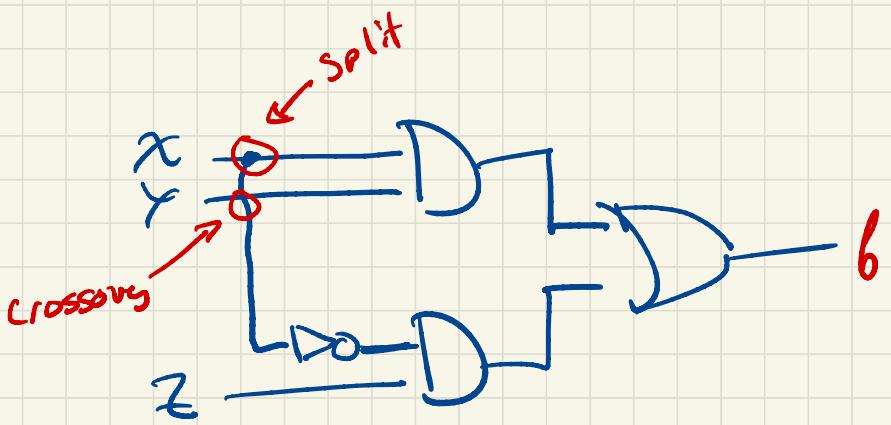


GATES

wires as
output

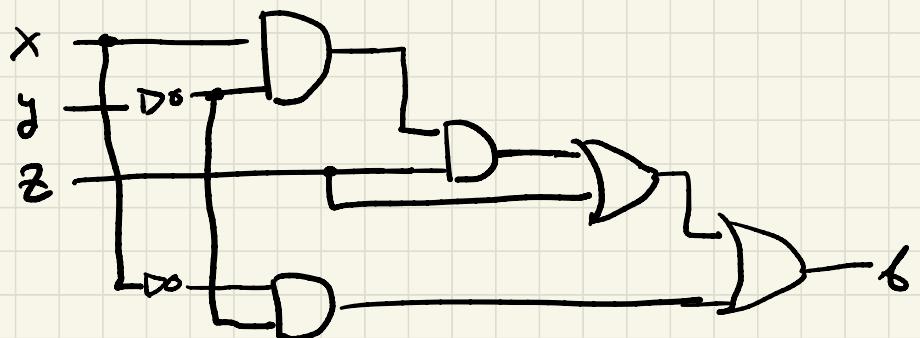


$$f = (x+y) \cdot z$$

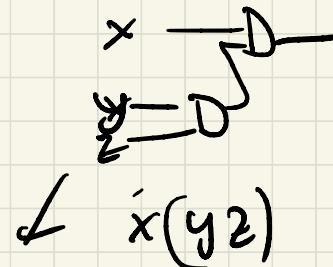


$$f(x,y,z) = xy + x'z$$





$$(x'y)z \downarrow$$



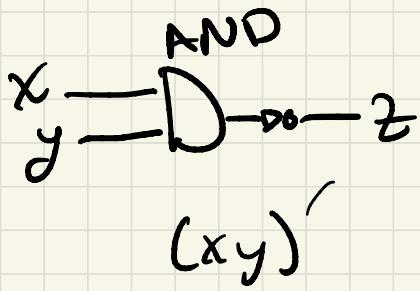
$$\swarrow \bar{x}(yz)$$



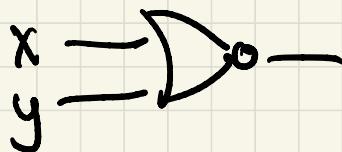
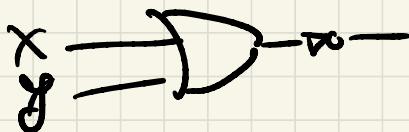
$$x \rightarrow D \quad y \rightarrow D \Rightarrow$$



Bubbles



x	y	NAND
0	0	1
0	1	1
1	0	1
1	1	0



x	y	NOR
0	0	1
0	1	0
1	0	0
1	1	0

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

$$(xy)' = x' + y'$$

$$\begin{array}{c} x \\ y \end{array} \overline{\text{D}} z = \begin{array}{c} x \\ y \end{array} \overline{\text{D}} \begin{array}{c} \bar{x} \\ \bar{y} \end{array} z$$

$$\begin{array}{c} x \\ y \end{array} \overline{\text{D}} z = \begin{array}{c} x \\ y \end{array} \overline{\text{D}} \begin{array}{c} x \\ y \end{array} z$$

Bubble pushing

$$\begin{array}{c} x \\ y \end{array} \overline{\text{D}} - = \overline{\text{D}} \begin{array}{c} x \\ y \end{array} -$$

Visualizing DeMorgan's Law

