

Licence Physique et Applications 2 – Ingénierie

Correction CC1 circuits numériques et automatismes

1a) $X = \underbrace{10}_2 \underbrace{1011}_B = 2B_h = 32+8+2+1 = 43_d$

$Y = \underbrace{1010}_A \underbrace{0010}_2 \underbrace{1011}_B = 10*256 + 2*16 + 11 = 2603_d$

$Z : \begin{array}{r|l} 60 & 16 \\ \hline 12 & 3 \quad 16 \\ \hline & 3 \quad 0 \end{array} \qquad Z = 3Ch = \underbrace{11}_3 \underbrace{1100}_C$

1b)
$$\begin{array}{r} 1 \ 1 \\ 101011 \\ +111100 \\ \hline 1100111 \end{array}$$

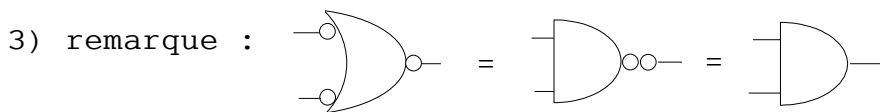
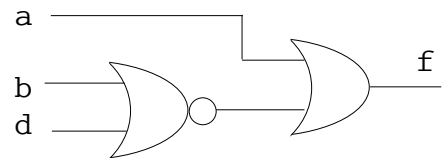
1c)
$$\begin{array}{r} 101000101011 \\ -101011 \downarrow \\ 1001100 \\ -101011 \downarrow \\ 1000011 \\ -101011 \downarrow \\ 110000 \\ -101011 \downarrow \\ 10111 \end{array} \quad \begin{array}{r} 101011 \\ \hline 111100 \end{array}$$

1d) en binaire, diviser par 4
= décaler la virgule 2 fois
donc $X/4 = \underbrace{1010}_A, \underbrace{1100}_C = A,Ch$

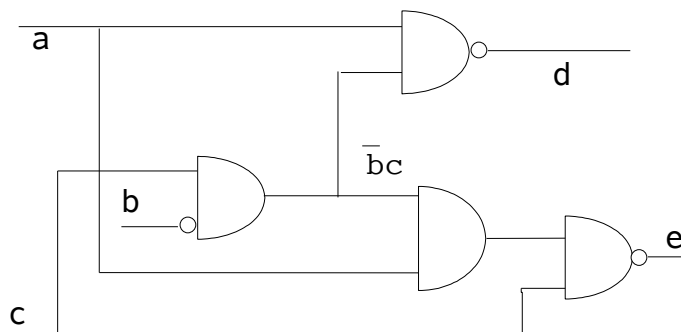
2) $f = \bar{a}\bar{b}\bar{c}\bar{d} + (a\bar{b} + \bar{a}b)\bar{d} + \bar{a}d + \bar{a}\bar{b}c$
 $\bar{a}\bar{b}\bar{c}\bar{d} + \bar{a}b\bar{d} + \bar{a}b\bar{d} + \bar{a}d + \bar{a}\bar{b}c$

	ab			
	00	01	11	10
00	1	1	0	1
01	1	1	0	0
11	1	1	0	0
10	1	1	0	1

$f = a + \bar{b}\bar{d}$



on obtient donc :



$d = \overline{\bar{b}\bar{c}\bar{a}} = b + \bar{c} + \bar{a}$

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