

1.

A	B	C	D	W	X	Y	Z
0	0	0	0	0	0	1	1
0	0	0	1	0	1	0	0
0	0	1	0	0	1	0	1
0	0	1	1	0	1	1	0
0	1	0	0	0	1	1	1
0	1	0	1	1	0	0	0
0	1	1	0	1	0	0	1
0	1	1	1	1	0	1	0
1	0	0	0	1	0	1	1
1	0	0	1	1	1	0	0
1	0	1	0	1	1	0	1
1	0	1	1	1	1	1	0
1	1	0	0	1	1	1	1
1	1	0	1	1	0	0	0
1	1	1	0	1	0	0	1
1	1	1	1	1	0	1	0

$$W = A + B(C + D)$$

$$X = \bar{B}(C + D) + B\bar{C}\bar{D}$$

$$Y = CD + \bar{C}\bar{D}$$

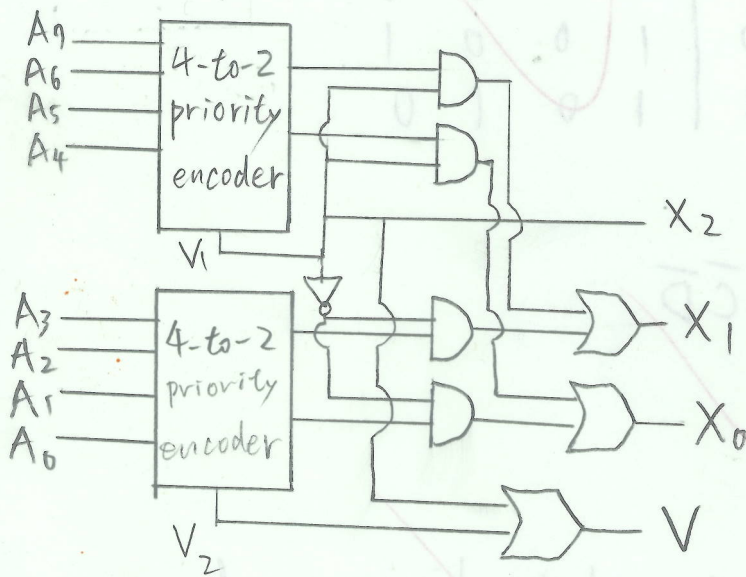
$$Z = \bar{D}$$

function = translate binary code  
to exceed-3 code.

2.

$A_7$	$A_6$	$A_5$	$A_4$	$A_3$	$A_2$	$A_1$	$A_0$	$X_2$	$X_1$	$X_0$
1	x	x	x	x	x	x	x	1	1	1
0	1	x	x	x	x	x	x	1	0	1
0	0	1	x	x	x	x	x	1	0	0
0	0	0	1	x	x	x	x	0	1	1
0	0	0	0	1	x	x	x	0	1	0
0	0	0	0	0	1	x	x	0	0	1
0	0	0	0	0	0	1	x	0	0	0
0	0	0	0	0	0	0	1	0	0	0

$A_7$	$A_6$	$A_5$	$A_4$	$Y_1$	$Y_0$	$V_1$
1	x	x	x	1	1	1
0	1	x	x	1	0	1
0	0	1	x	0	1	1
0	0	0	1	0	0	1
0	0	0	0			0



Very Good.

3.  $149_{10} = 010010101_2$

$$\begin{array}{r} 2 \overline{) 149} \\ 2 \overline{) 74} \dots 1 \\ 2 \overline{) 37} \dots 0 \\ 2 \overline{) 18} \dots 1 \\ 2 \overline{) 9} \dots 0 \\ 2 \overline{) 4} \dots 1 \\ 2 \overline{) 2} \dots 0 \\ 1 \dots 0 \end{array}$$

$$\begin{array}{r} 0.375 \\ \times 2 \\ \hline 0.750 \\ \times 2 \\ \hline 1.500 \\ \times 2 \\ \hline 3.000 \end{array}$$

A.  $110010101_2 = 01100$

B.  $101101010_2 = 10011$

C.  $101101010_2 = 10100$

4.

$\overline{A}BCD$   $\overline{A}BCD$

0	0	1	0
0	1	0	1
0	0	0	1
1	0	0	0

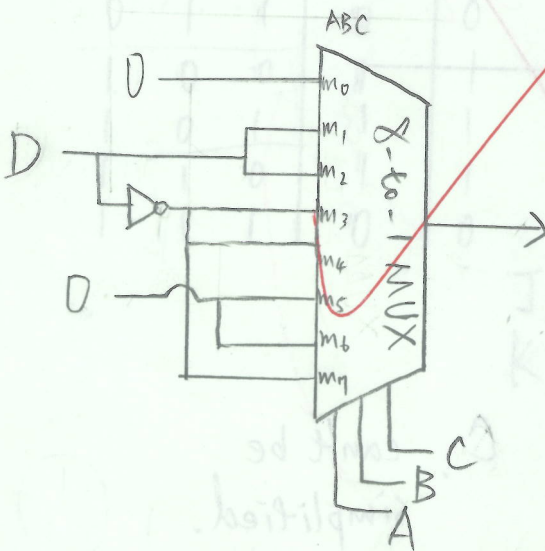
$\overline{A}BCD$

0011	3
0101	5
0110	6
1010	10
1100	12
1001	9

$$F = BCD + \overline{A}BCD + \overline{A}BCD + \overline{A}BCD$$

↓

0	D	$\overline{D}$	D
$\overline{D}$	0	$\overline{D}$	0



A	B	C	D	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	D
0	1	0	0	0
0	1	0	1	D
0	1	1	0	1
0	1	1	1	$\overline{D}$
1	0	0	0	0
1	0	0	1	D
1	0	1	0	1
1	0	1	1	$\overline{D}$
1	1	0	0	1
1	1	0	1	$\overline{D}$
1	1	1	0	0
1	1	1	1	0



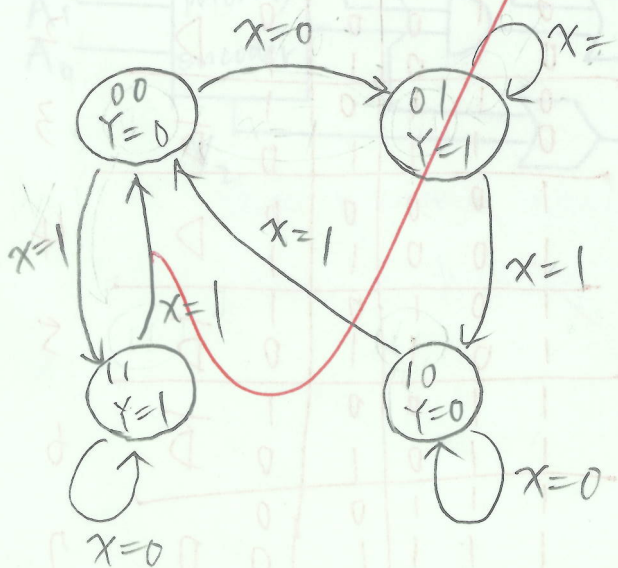
5.  $D = Q_1 \oplus X = Q_1(t+1)$  .  $Y = Q_0(t)$  .  $J = \overline{Q_1(t)}$

A.	$Q_1(t)$	$Q_0(t)$	X	$Q_1(t+1)$	J	K	$Q_0(t+1)$
$S_0$	0	0	0	0	1	0	1
	0	0	1	1	1	1	1
$S_2$	1	0	0	1	0	0	0
	1	0	1	0	0	1	0
$S_1$	0	1	0	0	1	0	1
	0	1	1	1	1	1	0
$S_3$	1	1	0	1	0	0	1
	1	1	1	0	0	1	0

⇓

$(Q_1 Q_0)(t)$	Next S		Y
	$x=0$	$x=1$	
0 0	0 1	1 1	0
0 1	0 1	1 0	1
1 0	1 0	0 0	0
1 1	1 1	0 0	1

B.



C. can't be simplified.

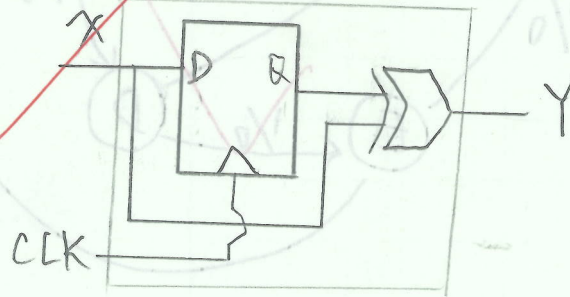
6.  $A=0, B=1$

$$15$$

S	X	NS	Y
0	0	0	0
0	1	1	1
1	0	0	1
1	1	1	0

$$NS = X$$

$$Y = S \oplus X$$



7.

10

J	K	$Q_{old}$	$Q_{new}$	D
0	0	0	0	0
0	0	1	1	1
0	1	0	0	0
0	1	1	0	0
1	0	0	1	1
1	0	1	1	1
1	1	0	1	1
1	1	1	0	0

$$D = F(J, K, Q)$$

$$= \sum m(1, 4, 5, 6) = J\bar{Q} + \bar{K}Q$$

$$10$$

	$\bar{Q}$	$Q$	$\bar{Q}$	$Q$
J	0	1	0	1
K	1	1	0	1

