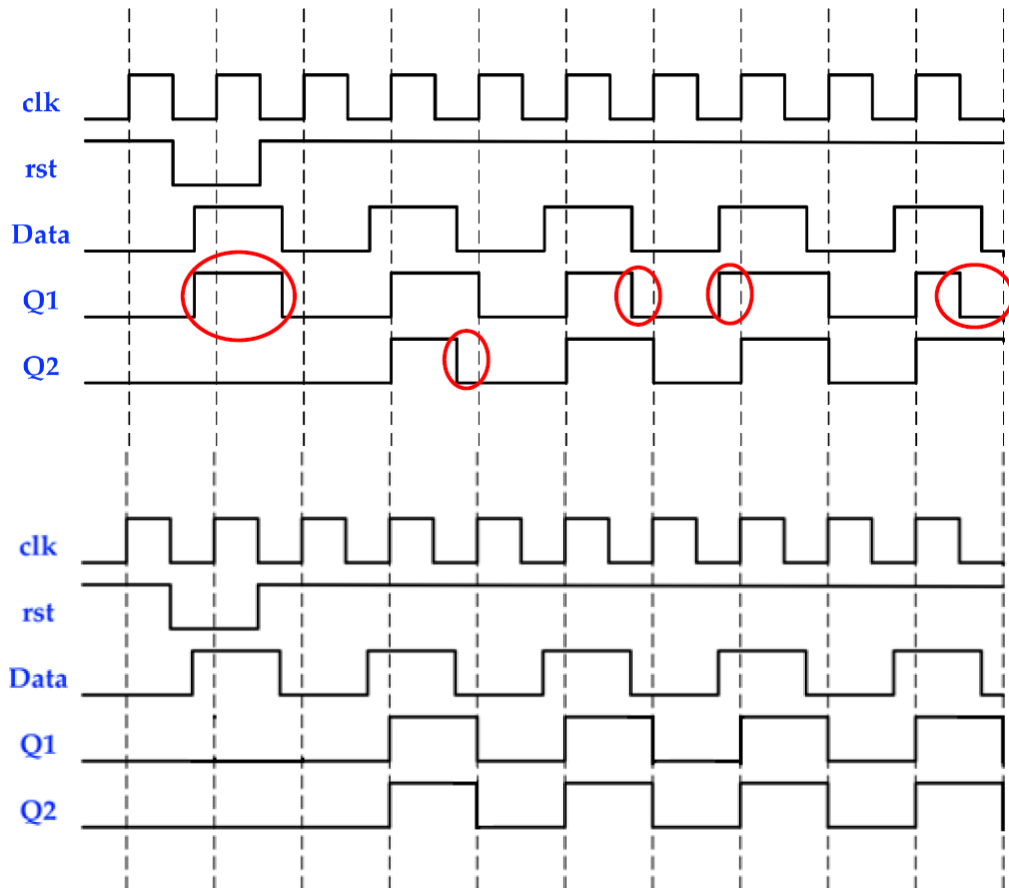
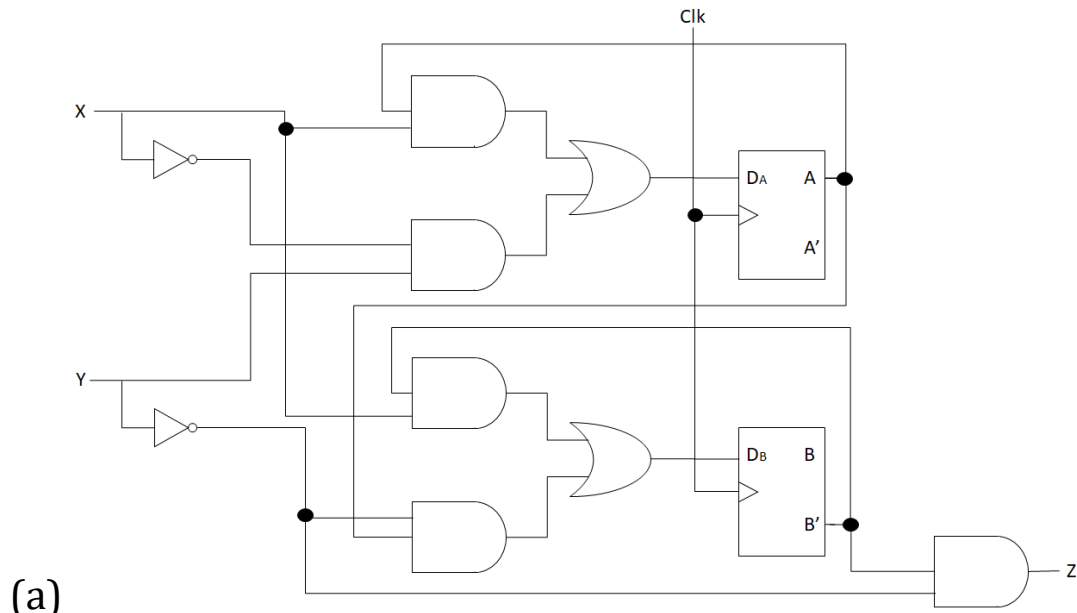


邏輯設計 HW6 Solution

1.(16%)



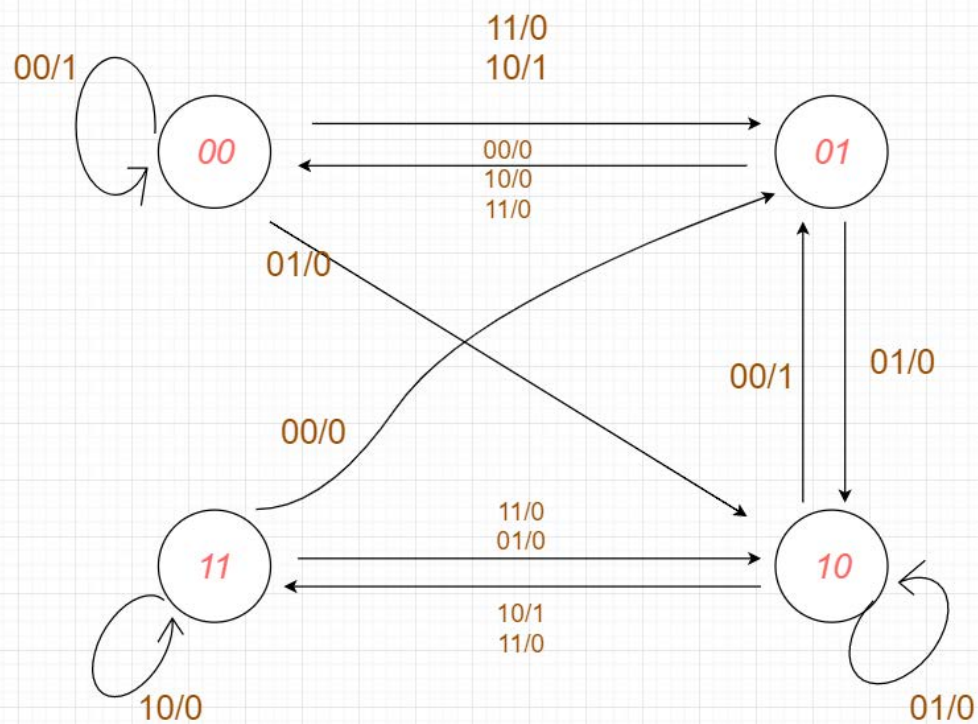
2.(18%)



(b)

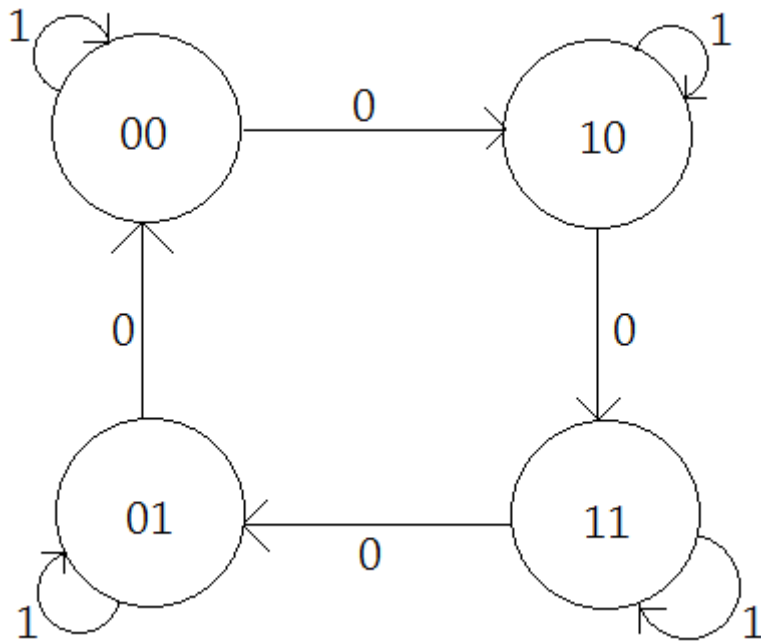
Present state		Input		Next state		Output
A	B	x	y	A+1	B+1	Z
0	0	0	0	0	0	1
0	0	0	1	1	0	0
0	0	1	0	0	1	1
0	0	1	1	0	1	0
0	1	0	0	0	0	0
0	1	0	1	1	0	0
0	1	1	0	0	0	0
0	1	1	1	0	0	0
1	0	0	0	0	1	1
1	0	0	1	1	0	0
1	0	1	0	1	1	1
1	0	1	1	1	1	0
1	1	0	0	0	1	0
1	1	0	1	1	0	0
1	1	1	0	1	1	0
1	1	1	1	1	0	0

(c)



3.(16%)

此電路沒有輸出，所以 state diagram 的箭頭只代表 input 的值



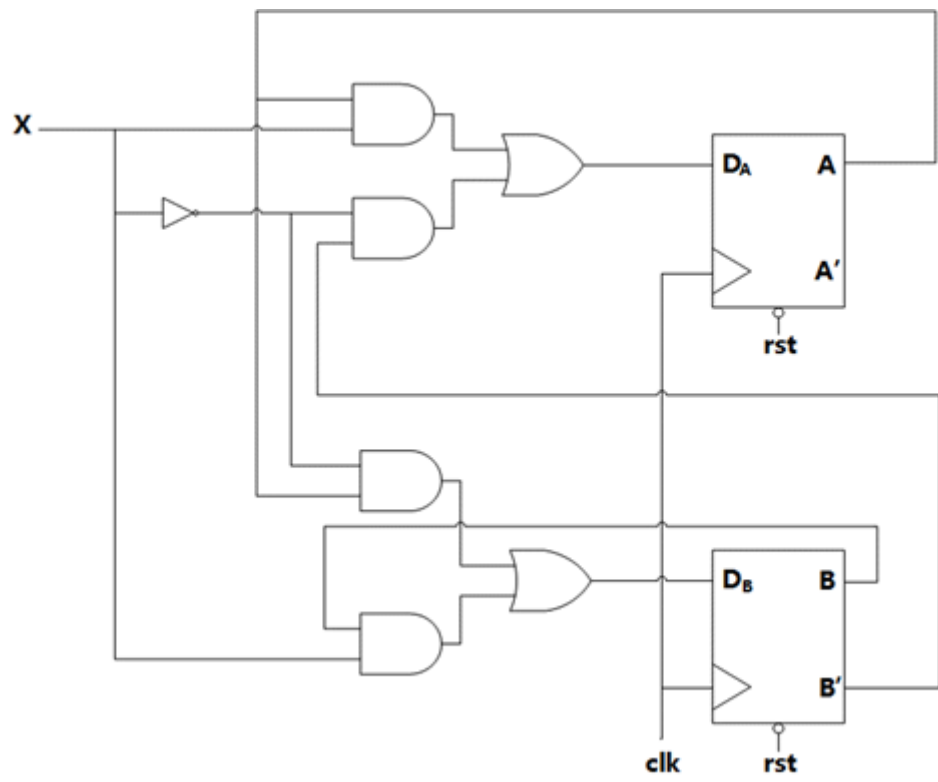
Present state		Input	Next state	
A	B	x	A+1	B+1
0	0	0	1	0
0	0	1	0	0
0	1	0	0	0
0	1	1	0	1
1	0	0	1	1
1	0	1	1	0
1	1	0	0	1
1	1	1	1	1

D _A	x	AB			
		00	01	11	10
0	0	1			1
	1			1	1

$$\underline{D_A = B'X' + AX}$$

D _B	x	AB			
		00	01	11	10
0	0			1	1
	1		1	1	

$$\underline{D_B = AX' + BX}$$



4.(16%)

00→1000 01→0100 10→0010 11→0001

Present state				Input	Next state				Output
A	B	C	D	x	A _{n+1}	B _{n+1}	C _{n+1}	D _{n+1}	Y
1	0	0	0	0	0	1	0	0	1
1	0	0	0	1	1	0	0	0	1
0	1	0	0	0	0	1	0	0	0
0	1	0	0	1	0	0	1	0	0
0	0	1	0	0	0	0	0	1	0
0	0	1	0	1	0	0	1	0	0
0	0	0	1	0	0	0	0	1	0
0	0	0	1	1	1	0	0	0	0

AB \ CD	00	01	11	10
00	x	0	x	0
01	0	x	x	x
11	x	x	x	x
10	0	x	x	x

X=0

AB \ CD	00	01	11	10
00	x	0	x	1
01	1	x	x	x
11	x	x	x	x
10	0	x	x	x

X=1

$$D_A = B'C'X$$

AB \ CD	00	01	11	10
00	x	1	x	1
01	0	x	x	x
11	x	x	x	x
10	0	x	x	x

X=0

AB \ CD	00	01	11	10
00	x	0	x	0
01	0	x	x	x
11	x	x	x	x
10	0	x	x	x

X=1

$$D_B = C'D'X'$$

AB \ CD	00	01	11	10
00	x	0	x	0
01	0	x	x	x
11	x	x	x	x
10	0	x	x	x

X=0

AB \ CD	00	01	11	10
00	x	1	x	0
01	0	x	x	x
11	x	x	x	x
10	1	x	x	x

X=1

$$D_C = A'D'X$$

AB \ CD	00	01	11	10
00	x	0	x	0
01	1	x	x	x
11	x	x	x	x
10	1	x	x	x

$X=0$

AB \ CD	00	01	11	10
00	x	0	x	0
01	0	x	x	x
11	x	x	x	x
10	0	x	x	x

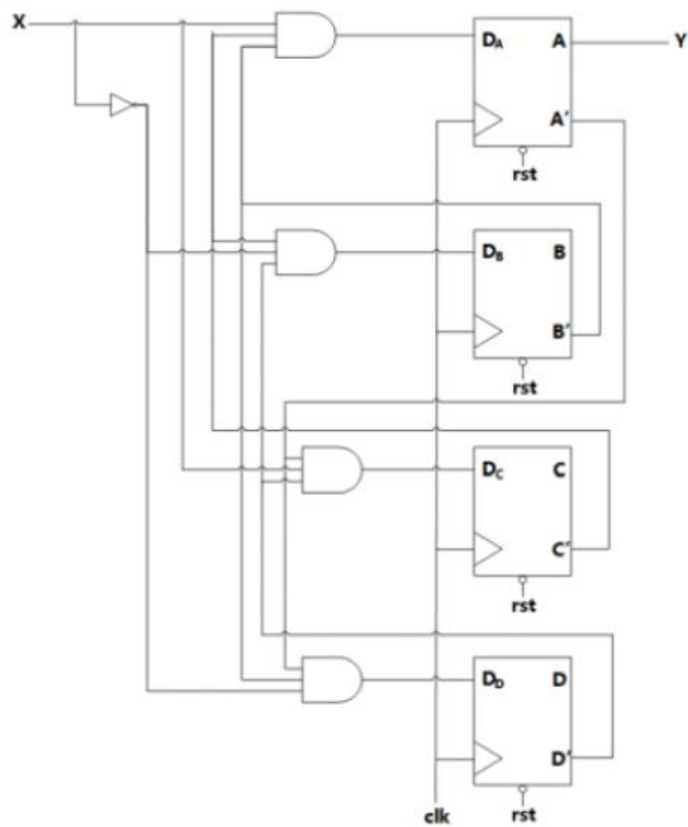
$X=1$

$$D_0 = A'B'X'$$

AB \ CD	00	01	11	10
00	x	0	x	1
01	0	x	x	x
11	x	x	x	x
10	0	x	x	x

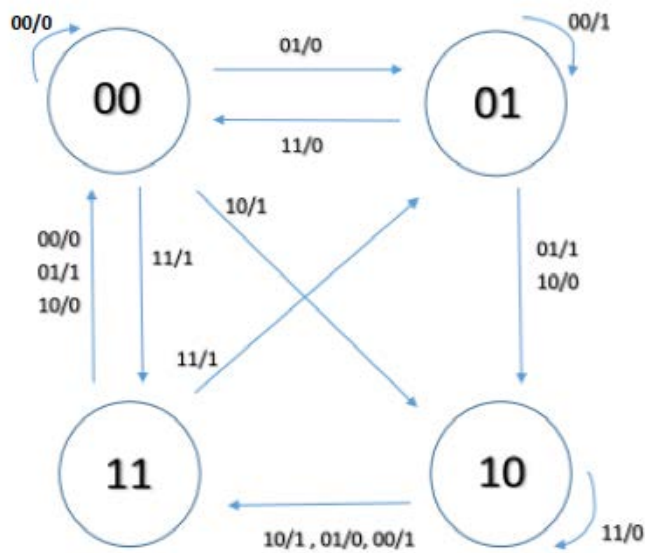
$Y = A$

AB \ CD	00	01	11	10
00	x	0	x	1
01	0	x	x	x
11	x	x	x	x
10	0	x	x	x



註：此題 00→0001, 00→0010, 00→0100, 00→1000 亦可

5.(16%)



6.(18%)

Present State	Next State		Output	
	x=0	x=1	x=0	x=1
a	f	b	0	0
b	d	c	0	0
c	f	e	0	0
d	g	a	1	0
e	d	c	0	0
f	f	b	1	1
g	g	h	0	1
h	g	a	1	0

$h \rightarrow d$

$e \rightarrow b$

$c \rightarrow a$

Present State	a	f	b	c	e	d	g	h	g	g	h
input	0	1	1	1	0	0	1	0	0	1	1
Next State	f	b	c	e	d	g	h	g	g	h	a
output	0	1	0	0	0	1	1	1	0	1	0

Reduced

Present State	Next State		Output	
	x=0	x=1	x=0	x=1
a	f	b	0	0
b	d	c	0	0
d	g	a	1	0
f	f	b	1	1
g	g	d	0	1

Present State	a	f	b	a	b	d	g	d	g	g	d
input	0	1	1	1	0	0	1	0	0	1	1
Next State	f	b	a	b	d	g	d	g	g	d	a
output	0	1	0	0	0	1	1	1	0	1	0