

# Fundamental / Moore

$x_1 x_2$

## Primitive flow table:

①

	00	01	11	10
a	a/0	<del>b/0</del> <sup>h/0</sup>	—	b/0
b	c/0	—	g/0	b/0
c	c/0	h/0	—	d/0
d	e/0	—	g/0	d/0
e	e/0	f/-	—	i/0
f	a/-	f/1	g/-	—
g	—	h/0	g/0	i/0
h	a/0	h/0	g/0	—
i	a/0	—	g/0	i/0

$$a = 00$$

$$b = 10 / 0$$

$$c = 00 / 0$$

$$d = 10 / 0$$

$$e = 00 / 0$$

~~$$e = 00 / 0$$~~

$$f = 01 / 1 \text{ (lock open)}$$

$$g = 11 / 0 \text{ (invalid state for 11)}$$

$$h = 01 / 0 \text{ (invalid state for 01)}$$

$$i = 10 / 0 \text{ (invalid state for 10)}$$

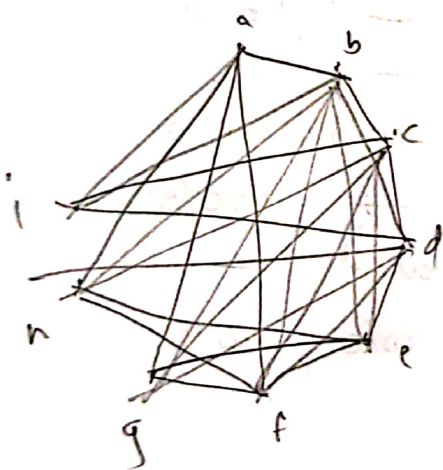
## Implication Table:

b	<del>a</del>							
c	<del>b</del>	<del>b</del>						
d	<del>a</del> <del>bd</del>	<del>ac</del>	<del>cd</del>					
e	<del>fh</del> <del>bi</del>	<del>ae</del> <del>bi</del>	<del>fh</del> <del>di</del>	<del>di</del>				
f	x	<del>ac</del>	x	<del>ae</del>	<del>ae</del>			
g	<del>bi</del>	<del>bi</del>	<del>di</del>	<del>di</del>	<del>fh</del>	x		
h	✓	<del>ac</del>	<del>ac</del>	<del>ae</del>	<del>fh</del>	x	✓	
i	<del>bi</del>	<del>ae</del>	<del>ae</del> <del>di</del>	<del>ae</del>	✓	✓	✓	✓
	a	b	c	d	e	f	g	h

∴ Max Compatible Merger Diagram: (2)



Max Incompatibility



∴ grasping

(ghi) (f) (e) (d) (c) (b) (a).  
7 / 6 5 4 3 2 1

7 states.

(ghi) (f) (e) (d) (c) (b) (a)

$n = 7$

Max

with vertices (abcdefg)

So,  $L = 7$

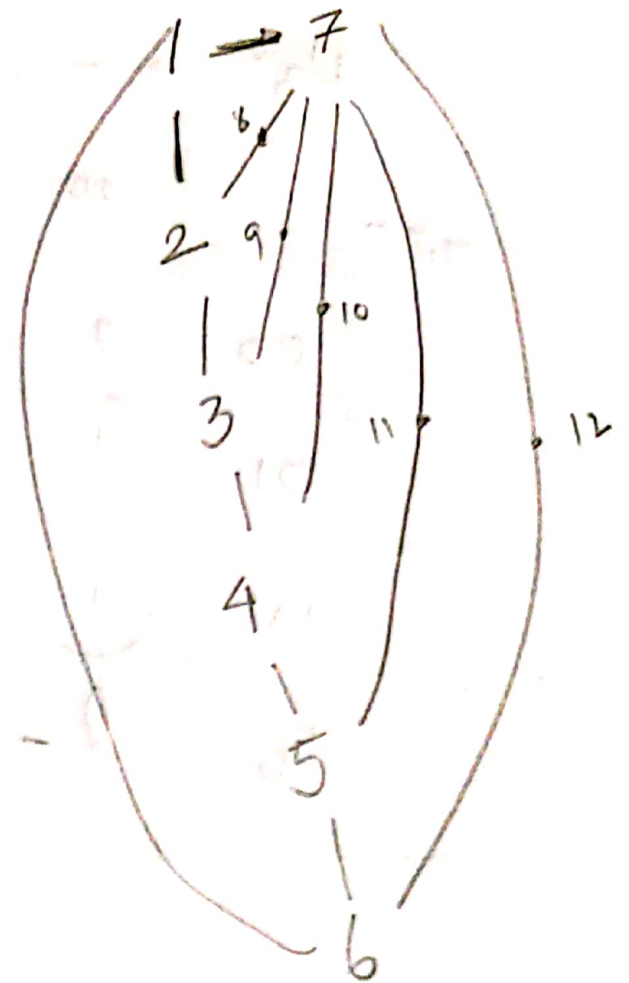
$k = 7$

Reduced flow:

	00	01	11	10	
1 (a)	①/0	7/0	—	2/0	2/0
2 (b)	3/0	—	7/0	②/0	
3 (c)	③/0	<sup>8/0</sup> 7/0	—	4/0	
4 (d)	5/0	—	7/0	④/0	
5 (e)	⑤/0	6/—	—	<sup>9/0</sup> 7/0	
6 (f)	1/0	⑥/1	7/—	—	
7 (ghi)	1/0	⑦/0	⑦/0	⑦/0	
8	—	⑧/0	—	—	
9	—	—	—	⑨/0	

(3)

7-1-2-3-4-5-6  
8



0000 ~~0000/0~~ 1100/0 - 0001/0

0001

0011

0110

0111

0101

0100

11

$x_1, x_2$

(4)

$x_1, x_2, x_3$	00	01	11	10
1 $\rightarrow$ 0000	000/0	100/0	—	001/0
2 $\rightarrow$ 0001	011/0	—	100/0	001/0
3 $\rightarrow$ 0011	011/0	010/0	—	110/0
4 $\rightarrow$ 0100	—	010/0	—	—
5 $\rightarrow$ 1100	111/0	—	100/0	110/0
6 $\rightarrow$ 1111	111/0	101/-	—	100/0
7 $\rightarrow$ 1001	000/0	101/1	100/-	—
8 $\rightarrow$ 1000	000/0	100/0	100/0	100/0

We see,  $z = x_1, x_2, x_3$

5

0000  
0001  
00

$y_1 = 0$

KMap for  $D_1$ :

$y_2 y_3$		$y_1$			
		00	01	11	10
$y_1 = 0$	00	0	1	-	0
	01	0	0	1	0
	11	0	0	-	1
	10	1	0	-	0

$$D_1 = \bar{y}_2 x_2 + y_2 x_1 + \bar{y}_2 y_1 + y_1 x_2 + \bar{y}_1 y_2 \bar{y}_3 \bar{x}_2$$

$D_2$ :

$y_2 y_3$		$y_1$			
		00	01	11	10
$y_1 = 0$	00	0	0	-	0
	01	1	-	0	0
	11	1	1	-	1
	10	-	1	-	-

$$D_2 = \bar{y}_1 y_2 \bar{x}_1 + \bar{y}_1 y_3 \bar{x}_1 + \bar{y}_1 y_2 y_3$$

$$+ y_1 \bar{y}_2 \bar{x}_1 \bar{x}_2 + y_1 \bar{y}_2 \bar{y}_3 \bar{x}_2$$

$y_2 y_3$		$y_1$			
		00	01	11	10
$y_1 = 1$	00	1	-	0	1
	01	1	0	-	0
	11	0	0	0	-
	10	0	0	0	0



KMap for  $D_3$

6

		$y_1 = 0$				$y_1 = 1$			
$D_3$		$x_2 x_3$							
$y_1$		00	01	11	10	00	01	11	10
00		0	0	-	1	1	-	0	0
01		1	-	0	1	1	1	-	0
11		1	0	-	0	0	1	0	-
10		-	0	-	-	0	0	0	0

$$D_3 = \bar{y}_1 \bar{x}_2 \bar{x}_3 y_3 + \bar{y}_1 y_2 x_1 \bar{x}_2 + y_1 \bar{x}_2 \bar{x}_1 \bar{y}_2 + y_1 \bar{x}_1 x_2 y_3$$