

1.

$$(a) \text{ SCC}(C_1 + C_2) = \text{SCC}(C_1) + \text{SCC}(C_2)$$

$$\hat{C}_1 = a'e, C_2 = b'e$$

$$\text{SCC}(C_1 + C_2) = \text{SCC}(a'e + b'e) = C$$

$$\text{SCC}(C_1) + \text{SCC}(C_2) = a'e + b'e$$

$$\Rightarrow \text{SCC}(C_1 + C_2) \neq \text{SCC}(C_1) + \text{SCC}(C_2)$$

$$(b) \text{ SCC}(C_1 \cdot C_2) = C_1 \cdot C_2$$

$$\hat{C}_3 = C_1 \cdot C_2, C_3 \text{ is also a cube.}$$

$$\Rightarrow \text{SCC}(C_3) = C_3$$

$$\Rightarrow \text{SCC}(C_1 \cdot C_2)$$

$$= \text{SCC}(C_3)$$

$$= C_3 = C_1 \cdot C_2$$

$$(c) \text{ SCC}(c \cdot f) = \text{SCC}(c \cdot f_c) = c \cdot \text{SCC}(f)$$

$$\hat{f} = a'b + b'a, c = a$$

$$\text{SCC}(c \cdot f) = \text{SCC}(b'a) = b'a$$

$$\text{SCC}(c \cdot f_c) = \text{SCC}(b'a) = b'a$$

$$c \cdot \text{SCC}(f) = c \cdot \text{SCC}(a'b + b'a) = c \cdot 1 = c$$

$$\Rightarrow \text{SCC}(c \cdot f) = \text{SCC}(c \cdot f_c) \neq c \cdot \text{SCC}(f)$$

2.

$$F = ad'e' + b'c'd' + bce + acde + abd'e' + abcd' + acd'e'$$

$$D = ac'de + bc'e + a'cd'e' + a'bd'e'$$

$$R = de' + b'cd'e + a'b'de$$

$$C_1 = ad'e'$$

$$\Rightarrow F(1) = \begin{pmatrix} - & 0 & 0 & 0 & - \\ - & 1 & 1 & - & 1 \\ 1 & - & 1 & 1 & 1 \\ 1 & 1 & - & 0 & 0 \\ 1 & 1 & 1 & 0 & - \\ 1 & - & 1 & 0 & 0 \\ 1 & - & 0 & 1 & 1 \\ - & 1 & 0 & - & 1 \\ 0 & - & 1 & 0 & 0 \\ 0 & 1 & - & 0 & 0 \end{pmatrix}$$

$$\Rightarrow F_{C_1}(1) = \begin{pmatrix} - & 0 & 0 & - & - \\ - & 1 & - & - & - \\ - & 1 & 1 & - & - \\ - & 1 & 1 & - & - \\ - & 1 & 1 & - & - \end{pmatrix}$$

$$\Rightarrow \text{SCC}(F_{C_1}(1)) = \phi$$

$$\Rightarrow C_1 = \phi$$

$$C_2 = b'c'd'$$

$$\Rightarrow F(2) = \begin{pmatrix} - & 1 & 1 & - & 1 \\ 1 & - & 1 & 1 & 1 \\ 1 & 1 & - & 0 & 0 \\ 1 & 1 & 1 & 0 & - \\ 1 & - & 1 & 0 & 0 \\ 1 & - & 0 & 1 & 1 \\ - & 1 & 0 & - & 1 \\ 0 & - & 1 & 0 & 0 \\ 0 & 1 & - & 0 & 0 \end{pmatrix}$$

$$\Rightarrow F_{C_2}(2) = \phi$$

$$\Rightarrow \text{SCC}(F_{C_2}(2)) = 1$$

$$\Rightarrow C_2 = b'c'd'$$

$$C_3 = bce$$

$$\Rightarrow F(3) = \begin{pmatrix} - & 0 & 0 & 0 & - \\ 1 & - & 1 & 1 & 1 \\ 1 & 1 & - & 0 & 0 \\ 1 & 1 & 1 & 0 & - \end{pmatrix}$$

$$\Rightarrow F_{C_3}(3) = \begin{pmatrix} 1 & - & 1 & - \\ 1 & - & 0 & - \\ d & \swarrow & \searrow & d' \\ (1 & - & - & -) & (1 & - & - & -) \end{pmatrix}$$

$$C_4 = acde$$

$$\Rightarrow F(4) = \begin{pmatrix} - & 0 & 0 & 0 & - \\ 0 & 1 & 1 & - & 1 \\ 1 & 1 & - & 0 & 0 \\ 1 & 1 & 1 & 0 & - \\ 1 & - & 1 & 0 & 0 \end{pmatrix}$$

$$\Rightarrow F_{C_4}(4) = \phi$$

$$\Rightarrow \text{SCC}(F_{C_4}(4)) = 1$$

$$\Rightarrow C_4 = acde$$

$$C_3 = bce$$

$$\Rightarrow F_{C_3} = \begin{pmatrix} - & 0 & 0 & 0 & - \\ 1 & - & 1 & 1 & - \\ 1 & 1 & - & 0 & 0 \\ 1 & 1 & 1 & 0 & - \\ 1 & - & 1 & 0 & 0 \\ 1 & - & 0 & 1 & 1 \\ - & 1 & 0 & - & 1 \\ 0 & - & 1 & 0 & 0 \\ 0 & 1 & - & 0 & 0 \end{pmatrix} \Rightarrow F_{C_3}(3) = \begin{pmatrix} 1 & - & - & 1 & - \\ & d & \checkmark & d' & \\ (1 & - & - & -) & (1 & - & - & -) \end{pmatrix}$$

$$\Rightarrow \text{Sccc}(F_{C_3}) = a'$$

$$\Rightarrow C_3 = a'bce$$

$$C_4 = acde$$

$$\Rightarrow F_{C_4} = \begin{pmatrix} - & 0 & 0 & 0 & - \\ 0 & 1 & 1 & - & 1 \\ 1 & 1 & - & 0 & 0 \\ 1 & 1 & 0 & - & - \\ 1 & - & 1 & 0 & 0 \\ 1 & - & 0 & 1 & 1 \\ - & 1 & 0 & - & 1 \\ 0 & - & 1 & 0 & 0 \\ 0 & 1 & - & 0 & 0 \end{pmatrix} \Rightarrow F_{C_4}(4) = \phi$$

$$\Rightarrow \text{Sccc}(F_{C_4}) = 1$$

$$\Rightarrow C_4 = acde$$

$$C_5 = abd'e'$$

$$\Rightarrow F_{C_5} = \begin{pmatrix} - & 0 & 0 & 0 & - \\ 0 & 1 & 1 & - & 1 \\ 1 & - & 1 & 1 & - \\ 1 & 1 & 1 & 0 & - \\ 1 & - & 1 & 0 & 0 \\ 1 & - & 0 & 1 & 1 \\ - & 1 & 0 & - & 1 \\ 0 & - & 1 & 0 & 0 \\ 0 & 1 & - & 0 & 0 \end{pmatrix} \Rightarrow F_{C_5}(5) = \begin{pmatrix} - & - & 1 & - & - \\ & & & & \\ & & & & \end{pmatrix}$$

$$\Rightarrow \text{Sccc}(F_{C_5}) = c'$$

$$\Rightarrow C_5 = abc'd'e'$$

$$C_6 = abcd'$$

$$\Rightarrow F_{C_6} = \begin{pmatrix} - & 0 & 0 & 0 & - \\ 0 & 1 & 1 & - & 1 \\ 1 & - & 1 & 1 & - \\ 1 & 1 & 0 & 0 & - \\ 1 & - & 1 & 0 & 0 \\ 1 & - & 0 & 1 & 1 \\ - & 1 & 0 & - & 1 \\ 0 & - & 1 & 0 & 0 \\ 0 & 1 & - & 0 & 0 \end{pmatrix} \Rightarrow F_{C_6}(6) = \begin{pmatrix} - & - & - & - & 0 \\ & & & & \\ & & & & \end{pmatrix}$$

$$\Rightarrow \text{Sccc}(F_{C_6}) = e$$

$$\Rightarrow C_6 = abcd'e$$

$$C_7 = acd'e'$$

$$\Rightarrow F_{C_7} = \begin{pmatrix} - & 0 & 0 & 0 & - \\ 0 & 1 & 1 & - & 1 \\ 1 & - & 1 & 1 & - \\ 1 & 1 & 0 & 0 & - \\ 1 & 1 & 1 & 0 & - \\ 1 & - & 0 & 1 & 1 \\ - & 1 & 0 & - & 1 \\ 0 & - & 1 & 0 & 0 \\ 0 & 1 & - & 0 & 0 \end{pmatrix} \Rightarrow F_{C_7}(7) = \phi$$

$$\Rightarrow \text{Sccc}(F_{C_7}) = 1$$

$$\Rightarrow C_7 = acd'e'$$

$$\Rightarrow F = b'c'd' + a'bce + acde + abc'd'e' + abcd'e + acd'e'$$

$$3. F = \overset{C_1}{b'c'd'} + \overset{C_2}{a'bce} + \overset{C_3}{acde} + \overset{C_4}{abc'd'e'} + \overset{C_5}{abcd'e} + \overset{C_6}{acd'e'}$$

$$R = de' + b'cd'e + a'b'de$$

$$C_1 = b'c'd'$$

$$C = \begin{pmatrix} b' & c' & d' \\ C_2 & 1 & 1 & 1 \\ C_3 & 1 & 1 & 1 \\ C_4 & 1 & 0 & 0 \\ C_5 & 1 & 1 & 0 \\ C_6 & 1 & 1 & 0 \end{pmatrix} \quad B = \begin{pmatrix} b' & c' & d' \\ r_1 & 0 & 0 & 1 \\ r_2 & 0 & 1 & 0 \\ r_3 & 0 & 0 & 1 \end{pmatrix}$$

\Rightarrow choose $c'd'$

$$C_2 = a'bce$$

$$C = \begin{pmatrix} a' & b & c & e \\ C_1 & 1 & 1 & 1 & 1 \\ C_3 & 1 & 1 & 0 & 0 \\ C_4 & 1 & 0 & 1 & 1 \\ C_5 & 1 & 0 & 0 & 0 \\ C_6 & 1 & 1 & 0 & 1 \end{pmatrix} \quad B = \begin{pmatrix} a' & b & c & e \\ r_1 & 0 & 0 & 0 & 1 \\ r_2 & 0 & 1 & 0 & 0 \\ r_3 & 0 & 1 & 0 & 0 \end{pmatrix}$$

\Rightarrow choose be

$$C_3 = acde$$

$$C = \begin{pmatrix} a & c & d & e \\ C_1 & 1 & 1 & 1 & 1 \\ C_2 & 1 & 0 & 1 & 0 \\ C_4 & 0 & 1 & 1 & 1 \\ C_5 & 0 & 0 & 1 & 0 \\ C_6 & 0 & 0 & 1 & 1 \end{pmatrix} \quad B = \begin{pmatrix} a & c & d & e \\ r_1 & 0 & 0 & 0 & 1 \\ r_2 & 0 & 0 & 1 & 0 \\ r_3 & 1 & 0 & 0 & 0 \end{pmatrix}$$

\Rightarrow choose ade

$$C_4 = abc'd'e'$$

$$B = \begin{pmatrix} a & b & c' & d' & e' \\ r_1 & 0 & 0 & 0 & 1 \\ r_2 & 0 & 1 & 1 & 0 \\ r_3 & 1 & 1 & 0 & 1 \end{pmatrix} \quad C = \begin{pmatrix} a & b & c' & d' & e' \\ C_1 & 1 & 1 & 0 & 0 & 1 \\ C_2 & 1 & 0 & 1 & 1 & 1 \\ C_3 & 0 & 1 & 1 & 1 & 1 \\ C_5 & 0 & 0 & 1 & 0 & 1 \\ C_6 & 0 & 1 & 1 & 0 & 0 \end{pmatrix}$$

choose $\Rightarrow bd' + d'e' + c'd'$

$$C_5 = abcd'e$$

$$B = \begin{pmatrix} a & b & c & d' & e \\ r_1 & 0 & 0 & 0 & 1 \\ r_2 & 0 & 1 & 0 & 0 \\ r_3 & 1 & 1 & 0 & 1 \end{pmatrix} \quad C = \begin{pmatrix} a & b & c & d' & e \\ C_1 & 1 & 1 & 1 & 0 & 1 \\ C_2 & 1 & 0 & 0 & 1 & 0 \\ C_3 & 0 & 1 & 0 & 1 & 0 \\ C_4 & 0 & 0 & 1 & 0 & 1 \\ C_6 & 0 & 1 & 0 & 0 & 1 \end{pmatrix}$$

choose $\Rightarrow bd' + be$

$$C_6 = acd'e'$$

$$C = \begin{pmatrix} a & c & d' & e' \\ C_1 & 1 & 1 & 0 & 1 \\ C_2 & 1 & 0 & 1 & 1 \\ C_3 & 0 & 0 & 1 & 1 \\ C_4 & 0 & 1 & 0 & 0 \\ C_5 & 0 & 0 & 0 & 1 \end{pmatrix} \quad B = \begin{pmatrix} a & c & d' & e' \\ r_1 & 0 & 0 & 1 & 0 \\ r_2 & 0 & 0 & 0 & 1 \\ r_3 & 1 & 0 & 1 & 1 \end{pmatrix}$$

choose $\Rightarrow d'e'$

$$F = c'd' + be + ade + d'e' + bd'$$

$F = cd + be + ade + d'e + da$

$F =$

	a	b	c	d	e
c_1	1	0	0	0	0
c_2	1	0	0	1	0
c_3	1	0	1	0	0
c_4	1	0	1	1	0
c_5	1	0	1	1	1
d_1	0	1	0	0	0
d_2	0	1	0	1	0
d_3	0	1	1	0	0
d_4	0	1	1	1	0

$(F_{c_1}) = \begin{pmatrix} - & - & - & - \\ - & 1 & - & - \\ - & - & - & 0 \\ - & - & - & 0 \\ 0 & 1 & - & 0 \end{pmatrix} \begin{matrix} y_1 \\ y_2 \\ y_4 \\ y_5 \\ d_4 \end{matrix}$

$(F_{c_2}) = \begin{pmatrix} - & 0 & 0 & - \\ - & - & - & - \\ 1 & - & 1 & - \\ - & 0 & - & - \\ 1 & - & 0 & 1 \end{pmatrix} \begin{matrix} y_1 \\ y_2 \\ y_3 \\ y_5 \\ d_1 \end{matrix}$

$(F_{c_3}) = \begin{pmatrix} - & 1 & - & - \\ - & - & - & - \\ - & 0 & - & - \\ - & 1 & 0 & - \end{pmatrix} \begin{matrix} y_2 \\ y_3 \\ d_1 \\ d_2 \end{matrix}$

$(F_{c_4}) = \begin{pmatrix} - & 0 & - & - \\ - & - & - & - \\ - & 1 & - & - \\ 0 & - & 1 & - \\ 0 & 1 & - & - \end{pmatrix} \begin{matrix} y_1 \\ y_4 \\ y_5 \\ d_3 \\ d_4 \end{matrix}$

$(F_{c_5}) = \begin{pmatrix} - & 0 & - & - \\ - & - & - & 1 \\ - & - & - & 0 \\ - & - & 0 & - \\ - & 0 & - & 1 \end{pmatrix} \begin{matrix} y_1 \\ y_2 \\ y_4 \\ y_5 \\ d_2 \end{matrix}$

$\bar{g}_1(y) = \bar{y}_1 + \bar{y}_1 \bar{y}_4$

$\bar{g}_2(y) = \bar{y}_2 + \bar{y}_2 \bar{y}_5$

$\bar{g}_3(y) = \bar{y}_3$

$\bar{g}_4(y) = \bar{y}_4 + \bar{y}_1 \bar{y}_4$

$\bar{g}_5(y) = \bar{y}_2 \bar{y}_5 + \bar{y}_4 \bar{y}_5$

$\bar{g}(y) = \bar{y}_1 + \bar{y}_1 \bar{y}_4 + \bar{y}_2 + \bar{y}_2 \bar{y}_5 + \bar{y}_3 + \bar{y}_4 + \bar{y}_1 \bar{y}_4 + \bar{y}_2 \bar{y}_5 + \bar{y}_4 \bar{y}_5$

$g(y) = y_1 y_2 y_3 y_4$

$\Rightarrow F = cd' + be + ade + d'e$

5.

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檔案(F) 編輯(E) 格式(O)
.i 6
.o 1
.ilb A B C D E F
.ob OUT
.type fr
1000001
0100001
0010001
0001001
0000101
0000011
11----0
1---1-0
1----10
-11---0
-1--1-0
--11--0
--1--10
---11-0
----110
.e

C:\Users\user>Skcd SkyDrive\碩一\LU5D\lsx

C:\Users\user\SkyDrive\碩一\LU5D>espresso.exe hw4.txt
.i 6
.o 1
.ilb A B C D E F
.ob OUT
.p 3
0-000 1
0-0-0- 1
00-0-0 1
.e

C:\Users\user\SkyDrive\碩一\LU5D>

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