

Problem 1~5

電機系 李友岐

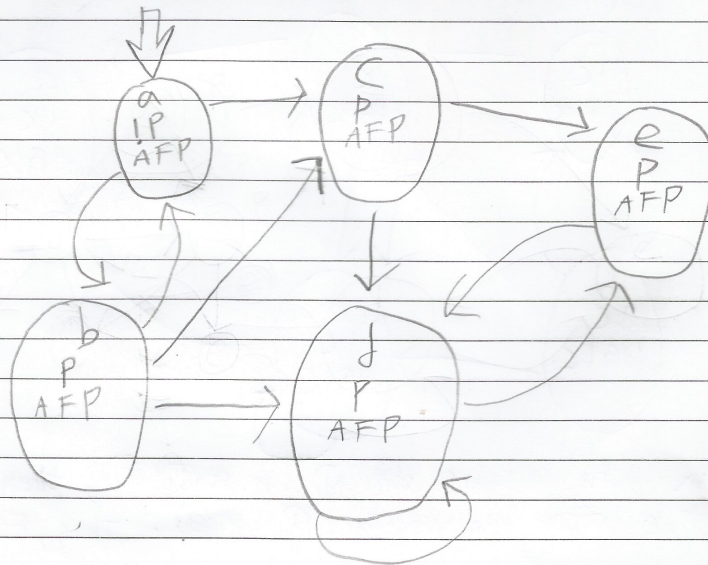
SOCV HW

電機系

李友岐

(1)

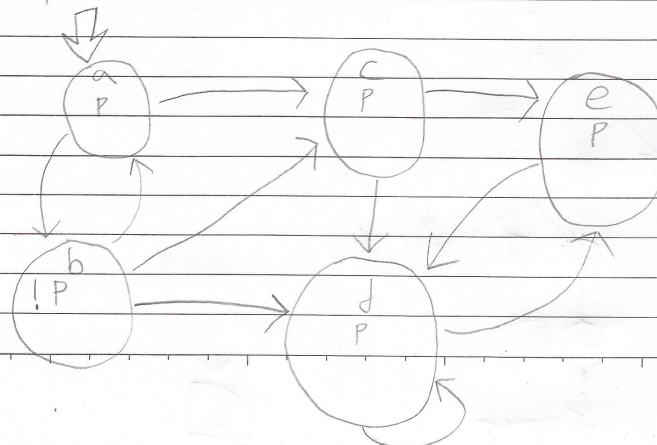
(a) Let p equal to $(a \rightarrow Xd)$, then $AGF(a \rightarrow Xd)$ can be transformed to $AGAF p$



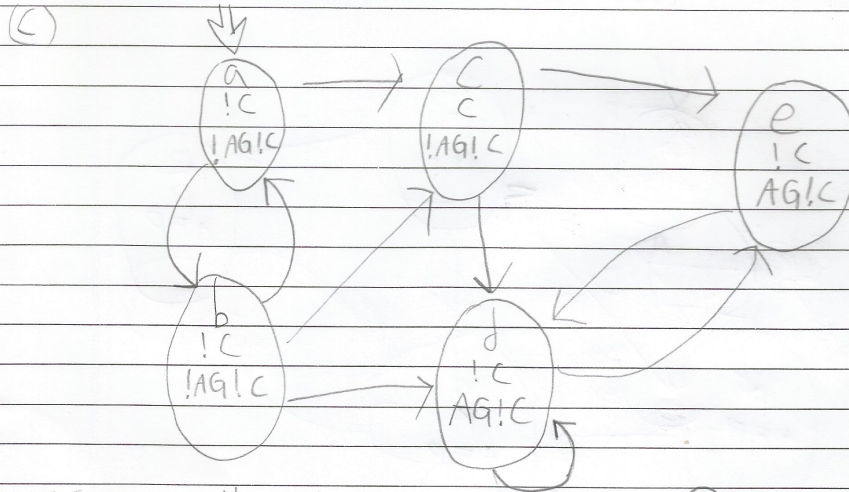
Since every state satisfies AFP ,
the whole structure satisfies $AGAFP$.
As a result, it is correct.

(b)

Let P equal to $(b \rightarrow AFd)$, then the formulae become $EG(b \rightarrow P)$.



There exists a path $a \rightarrow c \rightarrow d$, where P is always true. Thus, $EG(b \rightarrow AF d)$ is correct.



If a path contains state d or state e , then $AG!C$ becomes true after reaching state d or e . Thus, $EFAG!C$ is correct.

(Z)

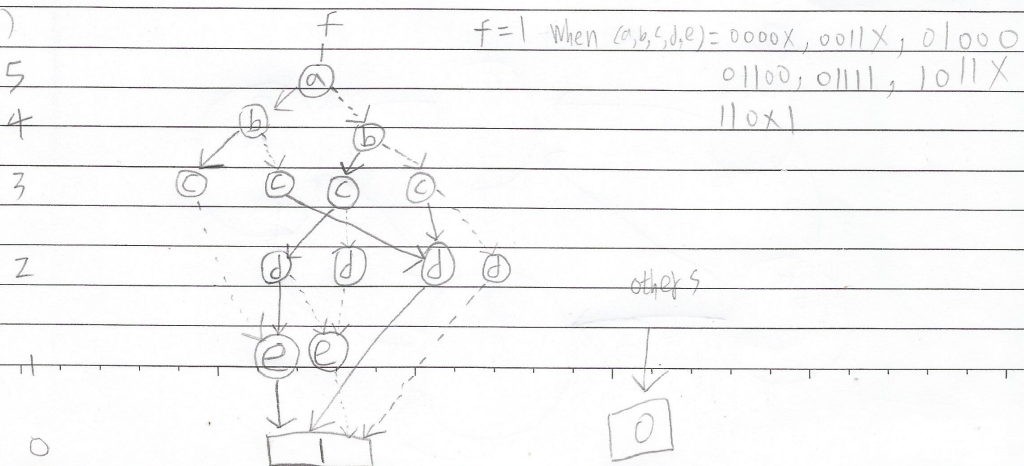
(a) $f(0,0,0,0,0) = 1$

$f(1,0,1,0,1) = 0$

$f(0,1,0,1,0) = 0$

(b) 00010, 00011, 00100, 00101, 01001, 01010, 01011, 01101, 01110, 10000, 10001, 10010, 10011, 10100, 10101, 11000, 11010, 11100, 11101, 11110, 11111.

(C)



B) $R = \text{ite}(F, 0, G)$

$= \text{ite}(\bar{G}, 0, \bar{F})$

by rule 2

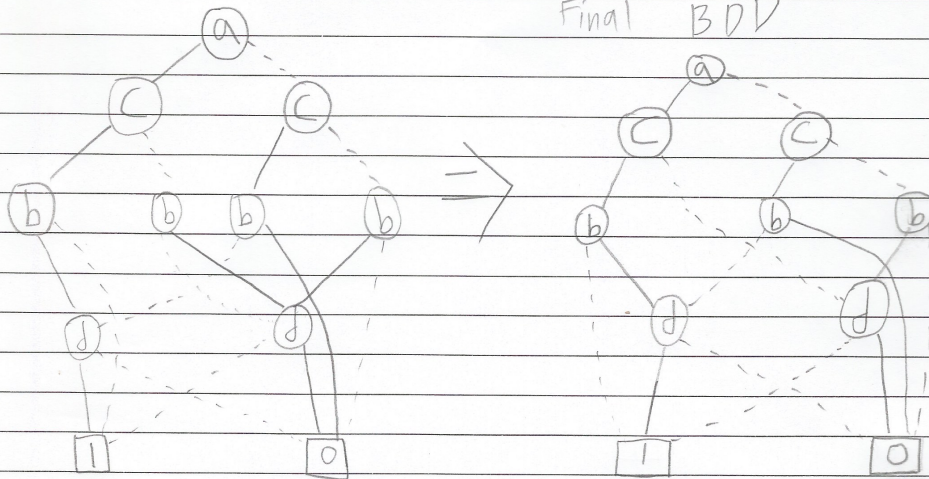
$= \text{ite}(\bar{G}, 1, F)$

by rule 3

(4)

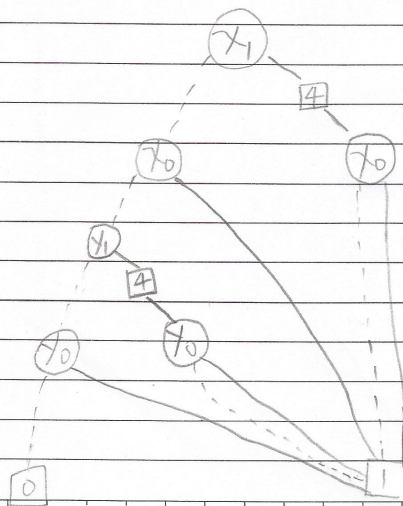
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Final BDD



\therefore The difference in the number of nodes is one.

(5)



$$\begin{aligned} x^2 y &= 4x_1^2 + 4x_1x_0 + x_0^2 + 4x_1^2 + 4x_1x_0 + x_0^2 \\ &= 4x_1 + 4x_1x_0 + x_0 + 4x_1 + 4x_1x_0 + x_0 \\ &= 4x_1(1+x_0) + x_0 + 4x_1(1+x_0) + x_0 \end{aligned}$$