データベースシステム 中間確認1-2

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中間確認 1-2

A	B	C	D	X,Y
T	T	T	T	F
F	T	T	T	T
T	F	T	T	F
T	T	F	T	F
T	T	T	F	T
F	F	T	T	F
F	T	F	T	F
F	T	T	F	T
T	F	F	T	T
T	F	T	F	F
T	T	F	F	F
F	F	F	T	T
F	F	T	F	T
F	T	F	F	F
T	F	F	F	T
F	F	F	F	T

i) 積和標準形

X = T は 2, 5, 8, 9, 12, 13, 15, 16 行目であるからそれぞれについて, 命題変数 P が T なら P,
F なら NOT　P とし, それらを AND でつなぎ, 各論理式を OR でつなぐ

$$X =NOT\ A\ AND\ B\ AND\ C\ AND\ D\ OR$$
$$A\ AND\ B\ AND\ C\ AND\ NOT\ D\ OR$$
$$NOT\ A\ AND\ B\ AND\ C\ AND\ NOT\ D\ OR$$
$$A\ AND\ NOT\ B\ AND\ NOT\ C\ AND\ D\ OR$$
$$NOT\ A\ AND\ NOT\ B\ AND\ NOT\ C\ AND\ D\ OR$$
$$NOT\ A\ AND\ NOT\ B\ AND\ C\ AND\ NOT\ D\ OR$$
$$A\ AND\ NOT\ B\ AND\ NOT\ C\ AND\ NOT\ D\ OR$$
$$NOT\ A\ AND\ NOT\ B\ AND\ NOT\ C\ AND\ NOT\ D$$

ii) 和積標準形

Y = F は 1, 3, 4, 6, 7, 10, 11, 14 行目であるからそれぞれについて, 命題変数 P が T なら NOT　P, F なら P とし, それらを OR でつなぎ, 各論理式を AND でつなぐ

$$Y =(NOT\ A\ OR\ NOT\ B\ OR\ NOT\ C\ OR\ NOT\ D)\ AND$$
$$(NOT\ A\ OR\ B\ OR\ NOT\ C\ OR\ NOT\ D)\ AND$$
$$(NOT\ A\ OR\ NOT\ B\ OR\ C\ OR\ NOT\ D)\ AND$$
$$(A\ OR\ B\ OR\ NOT\ C\ OR\ NOT\ D)\ AND$$
$$(A\ OR\ NOT\ B\ OR\ C\ OR\ NOT\ D)\ AND$$
$$(NOT\ A\ OR\ B\ OR\ NOT\ C\ OR\ D)\ AND$$
$$(NOT\ A\ OR\ NOT\ B\ OR\ C\ OR\ D)\ AND$$
$$(A\ OR\ NOT\ B\ OR\ C\ OR\ D)$$

iii) X = Y を示す

1) 1 行目 : A=T, B=T, C=T, D=T を代入

$$X = F\ AND\ T\ AND\ T\ AND\ T\ OR$$
$$T\ AND\ T\ AND\ T\ AND\ F\ OR$$
$$F\ AND\ T\ AND\ T\ AND\ F\ OR$$
$$T\ AND\ F\ AND\ F\ AND\ T\ OR$$
$$F\ AND\ F\ AND\ F\ AND\ T\ OR$$
$$F\ AND\ F\ AND\ T\ AND\ F\ OR$$
$$T\ AND\ F\ AND\ F\ AND\ F\ OR$$
$$F\ AND\ F\ AND\ F\ AND\ F$$
$$= F\ OR\ F\ OR\ F\ OR\ F\ OR\ F\ OR\ F\ OR\ F\ OR\ F$$
$$= F$$

$$Y = (F\ OR\ F\ OR\ F\ OR\ F)\ AND$$
$$(F\ OR\ T\ OR\ F\ OR\ F)\ AND$$
$$(F\ OR\ F\ OR\ T\ OR\ F)\ AND$$
$$(T\ OR\ T\ OR\ F\ OR\ F)\ AND$$
$$(T\ OR\ F\ OR\ T\ OR\ F)\ AND$$
$$(F\ OR\ T\ OR\ F\ OR\ T)\ AND$$
$$(F\ OR\ F\ OR\ T\ OR\ T)\ AND$$
$$(T\ OR\ F\ OR\ T\ OR\ T)$$
$$= F\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T$$
$$= F$$

2) 2 行目：A=F, B=T, C=T, D=T を代入

$$
\begin{aligned}
X =\ & T \ AND \ T \ AND \ T \ AND \ T \ OR \\
& F \ AND \ T \ AND \ T \ AND \ F \ OR \\
& T \ AND \ T \ AND \ T \ AND \ F \ OR \\
& F \ AND \ F \ AND \ F \ AND \ T \ OR \\
& T \ AND \ F \ AND \ F \ AND \ T \ OR \\
& T \ AND \ F \ AND \ T \ AND \ F \ OR \\
& F \ AND \ F \ AND \ F \ AND \ F \ OR \\
& T \ AND \ F \ AND \ F \ AND \ F \\
& = T \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \\
& = T
\end{aligned}
$$

$$
\begin{aligned}
Y =\ & (T \ OR \ F \ OR \ F \ OR \ F \ ) \ AND \\
& (T \ OR \ T \ OR \ F \ OR \ F \ ) \ AND \\
& (T \ OR \ F \ OR \ T \ OR \ F \ ) \ AND \\
& (F \ OR \ T \ OR \ F \ OR \ F \ ) \ AND \\
& (F \ OR \ F \ OR \ T \ OR \ F \ ) \ AND \\
& (T \ OR \ T \ OR \ F \ OR \ T) \ AND \\
& (T \ OR \ F \ OR \ T \ OR \ T) \ AND \\
& (F \ OR \ F \ OR \ T \ OR \ T) \\
& = T \ AND \ T \ AND \ T \ AND \ T \ AND \ T \ AND \ T \ AND \ T \ AND \ T \\
& = T
\end{aligned}
$$

3) 3 行目：A=T, B=F, C=T, D=T を代入

$$X = F \ AND \ F \ AND \ T \ AND \ T \ OR$$
$$T \ AND \ F \ AND \ T \ AND \ F \ OR$$
$$F \ AND \ F \ AND \ T \ AND \ F \ OR$$
$$T \ AND \ T \ AND \ F \ AND \ T \ OR$$
$$F \ AND \ T \ AND \ F \ AND \ T \ OR$$
$$F \ AND \ T \ AND \ T \ AND \ F \ OR$$
$$T \ AND \ T \ AND \ F \ AND \ F \ OR$$
$$F \ AND \ T \ AND \ F \ AND \ F$$
$$= F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F$$
$$= F$$

$$Y = (F \ OR \ T \ OR \ F \ OR \ F) \ AND$$
$$(F \ OR \ F \ OR \ F \ OR \ F) \ AND$$
$$(F \ OR \ T \ OR \ T \ OR \ F) \ AND$$
$$(T \ OR \ F \ OR \ F \ OR \ F) \ AND$$
$$(T \ OR \ T \ OR \ T \ OR \ F) \ AND$$
$$(F \ OR \ F \ OR \ F \ OR \ T) \ AND$$
$$(F \ OR \ T \ OR \ T \ OR \ T) \ AND$$
$$(T \ OR \ T \ OR \ T \ OR \ T)$$
$$= T \ AND \ F \ AND \ T \ AND \ T \ AND \ T \ AND \ T \ AND \ T$$
$$= F$$

4) 4 行目：A=T, B=T, C=F, D=T を代入

$$X = F \ AND \ T \ AND \ F \ AND \ T \ OR$$
$$T \ AND \ T \ AND \ F \ AND \ F \ OR$$
$$F \ AND \ T \ AND \ F \ AND \ F \ OR$$
$$T \ AND \ F \ AND \ T \ AND \ T \ OR$$
$$F \ AND \ F \ AND \ T \ AND \ T \ OR$$
$$F \ AND \ F \ AND \ F \ AND \ F \ OR$$
$$T \ AND \ F \ AND \ T \ AND \ F \ OR$$
$$F \ AND \ F \ AND \ T \ AND \ F$$
$$= F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F$$
$$= F$$

$$Y = (F \ OR \ F \ OR \ T \ OR \ F) \ AND$$
$$(F \ OR \ T \ OR \ T \ OR \ F) \ AND$$
$$(F \ OR \ F \ OR \ F \ OR \ F) \ AND$$
$$(T \ OR \ T \ OR \ T \ OR \ F) \ AND$$
$$(T \ OR \ F \ OR \ F \ OR \ F) \ AND$$
$$(F \ OR \ T \ OR \ T \ OR \ T) \ AND$$
$$(F \ OR \ F \ OR \ F \ OR \ T) \ AND$$
$$(T \ OR \ F \ OR \ F \ OR \ T)$$
$$= T \ AND \ T \ AND \ F \ AND \ T \ AND \ T \ AND \ T \ AND \ T \ AND \ T$$
$$= F$$

5) 5 行目：A=T, B=T, C=T, D=F を代入

$$X = F\ AND\ T\ AND\ T\ AND\ F\ OR$$
$$T\ AND\ T\ AND\ T\ AND\ T\ OR$$
$$F\ AND\ T\ AND\ T\ AND\ T\ OR$$
$$T\ AND\ F\ AND\ F\ AND\ F\ OR$$
$$F\ AND\ F\ AND\ F\ AND\ F\ OR$$
$$F\ AND\ F\ AND\ T\ AND\ T\ OR$$
$$T\ AND\ F\ AND\ F\ AND\ T\ OR$$
$$F\ AND\ F\ AND\ F\ AND\ T$$
$$= F\ OR\ T\ OR\ F\ OR\ F\ OR\ F\ OR\ F\ OR\ F$$
$$= T$$

$$Y = (F\ OR\ F\ OR\ F\ OR\ T)\ AND$$
$$(F\ OR\ T\ OR\ F\ OR\ T)\ AND$$
$$(F\ OR\ F\ OR\ T\ OR\ T)\ AND$$
$$(T\ OR\ T\ OR\ F\ OR\ T)\ AND$$
$$(T\ OR\ F\ OR\ T\ OR\ T)\ AND$$
$$(F\ OR\ T\ OR\ F\ OR\ F)\ AND$$
$$(F\ OR\ F\ OR\ T\ OR\ F)\ AND$$
$$(T\ OR\ F\ OR\ T\ OR\ F)$$
$$= T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T$$
$$= T$$

6) 6 行目：A=F, B=F, C=T, D=T を代入

$$X = T \ AND \ F \ AND \ T \ AND \ T \ OR$$
$$F \ AND \ F \ AND \ T \ AND \ F \ OR$$
$$T \ AND \ F \ AND \ T \ AND \ F \ OR$$
$$F \ AND \ T \ AND \ F \ AND \ T \ OR$$
$$T \ AND \ T \ AND \ F \ AND \ T \ OR$$
$$T \ AND \ T \ AND \ T \ AND \ F \ OR$$
$$F \ AND \ T \ AND \ F \ AND \ F \ OR$$
$$T \ AND \ T \ AND \ F \ AND \ F$$
$$= F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F$$
$$= F$$

$$Y = (T \ OR \ T \ OR \ F \ OR \ F) \ AND$$
$$(T \ OR \ F \ OR \ F \ OR \ F) \ AND$$
$$(T \ OR \ T \ OR \ T \ OR \ F) \ AND$$
$$(F \ OR \ F \ OR \ F \ OR \ F) \ AND$$
$$(F \ OR \ T \ OR \ T \ OR \ F) \ AND$$
$$(T \ OR \ F \ OR \ F \ OR \ T) \ AND$$
$$(T \ OR \ T \ OR \ T \ OR \ T) \ AND$$
$$(F \ OR \ T \ OR \ T \ OR \ T)$$
$$= T \ AND \ T \ AND \ T \ AND \ F \ AND \ T \ AND \ T \ AND \ T \ AND \ T$$
$$= F$$

7) 7 行目：A=F, B=T, C=F, D=T を代入

$$X = T \; AND \; T \; AND \; F \; AND \; T \; OR$$
$$F \; AND \; T \; AND \; F \; AND \; F \; OR$$
$$T \; AND \; T \; AND \; F \; AND \; F \; OR$$
$$F \; AND \; F \; AND \; T \; AND \; T \; OR$$
$$T \; AND \; F \; AND \; T \; AND \; T \; OR$$
$$T \; AND \; F \; AND \; F \; AND \; F \; OR$$
$$F \; AND \; F \; AND \; T \; AND \; F \; OR$$
$$T \; AND \; F \; AND \; T \; AND \; F$$
$$= F \; OR \; F \; OR \; F \; OR \; F \; OR \; F \; OR \; F \; OR \; F \; OR \; F$$
$$= F$$

$$Y = (T \; OR \; F \; OR \; T \; OR \; F) \; AND$$
$$(T \; OR \; T \; OR \; T \; OR \; F) \; AND$$
$$(T \; OR \; F \; OR \; F \; OR \; F) \; AND$$
$$(F \; OR \; T \; OR \; T \; OR \; F) \; AND$$
$$(F \; OR \; F \; OR \; F \; OR \; F) \; AND$$
$$(T \; OR \; T \; OR \; T \; OR \; T) \; AND$$
$$(T \; OR \; F \; OR \; F \; OR \; T) \; AND$$
$$(F \; OR \; F \; OR \; F \; OR \; T)$$
$$= T \; AND \; T \; AND \; T \; AND \; T \; AND \; F \; AND \; T \; AND \; T \; AND \; T$$
$$= F$$

8) 8 行目：A=F, B=T, C=T, D=F を代入

$$X = T\ AND\ T\ AND\ T\ AND\ F\ OR$$
$$F\ AND\ T\ AND\ T\ AND\ T\ OR$$
$$T\ AND\ T\ AND\ T\ AND\ T\ OR$$
$$F\ AND\ F\ AND\ F\ AND\ F\ OR$$
$$T\ AND\ F\ AND\ F\ AND\ F\ OR$$
$$T\ AND\ F\ AND\ T\ AND\ T\ OR$$
$$F\ AND\ F\ AND\ F\ AND\ T\ OR$$
$$T\ AND\ F\ AND\ F\ AND\ T$$
$$= F\ OR\ F\ OR\ T\ OR\ F\ OR\ F\ OR\ F\ OR\ F\ OR\ F$$
$$= T$$

$$Y = (T\ OR\ F\ OR\ F\ OR\ T)\ AND$$
$$(T\ OR\ T\ OR\ F\ OR\ T)\ AND$$
$$(T\ OR\ F\ OR\ T\ OR\ T)\ AND$$
$$(F\ OR\ T\ OR\ F\ OR\ T)\ AND$$
$$(F\ OR\ F\ OR\ T\ OR\ T)\ AND$$
$$(T\ OR\ T\ OR\ F\ OR\ F)\ AND$$
$$(T\ OR\ F\ OR\ T\ OR\ F)\ AND$$
$$(F\ OR\ F\ OR\ T\ OR\ F)$$
$$= T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T$$
$$= T$$

9) 9 行目：A=T, B=F, C=F, D=T を代入

$$X = F\ AND\ F\ AND\ F\ AND\ T\ OR$$
$$T\ AND\ F\ AND\ F\ AND\ F\ OR$$
$$F\ AND\ F\ AND\ F\ AND\ F\ OR$$
$$T\ AND\ T\ AND\ T\ AND\ T\ OR$$
$$F\ AND\ T\ AND\ T\ AND\ T\ OR$$
$$F\ AND\ T\ AND\ F\ AND\ F\ OR$$
$$T\ AND\ T\ AND\ T\ AND\ F\ OR$$
$$F\ AND\ T\ AND\ T\ AND\ F$$
$$= F\ OR\ F\ OR\ F\ OR\ T\ OR\ F\ OR\ F\ OR\ F\ OR\ F$$
$$= T$$

$$Y = (F\ OR\ T\ OR\ T\ OR\ F)\ AND$$
$$(F\ OR\ F\ OR\ T\ OR\ F)\ AND$$
$$(F\ OR\ T\ OR\ F\ OR\ F)\ AND$$
$$(T\ OR\ F\ OR\ T\ OR\ F)\ AND$$
$$(T\ OR\ T\ OR\ F\ OR\ F)\ AND$$
$$(F\ OR\ F\ OR\ T\ OR\ T)\ AND$$
$$(F\ OR\ T\ OR\ F\ OR\ T)\ AND$$
$$(T\ OR\ T\ OR\ F\ OR\ T)$$
$$= T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T$$
$$= T$$

10) 10 行目：A=T, B=F, C=T, D=F を代入

$$X = F \text{ } AND \text{ } F \text{ } AND \text{ } T \text{ } AND \text{ } F \text{ } OR$$
$$T \text{ } AND \text{ } F \text{ } AND \text{ } T \text{ } AND \text{ } T \text{ } OR$$
$$F \text{ } AND \text{ } F \text{ } AND \text{ } T \text{ } AND \text{ } T \text{ } OR$$
$$T \text{ } AND \text{ } T \text{ } AND \text{ } F \text{ } AND \text{ } F \text{ } OR$$
$$F \text{ } AND \text{ } T \text{ } AND \text{ } F \text{ } AND \text{ } F \text{ } OR$$
$$F \text{ } AND \text{ } T \text{ } AND \text{ } T \text{ } AND \text{ } T \text{ } OR$$
$$T \text{ } AND \text{ } T \text{ } AND \text{ } F \text{ } AND \text{ } T \text{ } OR$$
$$F \text{ } AND \text{ } T \text{ } AND \text{ } F \text{ } AND \text{ } T$$
$$= F \text{ } OR \text{ } F \text{ } OR \text{ } F \text{ } OR \text{ } F \text{ } OR \text{ } F \text{ } OR \text{ } F \text{ } OR \text{ } F \text{ } OR \text{ } F$$
$$= F$$

$$Y = (F \text{ } OR \text{ } T \text{ } OR \text{ } F \text{ } OR \text{ } T) \text{ } AND$$
$$(F \text{ } OR \text{ } F \text{ } OR \text{ } F \text{ } OR \text{ } T) \text{ } AND$$
$$(F \text{ } OR \text{ } T \text{ } OR \text{ } T \text{ } OR \text{ } T) \text{ } AND$$
$$(T \text{ } OR \text{ } F \text{ } OR \text{ } F \text{ } OR \text{ } T) \text{ } AND$$
$$(T \text{ } OR \text{ } T \text{ } OR \text{ } T \text{ } OR \text{ } T) \text{ } AND$$
$$(F \text{ } OR \text{ } F \text{ } OR \text{ } F \text{ } OR \text{ } F) \text{ } AND$$
$$(F \text{ } OR \text{ } T \text{ } OR \text{ } T \text{ } OR \text{ } F) \text{ } AND$$
$$(T \text{ } OR \text{ } T \text{ } OR \text{ } T \text{ } OR \text{ } F)$$
$$= T \text{ } AND \text{ } T \text{ } AND \text{ } T \text{ } AND \text{ } T \text{ } AND \text{ } T \text{ } AND \text{ } F \text{ } AND \text{ } T \text{ } AND \text{ } T$$
$$= F$$

11) 11 行目：A=T, B=T, C=F, D=F を代入

$$\begin{aligned}
X =& F \; AND \; T \; AND \; F \; AND \; F \; OR \\
& T \; AND \; T \; AND \; F \; AND \; T \; OR \\
& F \; AND \; T \; AND \; F \; AND \; T \; OR \\
& T \; AND \; F \; AND \; T \; AND \; F \; OR \\
& F \; AND \; F \; AND \; T \; AND \; F \; OR \\
& F \; AND \; F \; AND \; F \; AND \; T \; OR \\
& T \; AND \; F \; AND \; T \; AND \; T \; OR \\
& F \; AND \; F \; AND \; T \; AND \; T \\
=& F \; OR \; F \; OR \; F \; OR \; F \; OR \; F \; OR \; F \; OR \; F \; OR \; F \\
=& F
\end{aligned}$$

$$\begin{aligned}
Y =& (F \; OR \; F \; OR \; T \; OR \; T) \; AND \\
& (F \; OR \; T \; OR \; T \; OR \; T) \; AND \\
& (F \; OR \; F \; OR \; F \; OR \; T) \; AND \\
& (T \; OR \; T \; OR \; T \; OR \; T) \; AND \\
& (T \; OR \; F \; OR \; F \; OR \; T) \; AND \\
& (F \; OR \; T \; OR \; T \; OR \; F) \; AND \\
& (F \; OR \; F \; OR \; F \; OR \; F) \; AND \\
& (T \; OR \; F \; OR \; F \; OR \; F) \\
=& T \; AND \; T \; AND \; T \; AND \; T \; AND \; T \; AND \; T \; AND \; F \; AND \; T \\
=& F
\end{aligned}$$

12) 12 行目：A=F, B=F, C=F, D=T を代入

$$X = T\ AND\ F\ AND\ F\ AND\ T\ OR$$
$$F\ AND\ F\ AND\ F\ AND\ F\ OR$$
$$T\ AND\ F\ AND\ F\ AND\ F\ OR$$
$$F\ AND\ T\ AND\ T\ AND\ T\ OR$$
$$T\ AND\ T\ AND\ T\ AND\ T\ OR$$
$$T\ AND\ T\ AND\ F\ AND\ F\ OR$$
$$F\ AND\ T\ AND\ T\ AND\ F\ OR$$
$$T\ AND\ T\ AND\ T\ AND\ F$$
$$= F\ OR\ F\ OR\ F\ OR\ F\ OR\ T\ OR\ F\ OR\ F\ OR\ F$$
$$= T$$

$$Y = (T\ OR\ T\ OR\ T\ OR\ F)\ AND$$
$$(T\ OR\ F\ OR\ T\ OR\ F)\ AND$$
$$(T\ OR\ T\ OR\ F\ OR\ F)\ AND$$
$$(F\ OR\ F\ OR\ T\ OR\ F)\ AND$$
$$(F\ OR\ T\ OR\ F\ OR\ F)\ AND$$
$$(T\ OR\ F\ OR\ T\ OR\ T)\ AND$$
$$(T\ OR\ T\ OR\ F\ OR\ T)\ AND$$
$$(F\ OR\ T\ OR\ F\ OR\ T)$$
$$= T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T$$
$$= T$$

13) 13 行目：A=F, B=F, C=T, D=F を代入

$$X = T\ AND\ F\ AND\ T\ AND\ F\ OR$$
$$F\ AND\ F\ AND\ T\ AND\ T\ OR$$
$$T\ AND\ F\ AND\ T\ AND\ T\ OR$$
$$F\ AND\ T\ AND\ F\ AND\ F\ OR$$
$$T\ AND\ T\ AND\ F\ AND\ F\ OR$$
$$T\ AND\ T\ AND\ T\ AND\ T\ OR$$
$$F\ AND\ T\ AND\ F\ AND\ T\ OR$$
$$T\ AND\ T\ AND\ F\ AND\ T$$
$$= F\ OR\ F\ OR\ F\ OR\ F\ OR\ F\ OR\ T\ OR\ F\ OR\ F$$
$$= T$$

$$Y = (T\ OR\ T\ OR\ F\ OR\ T)\ AND$$
$$(T\ OR\ F\ OR\ F\ OR\ T)\ AND$$
$$(T\ OR\ T\ OR\ T\ OR\ T)\ AND$$
$$(F\ OR\ F\ OR\ F\ OR\ T)\ AND$$
$$(F\ OR\ T\ OR\ T\ OR\ T)\ AND$$
$$(T\ OR\ F\ OR\ F\ OR\ F)\ AND$$
$$(T\ OR\ T\ OR\ T\ OR\ F)\ AND$$
$$(F\ OR\ T\ OR\ T\ OR\ F)$$
$$= T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T$$
$$= T$$

14) 14 行目：A=F, B=T, C=F, D=F を代入

$$X = T \; AND \; T \; AND \; F \; AND \; F \; OR$$
$$F \; AND \; T \; AND \; F \; AND \; T \; OR$$
$$T \; AND \; T \; AND \; F \; AND \; T \; OR$$
$$F \; AND \; F \; AND \; T \; AND \; F \; OR$$
$$T \; AND \; F \; AND \; T \; AND \; F \; OR$$
$$T \; AND \; F \; AND \; F \; AND \; T \; OR$$
$$F \; AND \; F \; AND \; T \; AND \; T \; OR$$
$$T \; AND \; F \; AND \; T \; AND \; T$$
$$= F \; OR \; F \; OR \; F \; OR \; F \; OR \; F \; OR \; F \; OR \; F \; OR \; F$$
$$= F$$

$$Y = (T \; OR \; F \; OR \; T \; OR \; T) \; AND$$
$$(T \; OR \; T \; OR \; T \; OR \; T) \; AND$$
$$(T \; OR \; F \; OR \; F \; OR \; T) \; AND$$
$$(F \; OR \; T \; OR \; T \; OR \; T) \; AND$$
$$(F \; OR \; F \; OR \; F \; OR \; T) \; AND$$
$$(T \; OR \; T \; OR \; T \; OR \; F) \; AND$$
$$(T \; OR \; F \; OR \; F \; OR \; F) \; AND$$
$$(F \; OR \; F \; OR \; F \; OR \; F)$$
$$= T \; AND \; T \; AND \; T \; AND \; T \; AND \; T \; AND \; T \; AND \; T \; AND \; F$$
$$= F$$

15) 15 行目：A=T, B=F, C=F, D=F を代入

$$X = F\ AND\ F\ AND\ F\ AND\ F\ OR$$
$$T\ AND\ F\ AND\ F\ AND\ T\ OR$$
$$F\ AND\ F\ AND\ F\ AND\ T\ OR$$
$$T\ AND\ T\ AND\ T\ AND\ F\ OR$$
$$F\ AND\ T\ AND\ T\ AND\ F\ OR$$
$$F\ AND\ T\ AND\ F\ AND\ T\ OR$$
$$T\ AND\ T\ AND\ T\ AND\ T\ OR$$
$$F\ AND\ T\ AND\ T\ AND\ T$$
$$= F\ OR\ F\ OR\ F\ OR\ F\ OR\ F\ OR\ F\ OR\ T\ OR\ F$$
$$= T$$

$$Y = (F\ OR\ T\ OR\ T\ OR\ T)\ AND$$
$$(F\ OR\ F\ OR\ T\ OR\ T)\ AND$$
$$(F\ OR\ T\ OR\ F\ OR\ T)\ AND$$
$$(T\ OR\ F\ OR\ T\ OR\ T)\ AND$$
$$(T\ OR\ T\ OR\ F\ OR\ T)\ AND$$
$$(F\ OR\ F\ OR\ T\ OR\ F)\ AND$$
$$(F\ OR\ T\ OR\ F\ OR\ F)\ AND$$
$$(T\ OR\ T\ OR\ F\ OR\ F)$$
$$= T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T\ AND\ T$$
$$= T$$

16) 16 行目：A=F, B=F, C=F, D=F を代入

$$X = T \ AND \ F \ AND \ F \ AND \ F \ OR$$
$$F \ AND \ F \ AND \ F \ AND \ T \ OR$$
$$T \ AND \ F \ AND \ F \ AND \ T \ OR$$
$$F \ AND \ T \ AND \ T \ AND \ F \ OR$$
$$T \ AND \ T \ AND \ T \ AND \ F \ OR$$
$$T \ AND \ T \ AND \ F \ AND \ T \ OR$$
$$F \ AND \ T \ AND \ T \ AND \ T \ OR$$
$$T \ AND \ T \ AND \ T \ AND \ T$$
$$= F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ F \ OR \ T$$
$$= T$$

$$Y = (T \ OR \ T \ OR \ T \ OR \ T) \ AND$$
$$(T \ OR \ F \ OR \ T \ OR \ T) \ AND$$
$$(T \ OR \ T \ OR \ F \ OR \ T) \ AND$$
$$(F \ OR \ F \ OR \ T \ OR \ T) \ AND$$
$$(F \ OR \ T \ OR \ F \ OR \ T) \ AND$$
$$(T \ OR \ F \ OR \ T \ OR \ F) \ AND$$
$$(T \ OR \ T \ OR \ F \ OR \ F) \ AND$$
$$(F \ OR \ T \ OR \ F \ OR \ F)$$
$$= T \ AND \ T \ AND \ T \ AND \ T \ AND \ T \ AND \ T \ AND \ T \ AND \ T$$
$$= T$$

以上 (1) → (16) の結果より, X=Y が示された