

# In-class Exercise 7

(PAR 11)

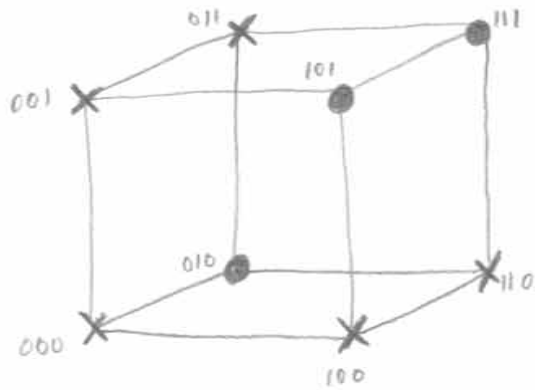
- Show Boolean n-space representation of
  - $F(a, b, c) = abc + ab'c + a'bc'$
  - $F(a, b, c) = a' + bc$
- Show compact cubical form of
  - $F(a, b, c) = ab + b'c + a'b'c'$
  - $F_1(a, b, c) = abc + ab'c + c'$ ;  $F_2(a, b, c) = abc + a'b'c' + bc + b'c$
- Calculate  $F \cap G$  for

$$F = \begin{array}{cccc} 0 & 0 & 1 & 3 & 4 \\ 2 & 1 & 0 & 3 & 4 \\ 0 & 2 & 0 & 4 & 3 \end{array} \quad G = \begin{array}{cccc} 0 & 0 & 1 & 4 & 3 \\ 2 & 2 & 0 & 4 & 4 \\ 0 & 1 & 0 & 4 & 4 \end{array}$$

- Calculate  $F \cup G$  for

$$F = \begin{array}{cccc} 0 & 0 & 1 & 3 & 4 \\ 2 & 1 & 0 & 3 & 4 \\ 0 & 2 & 0 & 4 & 3 \end{array} \quad G = \begin{array}{cccc} 0 & 0 & 1 & 4 & 3 \\ 2 & 2 & 0 & 4 & 4 \\ 0 & 1 & 0 & 4 & 4 \end{array}$$

① (a)  $F(a,b,c) = abc + ab'c + a'bc'$

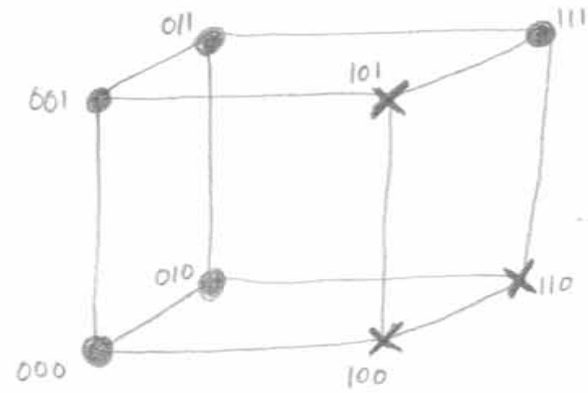


● = on set

○ = dc set

X = off set

(b)  $F(a,b,c) = a' + bc$



② (a)  $F(a,b,c) = ab + b'c + a'b'c'$

$$F = \begin{bmatrix} 1 & 1 & 2 \\ 2 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$$

(b)  $F_1(a,b,c) = abc + ab'c + c'$

$$F_2(a,b,c) = abc + a'b'c' + bc + b'c$$

$$F = \begin{bmatrix} 1 & 1 & 1 & 4 & 4 \\ 1 & 0 & 1 & 4 & 3 \\ 2 & 2 & 0 & 4 & 3 \\ 0 & 0 & 0 & 3 & 4 \\ 2 & 1 & 1 & 3 & 4 \\ 2 & 0 & 1 & 3 & 4 \end{bmatrix}$$

③  $F \cap G$

$$\begin{aligned}00134 \cap 00143 &= 00133 \text{ X} \\00134 \cap 22044 &= 00\phi 34 \text{ X} \\00134 \cap 01044 &= 0\phi\phi 34 \text{ X} \\21034 \cap 00143 &= 0\phi\phi 33 \text{ X} \\21034 \cap 22044 &= 21034 \\21034 \cap 01044 &= 01034 \\02043 \cap 00143 &= 00\phi 43 \text{ X} \\02043 \cap 22044 &= 02043 \\02043 \cap 01044 &= 01043\end{aligned}$$

$$F \cap G = \begin{array}{l}21034 \\01034 \\02043 \\01043\end{array}$$

$$\text{OR} \begin{array}{l}21034 \\01044 \\02043\end{array}$$

⑤  $F \cup G =$

00134	OR	00144
21034		21034
02043		02043
00143		22044
22044		01044
01044		

$$\text{OR} \begin{array}{l}00144 \\21034 \\02043 \\22044\end{array}$$

\* Note other permutations also possible.