

# CS 221 - HW 4

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## Question 5

a

Truth table with 4 inputs and 2 outputs:

| $I_0$ | $I_1$ | $I_2$ | $I_3$ | $F_1$ | $F_0$ |
|-------|-------|-------|-------|-------|-------|
| 0     | 0     | 0     | 0     | x     | x     |
| 0     | 0     | 0     | 1     | 1     | 1     |
| 0     | 0     | 1     | x     | 1     | 0     |
| 0     | 1     | x     | x     | 0     | 1     |
| 1     | x     | x     | x     | 0     | 0     |

b

K-Map and simple functions of  $F_1$  and  $F_0$ :

$$\begin{array}{c}
 F_1 \\
 \hline
 I_2 \left[ \begin{array}{c|ccccc}
 & 00 & \overbrace{01}^{I_1} & 11 & 10 \\
 \hline
 00 & \text{x} \\
 01 & | \\
 11 & | \\
 10 & |
 \end{array} \right]_{I_3} \\
 F_1 = I_0' I_1' \\
 \hline
 I_0
 \end{array}$$

$$\begin{array}{c}
 1 \quad x \quad x \quad x \quad | \quad 0 \quad 0 \quad -^2[10 \\
 \hline
 F_0 \\
 \hline
 I_2 \left[ \begin{array}{c|ccccc}
 & 00 & \overbrace{01}^{I_1} & 11 & 10 \\
 \hline
 00 & \text{x} \\
 01 & | \\
 11 & | \\
 10 & |
 \end{array} \right]_{I_3} \\
 F_0 = I_0' I_1 + I_0' I_2' \\
 \hline
 I_0
 \end{array}$$