QUIZ 3

Recall the function $F : \{0,1\}^3 \to \{0,1\}^3$ that we defined as follows

$$F(x_1, x_2, x_3) = \begin{cases} (x_1, x_2, x_3) & \text{if } x_1 = 0; \\ (x_1, x_3, x_2) & \text{if } x_1 = 1. \end{cases}$$

Question 1: Write down the matrix M_F for F (with rows and columns indexed in the order 000, 001, 010, 011, 100, 101, 110, 110.

Note that $F(x_1, x_2, 0) = (x_1, \overline{x_1}x_2, x_1 \text{ AND } x_2)$. So AND can be computed using F.

Question 2: Fill in the blanks with expressions involving one variable x and constants 0 and 1 in $F(\underline{\quad}, \underline{\quad}, \underline{\quad})$, so that the result is the negation $\neg x$ (or $\overline{x}$) of x?

Question 3: Use one or more copies of F to compute $x_1 \text{ OR } x_2$.