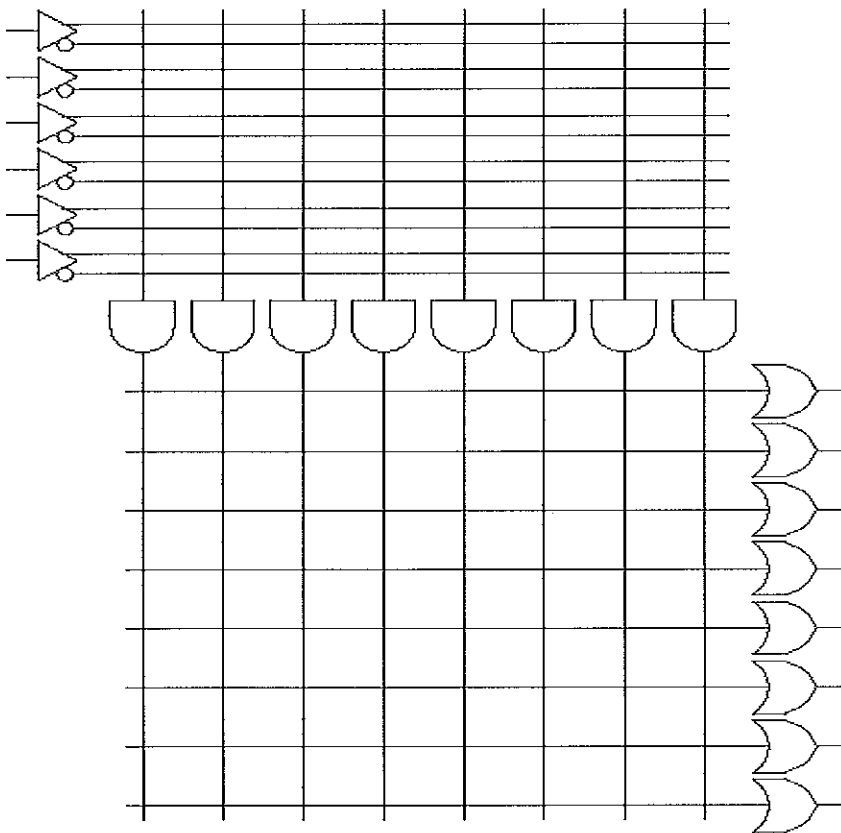


ECE 212 Spring 2017
Homework 5

1. Five logic functions are given by

$$\begin{aligned}
 F1 &= A'B + A \cdot B' \cdot C \cdot D' + A \cdot B \cdot C \\
 F2 &= B \cdot C' \cdot D' + A \cdot B' \cdot C \cdot D' + B' \cdot C \cdot D \\
 F3 &= A \cdot C \cdot D + A \cdot B' \cdot C \cdot D' + B' \cdot C \cdot D + A \cdot B \cdot C \\
 F4 &= A'B + A \cdot C \cdot D + B' \cdot C \cdot D \\
 F5 &= B \cdot C' \cdot D' + A \cdot C \cdot D + A \cdot B \cdot C
 \end{aligned}$$

Program the 6x8 PLA in Figure 1 below to implement these five logic functions (mark connections with an "X"). Remember to label the inputs (A, B, C and D) and outputs (F1, F2, F3, F4 and F5) on the PLA.



6 x 8 PLA with 8 product terms
Figure 1

2. The short form expression for a logic expression is given by

$F = \sum_{A,B,C,D}(0, 3, 6, 8, 10, 11, 12, 15)$ Implement the function F using a 8:1 MUX (Figure 2). Use A, B, and C as select inputs with A as the most significant select bit and C as the least significant select bit. Develop the Truth Table and determine the switching expressions for the inputs, I_0, I_1, \dots, I_7 to implement the function F with A, B, and C connected to the select inputs. Draw the external connections to the Mux.

