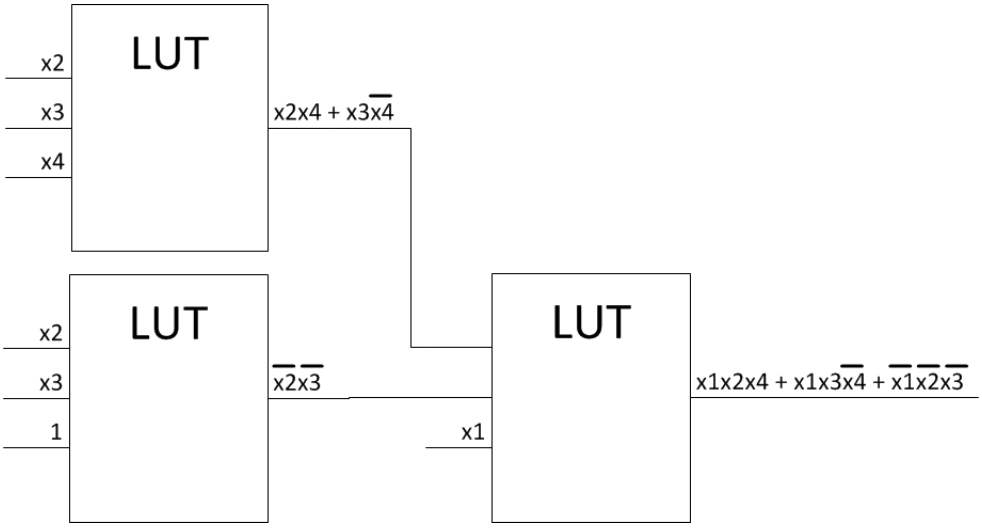
Solutions to HW3

(1) Note that:

$$f = x_1x_2x_4 + x_1x_3\bar{x}_4 + \bar{x}_1\bar{x}_2\bar{x}_3$$

$$f = x_1(x_2x_4 + x_3\bar{x}_4) + \bar{x}_1(\bar{x}_2\bar{x}_3)$$

$f = x_1g + \bar{x}_1h$, where $g = x_2x_4 + x_3\bar{x}_4$ and $h = \bar{x}_2\bar{x}_3$

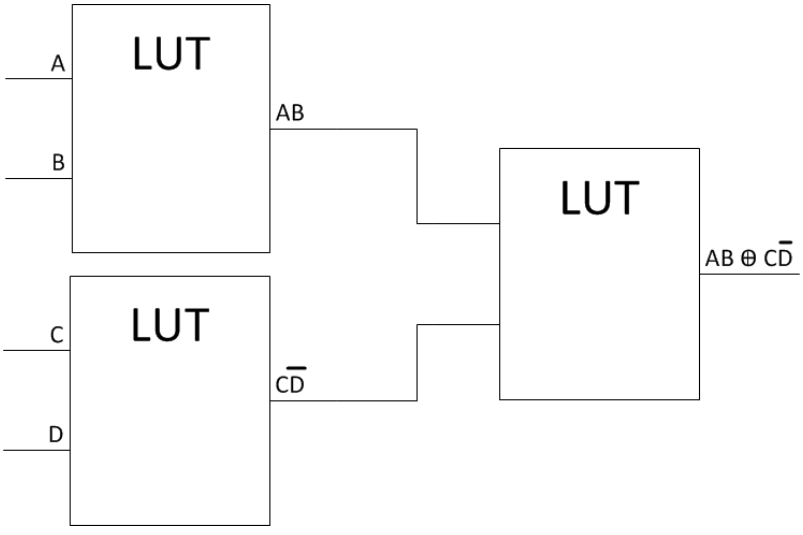


(2) Note that:

$$F = AB\bar{C} + \bar{A}C\bar{D} + ABD + \bar{B}C\bar{D}$$

$$F = AB(\bar{C} + D) + (\bar{A} + \bar{B})C\bar{D}$$

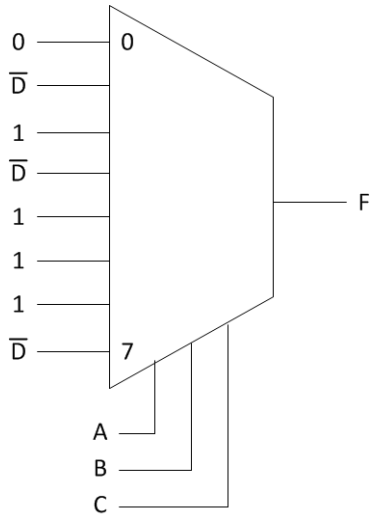
$$F = AB \oplus C\bar{D}$$



(3) Hard Macro: Specifies how logic elements are **physically** interconnected and placed.

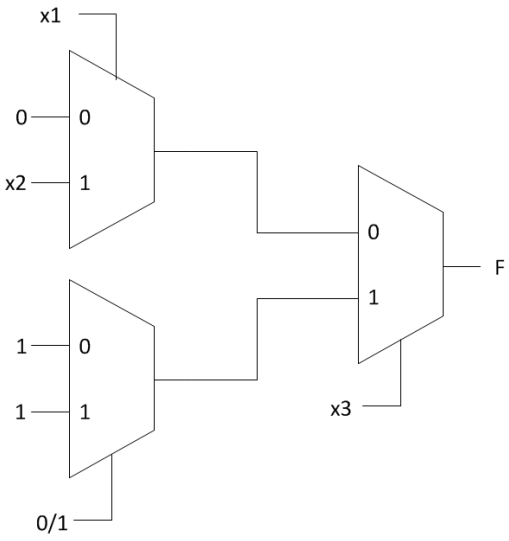
Soft Macro: Only **logical** interconnection is specified.

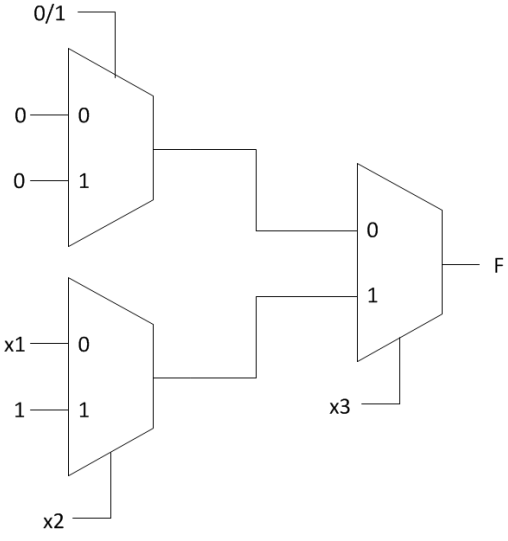
(4) $F = A\overline{B} + B\overline{C} + C\overline{D}$



(5) $F = X_1 \cdot X_2 + X_3$

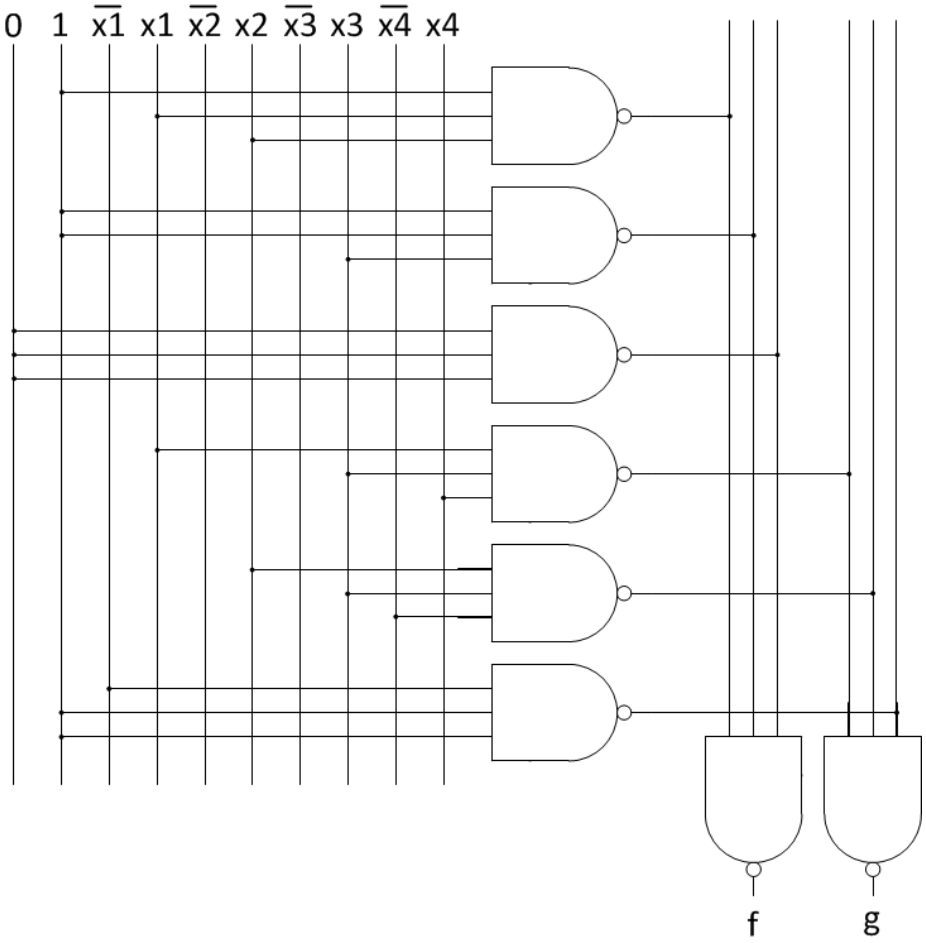
$F = X_1 \cdot X_3 + X_2 \cdot X_3 \Rightarrow X_3(X_1 + X_2)$





(6) $f = x_1 x_2 + x_3$

$g = x_1 x_3 x_4 + x_2 x_3 \overline{x_4} + \overline{x_1}$



(7) $F = A \oplus B \oplus C$

$G = A + \overline{B}C$