

EE 2000 Logic Circuit Design
Semester B 2023/24

Tutorial 6

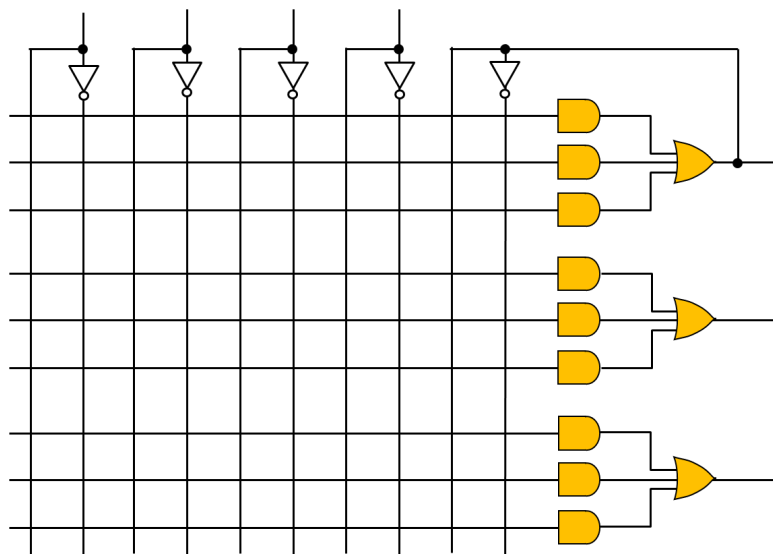
1. Implement the function $f(a, b, c, d) = \sum m(1, 2, 5, 7, 9, 11, 13)$ using:
 - (a) A 8-to-1-line multiplexer and a NOT gate only
 - (b) A 2-to-1-line multiplexer and minimum number of AND, OR, NOT gates
 (Hints: Assign variable a as selection input of the MUX, and then express f as a function of b, c, d with the help of K-map)
2. Construct an 8×4 PROM using a 3-to-8 decoder for the following functions.

$$\begin{aligned} A(x,y,z) &= \sum m(1,3,4,6) \\ B(x,y,z) &= \sum m(0,1,5,7) \\ C(x,y,z) &= \sum m(2,6,7) \\ D(x,y,z) &= \sum m(1,2,3,5,7) \end{aligned}$$

3. Construct the PLA diagram with the least number of distinct product terms for the following functions.

$$\begin{aligned} A(x,y,z) &= \sum m(1,2,4,6) \\ B(x,y,z) &= \sum m(0,1,6,7) \\ C(x,y,z) &= \sum m(2,6) \\ D(x,y,z) &= \sum m(1,2,3,5,7) \end{aligned}$$

4. Given the following PAL, construct the PAL diagram for the following functions.



$$\begin{aligned} x(a, b, c, d) &= \sum m(2, 12, 13) \\ y(a, b, c, d) &= \sum m(0, 2, 3, 4, 5, 6, 7, 8, 10, 11, 15) \\ z(a, b, c, d) &= \sum m(1, 2, 8, 12, 13) \end{aligned}$$