EE 2000 Logic Circuit Design
Semester A 2024/25

Tutorial 6

1. Implement the function $f(a, b, c, d) = \Sigma m\ (1, 2, 5, 7, 9, 11, 13)$ 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)

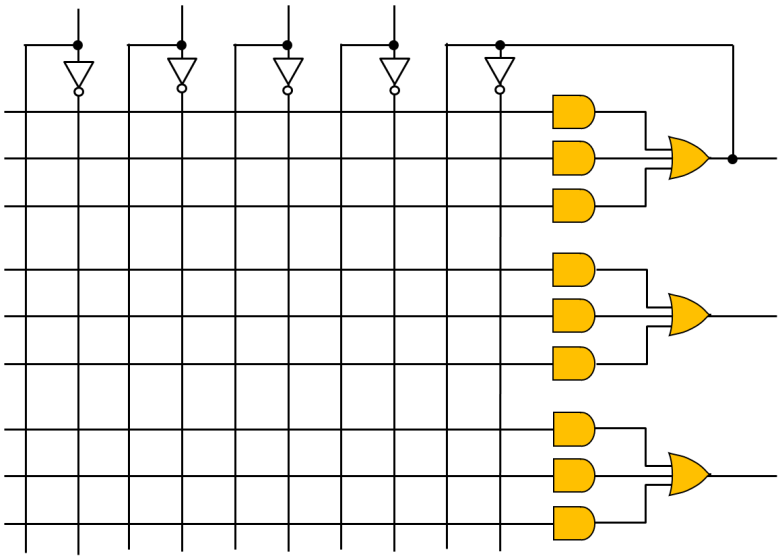
2. Construct an 8 × 4 PROM using a 3-to-8 decoder for the following functions.

$$A(x,y,z) = \Sigma\ m(1,3,4,6)$$
$$B(x,y,z) = \Sigma\ m(0,1,5,7)$$
$$C(x,y,z) = \Sigma\ m(2,6,7)$$
$$D(x,y,z) = \Sigma\ m(1,2,3,5,7)$$

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

$$A(x,y,z) = \Sigma\ m(1,2,4,6)$$
$$B(x,y,z) = \Sigma\ m(0,1,6,7)$$
$$C(x,y,z) = \Sigma\ m(2,6)$$
$$D(x,y,z) = \Sigma\ m(1,2,3,5,7)$$

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



$$x(a,b,c,d) = \Sigma m(2,12,13)$$
$$y(a,b,c,d) = \Sigma m(0,2,3,4,5,6,7,8,10,11,15)$$
$$z(a,b,c,d) = \Sigma m(1,2,8,12,13)$$