EE 2000 Logic Circuit
Design Semester A 2021/22A

Tutorial 2

1. Consider a 4-variable Boolean function. Using K-map, list the cells adjacent to cell m_{13}.

2. Plot the following functions on the K-map.
   (a) $f(x, y, z) = \Sigma\, m\,(0, 1, 3, 5)$
   (b) $f(a, b, c, d) = \Sigma\, m\,(2, 4, 6, 7, 15)$
   (c) Identify the prime implicants and the essential prime implicants for the answers (a) and (b).
   (d) Find the simplest SOP from of the above functions from the K-maps.
   (e) Find the simplest POS from of the above functions from the K-maps.

3. (a) Plot the following function on the K-map.
   $f(A, B, C, D) =$
   $(A'+B'+C+D)(A+B'+C+D)(A+B+C+D')(A+B+C'+D')(A'+B+C+D')(A+B+C'+D)$

   (b) Convert the standard POS expression in part (a) into
      (i) Minimum POS expression.
      (ii) Standard SOP expression.
      (iii) Minimum SOP expression.

4. Simplify the following function to SOP form using Q-M method:
   $f(a,b,c,d) = \Sigma\, m(4, 5, 6, 8, 11, 13, 15)$