Practice Problem 4
Solutions

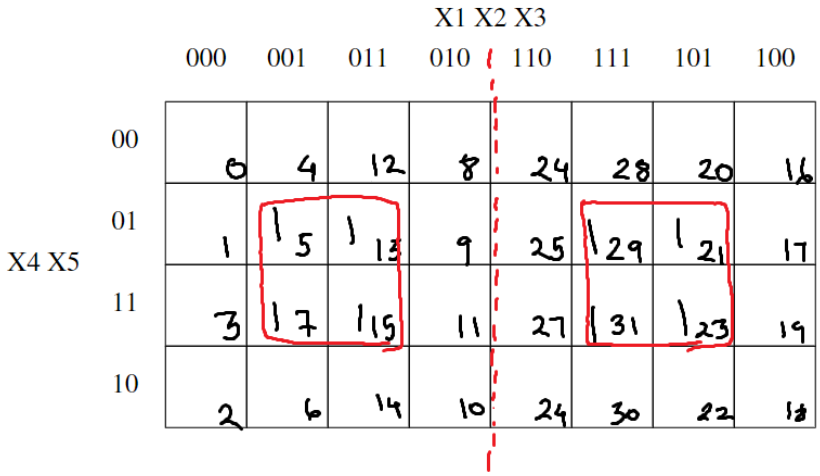
1. F1(X,Y,Z) = X'.Z' + X.Y' + Y.Z
   F2(X,Y,Z) = X'.Y + X.Z + Y'.Z'

   F1(X,Y,Z) = X'.Z'.(Y+Y') + X.Y'.(Z+Z') + Y.Z.(X+X')
   = X'.Y.Z' + X'.Y'.Z' + X.Y'Z + X.Y'Z' + X.Y.Z + X'.Y.Z
   = Σ(0,2,3,4,5,7)

   F2(X,Y,Y) = X'.Y.(Z+Z') + X.Z.(Y+Y') + Y'Z'.(X+X')
   = X'Y.Z + X'.Y.Z' + X.Y.Z + X.Y'.Z + X.Y'.Z' + X'.Y'.Z'
   = Σ(0,2,3,4,5,7)

   Both F1 and F2 have the same product terms in the canonical sum. Hence they are the same.

2. In F(X1,X2,X3,X4,X5), considering X1 to be the most significant bit (MSB) and X5 to be the least significant bit (LSB), the following Kmap can be drawn.



   On folding the Kmap about the shown axis, the two squares overlap each other. Hence the prime implicant covers 8 1s.

   Thus F(X1,X2,X3,X4,X5) = X3X5