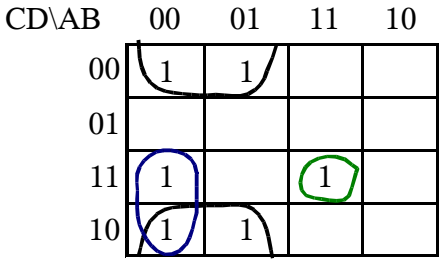
EEE 21 DC #5 (for Exam 2)
For the functions below,
(a) Draw the K-map and simplify in SOP format
(b) Draw the K-map and simplify in POS format
(c) Derive the SOP from the derived POS

1. F(A,B,C,D) = Σm(0,2,3,4,6,15)

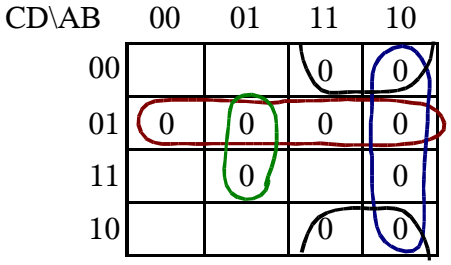
a)



F(A,B,C,D) = A'D' + A'B'C + ABCD

which group correspond to which term?

b)



F(A,B,C,D) = (A'+D)(A'+B)(C+D')(A+B'+D')

which group correspond to which term?

F(A,B,C,D) = (A'+D)(A'+B)(C+D')(A+B'+D')

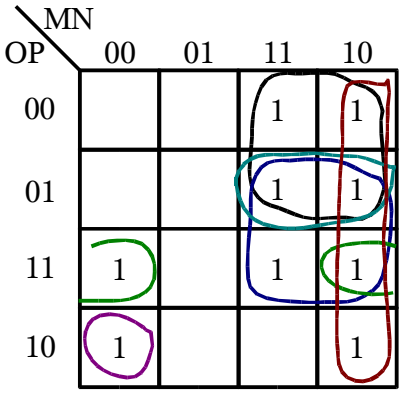
c)

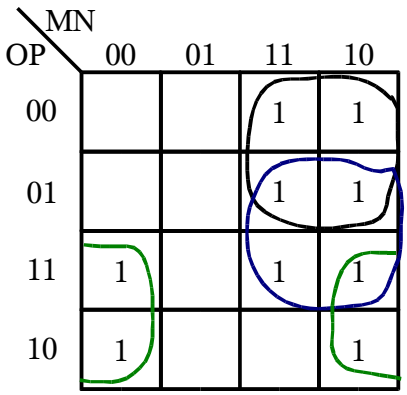
F(A,B,C,D) = (A' + B)(A' + D) (C + D') (A + B' + D')
= (A' + BD)(AC + B'C + D')
= A'B'C + A'D' + ABCD

* same as derived in (a)

2. X(M,N,O,P) = MO'+MP+N'OP+MO'P+MN'+M'N'OP'

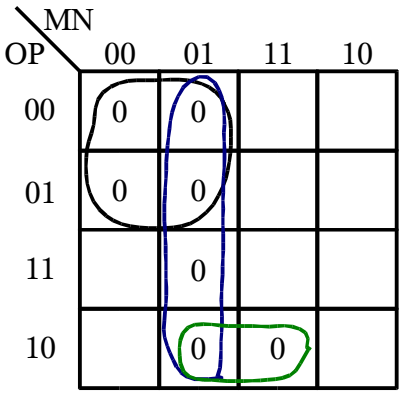
a)





X(M,N,O,P)=MO' + MP +N'O

b)

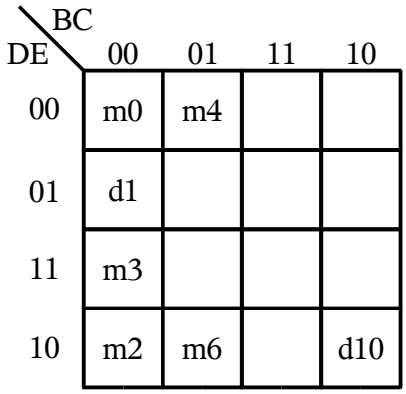


X(M,N,O,P)=(M + O)(M+N')(N'+O'+P)

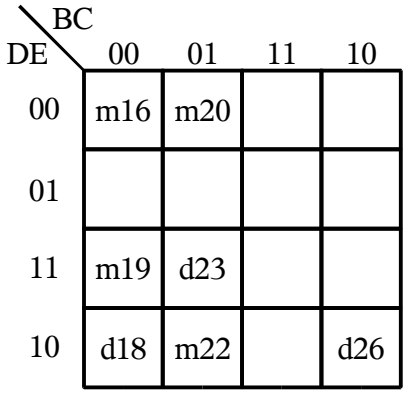
c) X(M,N,O,P)=(M + O)(M+N')(N'+O'+P)
= (M + N'O)(N' + O' + P)
= MN' + MO' + MP + N'O + N'OP
= MN' (O + O') + MO' + MP + N'O(1 + P)
= N'O(M + 1) + MO' + MP
= MO' + MP + N'O (same as answer to a)

3. F(A,B,C,D,E) = Σm(0,2,3,4,6,16,19,20,22) + d(1,10,18,23,26)

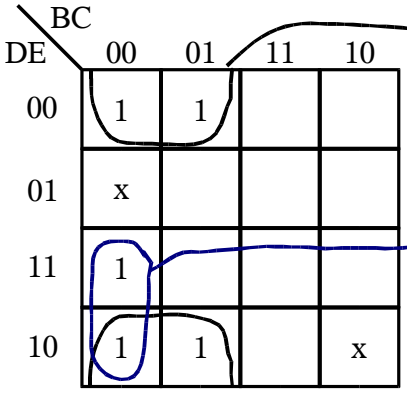
a)



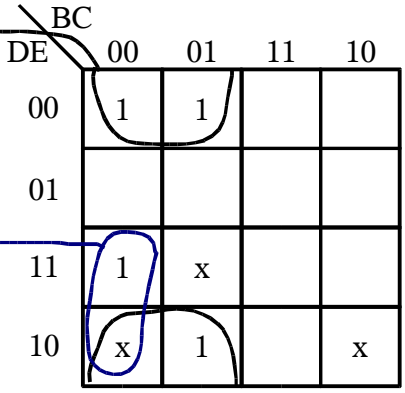
A = 0



A = 1

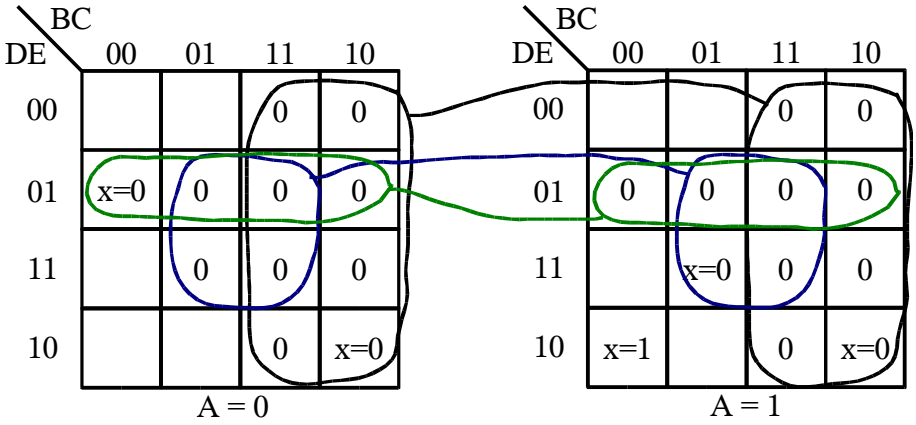


A = 0



A = 1

F(A,B,C,D,E) = B'E' + B'C'D



note: the x=0 and x=1 were set the moment we chose the mappings for SOP. We must observe the same values of x for deriving the SOP and POS to have consistent expressions.

F(A,B,C,D,E) = B'(C'+E')(D+E')
= B'(C'D +E')
= B'C'D + B'E' (same as SOP form)