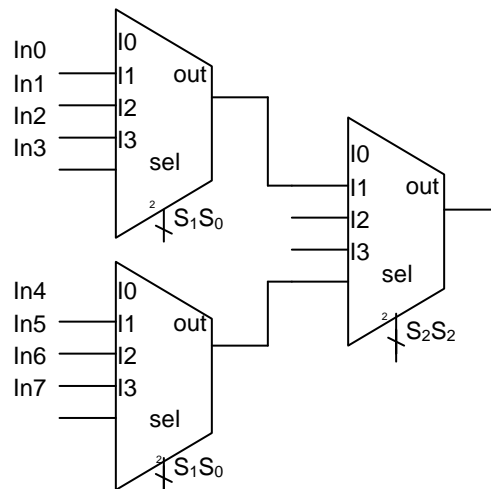


# ECEn 220

## Chapter 8 Homework Solutions

8.1 Implement an 8:1 MUX out of 4:1 MUX blocks.

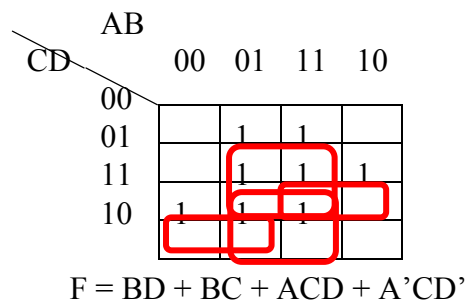
One example is shown below. Other solutions are possible.



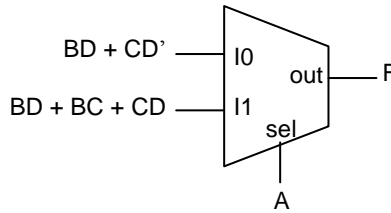
8.2 For the following few problems consider the following function:

$$F(A,B,C,D) = \sum m(2,5,6,7,11,13,14,15)$$

Use a 2:1 MUX (A as the MUX select signal) to implement the function this function.



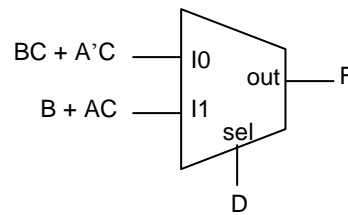
When  $A = 0$   $F = BD + BC + CD' = BD + CD'$  (Consensus theorem)  
 When  $A = 1$   $F = BD + BC + CD$



8.3 Use a 2:1 MUX (D as the MUX select signal) to implement the function from above.

$$F = BD + BC + ACD + A'CD'$$

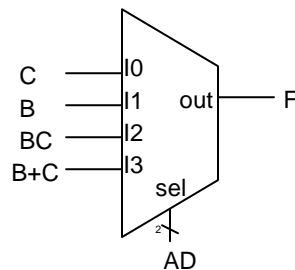
When  $D = 0$   $F = BC + A'C$   
 When  $D = 1$   $F = B + BC + AC = B + AC$



8.4 Use a 4:1 MUX (AD as the MUX select signals) to implement the function from above.

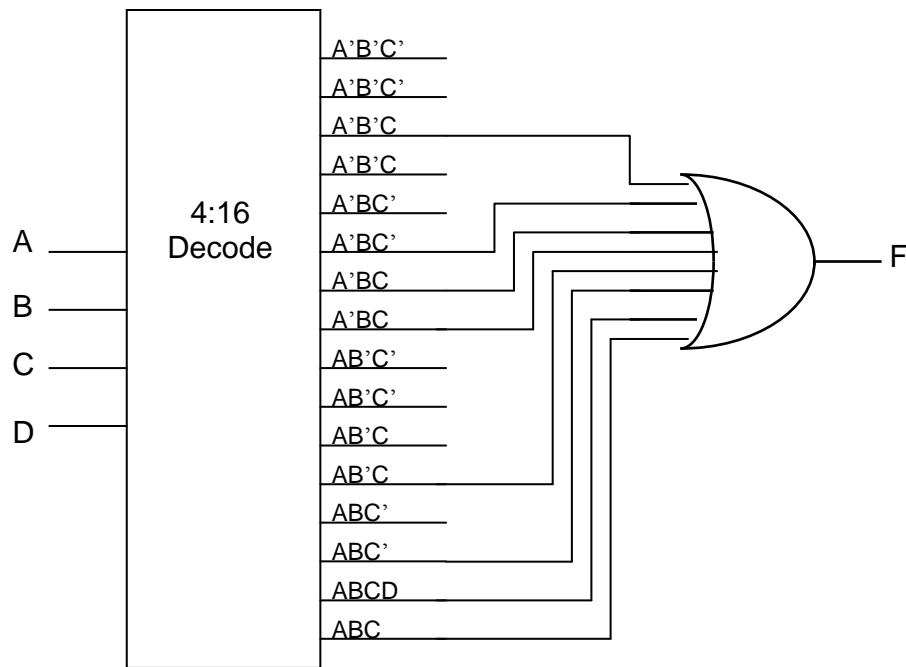
$$F = BD + BC + ACD + A'CD'$$

When  $AD = 00$   $F = BC + C = C$   
 When  $AD = 01$   $F = B + BC = B$   
 When  $AD = 10$   $F = BC$   
 When  $AD = 11$   $F = B + BC + C = B + C$

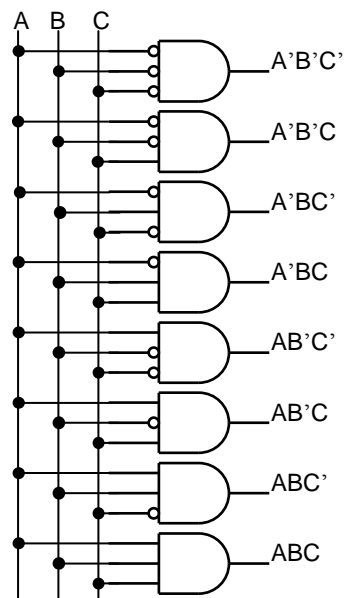


8.6 Use a 4:16 decoder and some gates to implement the function from above.

$$F = BD + BC + ACD + A'CD'$$



8.8 Draw the gate level schematic for a 3:8 decoder.



- 8.10 Show how to build an 8:1 MUX out of a 3:8 decoder, some AND gates, and a single OR gate.

