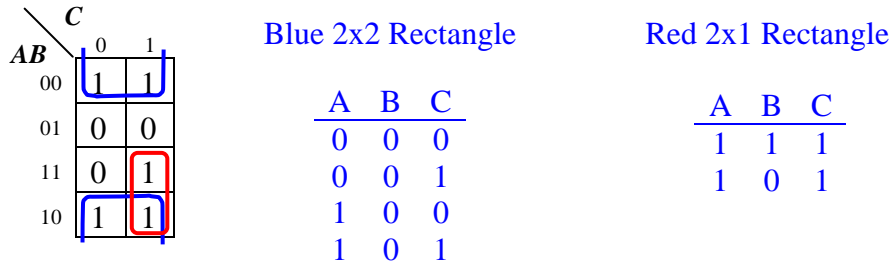


CSCI 2150 – Karnaugh Map Homework

Name: \_\_\_\_\_

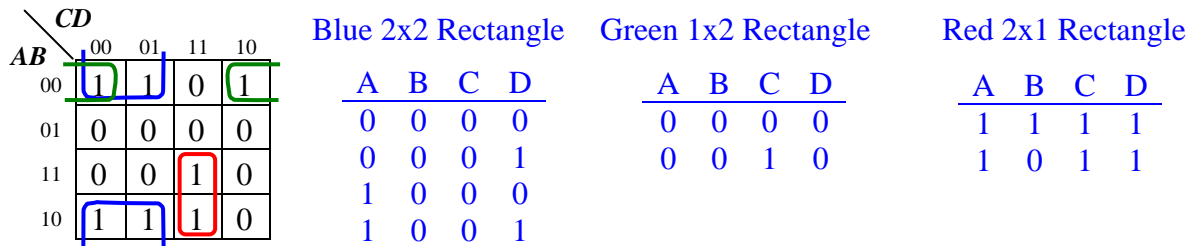
1. Derive the minimum SOP expression from the Karnaugh map below. Be sure to show all steps.



Since the only term that stays constant for the 2x2 blue rectangle is  $B = 0$ , then the product for that rectangle is simply  $\bar{B}$ . In the second rectangle, the red one, the terms that remain constant across all cells are  $A = 1$  and  $C = 1$ . Therefore, the product for that rectangle is  $A \cdot C$ . This gives us the minimum SOP expression:

$$\boxed{\bar{B} + A \cdot C}$$

2. Derive the minimum SOP expression from the Karnaugh map below. Be sure to show all steps.



Both A and D have values of 1 and 0 across the cells of the blue rectangle. Therefore, B and C are the terms that will be used to generate the product for the blue rectangle. Since both of them are a constant 0, both need to be inverted giving us  $\bar{B} \cdot \bar{C}$ . In the green rectangle, C takes on both values of 0 and 1 leaving A, B, and D as the constant terms across all the cells. Once again, all three are equal to the constant 0, therefore all three must be inverted giving us  $\bar{A} \cdot \bar{B} \cdot \bar{D}$ . The red rectangle has B dropping out leaving A, C, and D as constant 1's. This produces the product  $A \cdot C \cdot D$ . These three terms give us the minimum SOP expression:

$$\boxed{\bar{B} \cdot \bar{C} + \bar{A} \cdot \bar{B} \cdot \bar{D} + A \cdot C \cdot D}$$