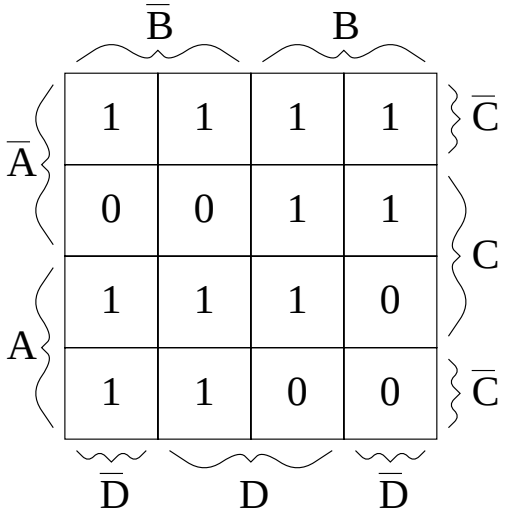
Simplification and Implementation

Part A A desired logical function is specified in the Karnaugh map below. Circle the prime implicants (containing ones). Then list each product term derived from the map indicating which are essential. You won't necessary need all lines. Finally, write the simplified sum of products expression.



prime implicant — essential?

_____ yes☐ no☐

_____ yes☐ no☐

_____ yes☐ no☐

_____ yes☐ no☐

_____ yes☐ no☐

_____ yes☐ no☐

_____ yes☐ no☐

$F_{(A,B,C,D)}\,(SOP) =$ _____

Part B Implement the simplified sum of products expression from Part A using a direct transistor design approach.

Part C Compute a product of sums expression by forming prime implicants of zeros.

$F_{(A,B,C,D)}\,(POS) =$ _____

Part D Implement the simplified product of sums expression from Part C using only **3-input NOR gates** and **inverters** with mixed logic notation.