Expression Simplification

Part A Complete the truth table for the following expression:

$Out = \overline{A}\,C\,D + \overline{A}\,\overline{B}\,\overline{D} + \overline{A}\,\overline{B}\,\overline{C}\,D + B\,C\,D + \overline{A}\,B\,C + A\,B\,C\overline{D}$

D	C	B	A	OUT
0	0	0	0	
0	0	0	1	
0	0	1	0	
0	0	1	1	
0	1	0	0	
0	1	0	1	
0	1	1	0	
0	1	1	1	

D	C	B	A	OUT
1	0	0	0	
1	0	0	1	
1	0	1	0	
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	

Part B For this expression, (A) express the minterm sum of products equation, and (B) express the maxterm product of sums equation.

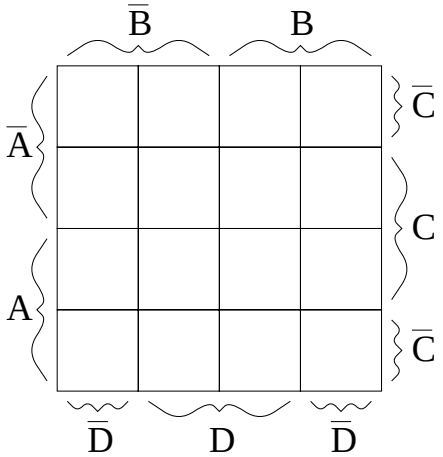
(A) SOP (minterms) = _____

_____

(B) POS (maxterms) = _____

_____

Part C Determine a simplified expression for the original expression above using a Karnaugh Map. Circle and list the prime implicants, indicating which are essential. Then write the simplified expression.



prime implicant

essential?

_____ yes☐ no ☐

_____ yes☐ no ☐

_____ yes☐ no ☐

_____ yes☐ no ☐

_____ yes☐ no ☐

_____ yes☐ no ☐

_____ yes☐ no ☐

$Out =$ _____