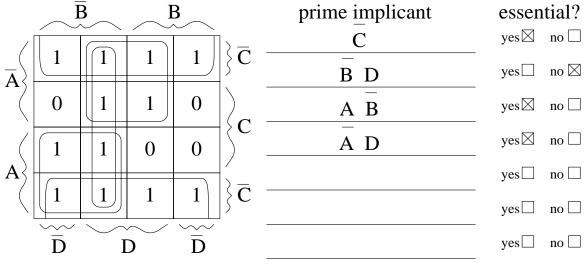**Simplification with Karnaugh Maps**

Part A For the Karnaugh map below, circle the prime implicants. Then list each product term derived from the map indicating which are essential. You won't necessary need all lines.

prime implicant	essential?
$\overline{C}$	yes ☒ no ☐
$\overline{B}\,D$	yes ☐ no ☒
$A\,\overline{B}$	yes ☒ no ☐
$\overline{A}\,D$	yes ☒ no ☐
	yes ☐ no ☐
	yes ☐ no ☐
	yes ☐ no ☐

Part B Write the simplified sun of products expression for this Karnaugh map.

$$F_{(A,B,C,D)} = \overline{C} + A\,\overline{B} + \overline{A}\,D$$

Part C Write the simplified product of sums expression for this Karnaugh map.

$$F_{(A,B,C,D)} = (\overline{A} + \overline{B} + \overline{C})(A + \overline{C} + D)$$