

Expression Simplification

Part A

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

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

Part B

(A) SOP (minterms) = $\overline{A}\overline{B}\overline{C}\overline{D} + \overline{A}\overline{B}C\overline{D} + \overline{A}B\overline{C}\overline{D} + ABC\overline{D} +$
 $\overline{A}\overline{B}\overline{C}D + \overline{A}\overline{B}CD + \overline{A}BCD + ABCD$

(B) POS (maxterms) = $(\overline{A} + B + C + D)(A + \overline{B} + C + D)(\overline{A} + \overline{B} + C + D)(\overline{A} + B + \overline{C} + D)(\overline{A} + B +$
 $C + \overline{D})(A + \overline{B} + C + \overline{D})(\overline{A} + \overline{B} + C + \overline{D})(\overline{A} + B + \overline{C} + \overline{D})$

Part C

		\overline{B}	B		
\overline{A}	\overline{C}	1	1	0	0
	C	1	1	1	1
A	C	0	0	1	1
	\overline{C}	0	0	0	0
		\overline{D}	D	\overline{D}	

prime implicant	essential?
$\overline{A}\overline{B}$	yes <input checked="" type="checkbox"/> no <input type="checkbox"/>
BC	yes <input checked="" type="checkbox"/> no <input type="checkbox"/>
$\overline{A}C$	yes <input type="checkbox"/> no <input checked="" type="checkbox"/>
_____	yes <input type="checkbox"/> no <input type="checkbox"/>
_____	yes <input type="checkbox"/> no <input type="checkbox"/>
_____	yes <input type="checkbox"/> no <input type="checkbox"/>

$Out = \overline{A}\overline{B} + BC$