

Boolean Algebra Simplifier

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

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Solution: $\overline{B}\overline{C}A+\overline{B}\overline{C}D+C\overline{A}\overline{D}+CB$

Steps

Start

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

Apply: Demorgan Theorm

$$(A+D)\overline{B}\overline{C}+(\overline{A+\overline{D}}+\overline{\overline{B}})C$$
Apply the Involution Law: $\overline{\overline{A}} = A$
$$(A+D)\overline{B}\overline{C}+(\overline{A+\overline{D}}+B)C$$

Apply: Demorgan Theorm

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

Apply: Distribution

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

Apply: Distribution

$$\overline{B}\overline{C}A+\overline{B}\overline{C}D+C\overline{A}\overline{D}+CB$$

Truth Table

A	B	C	D	Output
0	0	0	0	F
0	0	0	1	T
0	0	1	0	T
0	0	1	1	F
0	1	0	0	F
0	1	0	1	F
0	1	1	0	T
0	1	1	1	T
1	0	0	0	T
1	0	0	1	T
1	0	1	0	F
1	0	1	1	F
1	1	0	0	F
1	1	0	1	F
1	1	1	0	T
1	1	1	1	T

$$\overline{A}\overline{B}\overline{C}D+\overline{A}\overline{B}C\overline{D}+\overline{A}B\overline{C}\overline{D}+\overline{A}BCD+A\overline{B}\overline{C}\overline{D}+A\overline{B}C\overline{D}+ABC\overline{D}+ABCD$$