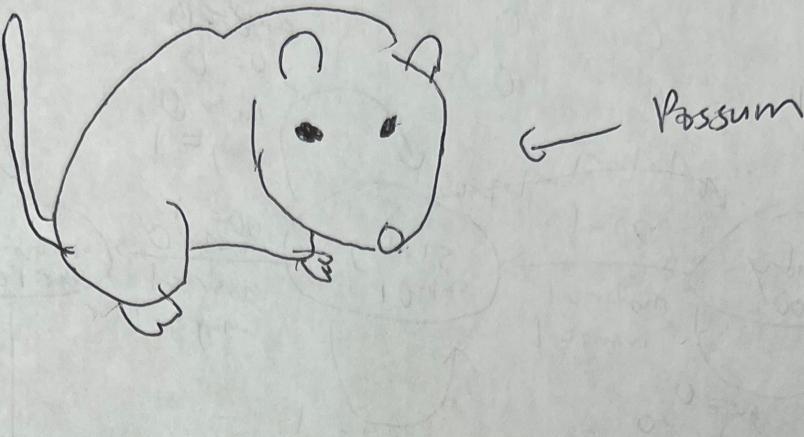


$$1) ((\neg A + \neg B) \cdot \neg C) + ((A \cdot \neg B) + (\neg C \cdot B))$$

a) A B C Out

0	0	0	1
1	0	0	1
0	1	0	1
0	0	1	0
1	1	0	1
0	1	1	0
1	0	1	1
1	1	1	0



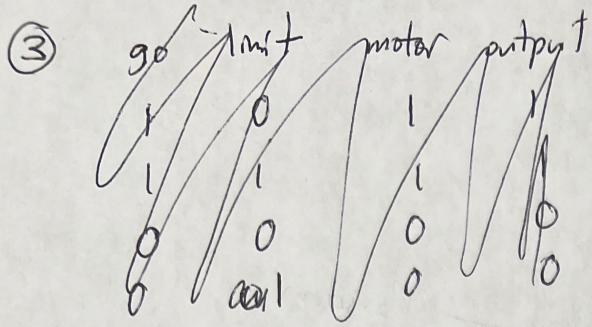
c) A B C out1 out2

0	0	0	0	1
0	0	1	0	0
0	1	0	0	0
0	1	1	0	1
1	0	0	1	0
1	0	1	1	0
1	1	0	1	0
1	1	1	0	1

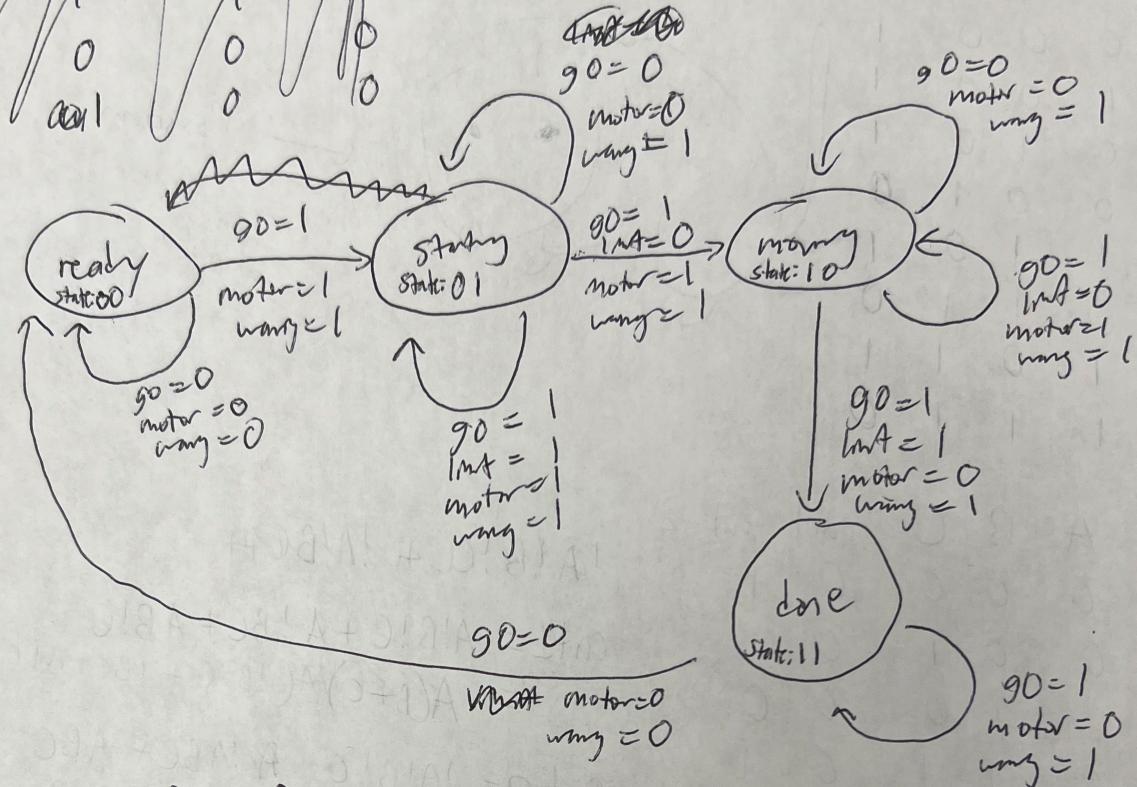
$$\neg A \cdot \neg B \cdot \neg C + A \cdot \neg B \cdot C + A \cdot B \cdot \neg C$$

$$\begin{aligned} \text{out1} &= A \cdot \neg B \cdot \neg C + A \cdot \neg B \cdot C + A \cdot B \cdot \neg C \\ &= A(\neg B + \cancel{AC}(\neg B \cdot C + \neg BC + B \cdot C)) = A(\neg B + B \cdot C) \end{aligned}$$

$$\begin{aligned} \text{out2} &= \neg A \cdot \neg B \cdot \neg C + \cancel{\neg A \cdot \neg B \cdot C} + A \cdot \neg C \\ &= \neg A \cdot \neg B \cdot \neg C + BC(\neg A + A) \\ &= \neg A \cdot \neg B \cdot \neg C + BC \end{aligned}$$



a)



b)

Q, Q_0	(G)	(L)	motor	wmg	motor wmg	D, D_0
0 0	0	0	0	0	0	0 0
0 0	0	1	0	0	0	0 0
0 0	1	0	1	1	0	0 1
0 0	1	1	1	1	0	0 1
0 1	0	0	0	1	0	0 1
0 1	0	1	0	1	0	0 1
0 1	1	0	1	1	1	0 0
0 1	1	1	1	1	1	0 0
1 0	0	0	0	0	1	1 0
1 0	0	1	0	1	1	1 0
1 0	1	1	0	0	1	1 1
1 1	1	0	0	0	0	0 0
1 1	0	1	0	0	0	0 0
1 1	1	1	0	0	0	0 0

c) ~~Do = 1(Q1, Q0, g0, !lmt)~~

$$\begin{aligned}
 D_0 &= 1(Q_1, Q_0, g_0, \neg l_{mt}) \\
 &+ \neg Q_1, \neg Q_0, \neg g_0, l_{mt} \\
 &+ \neg Q_1, Q_0, \neg g_0, \neg l_{mt} \\
 &+ \neg Q_1, \neg Q_0, g_0, \neg l_{mt} \\
 &+ Q_1, \neg Q_0, g_0, l_{mt} \\
 &+ Q_1, Q_0, \neg g_0, l_{mt} \\
 &+ Q_1, Q_0, g_0, \neg l_{mt} \\
 &+ \neg Q_1, Q_0 \\
 &+ Q_1, Q_0
 \end{aligned}$$

	Q_1	Q_0	G	L	Motor	Warning	D_1	D_0
	0	0	0	X	0	0	0	0
	0	0	1	X	1	1	0	1
	0	1	0	X	0	1	0	1
	1	0	0	X	0	1	0	0
	0	1	1	0	1	1	1	0
	0	1	1	1	1	1	0	1
	1	0	0	X	0	1	1	0
	1	0	1	0	1	1	1	0
	1	0	1	1	0	1	1	1
	1	1	1	X	0	1	1	1
	1	1	0	X	0	0	0	0

b)

$$\begin{aligned}
 D_0 &= !Q_1!Q_0G + !Q_1Q_0!G + !Q_1Q_0GL + Q_1!Q_0GL + Q_1Q_0G \\
 &= GL + Q_1Q_0G + !Q_1!Q_0G + \cancel{!Q_1Q_0!G} \\
 D_1 &= !Q_1Q_0G!L + Q_1!Q_0!G + Q_1!Q_0G!L + Q_1!Q_0GL + Q_1Q_0G \\
 &= Q_0G!L + Q_1G + Q_1!Q_0 \\
 \text{Motor} &= !Q_1!Q_0G + !Q_1Q_0G!L + !Q_1Q_0GL + Q_1!Q_0G!L \\
 &= !Q_0G!L + !Q_1G \\
 \text{Warning} &= !(Q_1!Q_0!G + Q_1Q_0!G) = Q_1!Q_0 + !Q_1Q_0 + G
 \end{aligned}$$

Used dcode.fr boolean expression calculator to
Simplify - screenshots are attached

https://www.dcode.fr/boolean-expressions-calculator



BOOLEAN EXPRESSIONS CALCULATOR

Mathematics > Symbolic Computation > Boolean Expressions Calculator

BOOLEAN EXPRESSIONS SIMPLIFIER

★ LOGICAL EXPRESSION CALCULATOR/SIMPLIFIER/MINIFIER

$!((!q*p*g)+(q*p!*g))$

★ RESULT FORMAT

Ⓐ ANY FORMAT

DISJUNCTIVE NORMAL FORM DNF (SUM OF PRODUCTS/SOP/MINTERMS)
 CONJUNCTIVE NORMAL FORM CNF (PRODUCT OF SUMS/POS/MAXTERMS)
 ONLY NAND GATES (NOT-AND $\bar{\wedge}$)
 ONLY NOR GATES (NOT-OR $\bar{\vee}$)

★ NOTATION Ⓐ ALGEBRAIC (*, +, !)
 LOGICAL (\wedge , \vee , \neg)
 PROGRAMMING ($\&\&$, $\|$, \sim)
 LITERAL (AND, OR, NOT)

▶ CALCULATE

See also: Truth Table – Equation Solver – Binary Code

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★ SEARCH A TOOL ON DCODE BY KEYWORDS:
 e.g. type 'sudoku'

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Results

$! ((! q * ! p * ! g) + (q * p * ! g))$
 \downarrow
 $g + (p * ! q) + (! p * q)$

Boolean Expressions Calculator - dCode

Tag(s) : Symbolic Computation, Electronics

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Results

```
( ! q * ! p * g ) + ( ! q * p * ! g ) + ( ! q * p * g * l ) + ( q * ! p * g * l ) + ( q * p * g )
↓
(g * l) + (g * p * q) + (g * ! p * ! q) + (! g * p * ! q)
```

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BOOLEAN EXPRESSIONS CALCULATOR

Mathematics > Symbolic Computation > Boolean Expressions Calculator

BOOLEAN EXPRESSIONS SIMPLIFIER

★ LOGICAL EXPRESSION CALCULATOR/SIMPLIFIER/MINIFIER
 $g) + (!q*p*x!g) + (!q*p*q*l) + (q*p!p*g*l) + (q*p*g)$

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See also: [Truth Table](#) — [Equation Solver](#) — [Binary Code](#)

Answers to Questions (FAQ)

What is a boolean expression? (Definition)

A Boolean expression (or Logical expression) is a mathematical expression using Boolean algebra and which uses Boolean values (0 or 1, true or false) as variables and which has Boolean values as result/simplification. The expression can contain operators such as conjunction (AND), disjunction (OR) and negation (NOT).

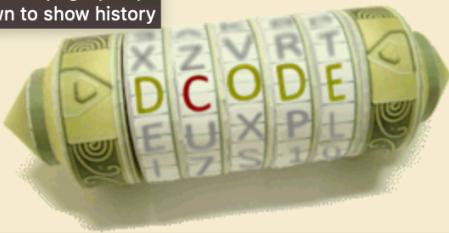
Summary

- ★ Boolean Expressions Simplifier
- ★ What is a boolean expression? (Definition)
- ★ How to simplify / minify a boolean expression?
- ★ What are boolean algebra simplifications methods?
- ★ How to show/demonstrate that 2 boolean expressions are equal?
- ★ What is De Morgan's law?
- ★ What is Disjunctive or Conjunctive Normal Form?
- ★ How to show step by step calculations?

Similar pages

- ★ Truth Table
- ★ Equation Solver
- ★ Boolean Dual
- ★ Boolean Minterms and Maxterms
- ★ Binary Code
- ★ Math Expression Simplifier
- ★ Remove Parentheses

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Search for a tool

★ SEARCH A TOOL ON DCODE BY KEYWORDS:
e.g. type 'boolean'

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Results

$$(\neg q * p * g * \neg l) + (q * \neg p * \neg g) + (q * \neg p * g * \neg l) + (q * \neg p * g * l) + (q * p * g)$$

$$(\neg g * \neg l * p) + (g * q) + (\neg p * q)$$

[Boolean Expressions Calculator - dCode](#)

Tag(s) : Symbolic Computation, Electronics

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 $q*p*g*\neg l + (\neg q*\neg p*\neg g) + (q*\neg p*g*\neg l) + (\neg q*\neg p*g*l) + (q*p*g)$

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Ⓐ ANY FORMAT

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