

calc_logic_example

Student Group

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example for a simplification with the rule for boolean algebra

$$\overline{a \vee (b \wedge (\bar{a} \vee c) \wedge 1)} \vee a$$

example for a simplification with the rule for boolean algebra

$$\begin{array}{ll} \overline{(a \vee (b \wedge (\bar{a} \vee c) \wedge 1)) \vee a} & \\ \quad \quad \quad \& \quad \quad \quad \end{array}$$

example for a simplification with the rule for boolean algebra

[illegible]

example for a simplification with the rule for boolean algebra

$$\overline{a \vee (b \wedge \bar{a} \vee c) \wedge 1} \vee a \quad \& \quad \quad \quad \& \quad \quad \quad$$

example for a simplification with the rule for boolean algebra

[illegible]

example for a simplification with the rule for boolean algebra

$$\begin{array}{ll} \overline{a \vee (b \wedge (\overline{a} \vee c) \wedge 1) \vee a} & \& \\ \quad \quad \quad \& \quad \quad \quad \end{array}$$

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$$\begin{array}{ll} \overline{a \vee (b \wedge (\overline{a} \vee c) \wedge 1) \vee a} & \& \\ \quad \quad \quad \& \quad \quad \quad \end{array}$$

example for a simplification with the rule for boolean algebra

$$\begin{array}{ll} \overline{(a \vee (b \wedge (\bar{a} \vee c) \wedge 1)) \vee a} & \\ \quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad & \\ \quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad & \end{array}$$

At first we will switch the representation to the following:

```
\begin{align*} \begin{array}{ll} \overline{a \lor (b \land (\bar{a} \lor c) \land 1) \lor a} & & \\ \color{white}{\overline{ab}} & \quad \quad \quad & \\ \quad \quad \quad & \quad \quad \quad & \end{array} \end{align*}
```

At first we will switch the representation to the following:

```
\begin{align*} \begin{array}{ll} /a + (b \cdot (/a + c) \cdot 1) + a & & \color{white}{\overline{ab}} \\ \quad \quad \quad & \quad \quad \quad & \end{array} \end{align*}
```

1. $\color{blue}{\text{Neutral Element}}$

```
\begin{align*} \begin{array}{ll} /a + (b \cdot (/a + c) \color{blue}{\cdot 1}) + a & & \\ \color{white}{\overline{ab}} & \quad \quad \quad & \\ \quad \quad \quad & \quad \quad \quad & \end{array} \end{align*}
```

1. $\color{blue}{\text{Neutral Element}}$

```
\begin{align*} \begin{array}{ll} /a + (b \cdot (/a + c) \quad \color{blue}{\cdot 1}) + a & & \\ \color{white}{\overline{ab}} & \quad \quad \quad & \\ \quad \quad \quad & \quad \quad \quad & \end{array} \end{align*}
```

2. $\color{blue}{\text{Commutative Law}}$

```
\begin{align*} \begin{array}{ll} /a + \color{blue}{(b \cdot (/a + c) \quad \color{blue}{\cdot 1})} + a & & \\ \color{white}{\overline{ab}} & \quad \quad \quad & \\ \quad \quad \quad & \quad \quad \quad & \end{array} \end{align*}
```

2. $\color{blue}{\text{Commutative Law}}$

```
\begin{align*} \begin{array}{ll} /a + a + (b \cdot (/a + c) \quad \color{blue}{\cdot 1}) & & \color{white}{\overline{ab}} \\ \quad \quad \quad & \quad \quad \quad & \end{array} \end{align*}
```

3. $\color{blue}{\text{Idempotence}}$

```
\begin{align*} \begin{array}{ll} /(\color{blue}{a + a} + (b \cdot (/a + c)\quad \;)) & \\ \color{white}{\overline{ab}} \; \; \quad\quad\quad\quad\quad\quad & \\ \quad\quad\quad\quad\quad\quad\quad\quad \; \; \end{array} \end{align*}
```

3. $\color{blue}{\text{Idempotence}}$

```
\begin{align*} \begin{array}{ll} /(a \quad \enspace \;: + (b \cdot (/a + c)\quad \;)) & \\ \color{white}{\overline{ab}} \; \; \quad\quad\quad\quad\quad\quad & \\ \quad\quad\quad\quad\quad\quad\quad\quad \; \; \end{array} \end{align*}
```

4. $\color{blue}{\text{Distributive Law}}$

```
\begin{align*} \begin{array}{ll} /(a \quad \enspace \;: + (\color{blue}{b \cdot (/a + c)} \quad \;)) & \\ \color{white}{\overline{ab}} \; \; \quad\quad\quad\quad\quad\quad & \\ \quad\quad\quad\quad\quad\quad\quad\quad \; \; \end{array} \end{align*}
```

4. $\color{blue}{\text{Distributive Law}}$

```
\begin{align*} \begin{array}{ll} /(a \quad \;: + ((b \cdot /a) + (b \cdot c))) & \\ \color{white}{\overline{ab}} \; \; \quad\quad\quad\quad\quad\quad & \\ \quad\quad\quad\quad\quad\quad\quad\quad \; \; \end{array} \end{align*}
```

5. $\color{blue}{\text{Associative Law}}$

```
\begin{align*} \begin{array}{ll} /(\color{blue}{a \enspace \;: + ((b \cdot /a) + (b \cdot c))}) & \\ \color{white}{\overline{ab}} \; \; \quad\quad\quad\quad\quad\quad & \\ \quad\quad\quad\quad\quad\quad\quad\quad \; \; \end{array} \end{align*}
```

5. $\color{blue}{\text{Associative Law}}$

```
\begin{align*} \begin{array}{ll} /(a \enspace \;: + (b \cdot /a) + \; \; (b \cdot c), ) & \\ \color{white}{\overline{ab}} \; \; \quad\quad\quad\quad\quad\quad & \\ \quad\quad\quad\quad\quad\quad\quad\quad \; \; \end{array} \end{align*}
```

6. $\color{blue}{\text{Absorption Law}}$

```
\begin{align*} \begin{array}{ll} /((\color{blue}{a \enspace \colon + (b \cdot /a)}) + \, , (b \cdot c) \, , ) & \\ \color{white}{\overline{ab}} \, \, \quad \quad \quad \quad \quad \quad \quad & \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad & \\ \end{array} \end{align*}
```

6. $\color{blue}{\text{Absorption Law}}$

```
\begin{align*} \begin{array}{ll} / (a \enspace \colon + \, , b \quad + \, , (b \cdot c) \, , ) & \\ \color{white}{\overline{ab}} \, \, \quad \quad \quad \quad \quad \quad \quad & \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad & \\ \end{array} \end{align*}
```

7. $\color{blue}{\text{Absorption Law}}$

```
\begin{align*} \begin{array}{ll} / (a \enspace \colon + \, , \color{blue}{b \quad + \, , (b \cdot c) \, , )} & \\ \color{white}{\overline{ab}} \, \, \quad \quad \quad \quad \quad \quad \quad & \\ \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad \quad & \\ \end{array} \end{align*}
```

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