

calc_logic_example

Student Group

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example for a simplification with the rule for boolean algebra

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

example for a simplification with the rule for boolean algebra

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

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

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

example for a simplification with the rule for boolean algebra

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

example for a simplification with the rule for boolean algebra

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

example for a simplification with the rule for boolean algebra

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

example for a simplification with the rule for boolean algebra

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

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

$$\begin{array}{l} \textcolor{blue}{a + a} + (b \cdot (a + c)) \quad \& \\ \overline{ab} \quad \& \\ \quad \quad \quad \end{array}$$

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

$$\begin{array}{l} (a \quad \text{enspace} \textcolor{white}{\overline{ab}} \quad \& \\ \quad \quad \quad \end{array}$$

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

$$\begin{array}{l} (a \quad \text{enspace} \textcolor{blue}{b \cdot (a + c)} \quad \& \\ \overline{ab} \quad \& \\ \quad \quad \quad \end{array}$$

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

$$\begin{array}{l} (a \quad \text{enspace} \textcolor{blue}{b \cdot (a + c)} \quad \& \\ \overline{ab} \quad \& \\ \quad \quad \quad \end{array}$$

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

$$\begin{array}{l} (a \quad \text{enspace} \textcolor{blue}{a \quad \text{enspace} \textcolor{blue}{b \cdot (a + c)}} \quad \& \\ \overline{ab} \quad \& \\ \quad \quad \quad \end{array}$$

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

$$\begin{array}{l} (a \quad \text{enspace} \textcolor{blue}{a \quad \text{enspace} \textcolor{blue}{b \cdot (a + c)}} \quad \& \\ \overline{ab} \quad \& \\ \quad \quad \quad \end{array}$$

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

```
\begin{align*} \begin{array}{ll} /(\color{blue}{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*}
```

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

```
\begin{align*} \begin{array}{ll} (a \quad \, + \quad\enspace b \quad\, , + (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*}
```

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

```
\begin{align*} \begin{array}{ll} (a \quad \, + \quad\enspace \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 \, \end{array} \end{align*}
```

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

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

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