

calc_logic_example

Student Group

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---> example for a simplification with the rule for boolean algebra

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

---> At first we will switch the representation to the following:

$\overline{a \vee (b \wedge (\bar{a} \vee c) \wedge 1) \vee a}$ &
 $\color{white}{\overline{ab}}$ \\ \quad\quad\quad\quad\quad\quad\quad\quad &
\\ \quad\quad\quad\quad\quad\quad\quad\quad \\ \end{array} \end{align*} <--- ---> At first we will switch the representation to the following:

$$\frac{1}{(a + b \cdot (a + c) \cdot 1) + a} = \frac{1}{a + b(a + c)}$$

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

$$\frac{(a + b \cdot (a + c) \cdot 1) + a}{\overline{ab}} \quad \text{\color{white}\quad\quad\quad\quad\quad\quad}$$

---> 1. $\text{\color{blue}}\{\text{\texttt{\textcolor{blue}{\text{\texttt{Neutral Element}}}}}\}$

$$\frac{(a + b \cdot (a + c) \quad) + a}{\quad \quad \quad} = \overline{ab}$$

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

$$\frac{(b \cdot (a + c) + a) \cdot \overline{ab}}{(a + c) \cdot \overline{ab}} = 1$$

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

$$\frac{1}{(a+a+(b \cdot (a+c)))} \text{ and } \overline{ab}$$

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

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

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

$$\begin{array}{l} (a \cdot (b \cdot (a + c))) \text{ \& } \overline{ab} \text{ \& } \\ \text{ \& } \end{array} <---$$

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

$$\begin{array}{l} (a \cdot (b \cdot (a + c))) \text{ \& } \\ \overline{ab} \text{ \& } \\ \text{ \& } \end{array} <---$$

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

$$\begin{array}{l} (a \cdot ((b \cdot a) + (b \cdot c))) \text{ \& } \\ \overline{ab} \text{ \& } \\ \text{ \& } \end{array} <---$$

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