

calc_logic_example

Student Group

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Table of Contents

example for a simplification with the rule for boolean algebra

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

example for a simplification with the rule for boolean algebra

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

example for a simplification with the rule for boolean algebra

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

example for a simplification with the rule for boolean algebra

[illegible]

example for a simplification with the rule for boolean algebra

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

example for a simplification with the rule for boolean algebra

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

example for a simplification with the rule for boolean algebra

[illegible]

example for a simplification with the rule for boolean algebra

[illegible]

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 \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} /(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} /(\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 \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 \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 \quad & \\ \end{array} \end{align*}
```

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

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

8. $\color{blue}{\text{DeMorgan}}$

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

8. $\color{blue}{\text{DeMorgan}}$

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

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