

## Chapter 4

# **BOOLEAN ALGEBRA AND THEOREMS, MINI TERMS AND MAX TERMS**

# Lesson 2

## **BOOLEAN ALGEBRAIC RULES AND LAWS**

# Outline

- **OR Rules**
- AND Rules
- NOT Rules
- Commutative laws
- Associative laws
- Distributive laws

## OR Rules

$$A + 1 = 1 \quad \dots (1)$$

$$A + 0 = A \quad \dots (2)$$

$$A + A = A \quad \dots (3)$$

$$A + \overline{A} = 1 \quad \dots (4)$$

# Outline

- OR Rules
- **AND Rules**
- NOT Rules
- Commutative laws
- Associative laws
- Distributive laws

## AND Rules

$$A \cdot 1 = A \quad \dots (1)$$

$$A \cdot 0 = 0 \quad \dots (2)$$

$$A \cdot A = A \quad \dots (3)$$

$$A \cdot \overline{A} = 0 \quad \dots (4)$$

# Outline

- OR Rules
- AND Rules
- **NOT Rules**
- Commutative laws
- Associative laws
- Distributive laws

## NOT Rules

$$\overline{1} = 0 \quad \dots (1)$$

$$\overline{0} = 1 \quad \dots (2)$$

$$\overline{\overline{A}} = A \quad \dots (3)$$



# Outline

- OR Rules
- AND Rules
- NOT Rules
- **Commutative laws**
- Associative laws
- Distributive laws

## Commutative Laws

$$\mathbf{A_1 + A_2 = A_2 + A_1} \quad \dots (1)$$

$$\mathbf{A_1 \cdot A_2 = A_2 \cdot A_1} \quad \dots (2)$$

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- OR Rules
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## Associative Laws

$$A1 + (A2 + A3) = (A1 + A2) + A3 \quad \dots(1)$$

$$A1 \cdot (A2 \cdot A3) = (A1 \cdot A2) \cdot A3 \quad \dots(2)$$

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## Distributive Laws

$$A1. (A2 + A3) = (A1.A2) + (A1. A3) \dots(1)$$

$$\begin{aligned} A1 +(A2. A3) &= (A1+A2). (A1+ A3) \\ &= (A1 + A2) .(A1 + A2+ A3) \end{aligned} \dots(2)$$

$$A1 + (\overline{A1}.A2) = A1 + A2 \dots(3)$$

# Summary

## We learnt

- OR, AND and NOT rules
- Commutative, Associative and Distributive laws



## End of Lesson 2

# **BOOLEAN ALGEBRAIC RULES AND LAWS**

# THANK YOU