

DIGITAL ELECTRONICS

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ANALOG AND DIGITAL SIGNALS

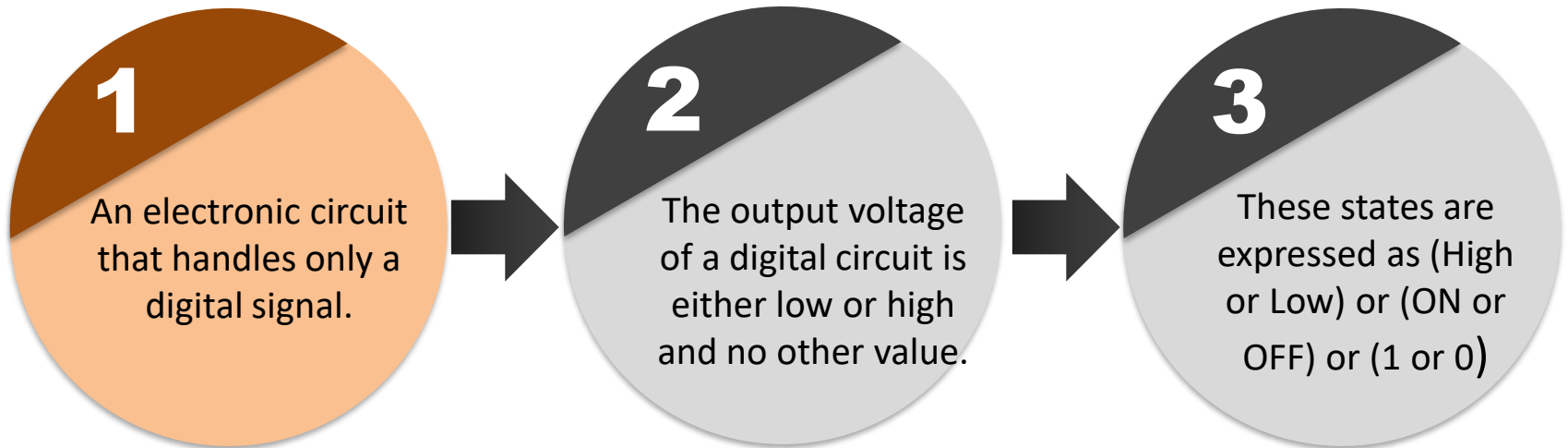
1

A continuously varying signal is called an analog signal.

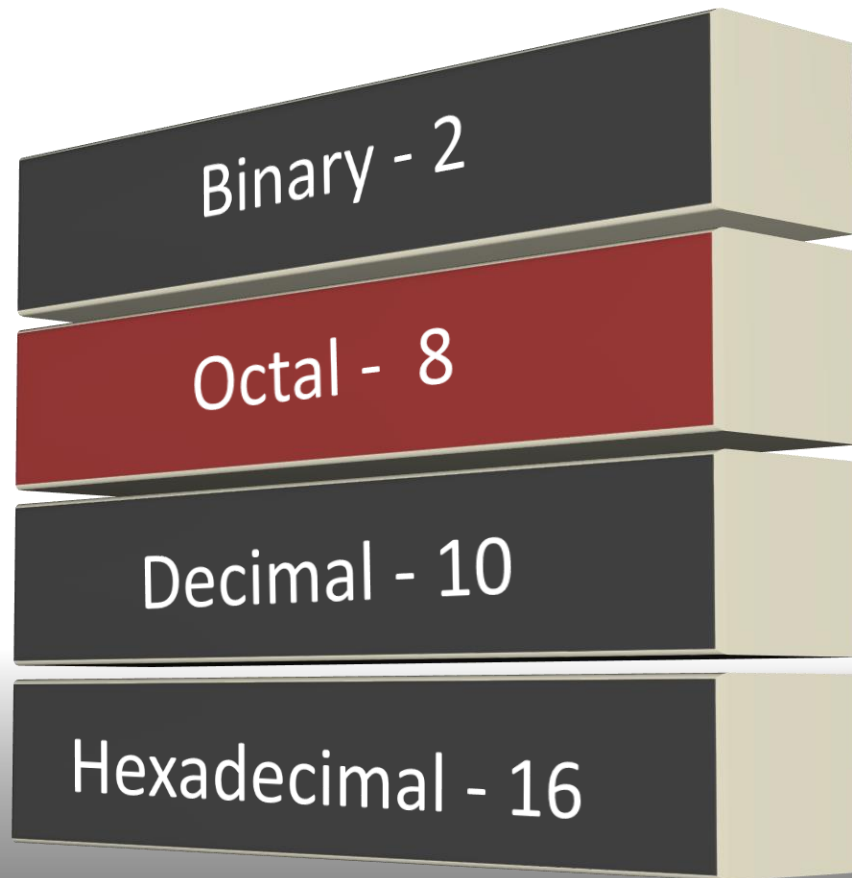
2

A signal that can have only two discrete values is called a digital signal.

DIGITAL CIRCUIT



NUMBER SYSTEM



LOGIC GATES

1

A digital circuit with one or more input signals but only one output signal . Some examples here,

2

When A&B are open, the bulb is OFF.

3

When A is open and B closed, the bulb is OFF.

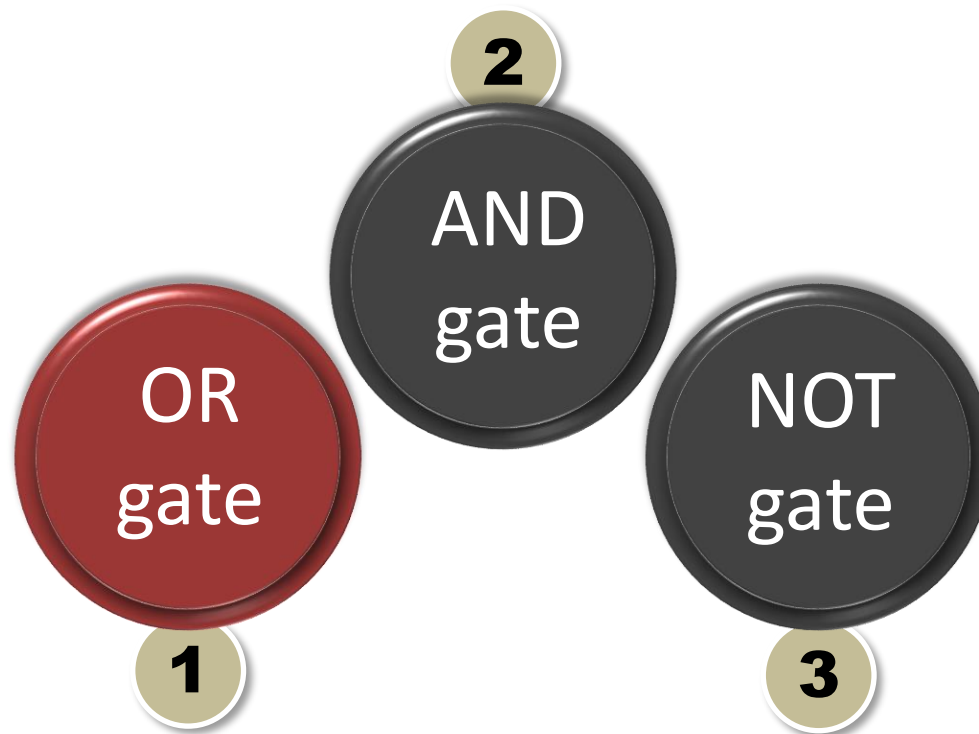
4

When B is open and A closed, the bulb is OFF.

5

When both A&B are closed, the bulb is ON.

THREE BASIC LOGIC GATES



OR GATE

1

An OR gate is a logic gate that has two or more inputs but only one output.

2

However, the output Y of an OR gate is LOW when all inputs are LOW.

3

The output Y of an OR gate is HIGH if any or all the inputs are HIGH.

4

FOR
EXAMPLE
 $A+B=Y$

5

A	B
0	0
0	1
1	0
1	1

6

Y
0
1
1
1

AND GATE

1

The AND gate is a logic gate that has two or more inputs but only one output.

2

The output Y of AND gate is HIGH when all inputs are HIGH.

3

However, the output Y of AND gate is LOW if any or all inputs are LOW.

4

FOR
EXAMPLE
A.B

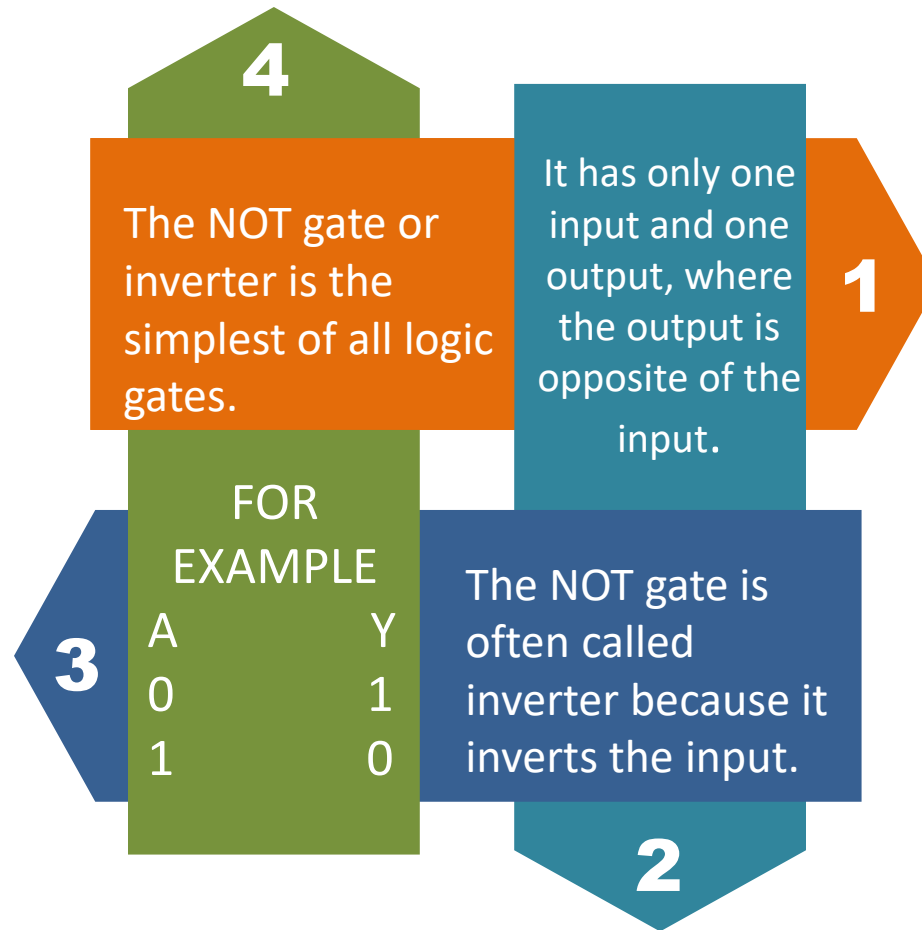
5

A	B
0	0
0	1
1	0
1	1

6

Y
0
0
0
1

NOT GATE



ENCODE, DECODE, RECODE

ENCODING

“Creation of text with specific messages”

DECODING

“Perception & interpretation of messages”

RECODING

“Appropriation & application of messages”



BOOLEAN THEOREMS

- ❖ Boolean theorems that are useful in manipulating and simplifying Boolean expressions.
- ❖ For convenience, we divide the theorems into two groups:
 - Single variable theorems
 - Multi variable theorems

SINGLE VARIABLE THEOREMS EXAMPLES

THEOREM

$$A + 0 = A$$

$$A \cdot 1 = A$$

$$A + \bar{A} = 1$$

$$A \cdot \bar{A} = 0$$

THEOREM

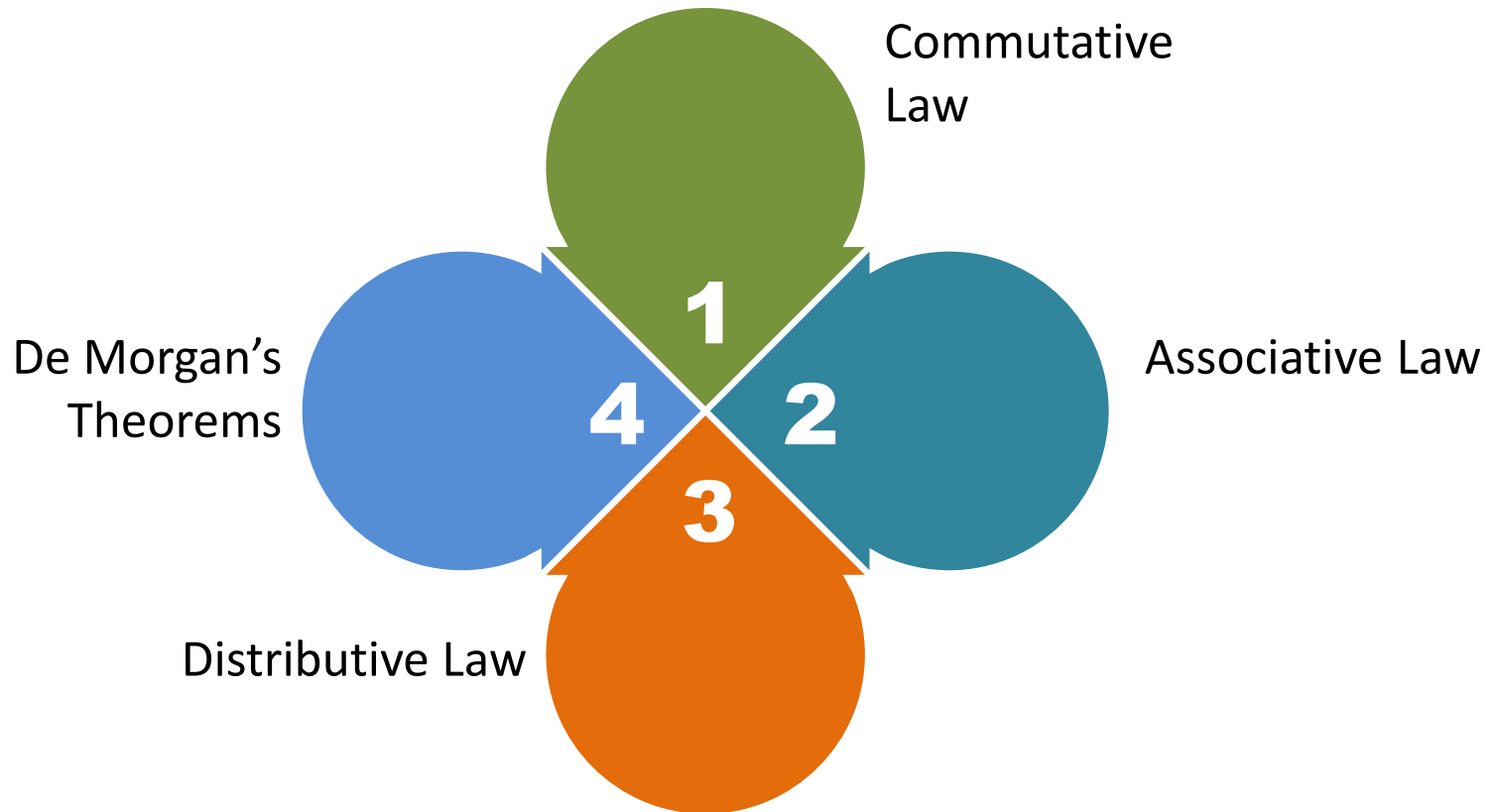
$$A + A = A$$

$$A \cdot A = A$$






$$A + 1 = 1$$

$$A \cdot 0 = 0$$

MULTI VARIABLE THEOREMS EXAMPLES



ADVANTAGES AND DISADVANTAGES OF DIGITAL ELECTRONICS

- 1** The real world is mainly analog. However, the digital circuits can handle only digital signal. 
- 2** Digital systems are generally easier to design. 
- 3** Information storage is easy with digital circuits. 
- 4** There are situations where using only analog techniques is simpler and more economical. 
- 5** Digital circuits are less affected by noise. 



THANKING YOU