

ENEL 353 Section 02 Lecture

Wed Sept 18 2019

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Set 1, Slide 79

Now the reading is 0010. Continued clockwise rotation will give readings 0011, 0100, ..., 1110, 1111 - the unsigned binary counting sequence

Slide 80

Readings could be 0001 (okay) or 0010 (also okay), 0011 (bad), 0000 (also bad).

Slide 81

Because only one bit changes on each "wedge boundary", only two readings - both reasonable - can be obtained when the sensors are over a wedge boundary.

Shaft encoders are not a quiz or exam topic.

Set 2, Slide 7

Full adder is not a logic gate - it has two output bits.

Slide 12

NOT gate (inverter)

A	Y
0	1
1	0

Buffer

A	Y
0	0
1	1

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Slide 14

AND

A	B	AB
0	0	0
0	1	0
1	0	0
1	1	1

OR

Slide 15

A	B	A+B
0	0	0
0	1	1
1	0	1
1	1	1

Slide 16

decimal arithmetic: $1 + 1 = 2$

binary arithmetic: $1 + 1 = 10$

digital logic, and Boolean algebra: $1 + 1 = 1$

Slide 17

XOR

A	B	$A \oplus B$
0	0	0
0	1	1
1	0	1
1	1	0

Slide 20

We've seen (1)-(5),
but not yet (6)-(8)

Slide 21

NAND

A	B	\overline{AB}
0	0	1
0	1	1
1	0	1
1	1	0

NOR

A	B	$\overline{A+B}$
0	0	1
0	1	0
1	0	0
1	1	0

Slide 23

XNOR

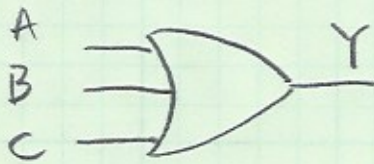
A	B	$A \oplus B$
0	0	1
0	1	0
1	0	0
1	1	1

XNOR output is 1 if and only if the two inputs match each other.

Slide 25

OR 3

Symbol

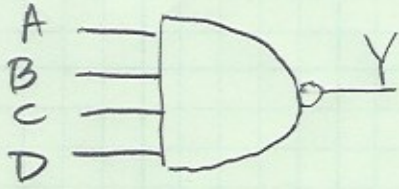


truth table

A	B	C	Y
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

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NAND 4



truth table

how many rows? $2^4 = 16$

Which rows have $Y = 1$? ←

All rows,
except the
last one.

A	B	C	D	Y
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	0

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