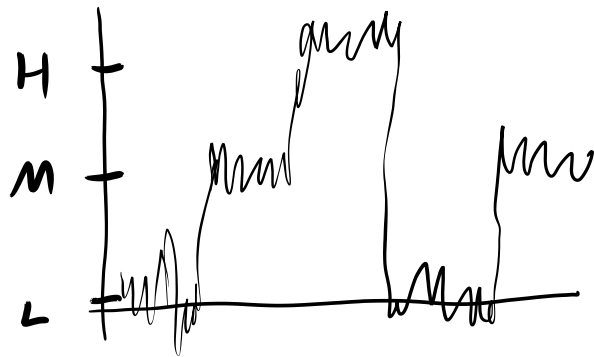
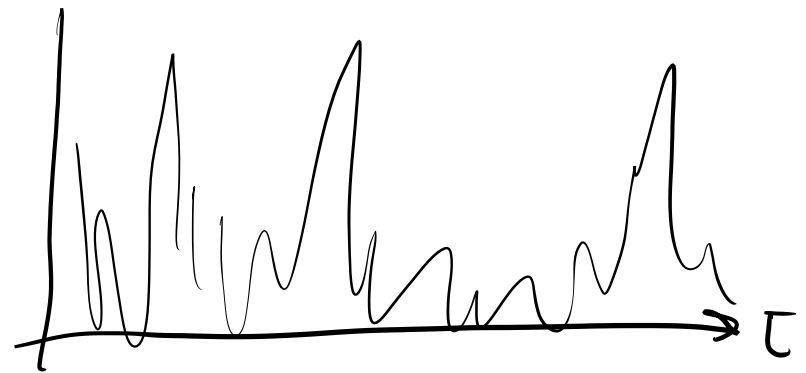
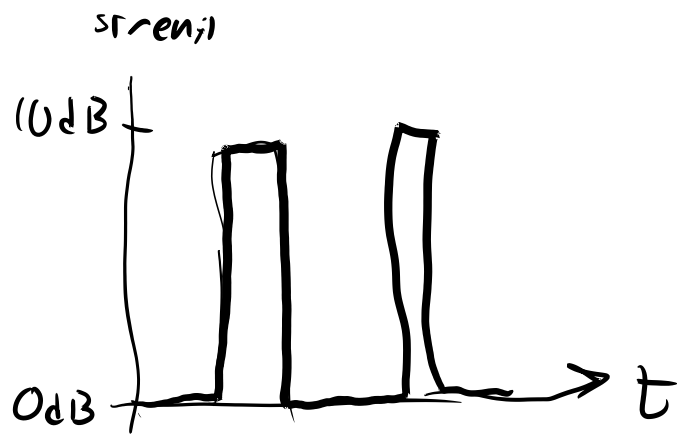


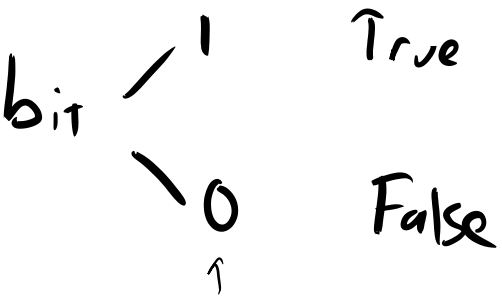


Claude Shannon

bit of info
→ yes from binary signal
in 1 sample



2 binary
3 ternary
4 quaternary



Boolean Algebra
T F

\wedge and $\&\&$ *

\vee or $\|\|$ +

line over \neg not $!$ -

Truth Table

variables

results

$a \&\& !b$

a	b	!b	$a \&\& !b$
0	0	1	0
0	1	0	0
1	0	1	1
1	1	0	0

11 variables
= 2^{11} rows

F I am a giraffe
Cicadas must sound

T we are in 009
the sky is blue

!x or y

x	y	if x, then y
0	0	1
0	1	1
1	0	0
1	1	1

(!x && !y) ||
(!x && y) ||
~~(x && !y) ||~~
(x && y)

!(x && !y)

Salt

Or

Pepper

||

∨

or

here

Or

! =

exclusive

or

xor

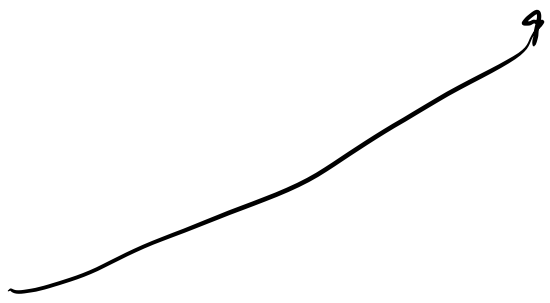
^

! =

and
or
not

$$\neg(a \wedge b) \equiv \neg a \vee \neg b$$

de Morgan's law



$$P \text{ NAND } Q \equiv \neg(P \wedge Q)$$
$$\text{NOR} \equiv \neg(P \vee Q)$$

xor

$$a \oplus b \equiv \neg(a \wedge b) \wedge (a \vee b)$$
$$(a \wedge \neg b) \vee (\neg a \wedge b)$$