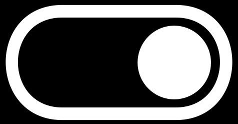
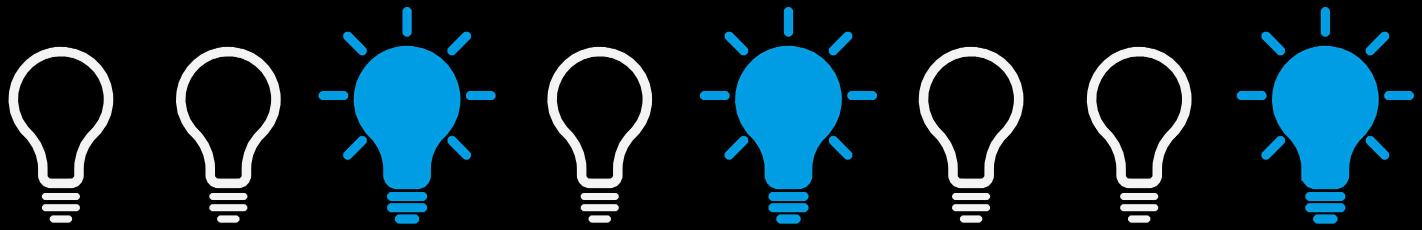
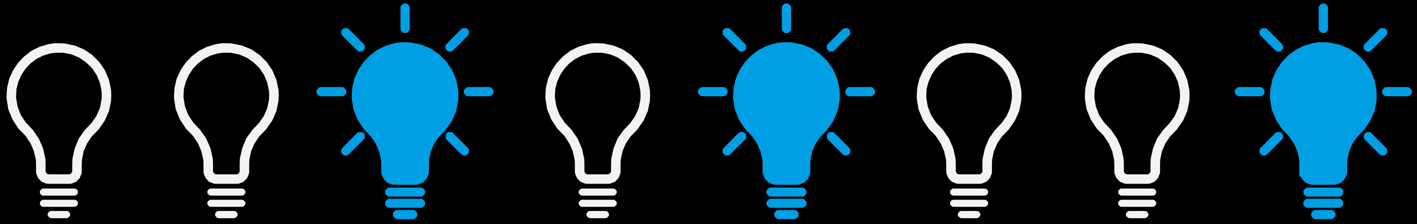
BITS

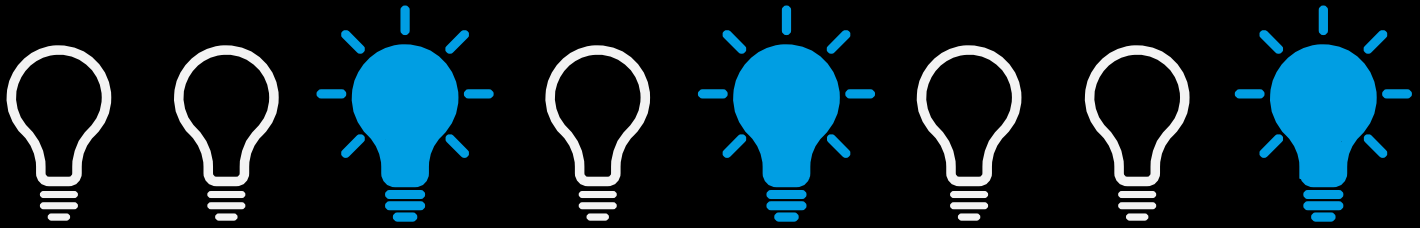
why do computers think binary?







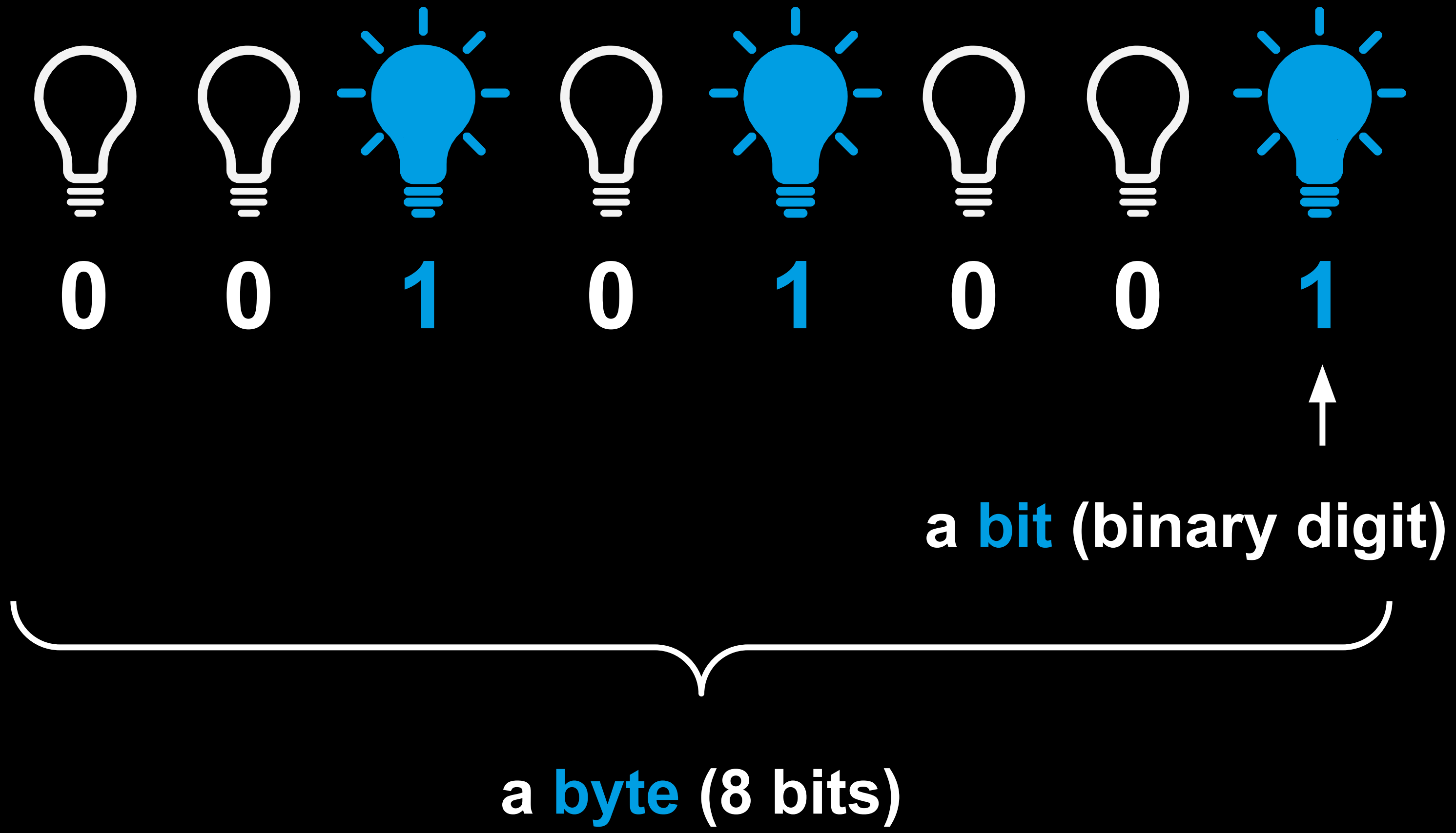
0 0 1 0 1 0 0 1

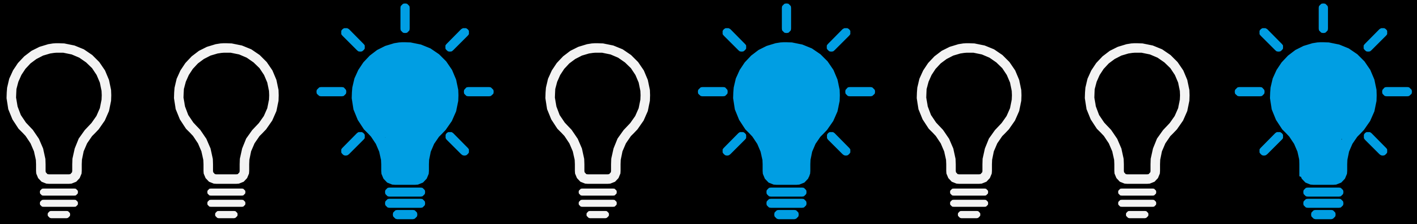


0 0 1 0 1 0 0 1

↑

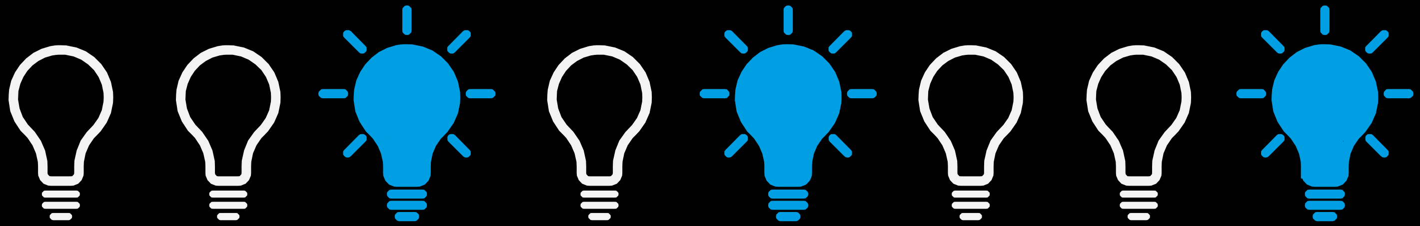
a bit (binary digit)


0 0 1 0 1 0 0 1
a bit (binary digit)
a byte (8 bits)

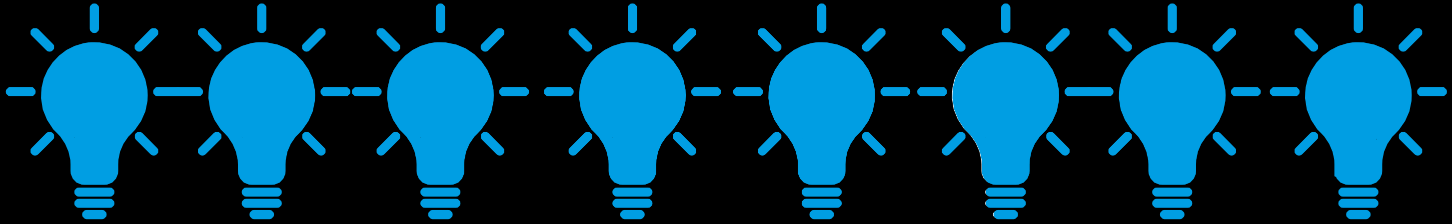


0 0 1 0 1 0 0 1

2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0



0	0	1	0	1	0	0	1
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1



what can we store in one byte?

what comes after the byte?

2^{10} bytes = 1.024 bytes = 1 Kibibyte (KiB)

2^{20} bytes = 1.048.576 bytes = 1 Mebibyte (MiB)

2^{30} bytes = 1.073.741.824 bytes = 1 Gibibyte (GiB)

10^3 bytes = 1.000 bytes = 1 Kilobyte (KB)

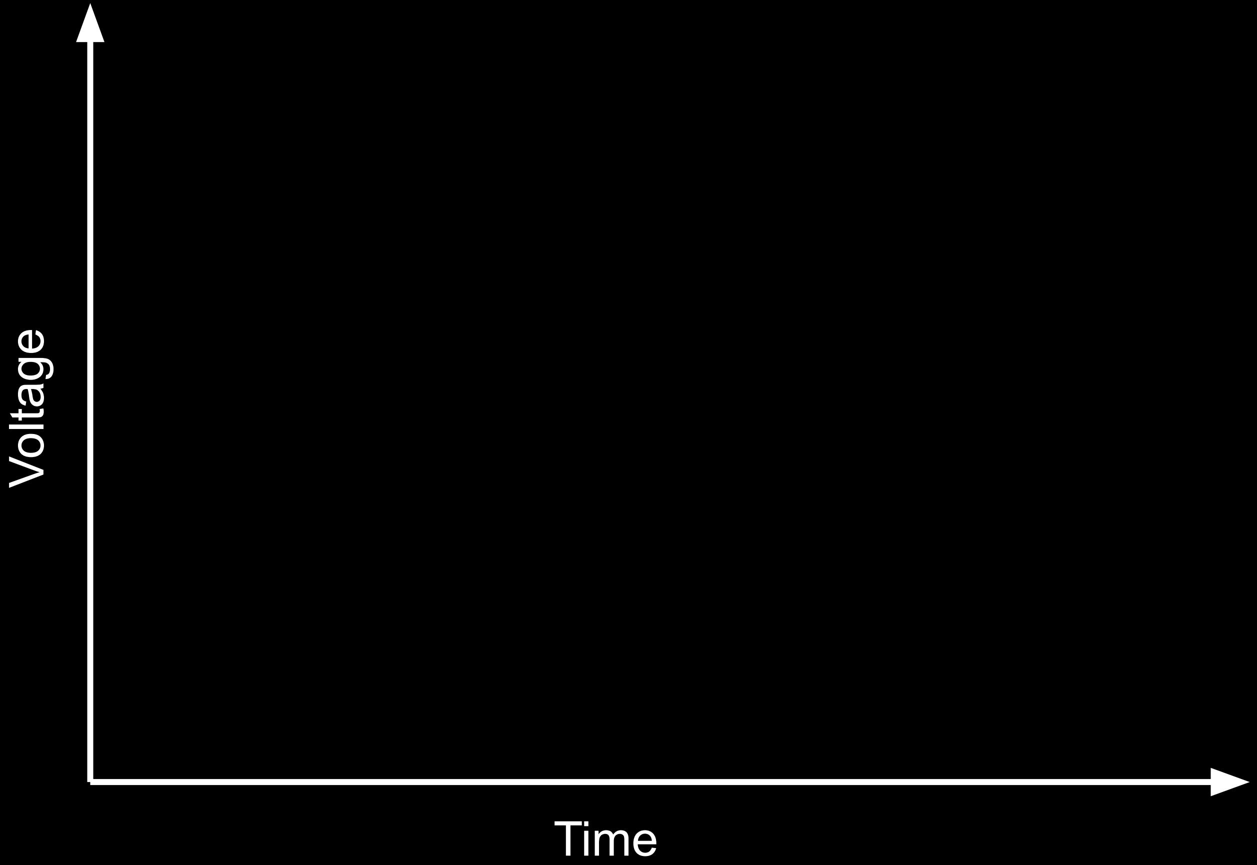
10^6 bytes = 1.000.000 bytes = 1 Megabyte (MB)

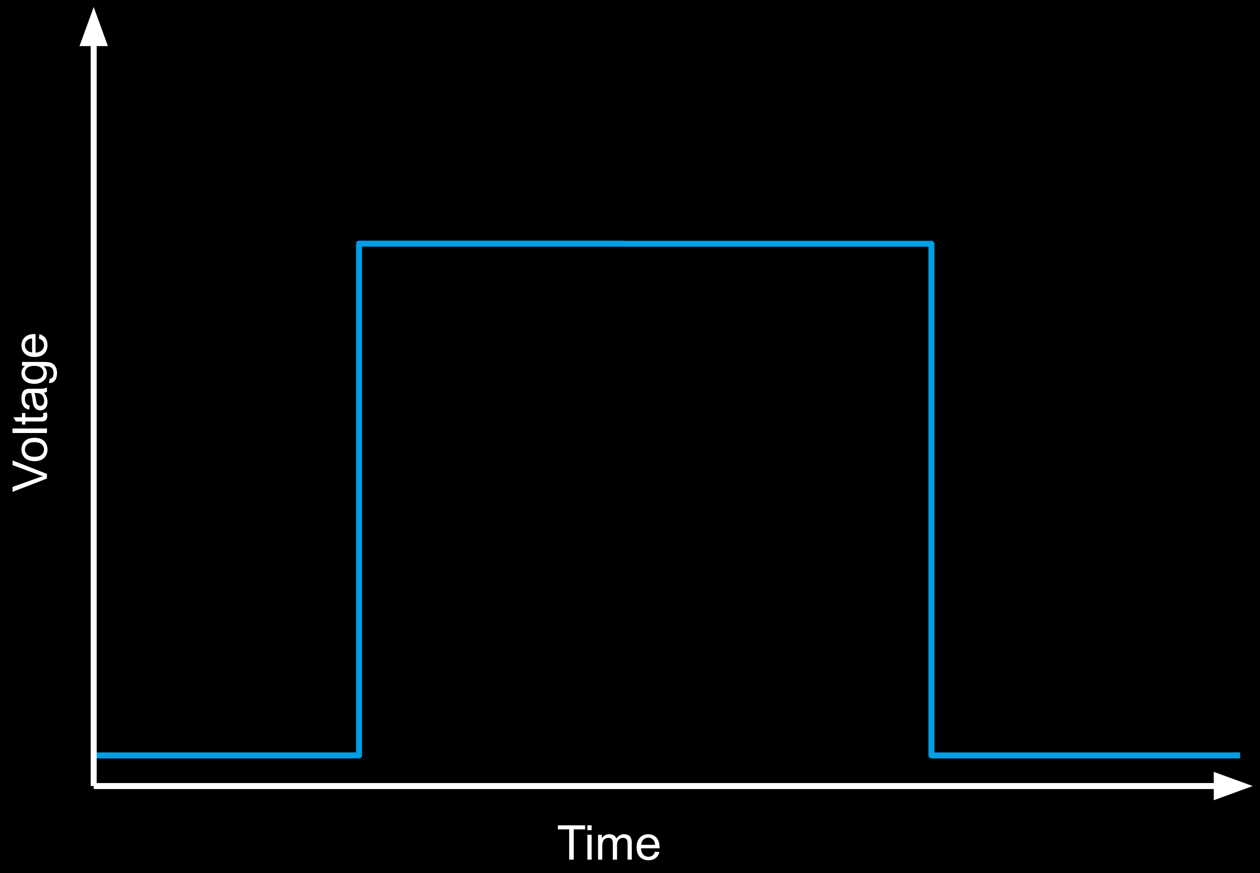
10^9 bytes = 1.000.000.000 bytes = 1 Gigabyte (GB)

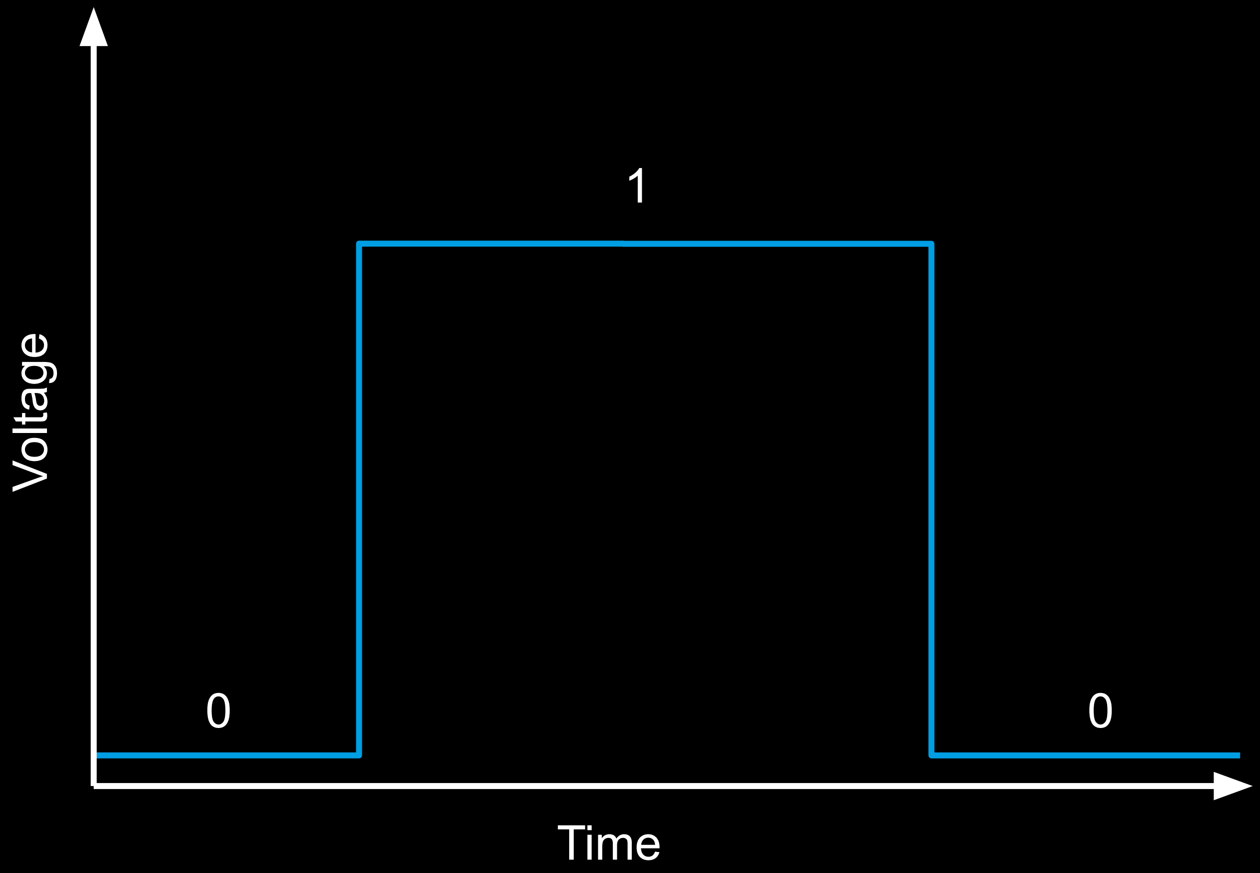
10^{12} bytes = ?

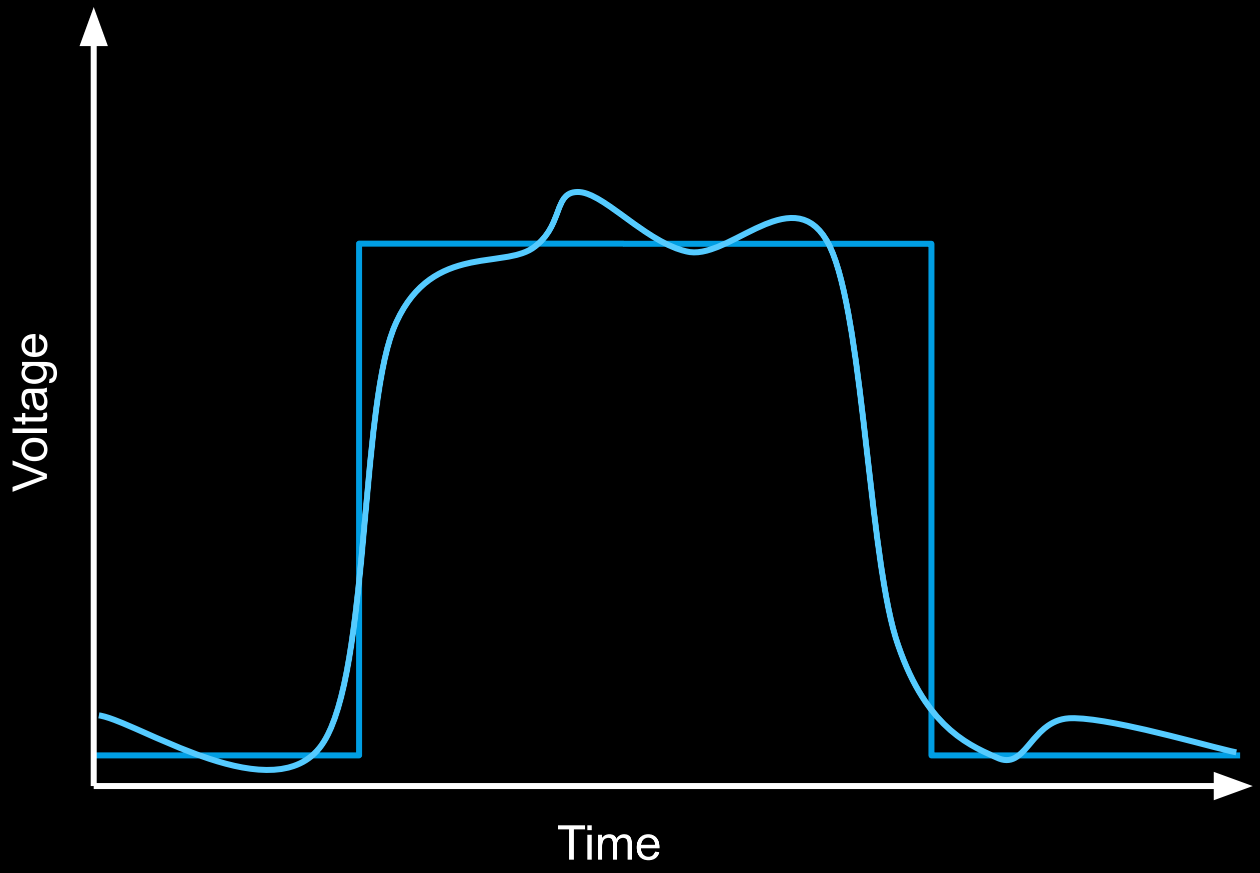
https://www.matheretter.de/wiki/zehnerpotenzen-namen how many bits are on a DVD with 4.7 GB capacity?

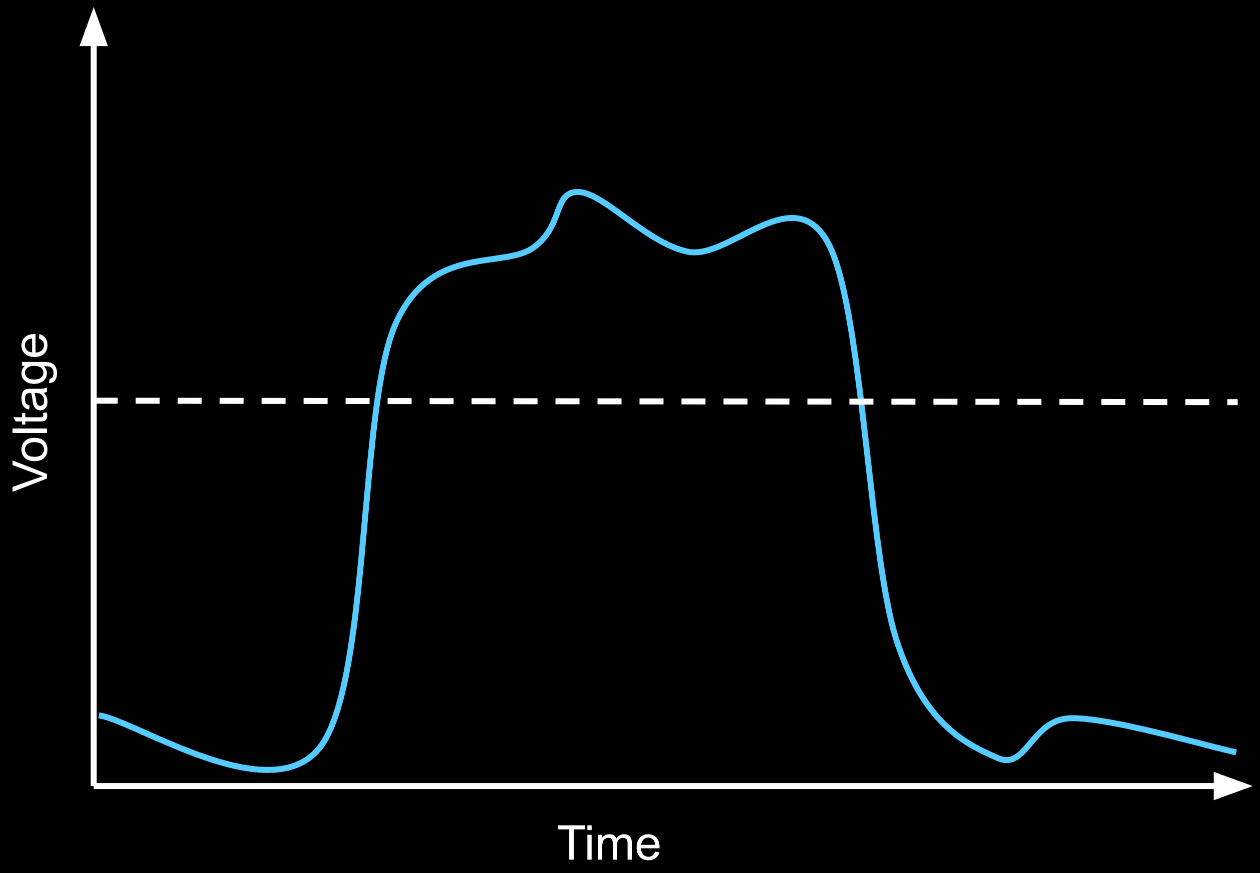
are we stuck with binary?

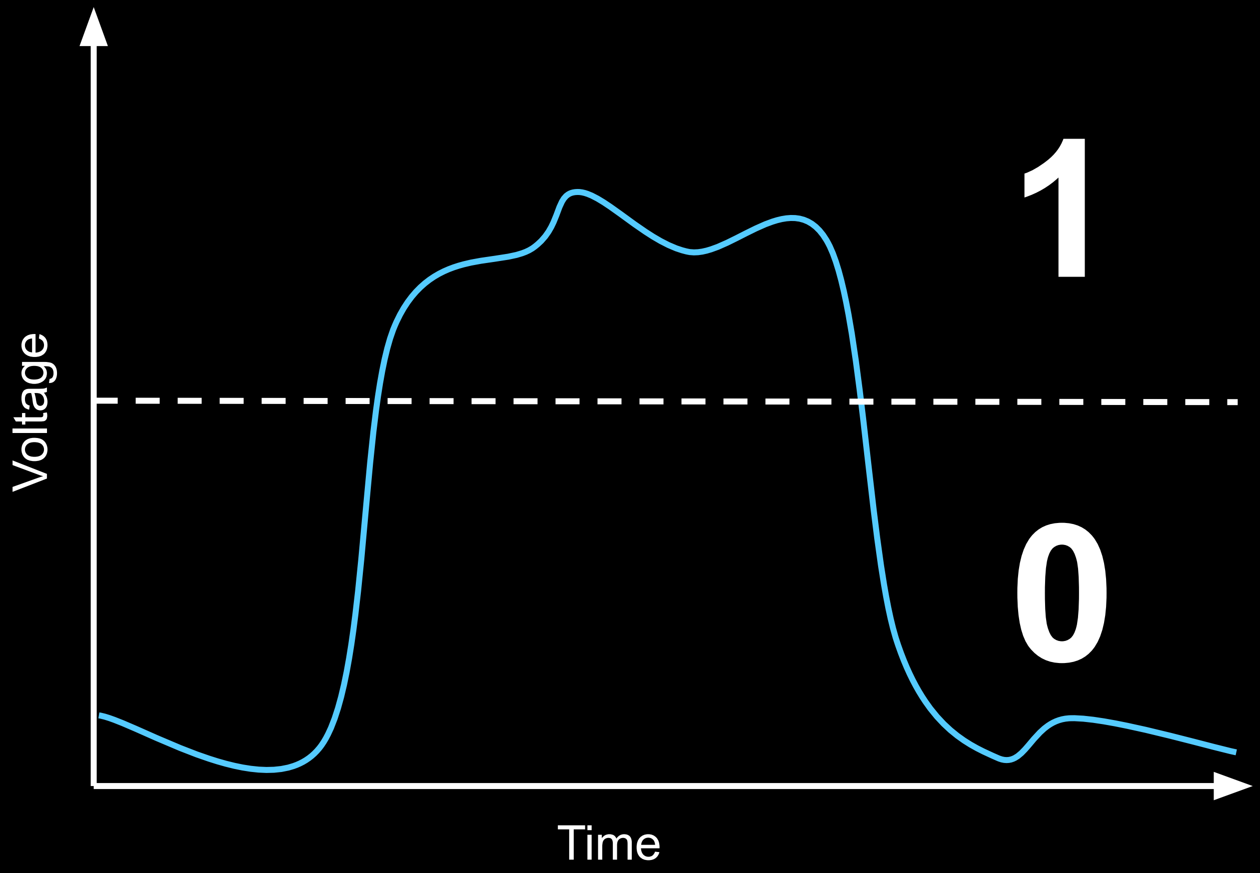

Voltage
Time

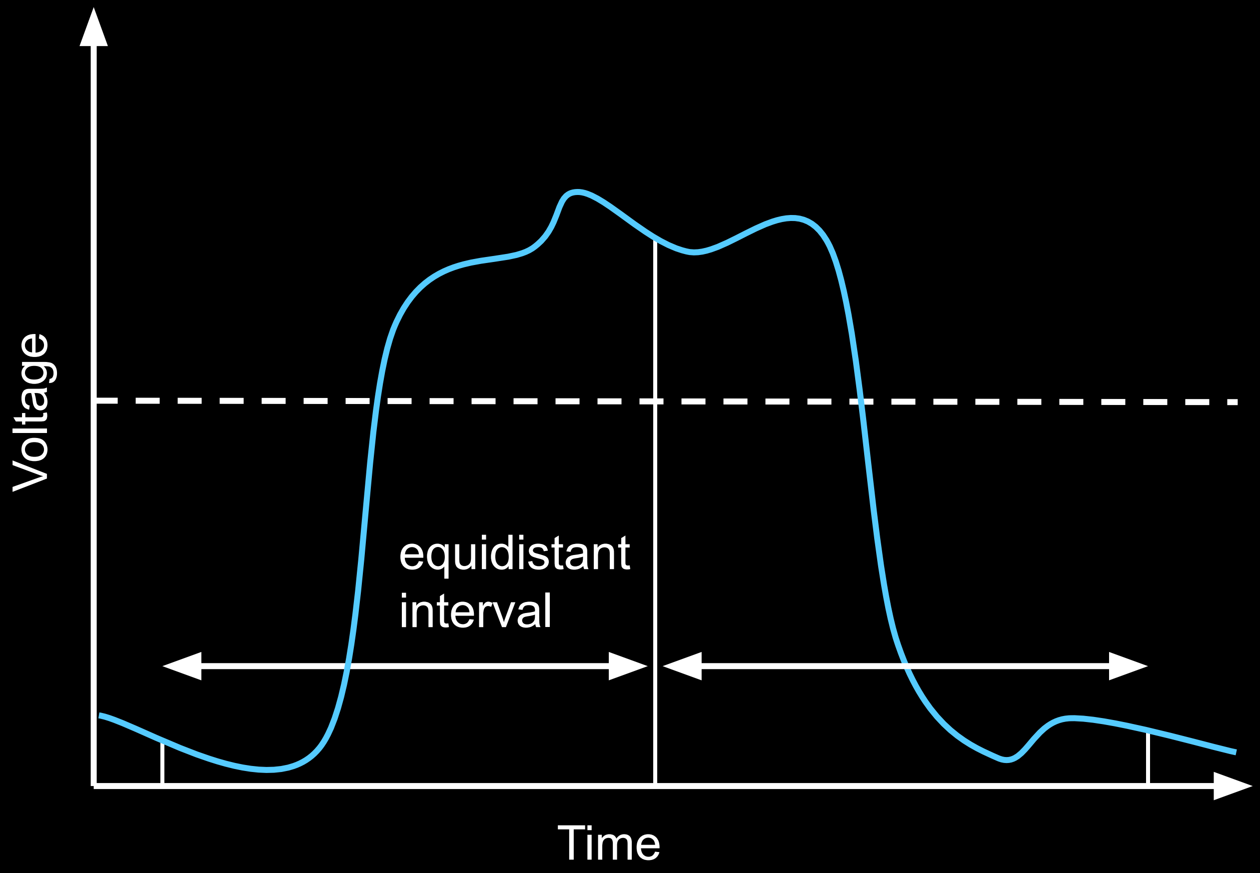

Voltage
Time

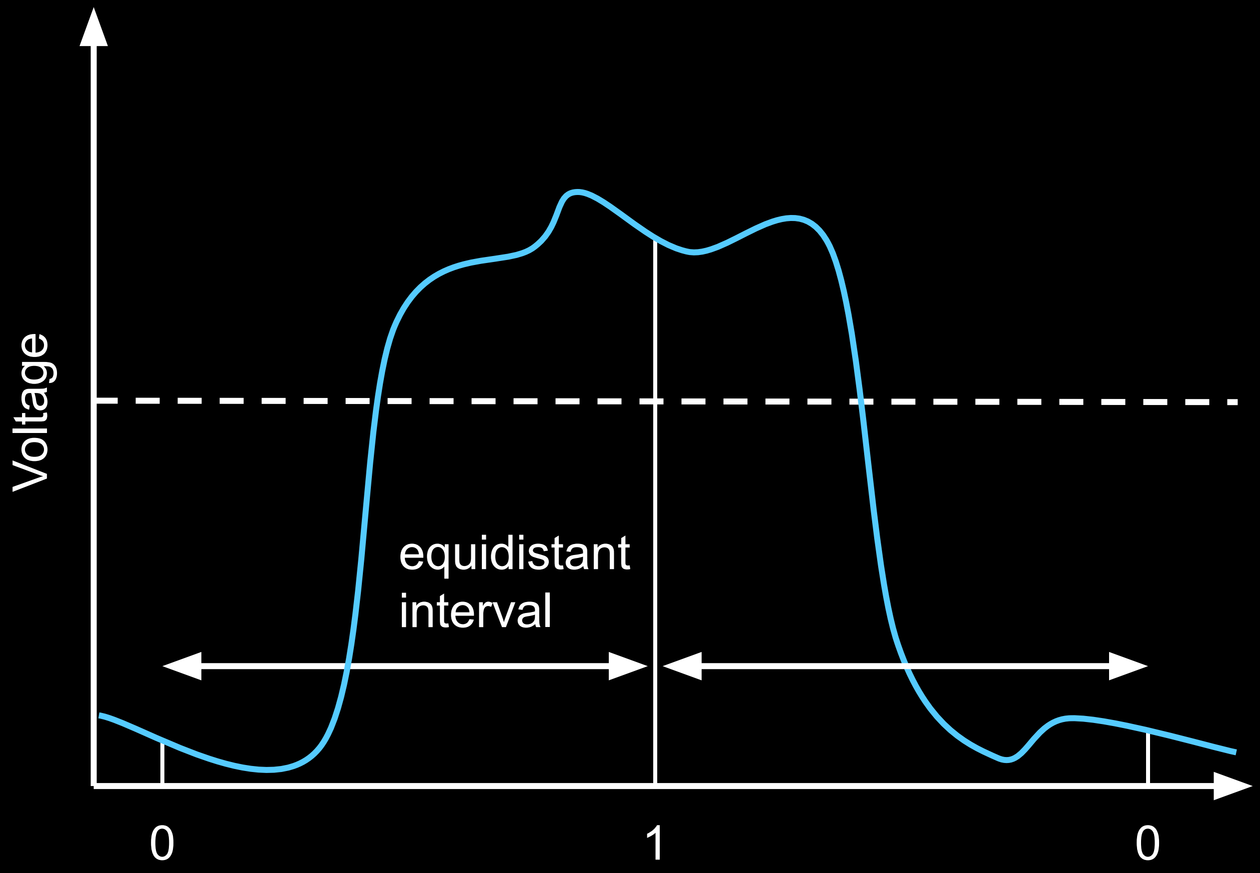

Voltage
1
0
0
Time

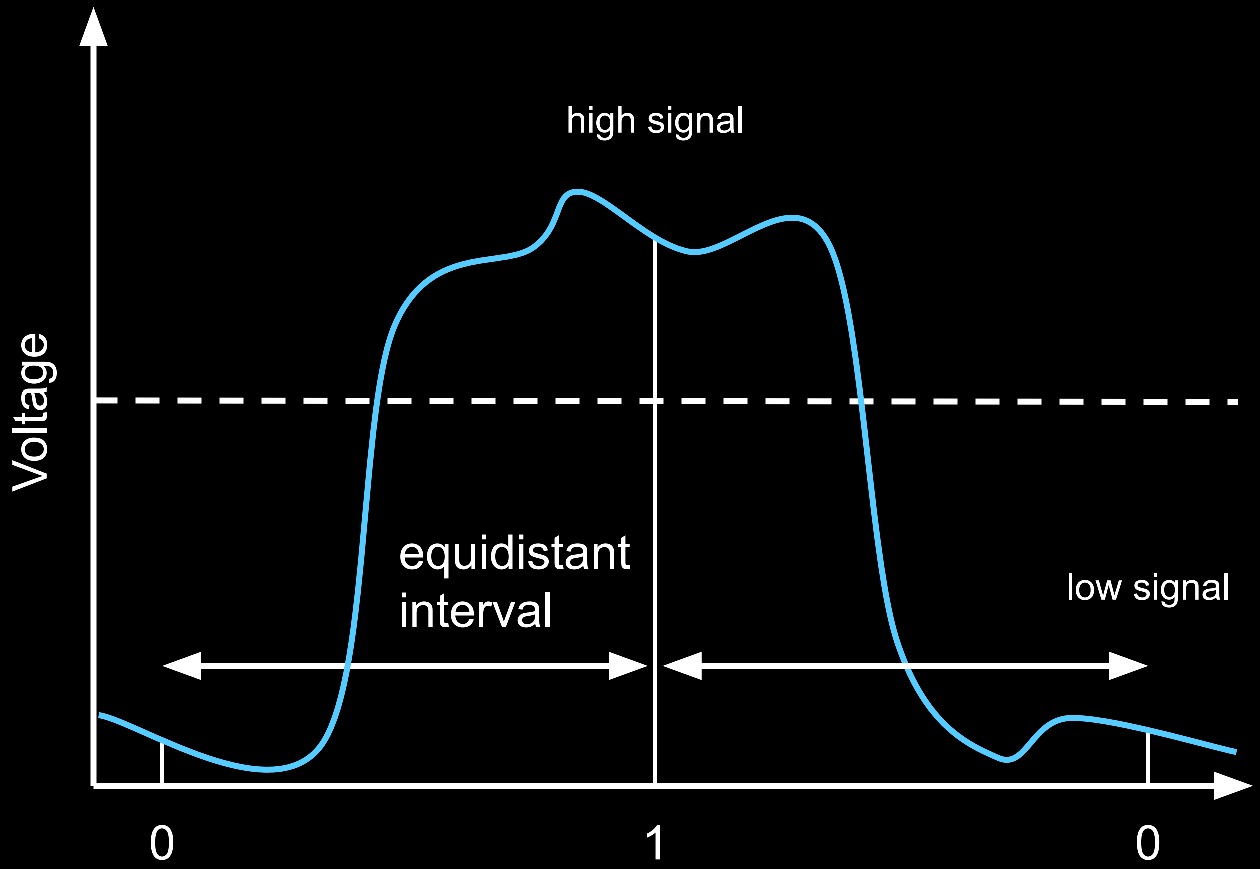

Voltage
Time


Voltage
Time


1
0
Voltage
Time


Voltage
equidistant
interval
Time

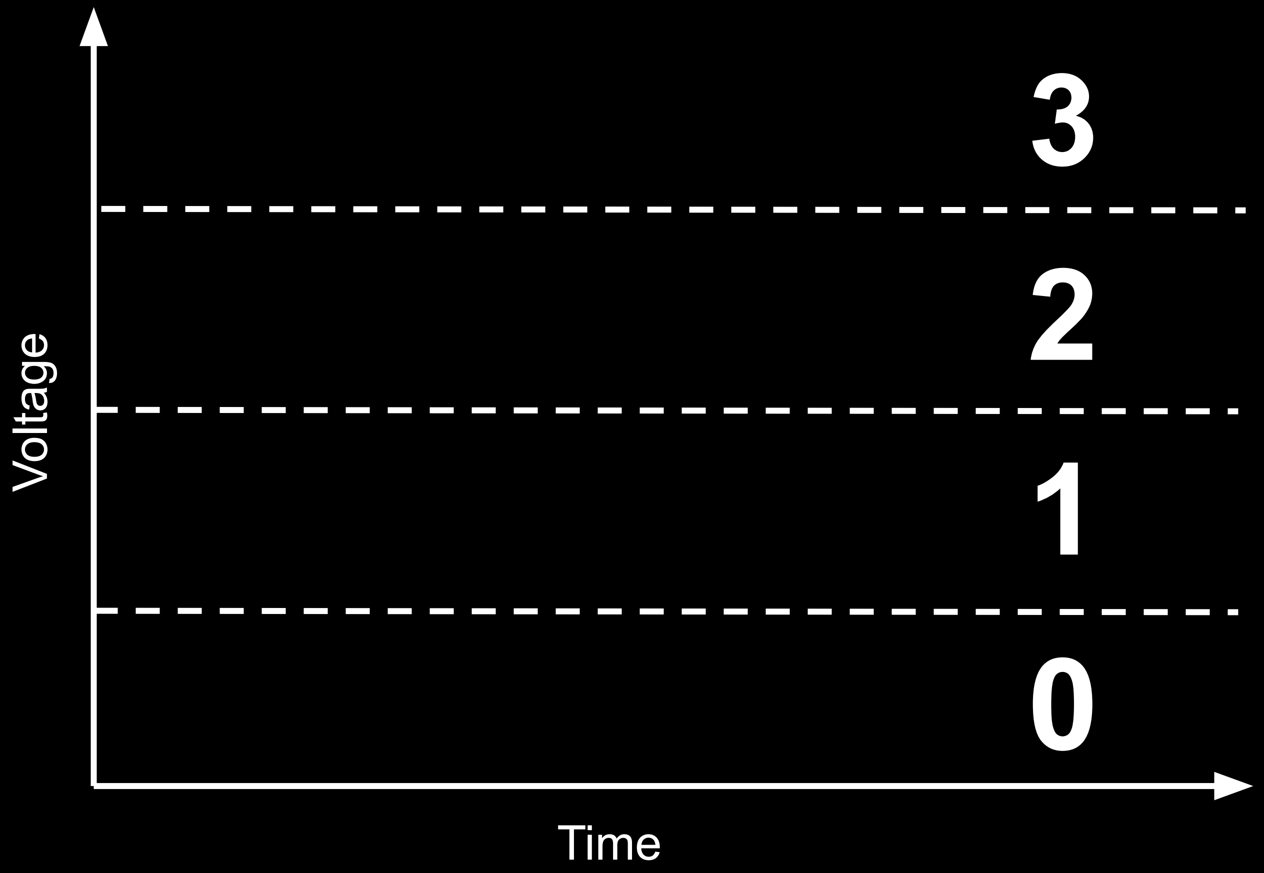

Voltage
equidistant
interval
0
1
0

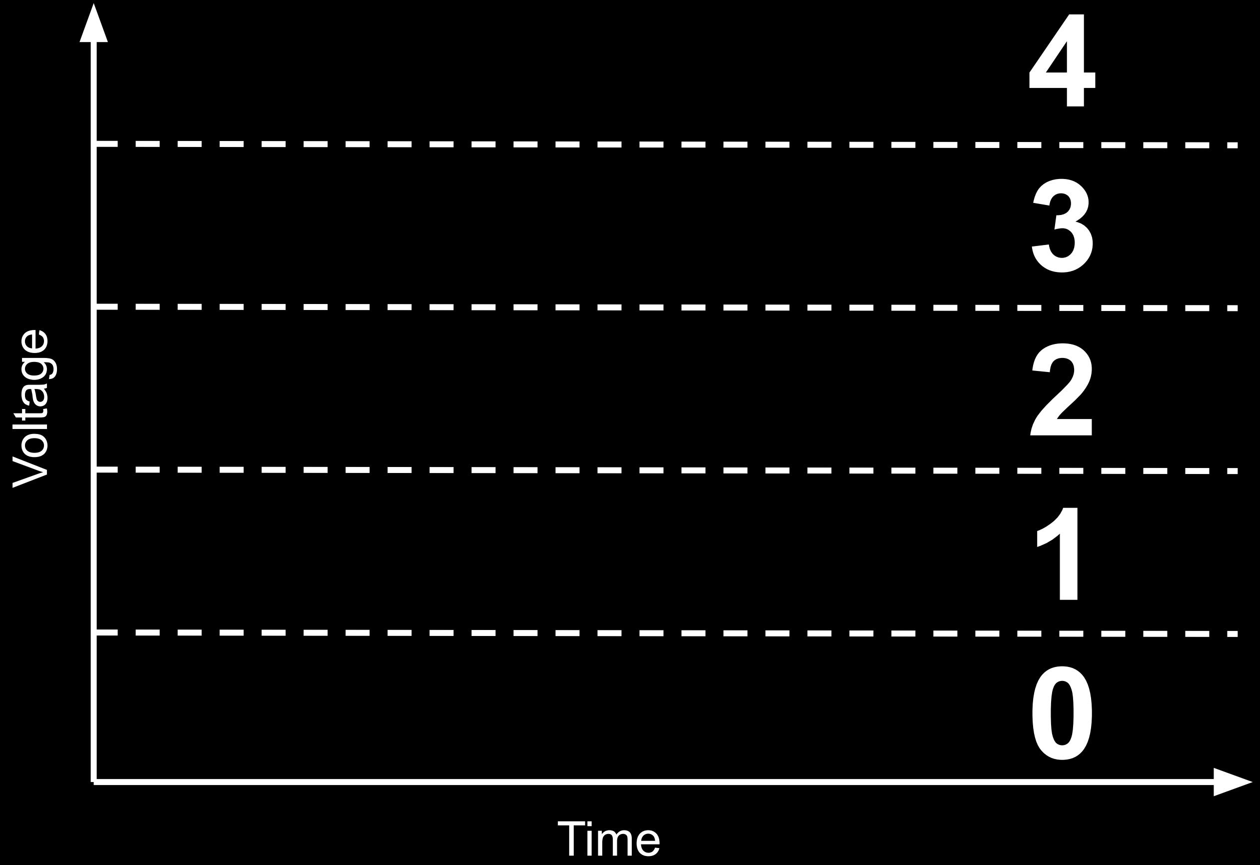


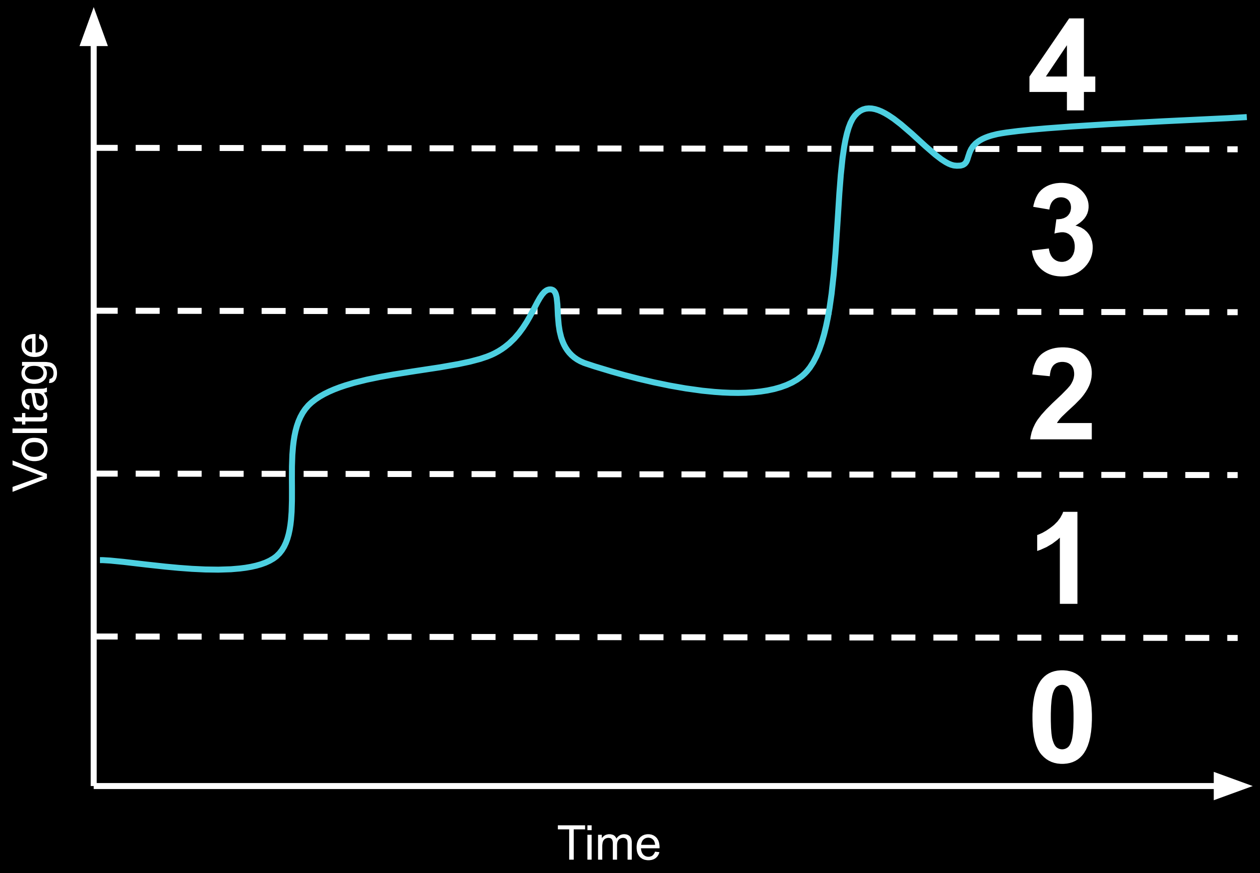
high signal
Voltage
equidistant
interval
low signal
0
1
0

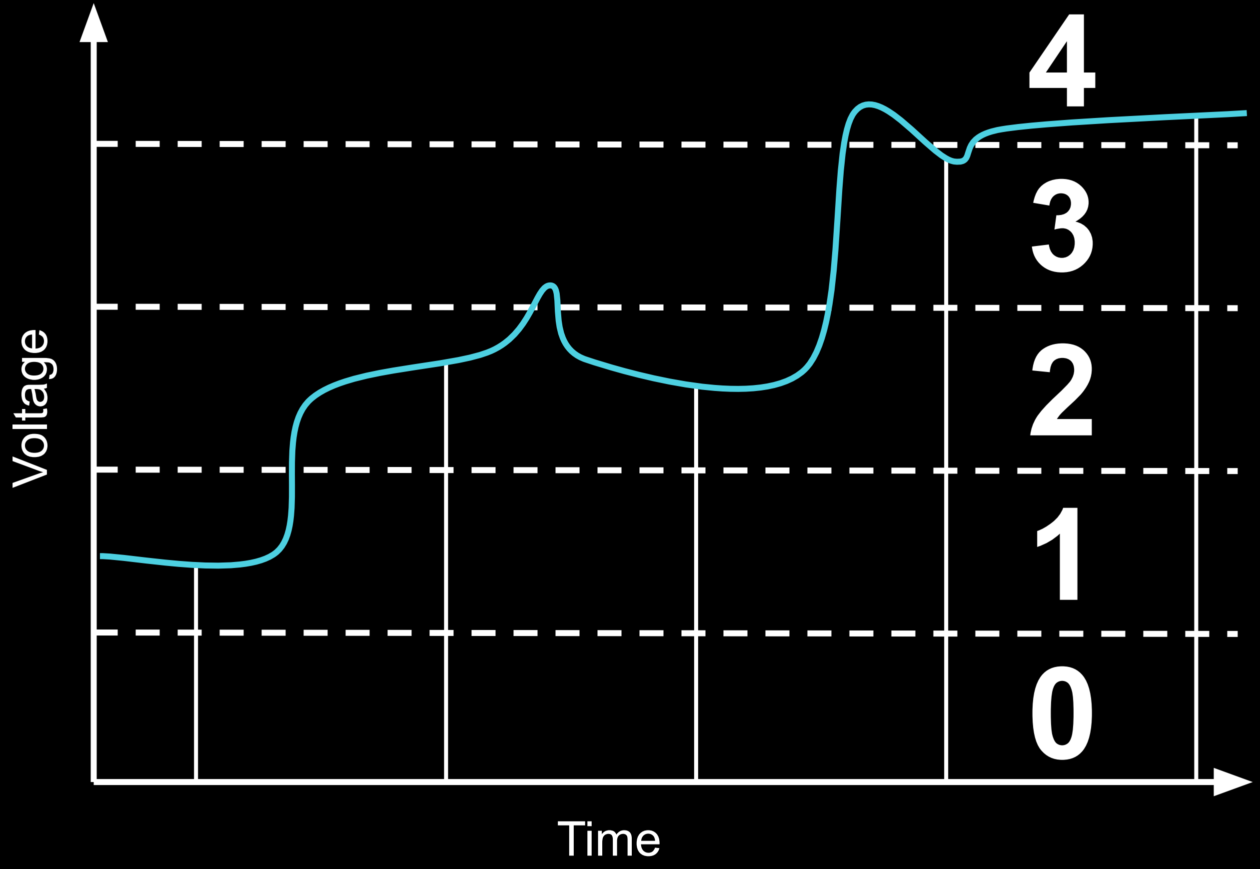
what about R > 2?

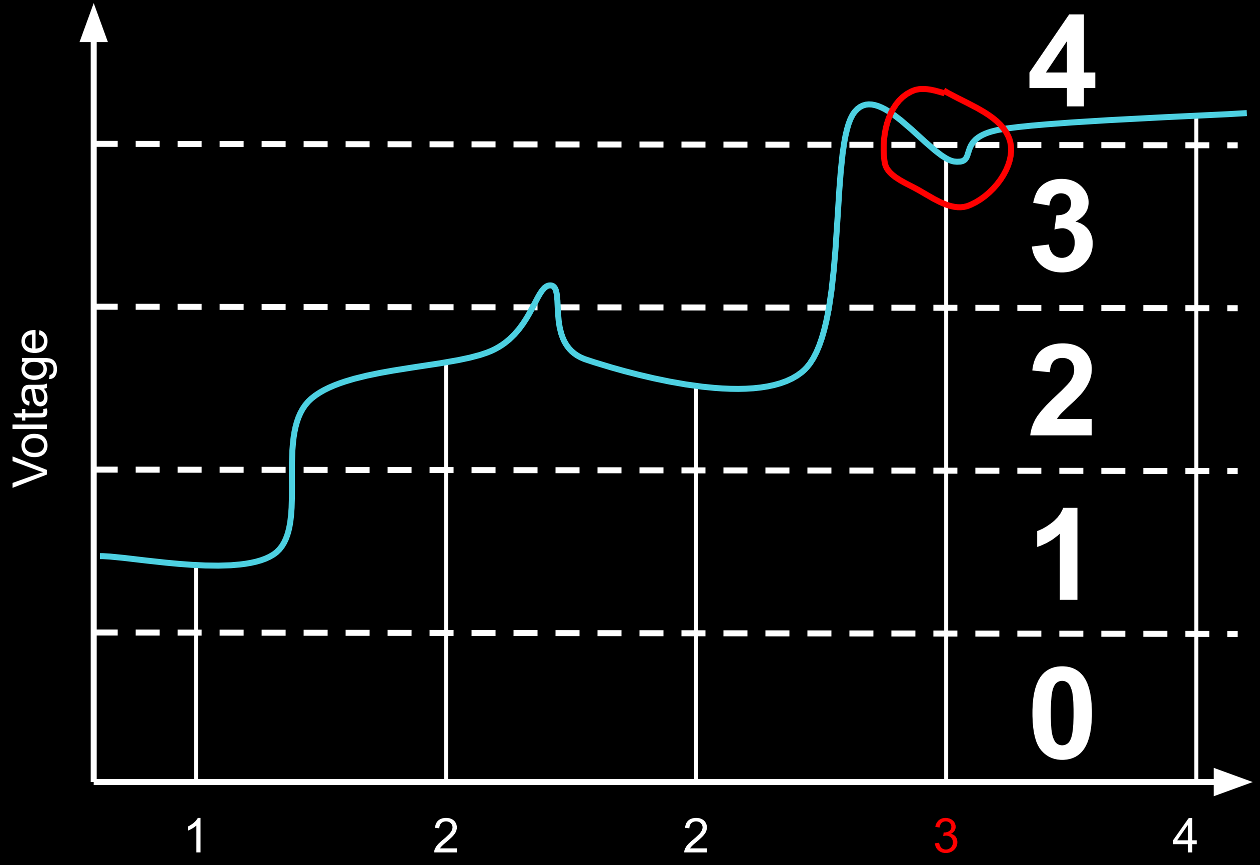

2
1
0
Voltage
Time


3
2
1
0
Voltage
Time


4
3
2
1
0
Voltage
Time


4
3
2
1
0
Voltage
Time


4
3
2
1
0
Voltage
Time


Voltage
4
3
2
1
0
1
2
2
3
4

a higher base means less hardware

a higher base means less hardware

but more complex devices

a higher base means less hardware

but more complex devices

and more errors