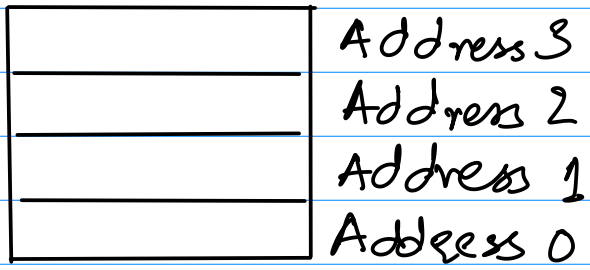
Memory



x

5

Bits 0 , 1 (2 values)

→ 1 byte = 8 bits
→ 1 Kilobyte = 1024 bytes
→ 1 Megabyte = 1024 kilo bytes
→ 1 Gigabyte = 1024 Megabytes.

A memory that can hold two bits:

2	1	
0	0	0
0	1	1
1	0	2
1	1	3

$2^2 - 1 = 3$
Max value

What about 3 bits?

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

$2^3 - 1 = 7$

What about negative numbers?

Sign ↑	2	1	
0	0	0	+ 0
0	0	1	+ 1
0	1	0	+ 2
0	1	1	+ 3
1	0	0	− 0 ?
1	0	1	− 1
1	1	0	− 2
1	1	1	− 3

0 for +ve
1 for −ve

$2^3/2 - 1 = 3$

→ 4 bytes for int

4 bytes = 32 bits

$\Rightarrow \frac{2^{32}}{2} - 1 = 2147483647$