

# Hexadecimal Numbers (1B)

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# Number Systems

radix=2

	$2^3$	$2^2$	$2^1$	$2^0$
	0	0	0	0
	0	0	0	1
	0	0	1	0
	0	0	1	1
	0	1	0	0
	0	1	0	1
	0	1	1	0
	0	1	1	1
	1	0	0	0
	1	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

Binary

radix=16

$16^0$
0
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F

Hexadecimal

radix=8

$8^1$	$8^0$
0	0
0	1
0	2
0	3
0	4
0	5
0	6
0	7
1	0
1	1
1	2
1	3
1	4
1	5
1	6
1	7

Octal

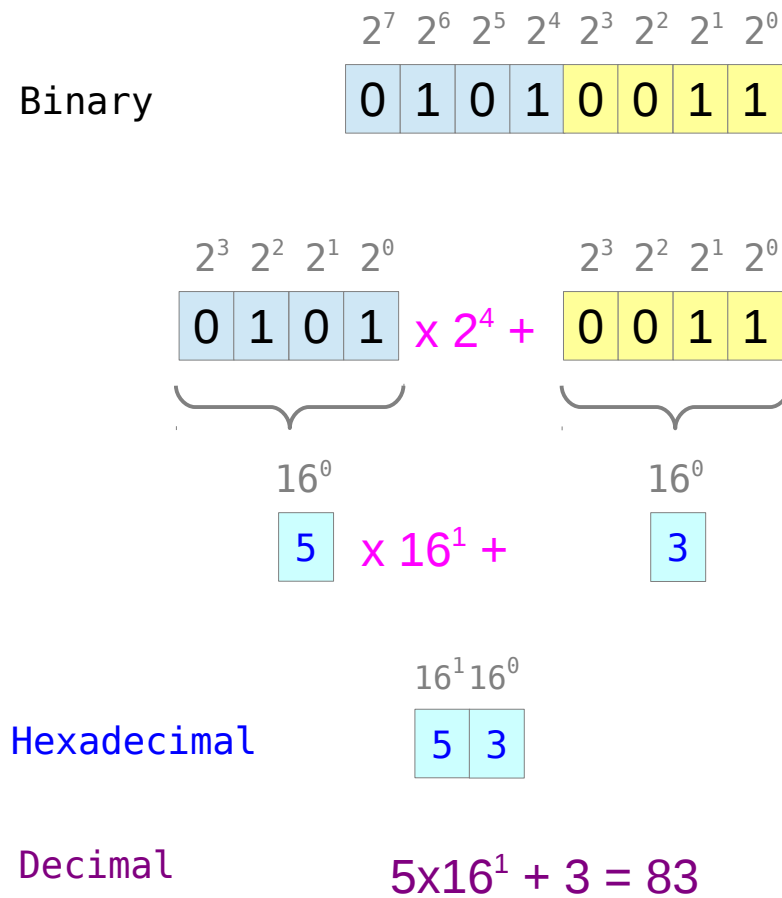
radix=10

$10^1$	$10^0$
	0
	1
	2
	3
	4
	5
	6
	7
	8
	9
1	0
1	1
1	2
1	3
1	4
1	5

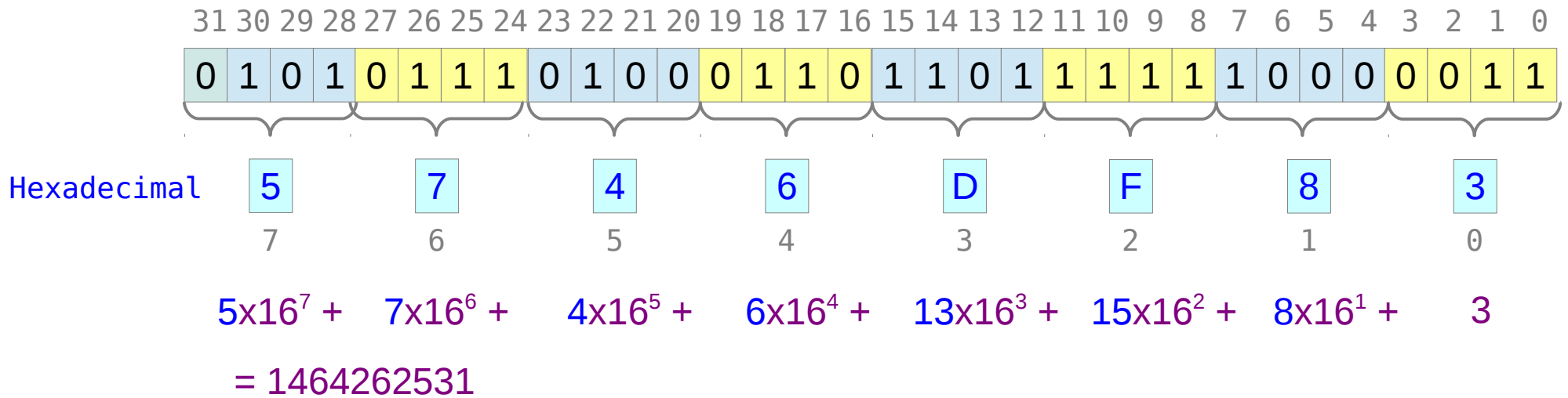
Decimal

# Binary and Hexadecimal Numbers

	$2^3$	$2^2$	$2^1$	$2^0$		$16^0$
radix=2	0	0	0	0	radix=16	0
	0	0	0	1		1
	0	0	1	0		2
	0	0	1	1		3
	0	1	0	0		4
	0	1	0	1		5
	0	1	1	0		6
	0	1	1	1		7
	1	0	0	0		8
	1	0	0	1		9
	1	0	1	0		A
	1	0	1	1		B
	1	1	0	0		C
	1	1	0	1		D
	1	1	1	0		E
	1	1	1	1		F
	Binary					Hexadecimal



# 4 Byte Unsigned Integer



# 4 Byte Signed Integer

31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

0 1 0 1 0 1 1 1 0 1 0 0 0 1 1 0 1 1 0 1 1 1 1 1 1 0 0 0 0 0 1 1

5 7 4 6 D F 8 3

7 6 5 4 3 2 1 0

$$5 \times 16^7 + 7 \times 16^6 + 4 \times 16^5 + 6 \times 16^4 + 13 \times 16^3 + 15 \times 16^2 + 8 \times 16^1 + 3$$

$$= +1464262531$$

31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

1 1 0 1 0 1 1 1 0 1 0 0 0 1 1 0 1 1 0 1 1 1 1 1 1 0 0 0 0 0 1 1

0 0 1 0 1 0 0 0 1 0 1 1 1 0 0 1 0 0 1 0 0 0 0 0 0 1 1 1 1 1 0 1

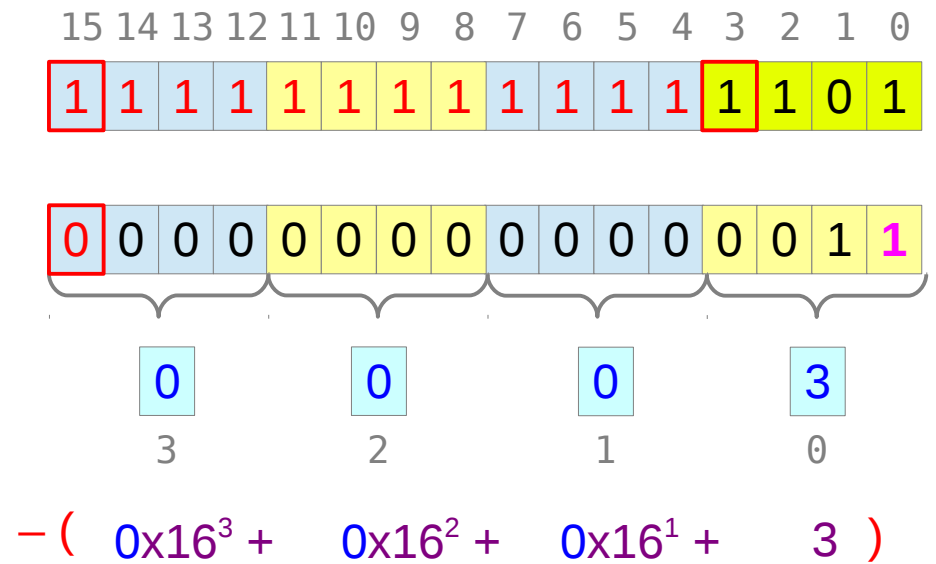
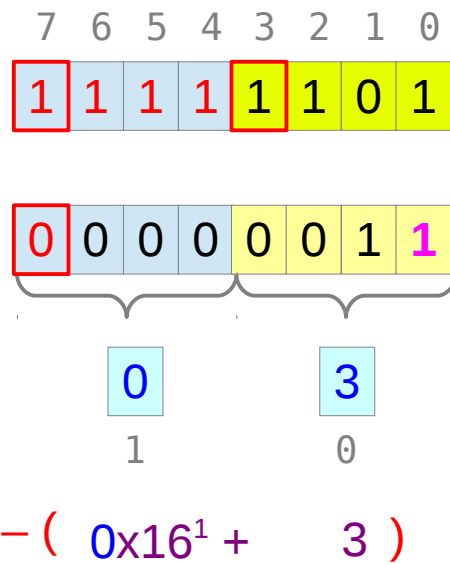
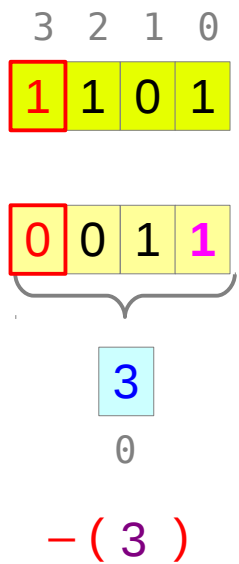
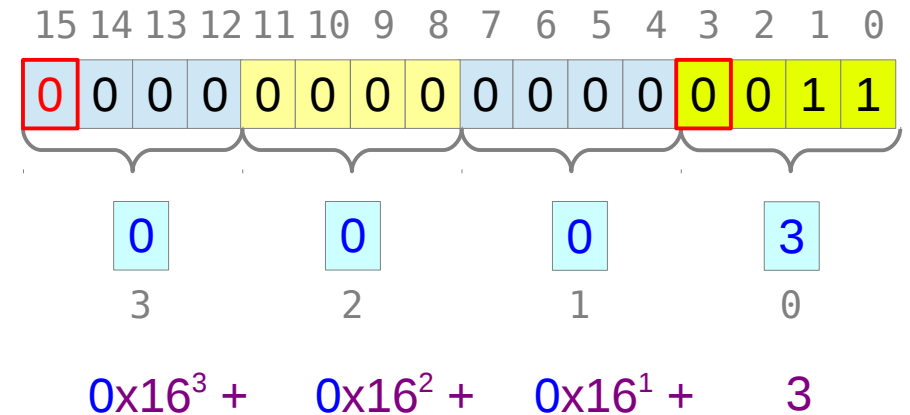
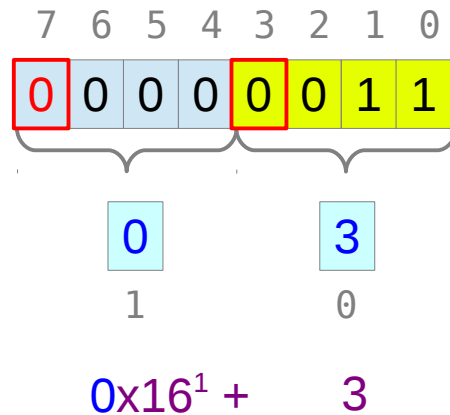
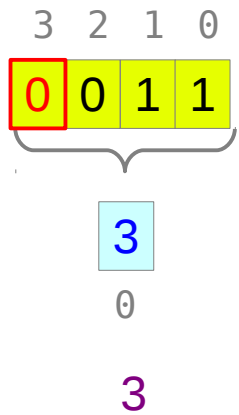
- 2 8 B 9 2 0 7 D

7 6 5 4 3 2 1 0

$$-(2 \times 16^7 + 8 \times 16^6 + 11 \times 16^5 + 9 \times 16^4 + 2 \times 16^3 + 0 \times 16^2 + 7 \times 16^1 + 13)$$

$$= -42701437$$

# Sign Extension



## References

- [1] <http://en.wikipedia.org/>
- [2] <http://planetmath.org/>
- [3] M.L. Boas, "Mathematical Methods in the Physical Sciences"