Number System

↳ Position

↳ Digit

↳ Base value

2 (Binary)
0 or 1

8 bits – 1 Byte

8 (Octal)
0 to 7

(0, 1, 2, 3, 4, 5, 6, 7)

16 (Hexadecimal)

(0, 1, 2, 3, 4, 5, 6, 7, 8, 9,
A, B, C, D, E, f)

10 (Decimal)
(0, 1, 2, 3, 4, 5, 6, 7, 8, 9)

1) **Binary to Decimal**

$\downarrow$

Base al 2

$(0 \text{ or } 1)$

Base al 10

$(100111)_2 \longrightarrow (39)_{10}$

Example 1

$$1 * 2^0 = 1$$
$$+$$
$$1 * 2^1 = 2$$
$$+$$
$$1 * 2^2 = 4$$
$$+$$
$$0 * 2^3 = 0$$
$$+$$
$$0 * 2^4 = 0$$
$$1 * 2^5 = 32$$

$$\overline{39}$$

$(1001)_2 \longrightarrow (9)_{10}$

Example 2

$$1 * 2^0 = 1$$

$$1 * 2^3 = 8 \qquad 0 * 2^1 = 0$$

$$0 * 2^2 = 0$$

2) Decimal to Binary / Octal / Hexadecimal

$$(39)_{10} \underline{\hspace{2cm}} (10011\underline{1})_2$$

2	39		Remainder
2	19	—	1
2	9	—	1
2	4	—	1
2	2	—	0
	1	—	0

$$1 * 2^0 + 1 * 2^1 +$$
$$1 * 2^2 + 0 * 2^3$$
$$+ 0 * 2^4 +$$
$$1 * 2^5$$
$$= 39$$

Decimal $\qquad$ Octal

$$(4320)_{10} \underline{\hspace{2cm}} (10340)_8$$

8	4320		
8	540	—	0
8	67	—	4
8	8	—	3
	1	—	0

$$(10340)_8$$

$$(700)_{10} \text{ —————— } (2AB)_{16}$$

```
16 | 700
   |————
16 |  43  ——— 12 (B)     (2AB)₁₆
   |————
   |   2  ——— 11 (A)
```

$(2AB)_{16}$

$$(1110110010101001)_2 \longrightarrow (3B29)_{16}$$

0011	3
1011	B
0010	2
1001	9

Hexadecimal Table

0	0	0	0	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

$16/2 = 8$

$8/2 = 4$

$4/2 = 2$

$2/2 = 1$

_____