



Numerical Systems and convert between them

- To convert the Numerical systems to the decimal system:

1- Binary to decimal system

Ex.

(011010)

$$2^5 \ 2^4 \ 2^3 \ 2^2 \ 2^1 \ 2^0$$

$$0 * 2^5 + 1 * 2^4 + 1 * 2^3 + 0 * 2^2 + 1 * 2^1 + 0 * 2^0$$
$$16 + 8 + 2$$

(26)

₁₀

(1001)

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

$$1 * 2^3 + 0 * 2^2 + 0 * 2^1 + 1 * 2^0$$
$$8 + 1$$

(9)

₁₀

● **Octal to decimal system**

Ex.

(35)

$$8^1 8^0$$

$$3 * 8^1 + 5 * 8^0$$

$$24 + 5$$

(29)

₁₀

(564)

₈

$$8^2 8^1 8^0$$

$$5 * 8^2 + 6 * 8^1 + 4 * 8^0$$

$$320 + 48 + 4$$

(372)

₁₀

● Hexadecimal to decimal system

Ex.

(A5)

$$16^1 16^0$$

$$A * 16^1 + 5 * 16^0$$

$$(10 * 16) + 5$$

$$160 + 5$$

(165)

₁₀

(11D)

$$16^2 16^1 16^0$$

$$1 * 16^2 + 1 * 16^1 + D * 16^0$$

$$256 + 16 + 13$$

(285)

₁₀