

Number System \Rightarrow ① Binary

② Decimal

③ Octal

④ Hexadecimal.

① Binary :- 1-0

② Decimal :- 0-9

③ Octal :- 0-8

④ Hexadecimal :- 0-0

1-1

6-6

11-B

2-2

7-7

12-C

3-3

8-8

13-D

4-4

9-9

14-E

5-5

10-A

15-F

① Binary to Decimal :-

$$(10101)_2 \Rightarrow (?)_{10}$$

$$\begin{array}{ccccccc} & 1 & 0 & 1 & 0 & 1 & \\ & 2^4 & 2^3 & 2^2 & 2^1 & 2^0 & \leftarrow \\ \hline & 16 & 8 & 4 & 2 & 1 & \\ & \text{---} & & \text{---} & & & \end{array} \quad \begin{array}{l} = 16 + 4 + 1 \\ = (21)_{10} \end{array}$$

② Octal to Decimal :-

$$(2057)_8 = (?)_{10}$$

$$\begin{array}{cccc} 2 & 0 & 5 & 7 \\ \hline 8^3 & 8^2 & 8^1 & 8^0 \end{array}$$

$$\begin{aligned} &= 2 \times 8^3 + 0 \times 8^2 + 5 \times 8^1 + 7 \times 8^0 \\ &= 1024 + 0 + 40 + 7 \Rightarrow (1071)_{10} \end{aligned}$$

③ Hexadecimal to Decimal :-

$$(28E)_{16} \Rightarrow (?)_{10}$$

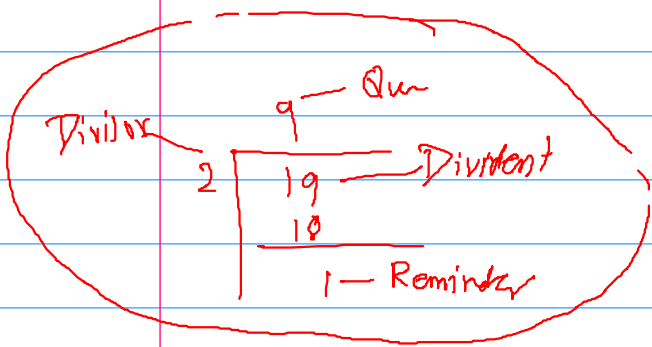
2 3 E $= 2 \times 16^2 + 3 \times 16^1 + 14 \times 16^0$

2 3 14 $= \underline{574}$

16^2 16^1 16^0

④ Decimal to Binary

$$(19)_{10} = (?)_2$$



→ successive Division

Handwritten diagram illustrating the conversion of the decimal number 19 to binary using the division-by-2 method.

2	19	1
2	9	1
2	4	1
2	2	1
	1	0

The remainders (1, 0, 1, 1, 1) are read from bottom to top to form the binary number 10011.

Labels: **LSB - Least Significant Bit**, **Binary**, **msb**, **most significant bit**.

1 0 1 0 1
16 8 4 2 1
= 21 ✓

$1 \quad 0 \quad 0 \quad 1 \quad 1$
 $2^4 \quad 2^3 \quad 2^2 \quad 2^1 \quad 2^0$
 $(16) \quad 8 \quad 4 \quad (2) \quad (1)$
 $= 16 + 2 + 1$
 $= (19)$

⑥ Decimal to Octal

$$(19)_{10} = (?)_8$$

Successive Division

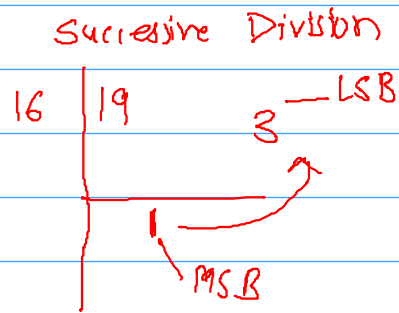
Diagram illustrating the addition of 8 and 19 using a 4-bit adder:

8	19
0	1
1	1
1	0
0	0

Carry bits are shown as 3 (from the 4th bit) and 2 (from the 3rd bit). The final result is 28, which is underlined.

⑥ Decimal to Hexadecimal :-

$$(19)_{10} \Rightarrow (?)_{16}$$

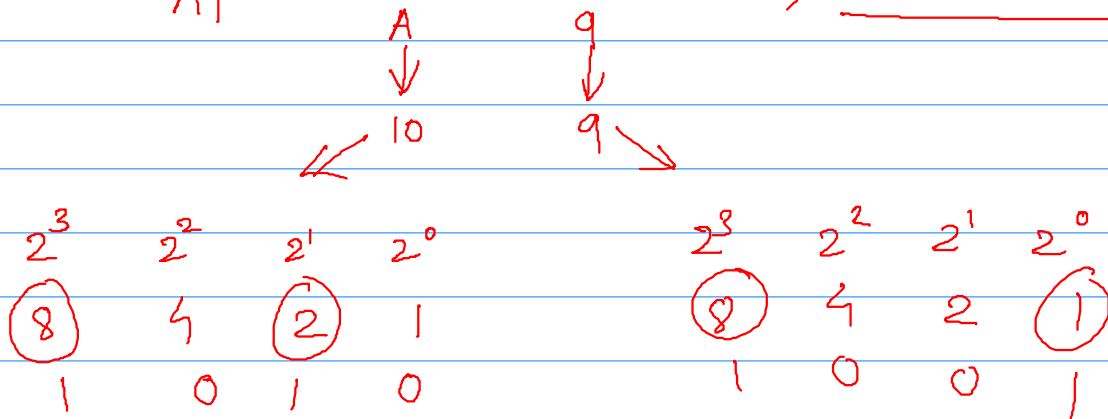


$$19 \Rightarrow \underline{\underline{13}}$$

⑦ Hexadecimal to Binary.

A9

$$\Rightarrow \underline{\underline{10101001}}$$



1	0	1	0	1	0	0	1
(128)	64	(32)	16	(8)	4	2	(1)

$$128 + 32 + 8 + 1 \Rightarrow \underline{\underline{(169)_{10}}}$$