

# BASIC NUMBER SYSTEM

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Q. What is number system?

Answer: It is a system for representing numeric values or quantities using different symbols (digits).

Q. What is decimal number system?

Answer: The decimal number system has base 10. It uses the digits 0 to 9.

Q. What does base or radix mean?

**Answer:** The number of digits (symbols) a number system use is called base or radix of that number system.

Q. What is binary number system?

Answer: The binary number system has base 2. It uses the digits 0 and 1 only.

Q. How we write a binary number?

Answer: The binary number is written as  $(1010)_2$  because its base is 2.

# COUNTING IN BINARY NUMBERS

Decimal	Binary	Decimal	Binary
0	0	12	1100
1	1	13	1101
2	10	14	1110
3	11	15	1111
4	100	16	10000
5	101	17	10001
6	110	18	10010
7	111	19	10011
8	1000	20	10100
9	1001	21	10101
10	1010	22	10110
11	1011	23	10111

# CONVERSION OF A DECIMAL NUMBER INTO BINARY NUMBER

## DIVISION METHOD:

- i. Divide the number by 2.
- ii. Put the remainder on right side.
- iii. Keep dividing the quotient till we get the quotient less than 2.
- iv. Record remainders from bottom to top to get the answer.

Example:  $(21)_{10}$

	Number	Reminder
2	21	
2	10	1
2	5	0
2	2	1
	1	0

Answer:  $(21)_{10} = (10101)_2$



# CONVERSION OF A BINARY NUMBER INTO DECIMAL NUMBER

## EXPANSION METHOD:

- i. Multiply each digit with its place value
- ii. Add these place values.
- iii. The sum is a decimal number.

Example:  $(11101)_2$

$$=(1 \times 2^4) + (1 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$$

$$=(1 \times 16) + (1 \times 8) + (1 \times 4) + (0 \times 2) + (1 \times 1)$$

$$= 16 + 8 + 4 + 0 + 1$$

$$= 29$$

$$\text{Answer: } (11011)_2 = (29)_{10}$$

Q. What is the place value 2 in  $(1259)_{10}$ ?

Answer: The place value of 2 in  $(1259)_{10}$  is  $2 \times 100 = 2 \times 10^2 = 200$ .

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Thank-you