

Number System Conversion Table

Decimal	Octal	Hexadecimal	B3	B2	B1	B0
0	0	0	0	0	0	0
1	1	1	0	0	0	1
2	2	2	0	0	1	0
3	3	3	0	0	1	1
4	4	4	0	1	0	0
5	5	5	0	1	0	1
6	6	6	0	1	1	0
7	7	7	0	1	1	1
8	10	8	1	0	0	0
9	11	9	1	0	0	1
10	12	A	1	0	1	0
11	13	B	1	0	1	1
12	14	C	1	1	0	0
13	15	D	1	1	0	1
14	16	E	1	1	1	0
15	17	F	1	1	1	1

1. Decimal to Binary:

- Divide the number by 2 repeatedly and write down the remainders in reverse order.
- Example: $13 \rightarrow 1101$

2. Binary to Decimal:

- Multiply each bit by 2 raised to its position (right to left starting from 0), then sum the results.
- Example: $1101 \rightarrow 1 \times 8 + 1 \times 4 + 0 \times 2 + 1 \times 1 = 13$

3. Decimal to Octal:

- Divide the number by 8 repeatedly and write the remainders in reverse.
- Example: $10 \rightarrow 12$

4. Decimal to Hexadecimal:

- Divide the number by 16 repeatedly and write the remainders in reverse. Use A-F for 10-15.
- Example: $14 \rightarrow E$

5. Binary to Hexadecimal:

- Group the binary digits in sets of 4 from right to left, and convert each group to its hex equivalent.

6. Binary to Octal:

- Group the binary digits in sets of 3 from right to left, and convert each group to its octal equivalent.

7. Quick Memory Aids:

- 8 in binary: 1000
- 10 in binary: 1010 \rightarrow A in hex
- 15 in binary: 1111 \rightarrow F in hex

Bonus Trick: Recognizing Binary Patterns

If binary ends in:

000 \rightarrow divisible by 8

00 \rightarrow divisible by 4

0 \rightarrow divisible by 2