



Number Systems

by:

Engr. Joseph Ronald Cañedo

Outline

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- Binary to Hexadecimal Number Conversion
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Base 2 Numbering System

Base ^N	2⁷	2⁶	2⁵	2⁴	2³	2²	2¹	2⁰
Place Value	128	64	32	16	8	4	2	1
Example: Convert Decimal 35 to binary	0	0	1	0	0	0	1	1

Decimal, Binary, and Hexadecimal Number Systems

Decimal	Binary	Hexadecimal
0	00000000	00
1	00000001	01
2	00000010	02
3	00000011	03
4	00000100	04
5	00000101	05
6	00000110	06
7	00000111	07
8	00001000	08
9	00001001	09
10	00001010	0A
11	00001011	0B
12	00001100	0C
13	00001101	0D
14	00001110	0E
15	00001111	0F

Binary and Hexadecimal Number Comparisons

Binary	Hexadecimal
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7

Binary	Hexadecimal
1000	8
1001	9
1010	A
1011	B
1100	C
1101	D
1110	E
1111	F

Binary-to-Hexadecimal Conversion Example

Converts this binary

1001 0010 0100 0101 1111 0111 1101 1100 1001

to Hexadecimal Number:

1 2 4 5 F 7 D C 9

Hexadecimal and Binary Number Conversion

Hexa-decimal	Binary
00	00000000
01	00000001
02	00000010
03	00000011
04	00000100
05	00000101
06	00000110
07	00000111

Hexa-decimal	Binary
08	00001000
09	00001001
0A	00001010
0B	00001011
0C	00001100
0D	00001101
0E	00001110
0F	00001111

Hexadecimal and Binary Number Conversion Example

Convert this
0x2102

to Binary Numbers:

2	1	0	2
0010	0001	0000	0010

Summary

- Computers can recognize and process data only in a binary format. The binary number system is made up of 0s and 1s.
- Decimal numbers can be converted to binary numbers, and binary numbers can be converted to hexadecimal numbers (and vice versa) by following specific procedures.
- The hexadecimal number system is used frequently at higher level of representation. The hexadecimal number system uses 16 symbols: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, and F.

