Number Conversions

Wednesday, 13 October 2021 4:30 PM

Number Systems: a. Denary
b. Binary
c. Hexa-Decimal.

10 DENARY Number System:

0, 1, 2, 3, 4, 5, 6, 7, 8, 9 Digits
Base = 10

5	6	9	2	→ Position
10^3	10^2	10^1	10^0	→ Base
1000	100	10	1	→ Worth

Most Significant Digit → (5) 6 9 (2) ← Least Significant Digit

$5 \times 1000 = 5000$, $6 \times 100 = 600$, $9 \times 10 = 90$, $2 \times 1 = 2$

5000 + 600 + 90 + 2 = **5692** Number/magnitude.

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2 BINARY NUMBER SYSTEM:

0, 1 Binary Digits
Base = 2 bit.

1	1	0	0	1	0	0	0	→ Position
2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0	→ Base
128	64	32	16	8	4	2	1	→ Worth

1 1 0 0 1 0 0 0 (input)
× 128 64 32 16 8 4 2 1
= 128 + 64 + 0 + 0 + 8 + 0 + 0 + 0 = **200** (output)

Minimum amount of data that a computer saves is a byte.

Byte is 8-bits arrangement.

It is necessary that a binary number should be written in multiples of 8-bits.

Q. Convert following binary to denary.

1. $(01100100)_2 = (?)_{10} = (100)_{10}$
2. $(00011111)_2 = (?)_{10} = (31)_{10}$
3. $(01000001)_2 = (?)_{10} =$

	8	4	2	1	8	4	2	1	→ Hex
Den ←	128	64	32	16	8	4	2	1	
100	0	1	1	0	0	1	0	0	6 4
31	0	0	0	1	1	1	1	1	1 F
65	0	1	0	0	0	0	0	1	4 1
55	0	0	1	1	0	1	1	1	3 7
79	0	1	0	0	1	1	1	1	4 F
175	1	0	1	0	1	1	1	1	A F
200	1	1	0	0	1	0	0	0	C 8

A 10
B 11
C 12 ✓
D 13
E 14
F 15

Q. Convert following denary numbers into binary:

1. $(90)_{10} = (?)_2$
2. $(150)_{10} = (?)_2$
3. $(240)_{10} = (?)_2$
4. $(63)_{10} = (?)_2$

Den	128	64	32	16	8	4	2	1
90	0	1	0	1	1	0	1	0
150	1	0	0	1	0	1	1	0
240	1	1	1	1	0	0	0	0
63	0	0	1	1	1	1	1	1

Hexa-Decimal Number System:

Hexa = 6
Decimal = 10 +
H-D 16

0, 1, 2, 3, 4, 5, 6, 7, 8, 9
A, B, C, D, E, F
Hexa-Decimal Digit/Hex.

8	4	2	1	8	4	2	1
0	0	0	0	1	1	1	1

- One Byte holds two HD digits.

A 10
B 11
C 12
D 13
E 14
→ F 15
1111

Den	128	64	32	16	8	4	2	1	Hex
108	0	1	1	0	1	1	0	0	6C
42	0	0	1	0	1	0	1	0	2A
63	0	0	1	1	1	1	1	1	3F
110	0	1	1	0	1	1	1	0	6E
115	0	1	1	1	0	0	1	1	73

Q. Convert following to Hex.

1. $(110)_{10} = (?)_{16}$
2. $(01110011)_2 = (?)_{16}$