



Let's convert the decimal number 25 to binary.

$25 \div 2 = 12$ remainder 1
 $12 \div 2 = 6$ remainder 0
 $6 \div 2 = 3$ remainder 0
 $3 \div 2 = 1$ remainder 1
 $1 \div 2 = 0$ remainder 1

Therefore, $25_{10} = 11001_2$

Write the remainder from step 1 as a Least Significant Bit (LSB) to Step last as a Most Significant Bit (MSB).

Divide the Number (Decimal Number) by the base of target base system

Decimal Number System to Any Other Base

Decimal (10)

$(1101)_2 \rightarrow 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0 = 8 + 4 + 0 + 1 = (13)_{10}$

Multiply the digit with base of target system (with place value exponent)

From Any Base to Base 10 Decimal

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Binary (2)

group binary digits into sets of four, starting with the least significant (rightmost) digits

Binary: $11100101 = 1110\ 0101$
Get the decimal Value for each 4 bits
But with those numbers 0,1,2,3,4,5,6,7,8,9, A,B,C,D,E,F

Hexadecimal (16)

group binary digits into sets of three, starting with the least significant (rightmost) digits

Get the decimal Value for each 3 bits
Binary: $11100101 = 11\ 100\ 101 \rightarrow 011\ 100\ 101$
Pad the most significant digits with zeros if necessary to complete a group of three

Octal (8)

From Hexadecimal to Binary

Hexadecimal: 0 1 2 3 4 5 6 7
Binary: 0000 0001 0010 0011 0100 0101 0110 0111
Hexadecimal: 8 9 A B C D E F
Binary: 1000 1001 1010 1011 1100 1101 1110 1111

Simply look up each hexadecimal digit to obtain the equivalent group of four binary digits

From Octal to Binary

Octal: 0 1 2 3 4 5 6 7
Binary: 000 001 010 011 100 101 110 111

Simply look up each octal digit to obtain the equivalent group of three binary digits

