Conversione da decimale a floating point

- Convert 2.625 to our 8-bit floating point format.
  - A. The integral part is easy, $2_{10} = 10_2$. For the fractional part:

    $0.625 \times 2 = 1.25$ | 1 | *Generate 1 and continue with the rest.*

    $0.25 \times 2 = 0.5$ | 0 | *Generate 0 and continue.*

    $0.5 \times 2 = 1.0$ | 1 | *Generate 1 and nothing remains.*

    So $0.625_{10} = 0.101_2$, and $2.625_{10} = 10.101_2$.
  - B. Add an exponent part: $10.101_2 = 10.101_2 \times 2^0$.
  - C. Normalize: $10.101_2 \times 2^0 = 1.0101_2 \times 2^1$.
  - D. Mantissa: 0101
  - E. Exponent: $1 + 3 = 4 = 100_2$.
  - F. Sign bit is 0.

  The result is | 0 | 100 | 0101 |. Represented as hex, that is 45_{16}.
- Convert -4.75 to our 8-bit floating point format.
  - a. The integral part is $4_{10} = 100_2$. The fractional:

    $0.75 \times 2 = 1.5$ | 1 | *Generate 1 and continue with the rest.*

    $0.5 \times 2 = 1.0$ | 1 | *Generate 1 and nothing remains.*

    So $4.75_{10} = 100.11_2$.
  - b. Normalize: $100.11_2 = 1.0011_2 \times 2^2$.
  - c. Mantissa is 0011, exponent is $2 + 3 = 5 = 101_2$, sign bit is 1.

  So -4.75 is | 1 | 101 | 0011 | $= d3_{16}$

Conversione da formato floating point a decimale

- Convert the 8-bit floating point number e7 (in hex) to decimal.
  - A. Convert: $e7_{16} = 11100111_2$.
  - B. Seprate: | 1 | 110 | 0111 |
  - C. Mantissa: 1.0111
  - D. Exponent: $110_2 = 6_{10}$; $6 - 3 = 3$.
  - E. De-normalize: $1.0111_2 \times 2^3 = 1011.1$
  - F. Convert:

Exponents	2^3	2^2	2^1	2^0	2^{-1}
Place Values	8	4	2	1	0.5
Bits	1	0	1	1 .	1
Value	8	+	2 +	1 +	0.5 = 11.5

  - G. Sign: negative.

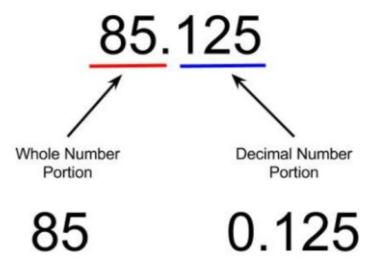
  Result: e7 is -11.5
- Convert the 8-bit floating point number 26 (in hex) to decimal.
  - a. Convert and separate: $26_{16} =$ | 0 | 010 | 0110 | $_2$
  - b. Exponent: $010_2 = 2_{10}$; $2 - 3 = -1$.
  - c. Denormalize: $1.011_2 \times 2^{-1} = 0.1011$.
  - d. Convert:

Exponents	2^0	2^{-1}	2^{-2}	2^{-3}	2^{-4}
Place Values	1	0.5	0.25	0.125	0.0625
Bits	0 .	1	0	1	1
Value		0.5		+ 0.125 + 0.0625 = 0.6875	

  - e. Sign: positive

  Result: 26 is 0.6875.

Decimale a floating point IEEE 754 (step by step)

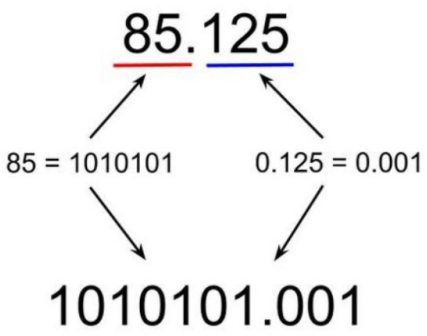


Whole Number Division	Result	Remainder
85/2	42	1
42/2	21	0
21/2	10	1
10/2	5	0
5/2	2	1
2/2	1	0
1/2	0	1

85 = 1010101

Decimal Number Multiplication	Result	Number in front of decimal
0.125 x 2	0.25	0
0.25 x 2	0.5	0
0.5 x 2	1.0	1
0.0 x 2	0.0	0

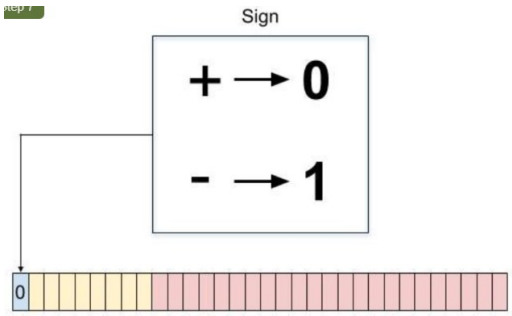
0.125 = 001



1010101.001

Move decimal 6 places

1.010101001×2^6



1.010101001×2^6

$127 + 6 = 133$

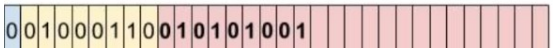
Whole Number Division	Result	Remainder
133/2	66	1
66/2	33	0
33/2	16	1
16/2	8	0
8/2	4	0
4/2	2	0
2/2	1	0
1/2	0	1

133 = **10000101**

Exponent

1.010101001×2^6

Mantissa



85.125