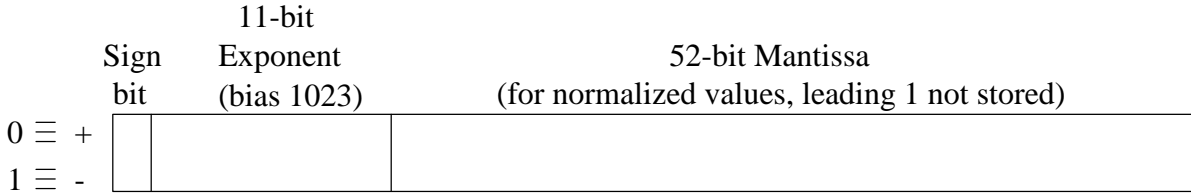
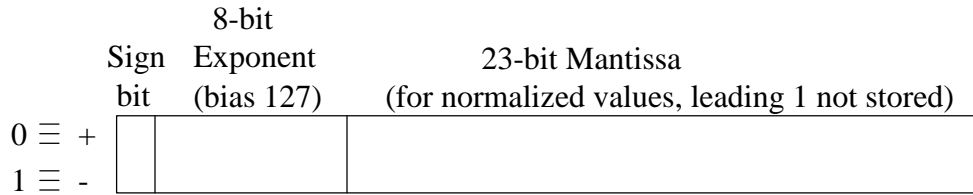


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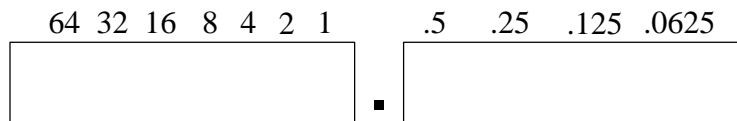
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IEEE 754 Standard Floating Point Representation



Single Precision		Double Precision		Object
Exponent	Mantissa	Exponent	Mantissa	Represented
1-254	any value	1-2046	any value	normalized #
0	0	0	0	0
0	nonzero	0	nonzero	denormalized #
255	0	2,047	0	infinity
255	nonzero	2,047	nonzero	NaN (not a #)

1) Convert the value 23.625₁₀ to its binary representation.



2) Normalize the above value so that the most significant 1 is immediately to the left of the radix point. Include the corresponding exponent value to indicate the motion of the radix point.

1. × 2

3) Write the corresponding 32-bit IEEE 754 floating point representation for 23.625₁₀.

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- 4) Write the corresponding 64-bit IEEE 754 floating point representation for 23.625_{10} .
- 5) What would be the smallest positive normalized 32-bit IEEE 754 floating point value?

6) The smallest positive denormalized 32-bit IEEE 754 floating point value has representation of

	8-bit	23-bit Mantissa
	Sign bit	Exponent (bias 127) (for denormalized values, leading 0 not stored)
0 ≡ +	0	00000000
1 ≡ -	0	000 ... 01

What value would it represent?

$$2^{\boxed{}} \times 2^{\boxed{}}$$

7) What would be the representation for the largest positive denormalized 32-bit IEEE 754 floating point?

	8-bit	23-bit Mantissa
	Sign bit	Exponent (bias 127) (for denormalized values, leading 0 not stored)
0 ≡ +	0	00000000
1 ≡ -	0	

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8) How would you add two IEEE 754 floating point numbers?

9) How would you multiply two IEEE 754 floating point numbers?

10) Consider adding 1.011×2^{40} and 1.01×2^5 .

a) How many places does the second number's mantissa get shifted?

b) After we add these two numbers and store the results back into a 32-bit IEEE 754 value, what would be the result?