IEEE 754 Floating Point Format

Encoding	Sign	Exponent	Exp Bias (*b*)	Fraction	Decimal Range
Single	1 [31]	8 [30-23]	127	23 [22-00]	$\pm\ 10^{-44.85}$ to $10^{38.53}$
Double	1 [63]	11 [62-52]	1023	52 [51-00]	$\pm\ 10^{-323.3}$ to $10^{308.3}$

Sign	Exponent (*e*)	Fraction (*f*)	Description	Value	Range (Single)	Range (Double)
0	11..11	11..11 : 10..00	Quiet Not a Number (indeter-minate operation)	QNaN		
0	11..11	01..11 : 00..01	Signaling Not a Number (invalid operation)	SNaN		
0	11..11	00..00	+ Infinity	$+\infty$		
0	11..10 : 00..01	11..11 : 00..00	Positive normalized	$1.f \times 2^{e-b}$	$\left(2-2^{-23}\right)\times 2^{127}$ $\vdots$ 1×2^{-126}	$\left(2-2^{-52}\right)\times 2^{1023}$ $\vdots$ 1×2^{-1022}
0	00..00	11..11 : 00..01	Positive denormalized	$0.f \times 2^{1-b}$	$\left(1-2^{-23}\right)\times 2^{-126}$ $\vdots$ 1×2^{-149}	$\left(1-2^{-52}\right)\times 2^{-1022}$ $\vdots$ 1×2^{-1074}
0	00.00	00..00	Positive zero	+0	0	0
1	00..00	00..00	Negative zero	-0	0	0
1	00..00	00.01 : 11..11	Negative denormalized	$-0.f \times 2^{1-b}$	-1×2^{-149} $\vdots$ $-\left(1-2^{-23}\right)\times 2^{-127}$	-1×2^{-1074} $\vdots$ $-\left(1-2^{-52}\right)\times 2^{-1022}$
1	00..01 : 11.10	00..00 : 11..11	Negative normalized	$-1.f \times 2^{e-b}$	$-\left(2-2^{-23}\right)\times 2^{-126}$ $\vdots$ $-\left(2-2^{-23}\right)\times 2^{127}$	-1×2^{-1022} $\vdots$ $-\left(2-2^{-52}\right)\times 2^{1023}$
1	11..11	00..00	– Infinity	$-\infty$		
1	11..11	00..01 : 01..11	Signaling Not a Number	SNaN		
1	11..11	10..00 : 11..11	Quiet Not a Number	QNaN		

Interesting to note that half of the code space is used for numbers between –1 and 1.

The absolute precision of a number is $2^{e-b-23} = 2^{e-140}$ for singles and $2^{e-b-52} = 2^{e-1075}$ for doubles.