

1. **Precision:** It represents the nearness of a number to the actual value. Sign bit indicates whether a number is positive or negative. Exponent will give the number of places by which the digits have to move to get the actual number.

For any given number, the representation in binary requires all the three parts for the number to be precise. But the Fraction part plays more importance as compared to the exponent and sign bit because the sign and exponent of a number remains constant for the same number. The binary values in the fraction part play a more important role in the nearness of the value to the true value.

Ex: 0000 1000 1101 1101 1101 1101 1110 0111 is an 32 bit number whose fractional part is 000 1101 1101 1101 1101 111. In the representation the maximum values that can be represented should be in 22 bits only even though the number requires more bits for correct representation. Hence the number is less precise to the actual number.

2. **Normal and Subnormal Values:**

Normal Values: Let the sign bit (31) be s , the exponent (30-23) be e and the mantissa (significand or fraction) (22-0) be m . The valid range of the exponents is 1 to 254 (if e is treated as an unsigned number). The actual exponent is biased by 127 to get e i.e. the actual value of the exponent is $e - 127$. This gives the range: $2^{1-127} = 2^{-126}$ to $2^{254-127} = 2^{127}$.

Subnormal Values: The interpretation of a subnormal a number is different. The content of the exponent part (e) is zero and the significand part (m) is non-zero. The value of a subnormal number is $(-1)^s \times 0.m \times 2^{-126}$ There is no implicit one in the significand.

3. **There are 5 methods of rounding off to a nearest number:**

1. Rounding to nearest, nearer to even: A number is rounded off to its nearest even integer.

Ex: 12.5 to 12

-12.5 to -12

2. Rounding to away, away from zero: A number is rounded off to a number away from zero.

Ex: 15.5 to 16

-15.5 to -16

3. Rounding towards zero: It is the opposite of the second method

Ex: 11.3 to 11

-11.3 to -11

4. Rounding towards minus infinity: A number is truncated to a value in the direction of minus infinity.

Ex: 11.3 to 11

-11.3 to -12

5. Rounding towards plus infinity: It is the opposite of the 4th method.

Ex: 11.3 to 12.

-11.3 to -11.