

Floating Point Adder

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Sign bit-1	Exponent-8	Mantissa-23
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Fig (1): Single Precision Format

Steps for converting decimal to floating point number:

1. Convert a Decimal number to Binary number $(975.75)_{10} = (1111001111.11)_2$
2. Normalize the number $1.1110011111 * 2^9$
3. From this normalized number we can fill all 32-bits of floating point number Sign bit = 0 (number is positive)
4. Exponent = Bias + 9 = $127 + 9 = (136)_{10} = (10001000)_2$
5. Fraction part will contain all the bits after decimal point.
6. $(975.75)_{10}$ is expressed as shown below in single precision floating point format.

0	1000 1000	11100111111000000000000
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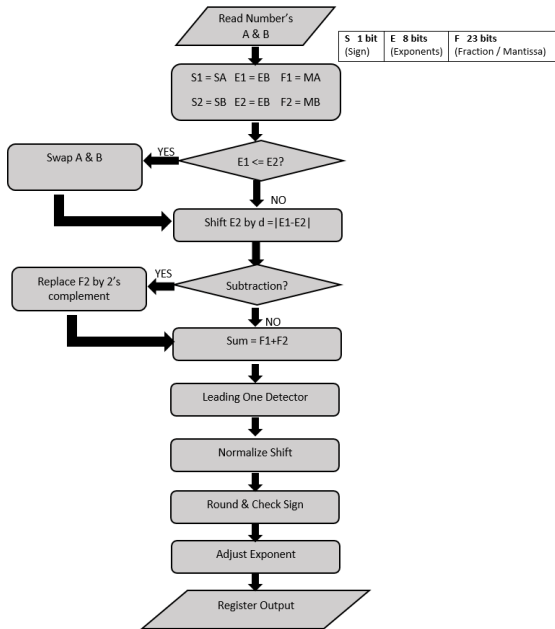
Fig (2): Single Precision Format of $(975.75)_{10}$

Steps for floating point adder:

- 1.Sort:Find the largest number.
- 2.Align:Make the exponent equal.
- 3.Add/Sub:Perform addition or subtraction
- 4:Normalize: set MSB of mantissa 1

Examples:

		sort	align	add/sub	normalize
eg.1	+0.54E3	-0.87E4	-0.87E4	-0.87E4	-0.87E4
	<u>-0.87E4</u>	<u>+0.54E3</u>	<u>+0.05E4</u>	<u>+0.05E4</u>	<u>+0.05E4</u>
				-0.82E4	-0.82E4
eg.2	+0.54E3	-0.55E3	-0.55E3	-0.55E3	-0.55E3
	<u>-0.55E3</u>	<u>+0.54E3</u>	<u>+0.54E3</u>	<u>+0.54E3</u>	<u>+0.54E3</u>
				-0.01E3	-0.10E2
eg.3	+0.54E0	-0.55E0	-0.55E0	-0.55E0	-0.55E0
	<u>-0.55E0</u>	<u>+0.54E0</u>	<u>+0.54E0</u>	<u>+0.54E0</u>	<u>+0.54E0</u>
				-0.01E0	-0.00E0
eg.4	+0.56E3	+0.56E3	+0.56E3	+0.56E3	+0.56E3
	<u>+0.52E3</u>	<u>+0.52E3</u>	<u>+0.52E3</u>	<u>+0.52E3</u>	<u>+0.52E3</u>
				+1.07E3	+0.10E4



Flow chart :

Applications:

Floating point numbers are used in various applications such as medical imaging, radar, telecommunications:

1. CPU
2. Calculators