FLOATING POINT ARITHMETIC TECHNIQUES

Addition and Subtraction

To add or subtract, the exponents must be equal.

e.g. (0.2 E 4) + (0.4 E 3) (2000 + 400 = 2400)

can only be done as - (0.2 E 4) + (0.04 E 4)
(significand shifts to compensate for change in exponent)
= 0.24 E 4 (2400)
(already in normal form)

The sequence is therefore :-

- Equalize exponents by shifting significand.
- Add or subtract significand (exponent unchanged)
- Normalize answer by shifting significand and adjusting exponent.

Multiplication

The sequence is :-

- Add exponents.
- Multiply significands.
- Re-normalize.

e.g. (0.2 E 3) x (0.4 E 2) (200 x 40 = 8000)

Add exponent	3 + 2 = 5	
Multiply significands	0.2 x 0.4 = 0.08	
result	0.08 E 5	
re-normalise	0.8 E 4	(= 8000)

Division

The sequence is :-

- Subtract exponents.
- Divide significands.
- Re-normalize.

e.g. (0.2 E 3) / (0.4 E 2) (200 / 40 = 5)

Subtract exponent	3 - 2 = 1	
Divide significands	0.2 / 0.4 = 0.5	
result	0.5 E 1	(= 5)
(already normalised)		