Computer Arithmetic Algorithms, 2nd Edition

Israel Koren

List of Corrections for the first printing (2002)

1. Page 33, reference [6], replace "(2001)." by "(November 2001), 1267-1278."

2. Page 36, in the equation on line 3, replace the last line

$$= \left(\sum_{j=0}^{n-2} x_j \; 2^{-(n-1-j)} \right) \cdot A \; = \; 2^{(n-1)} \left(\sum_{j=0}^{n-2} x_j \; 2^j \right) \cdot A$$

   by

$$= \left(\sum_{j=0}^{n-2} x_j \; 2^{-(n-1-j)} \right) \cdot A \; = \; 2^{-(n-1)} \left(\sum_{j=0}^{n-2} x_j \; 2^j \right) \cdot A$$

3. Page 49, line 4 (2nd line of the equation for r_m), replace

$$\begin{aligned} r_m &= 2r_{m-1} - q_m(2Q_{m-1} + q_m 2^{-m}) \\ &= 2^2 r_{m-2} - 2q_{m-1}(2Q_{m-2} + q_{m-1}) - q_m(2Q_{m-1} + q_m 2^{-m}) \end{aligned}$$

   by

$$\begin{aligned} r_m &= 2r_{m-1} - q_m(2Q_{m-1} + q_m 2^{-m}) \\ &= 2^2 r_{m-2} - 2q_{m-1}(2Q_{m-2} + q_{m-1} 2^{-(m-1)}) - q_m(2Q_{m-1} + q_m 2^{-m}) \end{aligned}$$

4. Page 68, line 15, replace the sentence "A similar effect is achieved by using a significand of $1.f$ instead of $0.f$, since this adds 1 to the exponent." by
   "A similar effect is achieved by using a significand of $1.f$ instead of $0.1f$, since this adds 1 to the exponent."

5. Page 82, last paragraph, replace the sentence "In the *CLOSE* case we first predict the exponent difference, based on the two least significant bits of the operands, ..." by
   "In the *CLOSE* case we first predict the exponent difference, based on the two least significant bits of the two exponents, ..."

6. Page 83, Table 4.10, Step 1 for the *CLOSE* case, replace "Predict exponent" by "Predict exponent difference"

7. Page 110, last sentence should be "Note that unlike Figure **??**, the Ladner-Fischer adder employs fundamental carry operators with a fan-out value higher than 2. Such an implementation with fan-outs of up to $n/2$ requires buffers which add to the overall delay.

8. Page 110, Figure 5.10, remove the right portion of the figure.

9. Page 129, 1st line (below Figure 5.25) should say: k primary inputs

10. Page 159, last sentence should be: The implementation in Figure 6.12 corresponds to the setting $a = b = d = 0$ and $c = e = f = 1$.

11. Page 167, last sentence in Section 6.5, replace "In this case, the rounding step for $(A \times B + C)$ is performed at the same time as the multiplication by D, by adding the partial product $Incr. \times D$ to the CSA tree." by
"In this case, the rounding step for $(X \times Y + Z)$ is performed at the same time as the multiplication by B, by adding the partial product $Incr. \times B$ to the CSA tree."

12. Page 180, reference [14], replace "600 floating-point unit" by "6000 floating-point unit"

13. Page 206, line 5 from the bottom, replace "where Q_{i-1} is the partially calculated root at step $(i-1)$, i.e., $Q_{i-1} = 0.q_1 q_2 \cdot q_{i-1}$." by
"where Q_{i-1} is the partially calculated root at step $(i-1)$, i.e., $Q_{i-1} = 0.q_1 q_2 \cdots q_{i-1}$."

14. Page 208, equation (7.22), replace

$$\sqrt{1.f \cdot 2^{E-1023}} = \begin{cases} \sqrt{0.1f} \cdot 2^{(E-1)/2-1023} & \text{if} \quad E \text{ is odd} \\ \sqrt{0.01f} \cdot 2^{E/2-1-1023} & \text{if} \quad E \text{ is even} \end{cases} \tag{7.22}$$

by

$$\sqrt{1.f \cdot 2^{E-1023}} = \begin{cases} \sqrt{0.1f} \cdot 2^{(E+1)/2-1023} & \text{if} \quad E \text{ is odd} \\ \sqrt{0.01f} \cdot 2^{E/2+1-1023} & \text{if} \quad E \text{ is even} \end{cases} \tag{7.22}$$

15. Page 241 equation (9.53), replace

$$y_m = y_i \prod_{k=i}^{m-1} (1 + s_k 2^{-k}) \approx y_i \left(1 + s_i 2^{-i} + s_{i+1} 2^{-(i+1)} + s_{i+1} 2^{-(i+1)} + \cdots\right) \tag{9.53}$$

by

$$y_m = y_i \prod_{k=i}^{m-1} (1 + s_k 2^{-k}) \approx y_i \left(1 + s_i 2^{-i} + s_{i+1} 2^{-(i+1)} + s_{i+2} 2^{-(i+2)} + \cdots\right) \tag{9.53}$$

16. Page 275, Exercise 11.9, replace $A - 2^a - 1$ by $A = 2^a - 1$.