Errata For 2nd Edition

Chapter 4

- p. 83, Eq (4.5) should be:
$$in0\_a = in0\_b \wedge \varphi_a^{UF} \wedge \varphi_b^{UF} \Rightarrow out2\_a = out0\_b$$
- Algorithm 4.3.1 on page 85, at the end of step 1.(a) it should read "All other terms form singleton equivalence classes" (rather than variables).

Chapter 6

- p. 145, Eq. (6.46) should be:
$$\langle a \rangle_S < \langle b \rangle_S \iff (a_{l-1} \iff b_{l-1}) \oplus add(a, \sim b, 1).cout\ .$$

Chapter 7

- (7.19), (7.20) are not strictly according to the definition of array properties, and in particular we used $< i$ as a 'syntactic sugar' substitute for $<= i-1$, and likewise $j! = i$ for $j <= i-1 \vee i+1 <= j$. Rewriting the equations without those shorthand notations we get:
$$\begin{array}{ll} & (\forall x \in \mathbb{N}_0.\ x \leq i-1 \rightarrow \mathsf{a}[x] = 0) \\ \wedge & \mathsf{a}'[i] = 0 \wedge \forall j.\ ((j \leq i-1 \vee i+1 \leq j) \rightarrow \mathsf{a}'[j] = \mathsf{a}[j]) \\ \wedge & z \leq i \wedge \mathsf{a}'[z] \neq 0\ . \end{array} \tag{1}$$
The set $\mathcal{I}$ for our example is $\{i, z\}$. We therefore replace the two universal quantifications as follows:
$$\begin{array}{ll} & (i \leq i-1 \rightarrow \mathsf{a}[i] = 0) \wedge (z \leq i-1 \rightarrow \mathsf{a}[z] = 0) \\ \wedge & \mathsf{a}'[i] = 0 \\ \wedge & ((i \leq i-1 \vee i+1 \leq i) \rightarrow \mathsf{a}'[i] = \mathsf{a}[i]) \\ \wedge & ((z \leq i-1 \vee i+1 \leq z) \rightarrow \mathsf{a}'[z] = \mathsf{a}[z]) \\ \wedge & z \leq i \wedge \mathsf{a}'[z] \neq 0\ . \end{array} \tag{2}$$
Let us remove the trivially satisfied conjuncts to obtain
$$\begin{array}{ll} & (z \leq i-1 \rightarrow \mathsf{a}[z] = 0) \\ \wedge & \mathsf{a}'[i] = 0 \wedge ((z \leq i-1 \vee i+1 \leq z) \rightarrow \mathsf{a}'[z] = \mathsf{a}[z]) \\ \wedge & z \leq i \wedge \mathsf{a}'[z] \neq 0\ . \end{array} \tag{3}$$
We now replace the two arrays a and a' by uninterpreted functions F_a and $F_{a'}$ and obtain
$$\begin{array}{ll} & (z \leq i-1 \rightarrow F_a(z) = 0) \\ \wedge & F_{a'}(i) = 0 \wedge ((z \leq i-1 \vee i+1 \leq z) \rightarrow F_{a'}(z) = F_a(z)) \\ \wedge & z \leq i \wedge F_{a'}(z) \neq 0\ . \end{array} \tag{4}$$