Corrections for Logic for Applications 2^{nd} edition
April, 2023

p. 10 -12: We begin by ...of the tree. –> We begin by defining a linear ordering $\leq_n$ of each level n by induction on the levels. Suppose σ and τ are on level $n+1$ and are the immediate successors of σ' and τ', respectively, of level n. If $\sigma' <_n \tau'$ then $\sigma <_{n+1} \tau$. If $\sigma' = \tau'$ then we order their immediate successors in some fixed fashion to determine the relationship between σ and τ.

l. –4: find the largest... T. –>

find the smallest level of T at which the predecessors x' and y' of x and y, respectively, are distinct.

p. 11 Exercise 6: chain –> sequence

p. 11 Exercise 7: We define the lexicographic ordering $<_L$on n-tuples $\langle x_1, \ldots, x_n \rangle$ of natural numbers as would be expected: $\langle x_1, \ldots, x_n \rangle <_L \langle y_1, \ldots, y_n \rangle$ if $x_i < y_i$ for the least i such that $x_i \neq y_i$.

p. 14 Figure 2: The root here should be labeled $((\neg(A \wedge B)) \rightarrow C)$ and the left node on the next level should be $(\neg(A \wedge B))$.

p. 17 l. 7: propositions -> propositional letters.

l. 8: proposition -> propositional letter.

p. 21 Exercise 1: (i.e. unabbreviated -> (based on Definition 2.1).

p. 22 Exercise 10 $\neg\alpha$ –> $(\neg A)$ and omit "from α".

p. 23 Add Exercise 17: Complete the remaining cases in the proof of Theorem 2.4.

p. 25 l. 3 of Definition 3.8 $\mathcal{V}$ –> $\mathcal{V}(\sigma)$

l. -2 $\pm$ –> Σ

p.34 l.7 of proof of 4.8 to end of proof: in the construction.... we would reduce E. –>

in the construction of the CST, if E is not already reduced on P, we reduce an unreduced entry on a level $k \leq n$. Thus we can proceed for at most finitely many steps in this construction before we would reduce E.

p. 35 l. 5: add at the end: This notion corresponds to the number of occurrences of connectives in the proposition.

l. -1 of Definition 4.10: the signed propositions -> the degrees of the signed propositions

p. 36 4b: mismatched parentheses. should be $((\alpha \wedge \beta) \rightarrow \gamma) \rightarrow ((\alpha \rightarrow (\beta \rightarrow \gamma)))$.

p. 42 Last line before Theorem 6.4: $T\alpha$ -> $T\alpha_m$

p. 44 l. -4 At end of this paragraph add: Note that if $\sigma \subseteq \tau \in T$ then $\sigma \in T$ and so T is binary branching.

p. 46 Exercise 7 line before **Note**: omit "; the order has width three"

p. 51 l. 3: the propositional –> the negations of propositional

l. -2: *parent* -> *parents*

p. 52 Definition 8.6: a labeled binary tree –> a finite labeled binary tree

p. 55 l. -4 of Proof of Lemma 8.14: ℓ -> ℓ or $\bar{\ell}$

p. 62 Exercise 14: add the hypothesis that S is satisfiable.

p. 64 l. 2: $\mathcal{R}^{\mathcal{A}}$ –> $\mathcal{R}^{\mathcal{A}}(S)$

p. 68 l. 10: proof is an ordinary –> proof can easily be made into an ordinary

(i) of Definition 10.4: is a clause –> is a nonempty clause

p. 76 l. -4 above Example 10.18: it is clear that –> it is clear (for finite programs P) that

p. 78 Exercise 4 l. 3 of second paragraph: If Patterson comes....Jones is ill. –> If Patterson comes, he will force Robinson back to his senses and Patterson will come if Jones is ill.

p. 87 l. -2 of Proof of Theorem 2.12: $s = t$ -> $s_1 = t_1$

l. -1 of Proof of Theorem 2.13: Exercise 9. -> Exercises 8 and 9.

p. 91 l. 1 of Definitions 3.8(i)(2): $\sigma \wedge 0$ -> $\sigma\hat{}0$

Example 3.9: The formulas on the second level down should be $((\exists x)R(c, f(x, y), g(a, z, w)))$ and $((\forall y)R(c, f(x, y), g(a, z, w)))$. The top level formula should be $(((\exists x)R(c, f(x, y), g(a, z, w))) \wedge ((\forall y)R(c, f(x, y), g(a, z, w))))$.

p. 119 figure 34: the remark (suppose $t_0 = c_0$) can be omitted or put one line higher up and the left path should end with the entry $T(\neg R(c_0, c_0))$.

p. 125 problem 2: infinite model but no finite ones –> a model with an infinite domain but none with a finite domain.

p. 127 8.1 Axioms (iii) should be as on p. 47 7.1 Axioms (iii):
$(\neg\beta \rightarrow \neg\alpha) \rightarrow ((\neg\beta \rightarrow \alpha) \rightarrow \beta)$

p. 127 l. -1: From $\forall x\alpha$ infer α. –> From α infer $\forall x\alpha$ for any formula α.

p. 133 Exercise 5a: It is better to write $(\exists y(\forall xR(x, y) \ \vee \ Q(x, y))$ for the formula after the $\wedge$,

p. 137 problem 3 (indeed least) –> (indeed least), in the sense of set containment,

p. 140 l. 5: $v(\psi(\theta\sigma).)$ –> $v(\psi(\theta\sigma))$.

p. 142 l. 7: $\{x/h(z)\}$ is our –> $\{x/h(z), y/z\}$ is our

l. 3 of next paragraph: If it does not contain –> If if contains

p. 144 problem 2: $hf(w)$ –> $h(f(w))$ and $hf(a)$ –> $h(f(a))$ (in both parts)

p. 147 Example 13.4: Next to last line of tableaux switch the underline from $\neg P(u,v)$ to $P(v,u)$ in the left hand clause and change $P(z,x)$ –> $P(x,z)$ in the right hand one.

p. 151l. 6: T_1 and T_2. –> T_1 and T_2 with one more resolution giving C from C_1 and C_2.

p. 152-3 problem 6: At beginning change six sentences –> seven sentences and at the end of the list add (vii) there is a bank.

p. 155 Definition 14.3 l. 1: We say that –> In this situation, we say that

p. 160 l. 1: linear resolution –> linear input resolution

p. 162 l.2 of proof of Theorem 1.8: I.10.9 –> I.10.11

p. 163 l. 2 of Theorem 1.10: $G = \{A_1, \ldots, A_n\}$ –> $G = \{\neg A_1, \ldots, \neg A_n\}$

p. 174 problem 11 after the program: The goal $? - tc(a,b)$ will succeed exactly –> The fact $tc(a,b)$ is a logical consequence of this program and the edge database exactly

p. 181 problem 4: II.7-8 and III.11-12 –> II.5.7-8 and III.2.12-14

p. 189 l. 7: After (Exercise 4). Add: Note that this does not imply that $=$ is true identity.

p. 230 Definition 3.2(ii) l. -1: of the form $Tq \Vdash \psi$ –> of the form $Tp \Vdash \psi$, $Fp \Vdash \psi$, $Tq \Vdash \psi$

p. 242 line 1 of Definition 4.6(i)(2)(a): about a possible world q -> about p or a possible world q

. 243 l. 2 of Definition 4.7(i): about a possible world q -> about p or a possible world q

p. 244 l. -2 of (iv): , where -> , as the second entry of the appended atomic tableau, where

p. 259 l. -7: an open formula –> a formula with free variables

l. -5: open α –> α with free variables

p. 323 definition of $a(S \times R)$: aRc –> aSc

p. 351 l. -3: If A and A –> If A and B

p. 364 problem 8: $\alpha(\beta * \gamma)$ –> $\alpha * (\beta * \gamma)$ –

p. 378 Exercise l. 1: Reconstruct the syllogisms –> To the extent you can (there is some ambiguity) reconstruct the syllogisms