Corrections for Logic for Applications 2nd 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 \( \sigma \) and \( \tau \) are on level \( n+1 \) and are the immediate successors of \( \sigma' \) and \( \tau' \), 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 \( \sigma \) and \( \tau \).

1. -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 \( (\neg(A \land B)) \to C \) and the left node on the next level should be \( (\neg(A \land B)) \).

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

1. 8: proposition –> propositional letter.

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

p. 22 Exercise 10 \( \neg \alpha \to (\neg A) \) and omit "from \( \alpha \".

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

p. 25 l. 3 of Definition 3.8 \( \forall \to V(\sigma) \)

1. -2 \( \pm \to \Sigma \)

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 \( \text{cst} \), 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.

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

p. 36 4b: mismatched parentheses. should be \( ((\alpha \land \beta) \to \gamma) \to ((\alpha \to (\beta \to \gamma))) \).

p. 42 Last line before Theorem 6.4: \( T\alpha \to T\alpha_m \)
At end of this paragraph add: Note that if $\sigma \subseteq \tau \in T$ then $\sigma \in T$ and so $T$ is binary branching.

Exercise 7 line before Note: omit "; the order has width three"

The propositional $\rightarrow$ the negations of propositional

-2: parent $\rightarrow$ parents

Definition 8.6: a labeled binary tree $\rightarrow$ a finite labeled binary tree

-4 of Proof of Lemma 8.14: $\ell \rightarrow \ell$ or $\bar{\ell}$

Exercise 14: add the hypothesis that $S$ is satisfiable.

De...nition 8.6: a labeled binary tree $\rightarrow$ a ...nite labeled binary tree

Proof of Lemma 8.14: ` $\rightarrow$ or $\rightarrow$

Exercise 14: add the hypothesis that $S$ is satisfiable.

De...nition 10.4: is a clause $\rightarrow$ is a nonempty clause

Exercise 4 l. 3 of second paragraph: If Patterson comes....Jones is ill. $\rightarrow$ If Patterson comes, he will force Robinson back to his senses and Patterson will come if Jones is ill.

Problem 2: in...nite model but no ...nite ones $\rightarrow$ a model with an ...nite domain but none with a ...nite domain.

8.1 Axioms (iii) should be as on p. 47 7.1 Axioms (iii):

$\neg \beta \rightarrow \neg \alpha \rightarrow ((\neg \beta \rightarrow \alpha) \rightarrow \beta)$

From $\forall x \alpha$ infer $\alpha$. $\rightarrow$ From $\alpha$ infer $\forall x \alpha$ for any formula $\alpha$.

Exercise 5a: It is better to write $(\exists y (\forall x R(x,y) \lor Q(x,y)))$ for the formula after the $\land$,

Problem 3 (indeed least) $\rightarrow$ (indeed least), in the sense of set containment,

5: $v(\psi(\theta \sigma). \rightarrow v(\psi(\theta \sigma))$.

7: $\{x/h(z)\}$ is our $\rightarrow$ $\{x/h(z), y/z\}$ is our

3 of next paragraph: If it does not contain $\rightarrow$ If it contains
p. 144 problem 2: $hf(w) \rightarrow h(f(w))$ and $hf(a) \rightarrow h(f(a))$ (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 $P(z, x) \rightarrow P(x, z)$ in the right hand one.

p. 151 l. 6: $T_1$ and $T_2. \rightarrow T_1$ 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 $\rightarrow$ 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 $\rightarrow$ In this situation, we say that

p. 160 l. 1: linear resolution $\rightarrow$ linear input resolution

p. 162 l. 2 of proof of Theorem 1.8: $I.10.9 \rightarrow I.10.11$

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

p. 174 problem 11 after the program: The goal $? - tc(a, b)$ will succeed exactly $\rightarrow$ 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 $\rightarrow$ II.5.7-8 and III.2.12-14

p. 189 l. 7: After (Exercise 4). Add: Note that this does not imply that

$p = \text{true identity}$.

p. 230 Definition 3.2(ii) l. -1: of the form $Tq \vDash \psi \rightarrow$ 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 $q \rightarrow$ about $p$ or a possible world $q$

p. 243 l. 2 of Definition 4.7(i): about a possible world $q \rightarrow$ about $p$ or a possible world $q$

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

p. 259 l. -7: an open formula $\rightarrow$ a formula with free variables

1. -5: open $\alpha \rightarrow \alpha$ with free variables

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

p. 351 l. -3: If $A$ and $A \rightarrow$ If $A$ and $B$

p. 364 problem 8: $\alpha(\beta \ast \gamma) \rightarrow \alpha \ast (\beta \ast \gamma)$

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