Errata for Maths Reasoning Book: 2nd edition

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April 28, 1997

Chapter 2: Arguments about propositions

Section 2.1.1: Negation

p.19, diagram:

$\sim$ p should be $\neg$p.

Section 2.1.2: Conjunction

p.20, diagram, and in subsequent diagrams:

p&q should be $p \wedge q$.

Chapter 4: Miscellaneous Topics

Section 4.1.2: Functionals

p.53, lines 8–9:

Exercise 10 should read:
Give a general definition of what it means for the limit of a unary function f(X) to be ∞ as $x \rightarrow l$.

p.53, line -3:

Omit #

Section 4.1.4: Omega order logic

p.54, line -11:

This should read:

> ..., since X has type *real* and ...

Section 4.3.1: Function or Predicate?

p.61, line -5:

for "set all y" read "set Y of all y".

Section 4.3.3: Variadic Functions and Predicates

p.63, line -1:

for $=$ read $\leq$

Section 4.3.5: The Importance of a Semantics

p.66, lines5–6:

for "*furthera* which are not in *furtherb*"
read "*furtherb* which are not in *furthera*".

Section 5.1.1: Stage 1

p. 74, line -14:

Omit second *the*.

p.74, line -3:

Second C′ should be C″.

5.1.2: Stage 2

p. 75, line 3 of section:

Second P′ should be P″.

Section 5.1.3: Stage 3

p. 76, line 4 of section:

" should be ″.

p.76, line 9 of section:

Second P′ should be P″.

Chapter 6

Section 6.2: Representing Choice

p. 89, lines -2 to -1:

Exercise 18 should read: Represent the applications of clause 2 to clause 5 by labelling the two unlabelled arcs.

Chapter 9

Section 9.6: Proving Rules Canonical and Church-Rosser

p.160, line -3:

for exp' read exp''

p.165, line -6:

The proof of theorem 9.8 is faulty. The assumption that $\mathrm{lhs1}\phi$ contains a subexpression $\mathrm{bit1}\phi$ identical to $\mathrm{lhs2}\phi$ is not yet justified. The correct proof requires a case split at this point. See [Huet 77] for details.

Chapter 10

Section 10.1: Formalising Geometry

p.172, line 3:

rightarrow should be $\rightarrow$.

Section 10.3: Constructions

p. 175, line -7:

eg should be *seg*.

p 177, line -8:

This should read:

> ... and find its intersection with *ea*... (not *ec*).

Section 10.4

lines 10-13:

The assignments for a,b,c,d do not work. Replace by

$a \rightarrow < \sqrt{3}, \sqrt{7/6} >$
$b \rightarrow < 0, 0 >$
$c \rightarrow < \sqrt{3}, 0 >$
$d \rightarrow < \sqrt{3}, 1 >$

10.5: Can the diagram be generalised?

p.183, line 1 (after diagram):

This should read:
4. $Z \mid X \wedge Z \not\setminus Y \rightarrow X \not\setminus Y$,

Section 10.7: The Theoretical Underpinning for Semantic Checking

p. 187, line 15:

Theorem 10.2 should commence:
If $\mathrm{input} \cup \{\mathrm{top}\}$...

Chapter 11

11.1: The Formal Theory of LISP

p. 192, line -1:

The list should have an extra ⟩ after the last item.

p. 193, line 9:

langle should be ⟨.

Section 11.3: The Method of Induction

p. 198, line -11/-10:

This description of the three induction rules is wrong. A better one would be:

> In the first one induction is on the cdr; in the second it is on both the car and the cdr and in the third it is on the cdr of the cdr.

p. 200, line 15:

This should read → *equal(append(a,append(b,c)),append(append(a,b),c)))=tt*

Chapter 12

Section 12.1: Reading Between the Lines

p.210, Exercise 38

Replace "and Attraction" by "Attraction and Arithmetic".

Section 12.3.1: Defining the Methods with Axioms

p.217, line 3

for ⟨1,2,1,1⟩ read ⟨2,1,1⟩

Chapter 13

Section 13.2.4: Making Conjectures

p.230, line 7–8 of section:

Split the line thus:
...always the case

- One concept is (almost) ...

Section 13.3: Formalizing the Knowledge

p.236, diagram:

bottom left box should be ...*of C'*

Chapter 14

Section 14.3: Bridging the Gaps

p.251, lines 17

Insert:

$$end(Str, End2, right) \wedge$$
$$incline(Str, End2, Dir2)$$

Section 14.6: Meta-Level Knowledge

p.257, lines -11 to -10

This should read

...abandoned as unsatisfiable.

- *Back-up Prevention*: if the goal *mass(part1,M)* is satisfied ...

Chapter 16

Section 16.2: Herbrand Interpretations

p.280, line 6 of section:

This should read $\ldots t_1, \ldots t_n \ldots$

Chapter 17

17.5.4: The Lambda Unifiability Procedure

p.315, line -11:

$g_{p'}$ should read g_p.

Appendix IV.Solutions to the Exercise

Solutions to Chapter 3

p. 370, Exercise 6:

The first four lines should read:

Continuous
$$\forall X \forall \epsilon \exists D \forall Y \;\; \epsilon > 0 \wedge |Y - X| < D \rightarrow |e^Y - e^X| < \epsilon$$
Uniformly Continuous
$$\forall \epsilon \exists D \forall X \forall Y \;\; \epsilon > 0 \wedge |Y - X| < D \rightarrow |e^Y - e^X| < \epsilon$$

Solutions to Chapter 4

p. 371, Exercise 10:

The formula should be:

$$\forall F, L \;\; \lim(F, L) = \infty \leftrightarrow$$
$$\forall M \; \exists \Delta \; \forall X \;\; |X - L| \leq \Delta \rightarrow F(X) > M$$

p. 371, Exercise 13:

The first line should read
$X^0 = s(0)$

Solutions to Chapter 7

p.374, Exercise 22:

For *idempotent(G)* read *exponent(G,2)* throughout.

Solutions to Chapter 10

Exercise 33:

Replace solution by:

> Any interpretation of the group axioms and hypotheses of the theorem in which a and b are assigned two unequal values, e.g. boole (see section 3.3.2) where $\circ$ is $+$, $e \mapsto 0$, $a \mapsto 0$, $b \mapsto 1$, $i(0) \mapsto 1$ and $i(1) \mapsto 0$. $a = b$ is false in this model so $a = b \rightarrow$ fails the truth test.

Solutions to Chapter 11

Exercise 36:

6th line should read:
by repeated use of the rewrite rule: $X + Y \Rightarrow cases...$

Exercise 41:

First occurrence of *Ans* should read *Ans1*
Second occurrence of *Ans* should read *Ans2*

Exercise 42:

Should read:
All occurrences of = are object-level...
then = in *occ*(X, A=B) should be labelled o, the other = in the same line should be labelled m; remaining = signs on that page labelled o. Omit last line.

Solutions to Chapter 15

Exercise 49:

$<$ should be $\leq$.

Solutions to Chapter 16

p. 384, Exercise 55

Clauses 1. and 2. are in answer to part (a); clauses 3. and 4. are in answer to part (b). For part (c), take 4. as top clause, *etc.*