Errata in *Discrete Mathematics and Functional Programming*

**Pg 26:** Ex 1.6.9 refers to a distance of $18\frac{1}{2}$ without giving units. Assume inches. Thanks to Cana Baez.

**Pg 48:** Exercise 1.11.5 mentions replacing Chips with Fries. However, the datatype given in Section 1.10 (available from [https://cs.wheaton.edu/~tvandrun/dmf/var/strand1-10-own-types.sml](https://cs.wheaton.edu/~tvandrun/dmf/var/strand1-10-own-types.sml)) doesn’t have Fries. Either add Fries to the datatype or make this function something like replaceCarrotSticks. Thanks to Kyler Dunn.

**Pg 48:** $4! = 4 \cdot 3 \cdot 2 \cdot 1$ should be $4! = 4 \cdot 3 \cdot 2 \cdot 1$. Thanks to Cooper Lazar.

**Pg 50:** I don’t believe there is a way to solve Exercise 1.12.1 using what the student knows at that point and without using ML’s size. The best solution would be to turn the string into a list using explode and then use the solution to Exercise 2.2.4. The following would work:

```ml
fun charCount("") = 0
    | charCount(s) = 1 + charCount(substring(s, 1, size(s) - 1));
```

...but that’s silly, since if we are allowed to use size anyway, there is no reason to write charCount.

**Pg 100:** Exercises 3.2.3 reads $\sim T \lor F \land T \lor T$. This is not an error, but it is inconsistent, since in other examples and exercises I tend to parenthesize expressions fully. Many students miss the brief mention of precedence rules for $\lor$ and $\land$ on pg 98. Read this exercise as $(\sim T \lor (F \land F)) \lor T$.

**Pg 105:** The example in the middle of the page should be $\sim (\sim p \land q) \lor (p \land \sim p) \equiv p \lor \sim q$. Note the $p$ on the right is not negated. This affects the original statement of the problem (“Suppose we were to show that $\sim (\sim p \land q) \lor (p \land \sim p) \equiv p \lor \sim q$”) and the first three right hand sides of the “Don’t do this” column. Spotted by Caleb Josue Ruiz Torres. (Moreover, the = in the ”Do this” column should all be $\equiv$. Spotted by David Topham.)

<table>
<thead>
<tr>
<th>Do this:</th>
<th>Don’t do this:</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\sim (\sim p \land q) \lor (p \land \sim p)$</td>
<td>$\sim (\sim p \land q) \lor (p \land \sim p)$  $\equiv p \land \sim q$</td>
</tr>
<tr>
<td>$\equiv \sim (\sim p \land q) \lor F$</td>
<td>by negation law</td>
</tr>
<tr>
<td>$\equiv (\sim p \land q) \lor F$</td>
<td></td>
</tr>
<tr>
<td>$\equiv \sim (p \land \sim p)$</td>
<td>by identity law</td>
</tr>
<tr>
<td>$\equiv p \lor \sim q$</td>
<td>by De Morgan’s</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Pg 121:** “Clearly $u \land p \rightarrow q \lor r$...” should be “Clearly $u \land p \rightarrow q \land r$...”

**Pg 135:** “...has additive” should be “has additive inverse.”

**Pg 136** The premise “If Socrates is a human, then he is mortal” doesn’t match the form $\forall x \in A, P(x)$. Instead it should read “All humans are mortal.” (But then it doesn’t match the argument from Section 3.11... Oh well.)
Pg 138: In the first example, step vii should cite iii and vi, not iii and iv. In the second example, step xi should cite iii (and x and d), not iv.

Pg 139: Ex 3.14.7 premise a should have “for all y in B, P(x,y)” parenthesized, that is:

\[(a) \forall x \in A, (\forall y \in B, P(x,y)) \rightarrow Q(x)\]

Pg 167: “D and E together make a partition of the powerset of A, \(\mathcal{P}(A)\).” should be “\(\mathcal{P}(D)\) and E together make a partition of the powerset of A, \(\mathcal{P}(A)\).”

Pg 177: In Exercise 4.10.6, the “termination” condition in Lemma 4.22 is incorrect. It should read:

**Lemma 4.22** For all \(a, b \in \mathbb{N}\), there exists unique \(n, r \in \mathbb{W}\) such that \(a = b^n + r\) and \(0 \leq r < (b - 1) \cdot b^n\).

Pg 179: Statement lists are introduced in section 1.3, not section 2.5.

Pg 205: Exercise 5.3.4 should say “requires that \(I_R(a) = \emptyset\)”, that is, element \(a\) rather than set \(A\). Thanks to Janet Davis.

Pg 208: The intention for Ex 5.4.1 was reflexivity fails for zero. However, the definition of reflexivity does allow 0|0 even though division by zero is undefined, Thanks to Janet Davis.

Pg 222: Ex 5.7.4 should read \((S \circ R) \circ Q = S \circ (R \circ Q)\).

Pg 260: In Ex 6.2.14, see Section 1.7 (not 2.5) to review the string type.

Pg 335: Ex 7.3.9 should read, “For example, \(\text{filter}(\text{fn}(x) \Rightarrow x \mod 2 = 0)\ldots\)”

Pg 359: In Ex 3.9.3, the fifth bullet (which is the first bullet of the second column of exercises, top right corner) should read

- Either \(f(a) \in F(A - \{a\})\) or \(f(a) \notin F(A - \{a\})\).

Pg 450: The part of the figure in the top right corner should read “Then add edge (1, 4)…”, not “Then add edge (3, 4)”.

Pg 513: The first bullet under the chapter goals should read “terms about lattices,” not “terms about graphs.”

Pg 653: The first paragraph under A.1 says that the general forms and set forms were introduced in Chapter 1. They were introduced rather in Chapter 4.

Pg 658: Under “Proving transitivity,” the second step should be “Show that \(a\) is related to \(c\). Hence \((a, c) \in R\) by . . .”