Errata in *Discrete Mathematics and Functional Programming*

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/dmfp/sec1-10-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 $\neg (p \land q) \lor (p \land \neg p) \equiv p \lor \neg q$. Note the $p$ on the right is not negated. This affects the original statement of the problem (“Suppose we were to show that $\neg (p \land q) \lor (p \land \neg p) \equiv p \lor \neg q$”) 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.)

Do this: $\neg (p \land q) \lor (p \land \neg p)$  
$\equiv (p \land \neg q)$  
$\equiv (p \land \neg q)$  
$\equiv p \lor \neg q$  

Don’t do this: $(p \land q) \lor (p \land \neg p)$  
$\equiv p \lor \neg q$  
$\equiv p \lor \neg q$  
$\equiv p \lor \neg q$  

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 \(\mathcal{I}_R(a) = \emptyset\)”, 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, filter(fn(x) => x mod 2 = 0 . . .”

**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 . . .”