Errata to DAM3 (last updated 10/9/12)

This file contains typos and outright errors, but also instances where what we wrote, while not wrong, is easily misinterpreted and could have been said better. It comes in three parts: Text Errata, Problems Errata, and Hints and Answers Errata.

The notation "$\longleftarrow$" means "should be". For example, $x \longleftarrow y$ means that an x appears, but it should be a y.

The notation L3 means 3rd line; L–3 means 3rd line counting from the bottom.

TEXT

p26. The definition of polynomial could be more explicit that the a_i's must be *constants*.

p53, caption for Fig 0.6. "$A = [a_{mk}]$ by $B = [b_{kn}]$" really should be "$A = [a_{ij}]$ by $B = [b_{ij}]$". (Here m, k, n are fixed dimensions, not dummy index variables.)

p66, last display. elementof $\longleftarrow$ element of

p75, Algorithms PowerB and PowerC. It should be made clear that we are counting only multiplications using the $\times$ sign.

p138 L2 notationthroughout $\longleftarrow$ notation throughout

p140 first display. The fraction line on the RHS may be missing. The whole RHS is a single fraction with denominator 2.

p140 L10. Should be a space between "true." and "Indeed".

p184 L–10. Closing parenthesis missing before end-of-example sign.

p185 L–13. $\text{gcdf}(i, 1) = 1$ (not i)

p199, Solution to Example 5. In parts a) and b), $S \longleftarrow P$.

p260, Fig 3.16b. Edge label from 01 to 11 should be a 1.

p 297 L−3 cycle $\longleftarrow$ simple cycle

p 333 Fig 4.3. Label of 2nd to leftmost leaf should be 2ℓ, not 1ℓ.

p428, 3rd display. Should read

$$\frac{\hat{V}}{V} > \left[\frac{1.05}{1.0375}\right]^{30}(.75) \approx 1.074.$$

(middle quantity not correct)

p457, first display of Sec 5.7. as_{n-2} should be $2s_{n-2}$

p474, last two displays in proof. The 3rd and 4th inequalities in each line are in fact equalities. (So, nothing false has been said, but the reader might be confused since more can and should be said.)

p709, 1st paragraph, L3. Insert a space after the comma.

p767, add to index: Inverse of an implication, 68 [7]

PROBLEMS

General note. The equation numbering was not always reset in Supplementary problem sets (e.g., supplements to chapters, and also the Appendix). The numbering is consistent, but doesn't in such cases start at (1).

p86 [2]. As on p.75, it should be stated that only multiplications caused by a $\times$ sign are to be counted. Otherwise the problem gets more complicated than we intended. Also, multiplications like $k \leftarrow 2k$ are easier to carry out than $power \leftarrow power \times x$, where x may be a decimal number.

p93 [32]. Problem statement should make clear that you may assume knowledge of single-digit arithmetic (you can add 1 to a digit and recognize that adding to 9 must be handled differently) but you may assume no knowledge of multidigit arithmetic.

p93 [33]. Problem statement should make clear that the only knowledge assumed is the knowledge at the end of [32]: for general (multidigit) positive integers the only arithmetic operation understood is adding 1.

p115 [16b]. Problem did not make clear that you can at this point assume that $\gcd(m, n)$ is a known function within AL. You don't have to write or quote a procedure or function to compute the gcd of two numbers.

p128 [1a] First two occurrences of Oh notation should be Ord.

p129 [4] L7. "back to the previous case" should be "you may use the algorithm from [3]".

p130, [11] L5. $2^i \longleftarrow 2^{i-1}$

p131 [20] L3. $p_i \longleftarrow w_i$. More generally, the problem cannot be solved without some assumption about how the probability of w not on the list is distributed among the gaps. The solution manual assumes each gap is equally likely.

p132. Algorithm StripDups1, L–5 should include a 3rd assignment and read $b_w \leftarrow a_k$; $c_w \leftarrow 1$; $a_k \leftarrow null$

p134 [12]. Append an additional sentence: Notice that the leftmost bit is thus 1, but every other bit is either 0 or 1.

p149 [24b] L2. Delete —pxx[24]

p149 [29]. Should say that $n \geq 1$.

p149 [30]. The sentence "They close their eyes, and hats are put on their heads." should be:

They close their eyes while hats are put on their heads, then open their eyes.

p150 [41] L9. Theorem 2, not 1.

p166 [5d]. find $\longleftarrow$ find and prove

p178 [17]. Should be at most $2 + 2\log_2 n$ calls. (The expression given is correct for the number of divisions, but there is one more call than division.)

p178 [18]. Should ask you to prove that the number of divisions $< 1 + 2\log_2 n$ for $n > 1$. (The inequality is an equality for the basis case.)

p192. Change rating of [17] to $\langle 4 \rangle$. Change rating of [21] to $\langle 3 \rangle$.

p194 [32c]. Should ask reader to prove your results from parts a) and b) by induction. (The solution manual proves both.)

p199 [3]. Lower bound on the sum should be $i = 1$, same as in the text. The point of the problem is: if the basis case is the empty sum ($k = 0$) how does the inductive definition change.
Also, in line 3, base $\longleftarrow$ basis.

p208 [20]. The problem does not explicitly define *prime factorization*; which given the other definitions needs to be defined as "is either a prime itself or is a product of factors that are prime".

p209 [26] L1. $a_3 \longleftarrow a_2$

p234 [20]. Better first sentence (using "degree" properly) would be: Suppose we had defined degree so that all edges, including loops, contributed 1.

p235 [28]. This problem uses an alternative definition of weakly connected from the earlier editions of DAM and is not correct for the current (standard) definition. All trees are weakly connected in the standard sense. Thus best to ignore the parts of this problem that concern weakly connected. (For those who are curious, that definition was: a directed graph is weakly connected if, for each pair of vertices, there is a (di)path between them in at least one direction.)

p248 [7,8]. In the solution manuals, u and w are reversed. Alternatively, in the problem 7 figure, replace edge $\{w, x\}$ with $\{u, x\}$. (This error arises because the handdrawn figure from DAM2 was not computerized correctly.)

p262 [1]. Should refer to Fig. 3.13b, not 3.15b.

pp262-263 [4-8]. These problems refer, sometimes explicitly, to the de Bruijn graph $D(n, k)$ without fully defining it. De Bruijn graphs are defined in the text at the bottom of p259, but only with one parameter n. $D(n, k)$ is the same as the de Bruijn graph with parameter n on p259 except that the alphabet has k symbols instead of 2, where the symbols are typically $0, 1, \ldots, k-1$.

p275 [8]. Clearer last line: possibly be shorter than the best U_k-path to v.

p284 [2]. Last sentence should just ask for the final tree; insisting on the rest makes too messy a figure.

p293 [16]. In ii) L2, connecting $\longleftarrow$ linking

p293 [17] L2 after matrix. 2-olor $\longleftarrow$ 2-color

p294 [25] L4. X $\longleftarrow$ χ.

p294 [26] L8. that $\longleftarrow$ whose vertices. (Helps make clear that every vertex in one supernode become adjacent to every vertex in some other supernodes)

p295 [30e]. In the figure, the vertical line on the right should not be there (and wasn't in previous editions) for the answer in the solution manual to be correct, that the graph is planar. As drawn now, the graph is not planar; if the bottom left vertex and the leftmost vertex are contracted together, the resulting graph is K_5.

p 307 [7] L2. graph G $\longleftarrow$ graph G, starting at v_1.

p307 [10]. The problem should really just ask to take English out of the repeat-loop. We have provided no AL construct for the Choose statement earlier in the algorithm.

p311 [1] L2. elementary $\longleftarrow$ simple

p311 [6a]. This problem part uses an alternative definition of weakly connected from the earlier editions of DAM, and is not correct for the current (standard) definition. See the errata for [28] on p235.

p317, comments before [38]. Should say that these problems are about free trees unless a particular type of tree is specified.

p317 [44]. Problem should refer to [32, S3.1] for a careful explanation of when labeled graphs are different.

p328 [21] L3. must not be $\longleftarrow$ must not be preceded by a 1.

p328 [24a] L4. of $\longleftarrow$ or
[25] L3. entires $\longleftarrow$ entries
[26], Paragraph 2, L1. test $\longleftarrow$ test (in 2004)

p352 L-12 get $\longleftarrow$ discover
(perhaps later in the paragraph say that since the CAS simplified the LHS down to the RHS, presumably by algebra rather than by an ad hoc programmed fact, then presumably the CAS had internally done a proof of these theorems.

p354 [20] display. Rightmost side should be $\binom{N}{n}$. Also, the lower bound on the leftmost sum should be $k = 1$.

p372, Fig 4.13 and discussion above it. There *is* a closed-form formula for $p(n)$, the Hardy-Ramanujan-Rademacher formula, but it is very long and elaborate.

p385 [25a]. Problem should make explicit that all the S_i are disjoint and everything in any one S_i is distinguishable from anything in any other S_j.

p398 [32]. It would be much better to list the permutations of 1,2,3 this way

$$123 \quad 132 \quad 312 \quad 321 \quad 231 \quad 213$$

because this way they begin with 123...n (in the case $n = 3$, which is much more likely to suggest the algorithm in the solution. That algorithm does start this way.

p406 [16c]. The problem is not well worded. It says use the L and L' from [16b]. But $L' = f(L)$ is not a 1-to-1 function, and often $f(L-1) = f(L)$, not $f(L) - 1$. The problem should have said to find special values of L for which $f(L-1) < f(L)$. For the algorithm in the text itself, $L = n^2 + 1$.

p409 [17] L5. u indistinguishable $\leftarrow$ u distinguishable.
L–1. 16h) $\leftarrow$ 16h Also, it would be best if $u \leftarrow j$ throughout the problem, so better match Eq (6) in Section 4.7.

p409 [19]. Third part should be **c)**, not **b)**.

p423 [8]. (N_n, L_n) should be printed as a column vector, since the transpose notation ^{T} is not defined in DAM3.

p449 [20] Column 2 L6. $r_1 r_2$ should be $r_1 - r_2$.

p484 [24]. The first appearance of **a)** should be omitted; parts have not started yet.
In Eq (8), *each* binomial coefficient should be squared. E.g., $\binom{n-1}{k}$ should be $\binom{n-1}{k}^2$.
The sentence after (8) would also better read: This is a second-order linear recurrence in two variables n, k, for the quantity $f(n,k) = \binom{n}{k}^2$, with coefficients that are polynomial in the single variable n.

p494 [15] last line. The LHS of the inequality should be $|(1 - P_{n+1})/(1 - P_n)|$

p506 [22] L4. The fraction bar in the display may be missing in your copy. 1 is the numerator and the long product is the denominator.

p510 [19c]. Label should be red. This part is included in H&A and in student solution manual.

p567 [25] L2. Drop reference to Sec 5.9

p576 [7], L2 on this page. Should refer to [6] or [5,6].

p605 [40b]. Confidence level *about* 95% (actually 94%)

p674 [14b] L–1. independent $\longleftarrow$ independent set

p688 [8]. The Law of Contradiction, as stated, does not allow one to prove the trivial result [10a], as far as we can now see. Better to state the Law of Contradiction as follows: Suppose that the assumption of $\neg P$ allows you to prove both Q and $\neg Q$ where Q is any wff. Then you may assert P. (DAM3 says you may assert $\neg\neg P$.)

p688 [10a]. As noted in the discussion of [8] above, we do not see how to prove this by the rules of natural deduction as we have stated them.

p704 [8] L–1. is $\longleftarrow$ in

p706 [28], last 3 lines. Better to refer to prev(v) for vertex v (rather than prev(j) for vertex j) since vertices in this problem are double indexed, e.g., $u_{i,j}$.

p706 [31b]. There is no question here. This paragraph should be a preface to the next part.

p714 [4c]. Second line of problem should read: $G(m, n)$, where for instance $G(4, 3)$ is obtained from Fig. E.1 by removing all the diagonal edges.

p720 [8] L4 . ReCFunc $\longleftarrow$ RecFunc

HINTS AND ANSWERS

p735, Sec 1.2, [22]. Initialization line of algorithm, "$f \leftarrow 1$" omitted.

p737 Sec 1.4 [23]. This is the answer to 23a as it should be, but it says 23b.

p737 Sec 1.5 [21]. There should be an entry for [21] and there isn't.

p738, Sup Ch 1 [4a]. Append to sentence "as for Euclid1"

p740 Sec 2.6 [4c]. Delete the 9.

p740 Sec 2.7 [18]. $bm \longleftarrow bn$

p742 [16a, Sec 3.1]. Two $\longleftarrow$ Three

p745 Sec 4.2. [12b] missing from Hints

p745 Sup Problems Ch 3 [38]. The suggested strengthening is unduly complicated if not wrong (for how does the induction hypothesis on n-vertex tree ensure a leaf in an $n + 1$-vertex tree?). Better strengthening: Prove by induction that every tree on $k \geq 1$ *edges* has at least *two* leaves.

p747, [21, Sec 4.8]. k should be n both places.

p751 [16c, Sec 5.10]. Should be 2 0 0 0 ... (0 is a fixed point)

p751, [10c, Sec 5.11]. Should be $\frac{1}{m+1}k_{(m+1)}\Big|_0^n = \frac{1}{m+1}n_{(m+1)}$

p757 [7, Sec 7.2]. Should be labeled **7. a)**

p757 [3b, Sec 7.5]. $U \vee A \longleftarrow U \cup A$

p758 [12a, Sec 7.6] L2. $\times \neq y \longleftarrow x \neq y$

p758 [13b, Sec 7.6]. Replace answer with: $(\forall S \subset N)(\exists n \in S)(\forall m)[m \in S \Longrightarrow n \leq m]$

p758 [26, Sec 7.6]. **.a)** should be **26.a)**

p759 [29d, Sec E.1]. $D_1' \longleftarrow D_0'$ and $n \longleftarrow n{+}1$.

p760 [9a, Sec E.2]. Same as $\longleftarrow$ Essentially like. (Each j is now a checkpoint, not a task, and $d(j) = 0$.)