Cumulative corrections through June 30, 2002 for
Computer Algorithms: Introduction to Design and Analysis, third edition
by Sara Baase and Allen Van Gelder

1. Corrections made in second printing
The copyright page of the second printing says “Reprinted with corrections, April 2000.” Corrections listed in this section have already been made in that printing.

Errata

(Jan. 28, 2000) Pg. 171, line –10. Change “is less than” to “≤”.
(Jan. 12, 2000) Pg. 187. The rightmost diagram on the second row of Fig. 4.19 should be changed to look like the diagram below.

(Jan. 12, 2000) Pg. 327, Fig. 7.11. Change “3” to “4” in the adjacency list of node 6 (just before “32.0”).
(Jan. 12, 2000) Pg. 357, line 5. Change the > symbol to the ≥ symbol.

Other clarifications

(Jan. 12, 2000) Pg. 97. Append “(Pseudocode is okay; exact Java would require Appendix A.6.)” to each of Exercise 2.8 and 2.9.
(Jan. 12, 2000) Pg. 163.
   Line 17: Change the comment “Assume failure”; to “In case no key < pivot.”
   Line 21: Delete the comment “// Succeed.”
   Line 29: Change the comment “Assume failure”; to “In case no key ≥ pivot.”
   Line 33: Delete the comment “// Succeed.”
(Jan. 12, 2000) Pg. 335, line 7. Change the word “sweep” to “wrapper”.
(Jan. 28, 2000) Pg. 383, 2nd line in 7.43(a). The phrase “there is an edge vs, and there are no edges of the form sv.” may be replaced by “there is an edge vs and there is no edge of the form sv.”
Index corrections

These corrections are motivated by actual problems students had in finding things.

(Jan. 12, 2000) Pg. 682. Insert page numbers 16, 27 before page number 126 in the entry for “factorial function”.


(Jan. 12, 2000) Pg. 685. Insert page number 607 after page number 479 in the entry for “partition problem”.

(Jan. 12, 2000) Pg. 688. Insert a new entry “wrapper, 108” before the entry for “write conflict”.

Misplaced stars

In the table of contents several sections were “starred” in error. Only section 12.4 should be “starred.” Sections 5.5 and 6.7 and all Exercise sections should not be “starred.” Similarly, on “chapter opening” pages only section 12.4 should be “starred”; no stars should appear on pp. 149, 223, 249, or 451.

2. Recent corrections, not in second printing

Some of these might be corrected in the third printing.

Errata

(Jan. 20, 2001) Pg. 24, l. –10. Change “(and is possible to prove) that” to “that on the interval (−∞, ∞)”.

(Dec. 10, 2000) Pg. 25, l. –5 (end of second line of Eq. 1.15). Change “n^{k+1}” to “(n^{k+1} − 1)”.

(Jan. 20, 2001) Pg. 55, l. –2. The lower-case “k” should be capital “K”.

(Jan. 20, 2001) Pg. 57, l. 17. Change “< x <” to “< K <” about in the center of the line.

(Jan. 20, 2001) Pg. 58, l. –7 (displayed eq.). Change “t2^{k−1}” to “t2^{l−1}”. (In the exponent k becomes t.)

(Dec. 10, 2000) Pg. 138, l. –7 (item 2 of Theorem 3.16). Change “Θ(f(n) log(n))” to “Θ(f(n) log(n)) = Θ(n^E log(n))”.

(June 6, 2000) Pg. 139, lines 8 and 12. Change “any positive ε” to “some positive ε” in two places.

See text below that includes all changes on lines 8–12 of p. 139.

(Dec. 10, 2000) Pg. 139, l. 10. Change Θ(f(n) log(n)) to Θ(n^E log(n)).

(Dec. 10, 2000) Pg. 139, l. 12. Change “and f(n) ∈ O(n^{E+δ}) for some δ ≥ ε;” to “and b f(n/e) ≤ r f(n) for some r < 1 and large enough n.”.

[Note to readers: Both the erroneous and corrected versions of this condition hold in practical cases; the condition immediately following “If” is the important one.]

After the above changes in Theorem 3.17, the three cases should read as follows:

1. If f(n) ∈ O(n^{E−ε}) for some positive ε, then T(n) ∈ Θ(n^{E}), which is proportional to the number of leaves in the recursion tree.
2. If f(n) ∈ Θ(n^E), then T(n) ∈ Θ(n^E log(n)), as all node depths contribute about equally.
3. If f(n) ∈ Ω(n^{E+ε}) for some positive ε, and b f(n/c) ≤ r f(n) for some r < 1 and large enough n, then T(n) ∈ Θ(f(n)), which is proportional to the nonrecursive cost at the root of the recursion tree.
(Dec. 10, 2000) Pg. 167, l. 1. Append “+ \frac{1}{4}.”

Pg. 167, l. 3. Change “\(- \frac{1}{4} n^2\)’’
to “\(- \frac{1}{4} n^2 + \frac{1}{4}\)”.

Pg. 167, l. 4. Change “\(- 1\)”
to “\(- \left(1 - \frac{c}{2n}\right)\)”.

(June 6, 2000) Pg. 169, l. 2 of the pseudocode. Change “>” to “\(\geq\)”.

(June 6, 2000) Pg. 170, change the pseudocode in three places.
Line 4: Change “>” to “\(\geq\)”.
Line 5: Change “first” to “first2”.
Line 9: Change “<” to “\(<\)”.

(Feb. 13, 2001) Pg. 190, l. 3 (not counting caption). Change “\text{constructHeap}(E, n);”
to “\text{constructHeap}(E, n, 1);”.

(Dec. 10, 2000) Pg. 191, l. 8. Change “\(-n\) = 2(\(n \lg(n) - 1.443n\))’’
to “\(-n + 1\) = 2(\(n \lg(n) - 1.443n + 1.443\))”.

(Jan. 20, 2001) Pg. 199, l. 9. Change “xLoc = 0; \ // Assume failure.”
to “xLoc = (x\text{index} \mod h); \ // Assume failure.”.

(Jan. 20, 2001) Pg. 268, l. 2 (not counting caption). Change “ok;” to “rbr;”.

(Feb. 5, 2001) Pg. 277, l. 3. Change “\(L_i + 1)/2\)” to “\(L_i(L_i + 1)/2\)”.

(Feb. 5, 2001) Pg. 339, Figure 7.14.

In the third row of pairs of numbers, the 5th pair should be “(3,2)” not “(3,1)”.
In the fifth row of pairs of numbers, the 5th pair should be “(5,2)” not “(5,3)”.

![Diagram](image)

Corrected Figure 7.14.

(Feb. 5, 2001) Pg. 367.
Line 18: Change “subgraph, that is” to “subgraph (that is)”.
Line 19: Change “biconnected subgraph.” to “biconnected subgraph) with at least one edge.”

After these changes lines, the paragraph on lines 17–19 reads:
A biconnected component (bicomponent for short) of an undirected graph is a maximal biconnected subgraph (that is, a biconnected subgraph not contained in any larger biconnected subgraph) with at least one edge.

**Note to readers:** By the corrected definition, a graph with one vertex is biconnected and has zero biconnected components! Also, as seen in Figure 7.22, a graph with two vertices and one edge is biconnected and has one biconnected component. Although these cases seem unintuitive, the given definitions lead to the elegant properties of biconnectivity and Algorithm 7.9.

*(Feb. 12, 2000)* Pg. 383, l. 7 and 8. Change “graph” to “graph with three or more vertices” in both parts (a) and (b).

*(Feb. 12, 2000)* Pg. 419, l. –15 (Exercise 8.18). Append the sentence “Assume all edge weights are positive.”

*(Mar. 30, 2001)* Pg. 462, l. –14. Replace the last “1” by “0” (zero), so the expression reads “\( \text{low} \not\leq 0; \)”. 

*(Feb. 12, 2000)* Pg. 463, l. 16. Replace the last “1” by “0” (zero), so the expression reads “\( \text{low} \not\leq 0; \)”. 

*(Nov. 16, 2005)* Pg. 465, l. –10. Replace “0” by “1”.

*(Oct. 31, 2001)* Pg. 486, 494, 503, scan procedures. All three scan procedures have the same bug: If a suffix of the text string is the first match to the pattern, then the match goes undetected, because the tests for end of text and end of pattern occur in the wrong order; e.g., text, *acab*, pattern *ab*. The correction is similar in all three procedures: 

1. Change “\[ \text{while (endText(T,j) == false) } \]” to “\[ \text{while (true) } \]” and 
2. after the existing “\[ \text{if } \] break; \]”, insert the new conditional statement, “\[ \text{if (endText(T,j)) break; } \]”.

*(Feb. 22, 2000)* Pg. 600, l. –10, in 13.4(e). The word “prime” should be “nonprime”.

**Other clarifications**


*(Jan. 20, 2001)* Pg. 2, l. –17. (This clarification probably will not be incorporated until a new edition.) The phrase “several thousand years to run” is a gross understatement. Interested readers should estimate how long it would take a million computers evaluating \( 10^9 \) states per second each, in parallel, to evaluate \( 10^{50} \) states.

*(June 30, 2002)* Pg. 14, ll. 15, 19, 20. Change “antisymmetric” to “asymmetric” three places.

*(Jan. 20, 2001)* Pg. 28, l. –14. Change “connective” to “operator”.

*(Jan. 20, 2001)* Pg. 28, l. –12. Change “connectives” to “quantifiers”.

*(Jan. 20, 2001)* Pg. 38, l. 6. Append a semi-colon after “\( b_k \)”.

*(May 1, 2003)* Pg. 40, l. –13. Change “\( E, n \)” to “\text{int}E, \text{int}n”.

*(Jan. 20, 2001)* Pg. 41, l. –4. Change “available whether or not the” to “supplied above whether the”.

*(Dec. 10, 2000)* Pg. 45, l. 7 (not counting the caption). Add this parenthesized sentence to the end of Definition 1.14: “(Or \( f(m,n) \leq c g(m,n) \) for all \( m,n \geq n_0 \), if \( f \) and \( g \) are functions of two variables that both go to infinity, etc.)”

*(Jan. 20, 2001)* Pg. 45, Def. 1.14 and pg. 47, Def. 1.15. (This clarification probably will not be incorporated until a new edition.) Although the functions \( f \) and \( g \) are described as being “into the positive real numbers” for simplicity, it is sufficient if the \( n_0 \) mentioned in the definitions can be chosen so that \( f(n) \) and \( g(n) \) are positive for \( n \geq n_0 \).

*(May 1, 2003)* Pg. ????. Append “such that \( g \geq 0 \) for sufficiently large \( n \) and”

*(Jan. 20, 2001)* Pg. 45, l. –4. Change “A function \( f \in O(g) \)” to “Function \( f \) is in \( O(g) \)”. 

*(Jan. 20, 2001)* Pg. 46, 4th line of Example 1.13. Change “\( 1 f(n) \)” to “\( 1 \cdot f(n) \)”
(Jan. 20, 2001) Pg. 48, l. 1. Change “Function $f \in \Omega(g)$” to “Function $f$ is in $\Omega(g)$”.

(June 6, 2000) Pg. 63, l. –3. Insert “in the worst case” at the end of the sentence. The phrase “at most” may be deleted.

(Feb. 5, 2001) Pg. 76.
End of figure, above caption: There should be one more “[” to end the class.

(Jan. 20, 2001) Pg. 85, l. 2. Change “remainSubs;” to “remainSubtrees;”.

(June 6, 2000) Pg. 94, l. 5. Insert “int” before the word “e”.

(Jan. 20, 2001) Pg. 120, l. 10. Extend the sentence by changing “form.” to “form (but also consider Section 3.5.6).”.

(Oct. 31, 2001) Pg. 132, l. 15. Change “)” to “”)”.

(Jan. 20, 2001) Pg. 144, l. –7. Change “3.16” to “3.15”.

(May 1, 2003) Pg. 155, l. 1. Figure 4.5, top line, leftmost entry should be ”i+1”.

(May 1, 2003) Pg. 156, l. 1. Change “(1.16)” to “(1.11)”.

(June 6, 2000) Pg. 190, l. 5. Remove “;” before “)”. 

(May 1, 2003) Pg. 191, l. 3–4. (not counting Figure 4.22): Replace ”...so the total for all the deletions...” with ”...so the total number of comparisons...”

(May 1, 2003) Pg. 192, l. 2. A return statement is missing in Algorithm 4.10.

(May 1, 2003) Pg. 195, l. 13. Change “due to incomplete” to “due to an incomplete”.

(May 1, 2003) Pg. 196, l. 2. A return statement is missing in fixHeapFast (Figure 4.25).

(Oct. 31, 2001) Pg. 199, l. 16. Delete the “;” at the end of the line for the function header.

(May 1, 2003) Pg. 209, l. 18. Change “3.10” to “3.9”.

(Feb. 5, 2001) Pg. 212, l. 4. Change “list of integers” to “lists of integers”.

(Oct. 31, 2001) Pg. 214, l. –11. Delete the last “;”, before the right parenthesis.

(Oct. 31, 2001) Pg. 226, last line. A clearer phrase is “each win and each loss”.

(Jan. 20, 2001) Pg. 237, l. –9. Change “1.10” to “1.9”.

(Jan. 20, 2001) Pg. 245, l. 1. Change “$i > M$” to “$i \geq M$”.

(Jan. 20, 2001) Pg. 245, all of Exercise 5.17. (This clarification probably will not be incorporated until a new edition.) The cost should have been for accessing the array $E$, rather than for comparisons. Part (a) show that three array accesses are necessary and sufficient. Part (c) should ask how many array accesses. Part (d) should say “with $k$ array accesses” instead of “with $k – 1$ comparisons”. Part (e) should say “$\lg n + 3$ array accesses” instead of “$\lg n + 2$ comparisons”.


(Dec. 10, 2000) Pg. 277–280. In eight places the number 1055 should be 1215. The eight places are p. 277, l. 1 and in the table; p. 279, l. 9, l. 10, in the table, and l. –7; p. 280, second line of Example 6.12 and in the table.

(Feb. 5, 2001) Pg. 280, l. 13. Change “approach $\sqrt{n}$” to “be $\Theta(\sqrt{n})$”.

(Feb. 5, 2001) Pg. 284, l. –7. Change “is” to “in”. 

5
Feb. 5, 2001 Pg. 286.
Line 1 (not counting caption): Change “(We are assuming)” to “(We know that)”.
Line 2 (not counting caption): Change “It is not hard to show that no such program does” to “We can show that no program of length $m$ does”.

Feb. 5, 2001 Pg. 287, l. 1 (not counting caption): Change “only $2^m / B^7 3^2 n / A^0$” to “about $2^m / B^7 3 n$”.

Feb. 5, 2001 Pg. 288, l. –2. Change “does twice as many link” to “may do twice as many link”.

Feb. 5, 2001 Pg. 289, line beginning “7.”: Delete the right parenthesis before the semi-colon.

Feb. 5, 2001 Pg. 291, l. –2. (This clarification probably will not be incorporated until a new edition.) Interested readers may verify that $\lg^*(n)$ can also be defined recursively by

$$
\begin{align*}
\lg^*(1) &= 0 \\
\lg^*(n) &= 1 + \lg^*([\lg n]) \quad \text{for } n > 1.
\end{align*}
$$

Feb. 5, 2001 Pg. 296, l. 21 (displayed code line): Change “Key $K$)” to “float $K$)”.

Feb. 5, 2001 Pg. 298–301. Five changes for consistency with Section 2.3.4.
Page 298, l. 11: Change “children” to “subtrees”.
Page 298, l. 22: Change “children” to “subtrees”.
Page 298, l. 24: Change “children” to “subtrees”.
Page 299, l. -10. Change “children” to “subtrees”.
Page 301, l. 7 (not counting caption). Change “children” to “subtrees”.

Oct. 31, 2001 Pg. 304, Exercise 6.23. Note to readers: In other words, let $m = n$ for the program you construct. Does this establish the claim on p. 288 that a lower bound of $\Omega(n + m \log n)$ can be achieved?

Feb. 5, 2001 Pg. 319, l. 6. Change “it is also required that $E' \subseteq V' \times V'$.” to “each edge in $E'$ must involve only vertices in $V'$.”.

Feb. 5, 2001 Pg. 319, l. 12. Change “vertices.” to “vertices. A subgraph of $G$ is proper if it is not equal to $G$.”.

Feb. 5, 2001 Pg. 319, l. –6. Change “all distinct.” to “all distinct. A path of length zero is called an empty path.”.

Feb. 5, 2001 Pg. 334, l. 15, in “Remarks”. (This clarification probably will not be incorporated until a new edition.) The variant of Queue.create that takes an argument is discussed in Exercise 2.16.

Feb. 5, 2001 Pg. 335, l. 10. Change “of all $G$” to “all of $G$”.

Oct. 31, 2001 Pg. 345, l. numbered 12 in the procedure. Append “;”.

Feb. 5, 2001 Pg. 351, l. 5. Change “If there is any directed path” to “If there is any nonempty path”.


Feb. 5, 2001 Pg. 361, l. –12, in “Remarks”. (This clarification probably will not be incorporated until a new edition.) The variant of Stack.create that takes an argument is discussed in Exercise 2.15.

Feb. 5, 2001 Pg. 364, l. 3. Change “then there is no problem.” to “then there is no problem. (How does Lemma 7.10 tell us $v$ is white?)”. 

6
Acknowledgments

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Bucks for bugs

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