

## Errata for Introductory Combinatorics, 4th edition

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1. Page ix, line -8 (Preface): Louis Deaëtt.
2. Page 43, line 6-7 (Exercise 28): What is the smallest sum  $a_1 + a_2 + \cdots + a_{100}$  that will generate this?
3. Page 67, Theorem 3.4.3: The second assertion in the theorem is not correct, since (considering the ‘proof’ given), not all the  $k!$  permutations are possible if not all the  $n_i$  are equal. The second assertion is true if  $n_1 = n_2 = \cdots = n_k$ . (Thanks to Joel Brawley of Clemson University for pointing this out.)
4. Page 67, line 1: **Delete** “For instance, we have”
5. Page 122, Exercise 50: The answer 42 give on page 609 is incorrect; the correct answer is 48.
6. Page 143, running head: Sec. 5.4: Unimodality of binomial coefficients
7. page 152, line 2: the s should be m.
8. Page 185, line -3, -2: A **not** is missing (... counts the number of elements that belong to all of the sets  $A_j$  with  $j$  not in  $K$  and possibly other sets as well).
9. Page 189, line 4: the  $C$  should be a  $B$  (... as there are subsets of cardinality  $k$  contained in the set  $B \setminus A$  of cardinality  $p$ )
10. Page 190, Corollary 6.6.2: The first displayed equation should be for  $G(K)$  (not  $G(L)$ ), the  $f$  should be  $F$ , and the last  $L$  should be  $K$ :

$$G(K) = \sum_{L \subseteq K} F(L), \quad (K \subseteq X_n).$$

(Thanks to Walter Morris of George Mason University for these last three items.)

11. Page 203, Exercises 29 and 30: The answer given on page 611 for Exercise 30 is the answer for Exercise 29.

12. Page 203-4, Exercise 32. The displayed 6-by-6 board is incorrect, the  $\times$ 's and the blanks should be interchanged (so there are 4  $\times$ 's in each row and column. Also the formula for  $a(n, k)$  should be

$$a(n, k) = \frac{2n}{2n - k} \binom{2n - k}{k}.$$

(Thanks to John B. Little of the College of Holy Cross for pointing this out.)

13. Page 213, line -8: The second  $f_n$  should read

$$f_n = \left( \frac{1 - \sqrt{5}}{2} \right)^n.$$

14. Page 262, lines 5-9 (Exercise 21): Let  $a_n$  equal the number of ternary strings of length  $n$  made up of 0's, 1's, and 2's, such that the substrings 00, 01, 10, 11 never occur.

15. Page 283, line -1: For  $c_2$  read  $c_1$ .

16. Page 285, line 5:  $c(p, 0) = 0$  for  $p \geq 1$ .

17. Page 319, Exercise 15, The last term in the displayed formula should be:

$$\binom{k}{n} n! S(n, n).$$

18. Page 320, Exercise 22:  $p(6)$  and  $p(7)$  should be  $p_6$  and  $p_7$ .

19. **The above corrections were requested for the 3rd printing of the 4th edition.**

20. Page 12, last sentence before Section 1.4: "furthered" should be "further"

21. Page 40, Exercise 4: it would be clearer to say  $n + 1$  *distinct* integers are chosen. Thanks to Manley Perkel of Wright University/University of Puget Sound for these two typos.

22. Page v: Title of section 11.3 is "Hamilton paths and cycles." Thanks to Cristina Ballantine.

23. Page 52, First Solution: The initial expression "One digit equal to 5." should be deleted.
24. Page 65, Example. The question should end with a question mark!
25. Page 66, "an multiset" should be "a multiset" in the second-to-last line of the middle paragraph.
26. Page 78–79: In part (b) there is only one block (=street) under water: the street which begins 4 blocks east and 3 blocks north of his home and ends 5 blocks east and 3 blocks north of his home
27. Page 82, Exercise 49: The answer should be

$$\binom{m+n+2}{m+1} - 1.$$

Thanks to Jim Propp for the above five observations.

28. Page 91, line 10: step n-1 should be step 2.
29. Page 105, line -2: It should be j=0 since I started counting with 0.
30. Page 114, Example: It is the partially ordered set of subsets ordered by containment.
31. Page 137, line 1: Because of the iteration, it would be clearer to say "last binomial coefficient" instead of "second binomial coefficient."
32. Page 144, line 12: Exercise 29 ahsould be Exercises 31, 32, and 33. Thanks to Zixia Song of the University of Central Florida.
33. Page 145, line -3: The denominator in the first fraction should be  $n_1!n_2!n_3!$  (as it currently stands there are two  $n_2$ 's. Thanks to Luke Piefer for these last five typos.
34. Page 156, Exercise 27: There is a 1/2 on the right side of the equation that should not be there. Thanks to Stephen Hartke (Univ. of Illinois, Urbana-Champaign) for this error found by his student Evan VanderZee.

35. Page 182, line 13: It should be

$$6! - 7 * 5! + 15 * 4! - 10 * 3! + 2 * 2! = 184.$$

Thanks to Travis McBride of University of Illinois, Chicago.

36. Page 196, line -7:  $\phi(p) = p - 1$  for  $p$  a prime. not 1 as asserted; in particular,  $\phi(13) = 12$ . Thanks to Ben Brookins.

37. Page 196, line -7:  $\phi(13) = 12$  and  $\phi$  at a prime number  $p$  is always  $p - 1$ .

38. Page 197: middle of the page: The factor  $(-1)^r \frac{n}{p_1 p_2 \cdots p_r}$  is repeated. Thanks to Doug Shaw of the University of Northern Iowa for catching these typos.

39. Page 197 In the displayed formula right before the end of the proof  $\mu(n)$  should be  $\phi(n)$ .

40. Page 198: Formula (6.35) is missing a  $1/d$ . (Compare with (6.36)). This issue repeats in the first displayed formula after (6.37). Thanks to Graham Denham of the University of Western Ontario for the last two corrections.

41. Page 306, Theorem 8.5.3: The formula given should be

$$\frac{p - q + 1}{p + 1} \binom{p + q}{q}.$$

(See top of page 307.) Thanks to Sharad Chandarana.

42. Page 318, Exercise 4 (b): It should be

$$(((a_1 \times a_2) \times (a_3 \times (a_4 \times a_5))) \times ((a_6 \times a_7) \times a_8)).$$

Thanks to Luke Piefer.

43. Page 361: Exercise 21: The last two entries in the first column of the matrix should be  $3, n - 2$  and  $2, n - 1$ . Thanks to William McGovern.

44. Page 361: Exercise 25: "no complete marriage" should be "no stable complete marriage." Thanks to William McGovern.

45. Page 483: Exercise 12: The multigraphs are actually graphs so I should have used the term graph. Thanks to Doug Shaw again.
46. Page 516: Exercise 25: "in Exercise 22" should be "in Exercise 24." Thanks to William McGovern.
47. Page 559: Exercise 30: "in Exercise 28" should be "in Exercise 29." Thanks to William McGovern again.
48. Page 567 (Under Figure 14.2) At the end of the formula given for  $\rho_n^k$ , it should be n "over" k, not n "over" k-1; Thanks to Alexander Zakharin.
49. Page 618, Hint for Exercises 26: It should be Theorem 13.2.2 not 12.2.2. Thanks to Doug Shaw once more.
50. Page 609: The hint given for problems 5.17 is actually a hint for problem 5.16. Thanks to Jim Propp.
51. Possible Exercise: The book-designer used four fonts (thick roman, thick italic, thin roman, thin italic) and four colors (red, orange, yellow, and blue, more or less) in writing the word "combinatorics" on the cover, subject to the constraint that adjacent letters must be different fonts and different colors. The total number of ways to satisfy these constraints is 16 times  $9^{12}$ . This might make a fun application of the multiplication principle in the text or one of the (early!) exercises. Thanks to Jim Propp for this!