Invitation to discrete mathematics solutions

Here is an excerpt from Richard Stanley's book Enumerative Combinatorics, in which he lists 66 different interpretations of Catalan numbers. Here's an addition to the list in which he adds another 136! Here are slides giving a brief history of the 4-color problem from Lecture 18.Here are slides on P vs. NP challenges from Lecture 12. Here's a link to the trailer for the (perhaps very bad) 2012 film about P vs. NP. Here's a page with information about The icosian game Hamilton. Here's a Wikipedia page about the problem of the knight's tour. Here is a link to information about Euler's work on the bridges of the Koenigsberg problem, from Lecture 10. Here's a Wolfram page on Petersen's graph, and here's an apple that lets you move the graphics around. (From Lecture 4) Homework: The Ninth Assignment to be completed in class on Wednesday, December 5. Decisions are here. The eighth assignment, which is scheduled to take place in class on Friday, November 16. Issues graded (all 2pts): 1.8.1 3, 1.8.2 5, 2.4 5, 2.5 6, 2.5 10a. Solutions here. The seventh assignment, which is due to take place in class on Friday, November 2. Issues: 2.1 7 (2pts), 2.1 11 (2pts), 2.2 4 (2pts), 2.2 7d (2pts), 2.3 5 (2pts). Decisions are here. The sixth assignment, which is scheduled to take place in class on Friday, October 26. (Changed October 17 to remove questions from Chapter 2, and again on October 23 to remove 1.7.4 (2).) Issues: 1.7.1 2 (4pts), 1.7.2 4 (2pts), 1.7.3 3 (3pts), 1.7.4 7 (4pts). Solutions here, with accompanying page figures here. The fifth assignment, which is to take place in the classroom on Friday, October 5. Issues: 1.4.2 4 (3pts), 1.4.2 7a (3pts), 1.5.2 1 (2pts), 1.5.2 6 (3pts), 1.5.2 9 (9 (3pts) 2pts), 1.6.1 1 a and d (2pts each), 1.6.2 1 (2pts), 1.6.2 8 a and b (2pts each), 1.6.3 2 (2pts). Solutions here, with accompanying page figures here. The fourth assignment, which is scheduled to take place in the classroom on Monday, September 24. Issues: 1.4.2 4 (3pts), 1.4.2 7a (3pts), 1.4.3 1 (2pts), P vs NP 1 (3pts), 1.5.1 4 (3pts), 1.5.1 8 (2pts). Solutions here, with accompanying page figures here. The third assignment, which is scheduled to take place in the classroom on Monday, September 17. (NB: changed on September 12; questions under section 1.4.2 have moved on to the next homework assignment). Issues: 1.3.3 1 (2pts), 1.3.3 2 (3pts), 1.3.4 2a (1pt), 1.3.4 3 (2pts), 1.3.4 4 (2pts), 1.3.4 7 (3pts). Decisions are here. The second assignment, which is to take place in the classroom on Friday, September 7. Issues: 1.2.1 8d (3pts), 1.2.2 3 (2pts), 1.2.2 4a (2pts), 1.2.2 5 (2pts), 1.3.2 2 2 (2pts), 1.3.2 9 (3pts). Decisions are here. The first assignment to be in class on Friday, August 31. NB: This homework has been changed. Problems 8 (d) and 11 (a) of Section 1.2.1 were rescheduled for homework 2. The questions are 1.1.1. 1 (2pts), 1.1.2 1 (2pts), 1.1.2 2 (3pts), 1.1.2 10 (3pts), 1.1.3 10 (2pts), Extra Problem 2 (3pts). Solutions here, with accompanying page figures here. The quiz: The fifth quiz, with solutions. Fourth quiz, with solutions. The third quiz, with solutions. Second With solutions. The first quiz, with Exams: Here is general information, including opening hours and some review questions, for the final exam. Here's general information, including working time for the first exam. Exam, with solutions, here Instructor: Andrew McDowell Email: amcdowel AT andrew.cmu.edu Office Clock: Wean Hall 7130 Monday 10:30-11:30 Friday 10:30-11:30 Course tutorial: Invitation to discrete mathematics J. Matousek and J. Nesetril. Oxford University Press. The purpose of this course is to provide introduction in various areas of combinatory and provide a basis for both combinatory techniques and techniques that can be used in solving combinatory problems. Here's an approximate description of the course material. Combinatorary Counting Kits, Subsets and Display Inclusion-Exception Combinator identity and evidence Generation features Extreme Combinatorics Probability Techniques Count Theory Combinator games An excellent source of notes for material covered in the classroom, especially for generation features, can be found on Alan Fries's website; The Alan Frieze Course Notes homework will be issued on Wednesdays and is usually expected early next Wednesday. Despite this, it will be expected by the beginning of the lecture given as a deadline. Collaboration on a homework assignment is allowed and actually encouraged to help understand the problem, but the purpose of the homework is to help your understanding of the material, so discuss but do not copy the solution. Write your work on your own. Later homework will not be taken for evaluation unless advance notice is given to exceptional circumstances such as illness or an emergency in which extensions will be considered. Homework Sheet 1 Homework 1 Solutions Homework Sheet 2 Homework 2 Solutions Homework Sheet 3 Homework Solutions 3 Solutions 4 Homework Solutions 4 Solutions Homework Sheet 5 Homework 5 Solutions Note that HW5 for practice and should not be referred to in.6 Homework Sheet 6 Homework Solutions 6 Solutions Homework 6 is optional. I'll be taking your average of 4 best homework. The first interim election will take place on Wednesday 18 February. It will cover the material that we saw in the class on counting, generating functions and description, involution, exceptions. The second interim period will take place on Wednesday, March 4. It will cover the topics of estimation and probabilistic methods. The third interim period will take place on April 10. It will cover topics about the inequality of Markov, Chebychev and Hoffding. Average Term 1 Solutions Average Term 2 Solutions Medium-Term 3 Solutions Homework and Unannounced Quizzes: 20% 3 Intermediate Exams: 45% Final Exam: 35% p. 27, King's Dream Formula, x and U should be replaced in formula for X-coordinates f(x,y). (Marked by Hugo Ishimaru.) p.41, Exercise 2, instead of the composition of R and there has to be an intersection. (Jakub Tomek is noted.) p.44 the definition of a lexicographical order for couples should be compared to a_1 b_1 a_2 b_2 as The general definition is below. (Noted by Wai Yang Pong.) 49, the second proof of the theorem 2.2.3, L_x It should be on the L_x and x. (Noted by Mario A. Lopez.) page 49, Thm. 2.2.3, X should be considered untidy. (Noted Sang-il Um.) p. 51, Exercise 3 (b), should be HG. (Noted by Mario Lopez.) 58, Exercise 3, 17 should be 16. (Noted Sang-il Um.) p. 58, Exercise 6 (b), c) should be (a). (Noted Sang-il Um.) Exercise 3.2.6, Part b) is incorrectly worded (and false as stated). The attitude should be (i,j): i'lt;j and pi(i)s pi's. (Marked by Ivan Vukovic.) p. 118, Exercise 5 (d), no assumption; Namely, the schedule must be connected. (Marked by Lucas Klyuda.) p. 119 average, the path from v0 to vn length t should be way from v0 to vt length t. (marked Sang-il Um.) p. 233, Exercise 6, part (b) fails n odd in stated setting; to correct this, one of two inequalities in the definition of p (a_1,...,a_n) should be made non-strict. (Marked by Boris Buch.) p. 241 bottom, the first amount in three display lines should also go up to n-1, n. (marked Sang-il Oum.) p.323, the remark, the following Corollary 11.3.2, is incorrect and should be omitted (since r(2) (marked by Eva Kopek.) p. 420, tip 6.3.8 (c), e-gt;-3f-n should be 2e-gt;-3f-n. (Noted Sang-il Um.) Hint 3.1.5, q'n-q'i should be q'n-q'i-1. (Marked by Russ Woodroof.) Hint 12.3.10, the expression to consider is (6'sqrt 37) n (6-sqrt 37) (plus instead of minus). (Marked by Boris Buch.) There is a bug, too, in the upcoming new edition for which I can't check the page numbers at the moment: In Ex. 5 of the last section Double tally, f(m/2n) should be f (2m/n). (Marked by Nabiho Asghar.) Another newly discovered bug in Exercise 9.4.9 (1st edition), where it should be assumed that the point o lies below all lines (otherwise, the solution does not work quite as indicated in the hint). (Marked by Raabiya Mumtaz.) p. 5 mid, there are 5 ways to divide coins: 2'2 has been omitted! (Marked by Omar, UIUC) p. 69-70, this definition of a f'O(g) relationship is not appropriate for situations where g/n)0 for certain n. values (e.g. n'O (n ln n) will not follow this definition.) So it is best to take the second definition mentioned later, n_0. (Marked by Konrad Swanepoel.) P. 73 Exercise 1, the ratio is not a partial order because it is not antisymmetric. The correct statement should be that the attitude is transit. (Marked by Konrad Swanepoel.) p. 96, exercise 2.8.11 (b), subscriptum p is absent in the numerate (should be p_i instead). (Marked by Nabil Mustafa.) page 110, Consequence 3.2.5, k'gt;-1 should be k'gt;'0. (marked Bernd Bischl) b. 111, Exercise 7, function d should go into natural numbers plus 0. (Marked Bernd Bischle) page 111, Exercise 10, the disease matrix should be the matrix of the adjaction. The same goes for 11 on page 112. (Marked by Hans Mielke, Berlin) 119, the first formula to be displayed, is missing the zlt;/j'gt; between v_-1 and v_0 page 130, pic. 3.5 left, the labels of the medium shooter should be replaced (marked by Pavel Vavra, Prague) page 132 medium instead of ... The first top must be removed. (Marked by Hans Mielke, Berlin) 145, the definition of a planted tree in the middle: must be ... plus some fixed figure T ... (Marked by Hans Mielke, Berlin) p. 151, line -7, should refer to Exercise 4.1.2 instead of Theorem 4.1.2 (v) (marked By Bernd Bishl) page 159 2nd line, e'in check E'in'check E 'setminus E' p. 160, Exercise 6, line 4: in place of the tree. (Marked by Hans Mielke, Berlin) p. 179 in the middle, Such graphs have essentially a unique planar pattern: an explanation before the continuous deformation of the plane and mirror reflection is incorrect, as we can also choose which face is external. This explanation refers to the drawings on the sphere. (Noted Hans Mielke, Berlin) p. 188, 4 lines over Prop. 5.3.4, correctly because the triangle-free chart on 6 vertices has on most 8 edges (K_'3.3 has 6 vertices, not 9). (Marked Delphine Hachez) page 201 Exercise 12, Inequality L(v) (Marked by Hans Mielke, Berlin) page 214 2nd paragraph from below: The only way two sequences with the same partial pairing may differ is that one has a more unrivalled right brace on the left than the other: it can also happen that there are more unrivalled left braces on the right. (Marked by Hans Mielke, Berlin) page 215, line 10, a sign of inequality between f(x) and f(y) must be curved (attitude on Y) (marked Bernd Bishl) page 231, the proof for Prufer coding is incomplete. It is still necessary to prove that the reconstruction algorithm always produces a tree, for any sequence of input. A sensible way to do this is to grow a lemma tree. Details should appear here in the future. (Marked by Martin Klasar, Prague) 246, at the end of the Proof Prop. 8.1.5 (ii), the line of the axe coincides with the L_i (not L). (Second edition too) (Marked by Nabil Mustafa.) p. 250, Exrecise 10b, or A_1'A_2 should be added to the definition of attitude, so that reflexivity holds. (Noted Bernd Bischle) page 250 of the bottom, erroneously asserted that the mentioned theorem does not preclude the existence of a project plane of about 6; in fact it does (6 gives the remainder of 2 mods 4, and it can't be written as a sum of two squares). p. 252 the first picture should be another (without lines and with point inscriptions) (Marked by Hans Mielke, Berlin) page 274 l. 4 We prove the SECOND of these claims (Marked by Hans Mielke, Berlin) Page 331, the last formula displayed, m (2m-1)/3rd on the left side should be m (2m-1)/3 m (noted by Hans-Joachim Brenner). p. 333 footnote block (instead of blocks) p. 334, Def 11.1.1 (2), remove the first of p. 338, ex 11.1.2, as --gt; p. 338, ex. 11.1.4, for i'3, i'1 means 1 (Noted Hans Mielke, Berlin) P. 345, ex. 11.3.4, false statement and decision in hint Of course). (Noted Yuji Odaka) P. 361, Exercise 1, 0.1,...,m) better be 0.1,...,m-1 to match the probability of 1/m. (noted by Konrad Swanepoel.) P. 365, the missing a_ formula in paragraph 5 (expansion depending on the line); the expression following the amount sign should be (-1) and a_ yuai A_. p.366, l. 10 bottom: conventional matrix should be non-game matrix page 368, Third paragraph, def. Linear Dependence: v_1,...,v_n in V should be v_1,...,v_n in A and nonzero alpha_1,...,alpha_n'in K should be alpha_1,...,alpha_nin K, not all zero (marked emo Welzl, ETH zurich) Tip for exercise 2.3.2 (b): should be divided into n-r'1 groups, not n-r groups. (Marked M. Suda, Prague) Hint to Exercise 2.3.7: The equation should be k_n k_0 -k_1 ... (Noted J.Suhar, Prague.) Hint on exercise 2.8.7 (c): A_n should be A_m. (Noted By Yana Khlebikova, Bratislava) Hint 2.8.9 wrong (but perhaps there are too many clues anyway...). (Marked by Hans Mielke, Berlin) Tip 3.3.12: instead of the kn should be strange should be the kn should be even. (Marked by Hans Mielke, Berlin) Hint to Exercise 10.2.5: (1-x) 3 in last expression should be (1-x'3). (A mistake noted by J. L. Doncel, Coruna, error in errors noted by Peter Kovarem, Ostrava.) Tip to exercise 10.3.8: should be (n'1)/2'n (marked by Hans-Joachim Brenner). Hint to Exercise 10.7.6 (d): in the first limit (for ln r_n), P_n (x'j) should be replaced (P_n (x'j)-1). Therefore, the final amount must be (1/j) exp (Cx'j/(1-x'j))-1 and then the amount does converge, as claimed. (Marked by Andreas Weiermann, Munster.) Tip 11.2.6 (a), their - They are corrected in the 2nd print: page 43, 2nd line from below: x drawn higher than that of the drawn higher than x. (marked by Mel Hausner, NYU.) page 116, line 9: should be (0.0.0,0,0) and not (0.0.0.0). Next line: from the chart with 5 vertices ... (not 4). (Noted by Mel Hausner, NYU.) page 172: the first picture should be another (picture K_5 on the torah). Theorem 5.2.1, 5th statement line, R-2gamma should be R'2'k (marked Emo Welzl, ETHH.) page 290, KVIKSORT example: triple (3,2,1) should be (3,1,2), followed by changes down the line. (Noted by Mel Hausner, NYU.) page 380, tip 2.3.7: k_0 should be f--1. (Noted by Mel Hausner, NYU.) NYU.) invitation to discrete mathematics solutions pdf. invitation to discrete mathematics solutions manual. invitation to discrete mathematics solutions manual pdf