Discretionary Note

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IF YOU USE THIS FILE TO CHEAT, YOU ARE NOT ONLY STUPID BUT YOU ARE CHEATING YOURSELF OUT OF THE ABILITY TO FALL IN LOVE WITH MATH. Furthermore, I am not smarter than you and my solutions did not always get a perfect score.

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To access the general instructions for this repository head here.

S&DS 241/541
Problem Set 4
due Sept. 25, 2024, 11:00 pm via Gradescope

Guidelines

- Instead of writing your name at the beginning of your problem set, please only write it in your answer to question 6.
- Please write legibly and explain your reasoning. For full credit, your answer and your reasoning need to be not only correct, but clear to the grader.
- Late problem sets will not be accepted unless there are extenuating circumstances (e.g., an illness or family emergency). Undergraduates must obtain a Dean's excuse for any late submission. Graduate students must obtain permission before the deadline. (As mentioned in the syllabus, we'll drop your lowest homework score.)
- You're encouraged to discuss the homework with classmates (this can be a good way to learn), but you must write your solutions independently and in your own words.

Problems

1. Chapter 3, Exercise 19. Assume that there are $2n$ players in the tournament and that each player's playing exactly one game. Give formulas for the PMFs and specify the supports. (The *support* of a discrete random variable is defined in Definition 3.2.1 and slide 5. For example, slide 14 specifies the support of X with the phrase "for integers k with $0 \leq k \leq w$ and $0 \leq n-k \leq b$.")
2. Chapter 3, Exercise 20, parts (a) and (b) only. Assume $0 < p < 1$. For part (a), give the name of a distribution and specify any needed parameters.
3. Chapter 3, Exercise 22, parts (a) and (b) only. Assume $0 < p_1 < 1$ and $0 < p_2 < 1$. For part (a), give a formula for the PMF and specify the support. For part (b), give the name of a distribution and specify any needed parameters. Hint: For part (a), use the Law of Total Probability.
4. Chapter 3, Exercise 30, parts (a) and (b) only. Give the names of the distributions and specify any needed parameters. In part (b), assume $0 < p < 1$.
5. Chapter 3, Exercise 44, parts (a) and (b) only. For part (a), give the name of a distribution and specify any needed parameters.
6. (Not graded) On a separate page, please write your name and acknowledge anyone who helped you or discussed the problem set with you (other than the instructor, TFs, and ULAs), as well as any written resources you consulted (other than the textbook and other

resources on Canvas). If you don't have any acknowledgments to make, please write "I worked independently."