

Homework 11t

Due: 9:00 a.m. EST, November 12, 2020

This assignment is due at the beginning of the class on the due date. Unless all problems carry equal weight, the point value of each problem is shown in []. To receive full credit, all your answers should be carefully justified; in particular, please make sure to explicitly define your sample space for any probability question unless otherwise specified.

Please make sure to strictly follow our collaboration policy as clarified on piazza @1716 @1750 @1882.

1. [15 pts] “Beruvian” Boneless Birds Borne from Bean Based Bickering

Tien and Tiffany are planning on eating a sustainable and vegetarian Thanksgiving meal this year. They are planning on making their turkey entirely out of beans. However, Tiffany wants to use only kidney beans to mock the color and texture of a turkey, but Tien is confused and believes that kidney beans are not vegetarian. Of course, Tien, a Peru enthusiast, wants to use Lima beans. Tiffany doesn't believe that the name of the bean originates from Peru's capital, and thinks Tien's idea is silly. Lucy, who was opposed to the whole bean-turkey idea from the start, has come to settle this once and for all. To determine which type of bean to use, Lucy suggests that Tien and Tiffany predict an integer from 1 to 6, inclusive. Then Lucy will independently roll four fair 6-sided dice. The bean chef who correctly predicted the largest integer appearing on any of the four fair dice will get to make the bean turkey out of their choice of beans (for example if the outcome of the 4 rolls 1, 2, 2, 6, then those who predicted the number 6 would win). To help speed things along, Lucy asks you to compute the expected value of the largest integer appearing on any of the four dice, and tell the TA representing your favorite bean, so that they may have a better chance of winning.

2. [15 pts] [Boki's One Big Bite MukBean](#)

Set on becoming a YouTube star, Jason has decided to try a mukbang this week. He has 130 empty bowls, where each pair of bowls is possibly connected by at most one piece of string (so he can keep track of what bowls he can choose to eat next at each step!). Jason resolves to fill each bowl with one of three types of beans: Pinto, Kidney, and Black Turtle. In order to make sure he has some variety during his mukbang, he has one requirement: he cannot put the same kind of beans in bowls connected by a string.

However, Jason just wants to eat beans, so he decides that instead of calculating a way to fill up the bowls, he's just going to try every single possible assignment of filling each of the 130 bowls. If each trial takes 5 minutes to fill the bowls and eat the beans, how much time (in minutes) will

it take for Jason to check every possible assignment of bean fillings (he will check every possible assignment, regardless if he finds a valid one before checking them all)?