Homework 4

CS 206: Discrete Structures II
Summer 2018

Due: 5:00 PM EDT, Thursday, July 26th, 2018

Total points: 60

Name:

NetID:

INSTRUCTIONS:

1. Print all the pages in this document and make sure you write the solutions in the space provided for each problem. This is very important! Even if you are using LaTeX, make sure your solutions fit into the given space.

2. Make sure you write your name and NetID in the space provided above.

3. After you are done writing, scan the sheets in the correct order into a PDF, and upload the PDF to Gradescope before the deadline mentioned above. No late submissions barring exceptional circumstances! **The submitted PDF should have all the 7 pages in the correct order.**

4. As mentioned in the class, you may discuss with others but my suggestion would be that you try the problems on your own first. Even if you do end up discussing, make sure you understand the solution and write it in your own words. If we suspect that you have copied verbatim, you may be called to explain the solution.

Problem 1. [5 + 10 + 10 + 5 = 30 pts]
Three fair dice colored red, blue and green are rolled.

1. What will you choose the sample space to be in this case? How many atomic events are there in the sample space? What probability distribution will you use to model this problem?

2. What is the probability that exactly two of the dice roll the same number?

3. What is the probability that all three dice roll distinct numbers?

4. What is the probability that at least two of the dice roll the same number?

Give explanations for all your answers and show all the steps involved.

More space for Problem 1:

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Problem 2. [5 + 10 + 15 = 30 pts]

You are at a casino table and are about to play a game. The rule of the game is as follows: at each step a fair coin is tossed and if it comes up heads you win $1, and if it comes up tails you lose $1. The game consists of 50 such steps. Define your net gain to be the total amount of money won by you during the game minus the total amount of money lost by you during the game.

1. What will you choose the sample space to be in this case? What is the size of the sample space? What probability distribution will you use to model this problem?

2. What is the probability that you end up with zero net gain?

3. What is the probability that you end with a positive net gain? [Hint: Try to use the results from Problem 3 of Homework III]

Give explanations for all your answers and show all the steps involved.

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