CSCI 4452.1 2015 Assignment #1

Show all your work.

It will be important for you to understand how to work with the probabilities associated with different cases for the algorithms we consider in this course; this assignment therefore considers several exercises involving probabilities. Enjoy!

(1) Assume that we have a fair four-sided die with the numbers 1 through 4 on its sides. What is the probability that each of the numbers 1 through 4 will be rolled? If we roll two of these dice, what is the range of possible totals of the values showing on the two dice? What is the chance of each of these totals appearing? [Show and explain all your work.]

(2) Assume we have a fair eight-sided die with the numbers 1, 2, 3, 3, 4, 5, 5, 5, appearing on its sides. What is the probability that each of the numbers 1 through 5 will be rolled? If we roll two of these dice, what is the range of possible totals of the values showing on the two dice? What is the chance of each of these totals appearing? [Show and explain all your work.]

(3) We have four fair six-sided dice with the following numbers on their faces:

Dice 1: 1, 2, 3, 9, 10, 11
Dice 2: 0, 1, 7, 8, 8, 9
Dice 3: 5, 5, 6, 6, 7, 7
Dice 4: 3, 4, 4, 5, 11, 12

For each pair of dice, compute the probability that the first dice will have a higher value showing than the second will, and vice versa. Use tables to show the outcomes for rolling each pair of dice and from these tables determine the winner for each pair. These dice have an interesting property - what is it? [Show and explain all your work.]