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10/24/2022

The birthday program in the birthdayproblem package calculates the probability that any two people within a group of any given size share the same birthday. The program accomplishes this by using a permutation formula where n is the number of days in a year and r is the size of the group. This number is then divided by and subtracted from 1 to receive the percentage chance. The program then prints out all the birthdays within the group, calculates the number as well as the percentage of matches found, and finishes by printing out all the birthdays that had matches.

The Monty Hall simulation in the montehall package works as a proof for the Monty Hall brain teaser. This is accomplished by loading in 3 doors to an array and using a random integer to pick one. A door is then revealed with one version of the play method sticking to its choice returning roughly 33% on average and the other changing its choice and returning 66% on average.

The graph manipulator program in the graphmanipulation package graphs an nLog(n) graph by writing data to a csv file using a user defined x value and user defined range. The program can also salt the data from a user given csv file within a bound also decided by the user by randomly adding or subtracting a number from the data within those user-defined bounds. Finally, the program has the ability to smooth out salted data from a csv file by averaging the values within a range decided by the user. The chosen range acts as both the lower and upper bounds for whatever value falls in the middle.

The Fish Market program in the fishproblem package simulates a fish market using up to 4 separate seafood types depending on the user configuration. The market can be populated with fish, crab, shrimp, or scallops, each with their own weight range and price. The population of the market can either be fully randomized or with a weighted chance defined by the user. Afterwards the market can then be written to a csv file (a csv file can also be read in to populate the market). I ran the program with weighted chances towards fish and wrote it to a csv file which resulted in 42% fish, 29% shrimp, 21% crab, and 7% scallops. I then created two histograms using the data from the market which showed the seafood type percentages as well as the weight percentages which skewed low.

The last program was the StatLibrary class in the statlibrary package. This class holds methods used to calculate the majority of formulas used throughout the semester from chapter 1 up to chapter 4. BigInteger was required for this class as factorials would not return the expected outcome as many numbers would become too large for ints and longs when calculating combinations and permutations.