Combinations & Permutations

The main objective of this was to compute the outcome of a Binomial Distribution, which is used to ascertain the probability of a given number of successes in a predetermined number of independent trials. The number of combinations, the probability of failure increased to the number of trials left, and the prob of success raised to the power of the number of successes are all included in the formula for the binomial distribution. The program is designed to use n = 5 trials, k = 3 successes, and a success probability of p = 0.5 for this computation. The binomial distribution's ultimate result for these numbers is 0.3125, which tells us the chance of getting exactly three successes out of five trials with a 50% chance of success in each trial.

I implemented a class named MathOperations that was added to compute permutations, combinations, and factorials. Doing so will determine how many options there are to select K successes out of n trials, and as well the combinations technique is needed in the binomial distribution formula. The program calculates that there are ten possible ways to accomplish precisely three successes for the specified values of n = 5 and k = 3. Additionally, 60 permutations for the same values of n and k are produced by the permutation’s method, which determines the number of possible arrangements for k successes within the trials.

After looking at the output of the program, I could see how these mathematical ideas combine to calculate the intended probabilities and configurations. The binomial distribution's result, 0.3125, is visible and shows that there is basically a 31.25% chance that exactly three successes will occur out of five trials.