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Within this essay I will present you with the information I used to program all the distributions as well as when to use said distributions. I will also explain to you how my group and I went about programming the graph salter plotter and smoother as well as the poker hand checker.

To start let me explain on how and when one should use geometric distribution. geometric distribution is used when there is a when you want to find the probability of getting a success on a specific point during a trial. In other words, you would use geometric distribution when they give you the probability as well as when the give the number that they want you to check. A good example is when you would want to use this distribution is say you are driving in a car and the odds of you getting through a light is 0.2 percent what is the probability of you getting through the third light. That problem fits the criteria perfectly because of the fact that it provides you with a probability of making it through a light as well as when they want to have the first success. This allows you to find the probability of success and failure. Plus having the needed x value.

Next let’s take a look at binomial distribution and when you would want to use this formula over the others. You would want to use the binomial distribution when you want to find the probability of getting a certain number of successes within a set number of trials. Another way to figure out when one should use binomial distribution is by following the acronym B.I.N.S. The B in bins stands for binary outcomes and what this means is that if the problem has either an outcome of one of two out comes either a success or a failure. I in the acronym B.I.N.S. stands for independent trials which means that the success or failure of one event will not affect the outcome of any other event. In other words, the problem must be one that has replacement. Next the N within the acronym stand for a defined “N” number of trials. In other words, this means there must be a set number of trials in order to be able to use binomial distribution. Lastly the S stands for same probability for every trial you run. This means each probability must not change when moving on to the next trial and must stay the same all the way through. If the problem fits all 4 of these criteria, then you will be able to use binomial distribution for that selected problem.

Now let’s take a look at Poisson Distribution and when one would use this formula and how they would use it in a word problem. Poisson distribution is a distribution that is used to see the likelihood at which a certain event will occur over a specified amount of time. These are very specific parameters that must be met in order to proceed with using this specific this distribution. What this shows is the Poisson distribution formula can only truly be used in specific scenarios where you are given variables of interest are a discrete count variable. Within this formula you will need the following data in order to complete the problem you will need an x value and enough information to find the average or be given the average in some shape or form to be able to complete this problem. Once you are given this information you can figure out the answer to your problem by plugging in the numbers into the formula correctly. Let’s take a look at an example where you would use the Poisson distribution formula, “The average number of homes sold by the Acme Realty company is 2 homes per day. What is the probability that exactly 3 homes will be sold tomorrow?” You can tell this is a Poisson Distribution problem because the information that is given; it gives an average, 2 homes per day, a specific scenario you want to find the probability of happening, the likelihood of 3 homes being sold, and a time frame, one day. Given this information you can infer that you must use the Poisson Distribution formula.

The last distribution that will be discussed is the Hypergeometric Distribution. This distribution is the most complicated out of the bunch. With the Hypergeometric Distribution formula, one must realize if the problem is asking the said individual what the probability of a certain number of successes in a problem is where the is no replacement from a specific sample size. What this means is you must have the total sample size, the sample size of specific group, the number of successes within a given population, and lastly is the total number of successes observed within the sample size of the selected group. If given this information you will be able to complete the Hypergeometric distribution problem with ease. An example of a hypergeometric problem is as follows, “A deck of cards contains 20 cards: 6 red cards and 14 black cards. 5 cards are drawn randomly without replacement what is the probability that exactly 4 red cards are drawn.” You can tell that this is a hyper geometric distribution problem because of it stating the few key phrases like without replacement, asking the probability of something happening in a smaller select group, and the fact they mention that there is a whole group and not just the one with 5 cards.

The way my group and I went about programing the poker hand project is by first creating 3 separate classes a card class, card tester class and lastly a class that tested poker hands. The card class is used to create different types of cards within that exist in a deck of cards in order to make different hands. The card tester class makes 1000 different types of hands and checks the probability of each hand occurring as well as how often each hand did occur. This class also calls the deck class so it can create a total deck of cards without any jokers. The last class is what holds all the information in order to calculate the probability of different types of hands by dividing the number of successes by the total amount of runs. This class also holds the method that is used to create the deck as well as shuffle the cards as well.

When it came to programing the graphing programs, Plotter, Salter, and Smoother, I made one main class that filled up two array lists with variables for the x and y variables. Once the array list is filled up with x and y values it gets sent to the first method which was the plotter which took each output and organized them in size order from smallest to largest. Next they went through the salter which changed the y values by adding the numbers onto y1 for ex then subtracts from y2. Lastly my group and I programed the smoother. They then went through the next method which was the smoother, and this method went through all the y values and replaced them with the average of the y values around that specific number.