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**Stats Library Documentation and Results**

This document contains information pertaining to the second version of my Stats Library. It will focus primarily on new methods created from the end of chapter 3, all of chapter 4, and most of chapter 5. This includes Poisson distribution, the expected, variance, and standard deviation of Poisson distribution, Chebyshev’s theorem, the k-value for Chebyshev's theorem, Uniform distribution, the expected, variance, and standard deviation of uniform distribution, the expected, variance, and standard deviation of Gamma distribution, exponential distribution, the expected, variance, and standard deviation of exponential distribution, conditional density, and independency for densities, functions, probabilities, and distributions.

**Stats Library Tester Class**

The tester class holds all the method calls and prints the results. Each section is split up by blank lines, and results are printed into the console whenever necessary. Some methods were kept from the previous stats library, such as regular independence and factorial. The factorial method is used for Poisson Distribution.

**Stats Library Main Class**

**Poisson Distribution**

The methods associated with Poisson Distribution are as follows:

* poissonDistribution() – calculates the Poisson Distribution by raising the mean to the yth power and dividing it by the product of the factorial of y and e-mean. Both y and the mean are passed as parameters to the method.
* expectedValuePoissonDistribution() – returns the mean (which is passed as a parameter)
* varianceValuePoissonDistribution() – returns the mean (which is passed as a parameter).
* standardDeviationValuePoissonDistribution() – returns the square root of the mean.

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**Chebyshev’s Theorem**

The methods associated with Chebyshev’s Theorem are as follows:

* tchebysheffsTheorem() – taking k as a parameter, the result is calculated by subtracting one divided by k squared from one.
* k() – calculates the k-value which is the “within” number over the standard deviation (these are accepted as parameters).

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**Uniform Distribution**

The methods associated with Uniform Distribution are as follows:

* uniformDistribution() – returns 1 divided by two parameters subtracted from each other (1 / a – b).
* expectedValueUniformDistribution() – adds two theta parameters and divides them by 2 to get the result.
* varianceValueUniformDistribution() – takes two theta values, adds them and squares them, then divides the result by 12.
* standardDeviationUniformDistribution() – returns the square root of the variance.

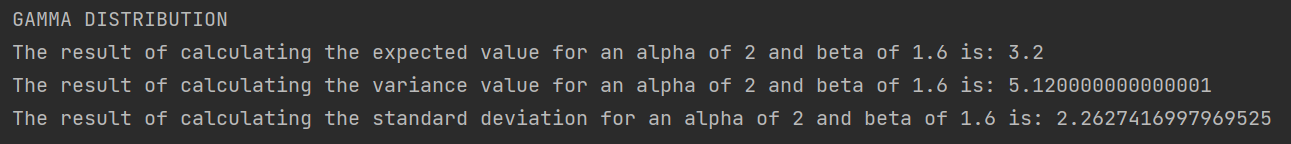
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**Gamma Distribution**

The methods associated with Gamma Distribution are as follows (each of these have two parameters, one being alpha and the other being beta):

* expectedValueGammaDistribution() – returns alpha multiplied by beta.
* varianceValueGammaDistribution() – returns alpha multiplied by beta squared.
* standardDeviationGammaDistribution() – returns the square root of the variance.



**Exponential Distribution**

The methods associated with Exponential Distribution are as follows:

* exponentialDistribution() – checks to see if alpha is equal to 1. If not, the program states that exponential distribution is not possible because alpha must be 1. If it is, it calculates the distribution by dividing 1 by beta and multiplying this result by e-y/beta
* expectedValueED() – returns beta.
* varianceValueED() – returns beta (or mean) squared.
* standardDeviationED() – returns beta.

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**Conditional Density**

The methods associated with Conditional Density are as follows:

* conditionalDensity1() – divides the original density function by the y-value density function.
* conditionalDensity2() – divides the original density function by the x-value density function.

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**Independency**

The methods associated with independency are as follows:

* independency1() – determines independency through distributions by comparing the multiplication of x and y densities with the original distribution function.
* independency2() – determines independency through probabilities by comparing the multiplication of x and y probabilities with the original probability function.
* independency3() – determines independency through densities by comparing the multiplication of x and y probabilities with the original density function.
* independency4() – determines independency through functions by comparing the multiplication of x and y functions with the original function.

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