**StatsLibrary User Manual**

A collection of Java based statistical functions.

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**Software Description**

A collection of Java based statistical functions.

**Detailed Description**

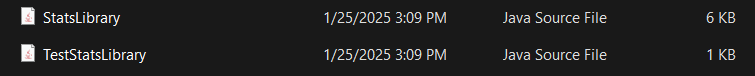
In the StatsLibrary class you can find a multitude of different statistical functions that can be used to calculate various formulas for a given set of inputs. You can find functions such as factorial, poissonDistribution, etc.... More functions can be found in the **Class Overview** section.

**System Requirements**

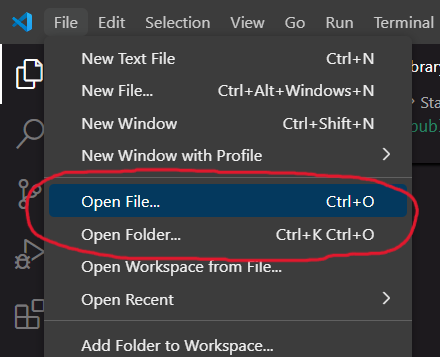
* A working device, primarily a desktop or laptop
* An IDE (ex: VSCode, Eclipse, etc…)
* Java JDK (Ver. 17 & up) & JRE (SE 17 & up)

**Installation Guide**

To begin using StatsLibrary, you will need to download two files. One is “StatsLibrary.java” and the other is “TestStatsLibrary.java” (optional).



After downloading the files, simply move the files to the folder containing your project. Once done, you can open your preferred IDE (for this example we will be using VSCode). Then you can open the folder or the file itself within your IDE.



If you opened the folder containing the files then it should look similar to the image below.

A screenshot of a computer

AI-generated content may be incorrect.

If you only imported the StatsLibrary file then you can simply start using the class within your own personal project. Otherwise, if you also imported the TestStatsLibrary, then you can open that file and run it.

The result will be displayed on the console, unless there are graphical displays being run.

A black screen with white text

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**Class Overview**

**factorial Function**

The factorial function calculates the factorial value of a given integer value. It takes in an int value as the number to find the factorial value. It returns the BigInteger value of the factorial. This is primarily used as a helper function for combination and permutation functions.

**poissonDistribution Function**

The poissonDistribution function will calculate the poissonDistribution value based on the given lambda and y value. The function will return this value as of type double.

**poissonExpected Function**

The poissonExpected function will calculate the poissonDistribution’s expected based on the given lambda value. The function will simply return the lambda which is of type double.

**poissonVariance Function**

The poissonVariance function will calculate the poissonDistribution’s variance based on the given lambda value. The function will simply return the lambda which is of type double.

**poissonStandardDeviation Function**

The poissonStandardDeviation function will calculate the poissonDistribution’s standard deviation based on the given lambda value. The function will simply return the square root of the lambda which is of type double.

**tchebysheff Function**

The tchebysheff function will calculate the tchebysheff value based on the given k value and if it is greater than or equal to (or opposite*)*. The function will simply return the value based on the equation below.

**uniformDistribution Function**

The uniformDistribution function will calculate the uniform probability distribution value based on the given a and b values. It checks if a is less than or equal to b, if so then it returns the value based on the equation below.

Otherwise, it returns zero.

**uniformDistributionAlt Function**

The uniformDistributionAlt function will calculate the uniform probability distribution value based on the given a, b, c, and d values. It returns the value based on the equation below.

**uniformExpected Function**

The uniformExpected function will calculate the expected value based on the given theta1 and theta2 values. The function will simply return the value based on the equation below.

**uniformVariance Function**

The uniformVariance function will calculate the variance value based on the given theta1 and theta2 values. The function will simply return the value based on the equation below.

**gammaExpected Function**

The gammaExpected function will calculate the expected value based on the given alpha and beta values. The function will simply return the value based on the equation below.

**gammaVariance Function**

The gammaVariance function will calculate the variance value based on the given alpha and beta values. The function will simply return the value based on the equation below.

**chiSquareExpected Function**

The chiSquareExpected function will calculate the expected value based on the given v value. The function will simply return the value based on the equation below.

**chiSquareVariance Function**

The chiSquareVariance function will calculate the variance value based on the given v value. The function will simply return the value based on the equation below.

**exponentialExpected Function**

The exponentialExpected function will calculate the expected value based on the given beta value. The function will simply return the value based on the equation below.

**exponentialVariance Function**

The exponentialVariance function will calculate the variance value based on the given beta value. The function will simply return the value based on the equation below.

**normalExpected Function**

The normalExpected function will calculate the expected value based on the given mu value. The function will simply return the value based on the equation below.

**normalVariance Function**

The normalVariance function will calculate the variance value based on the given omega value. The function will simply return the value based on the equation below.

**betaExpected Function**

The betaExpected function will calculate the expected value based on the given alpha and beta value. The function will simply return the value based on the equation below.

**betaVariance Function**

The betaVariance function will calculate the variance value based on the given alpha and beta value. The function will simply return the value based on the equation below.

**Result Analysis**

Based on the results of the tester class we can see the outcome of a couple experiments while using the various functions within the StatsLibrary class. Here we can see that the poisson distribution as well as its other information such as expected, variance and standard deviation are calculated properly. Furthermore, Tchebysheff function also works properly. So do the uniform distribution functions. And all other functions are found in the Statslibrary.

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