**StatsLibrary User Manual**

A collection of Java based statistical functions.

Cachary Tolentino

CSCI-3327

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**Software Description**

A collection of Java based statistical functions.

**Detailed Description**

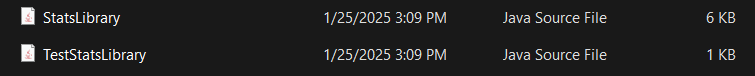
In the StatsLibrary class you can find a multitude of different statistical functions that can be used to calculate various formulas for a given set of inputs. You can find functions such as getMean, getMedian, and getMode which returns the mean, median, and mode. More functions can be found in the **Class Overview** section.

**System Requirements**

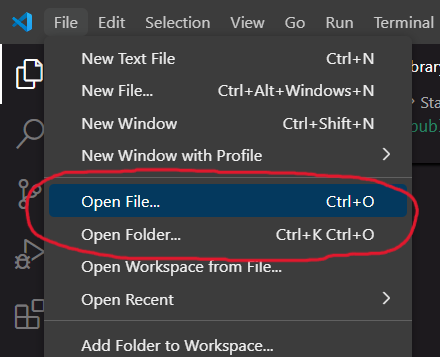
* A working device, primarily a desktop or laptop
* An IDE (ex: VSCode, Eclipse, etc…)
* Java JDK (Ver. 17 & up) & JRE (SE 17 & up)

**Installation Guide**

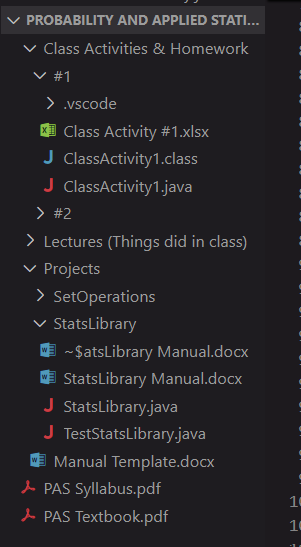
To begin using StatsLibrary, you will need to download two files. One is “StatsLibrary.java” and the other is “TestStatsLibrary.java” (optional).



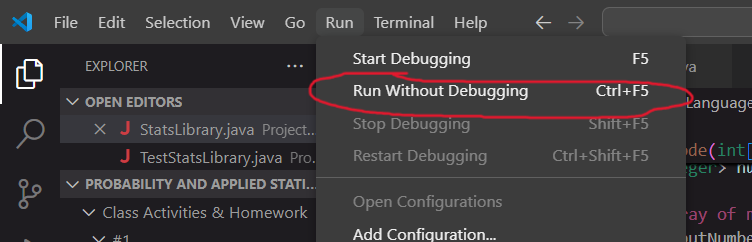
After downloading the files, simply move the files to the folder containing your project. Once done, you can open your preferred IDE (for this example we will be using VSCode). Then you can open the folder or the file itself within your IDE.



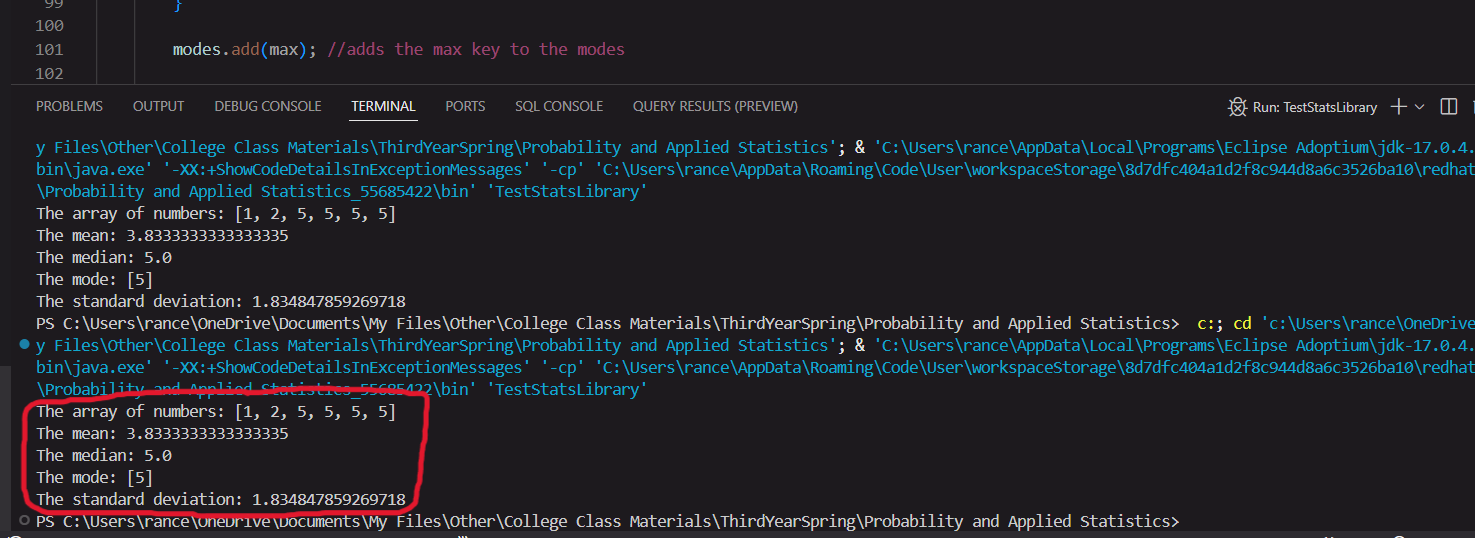
If you opened the folder containing the files then it should look similar to the image below.



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.



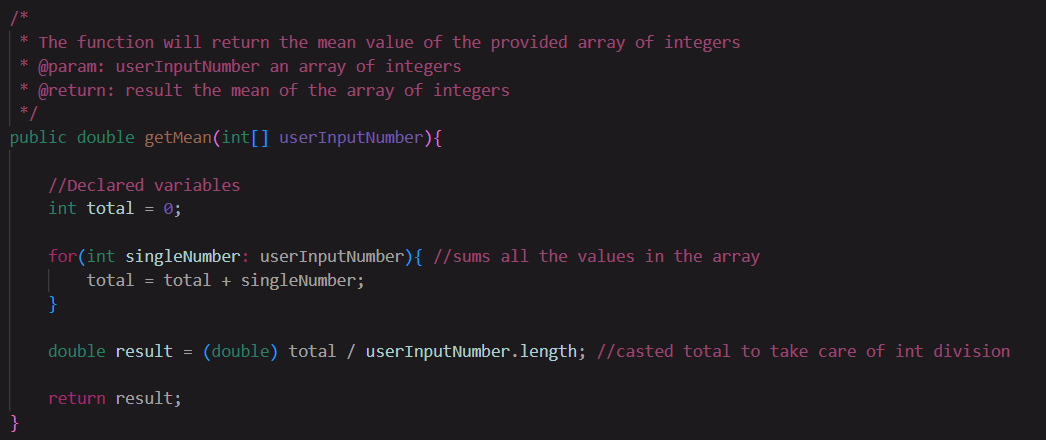
The result will be displayed on the console, unless there are graphical displays being run.



**Class Overview**

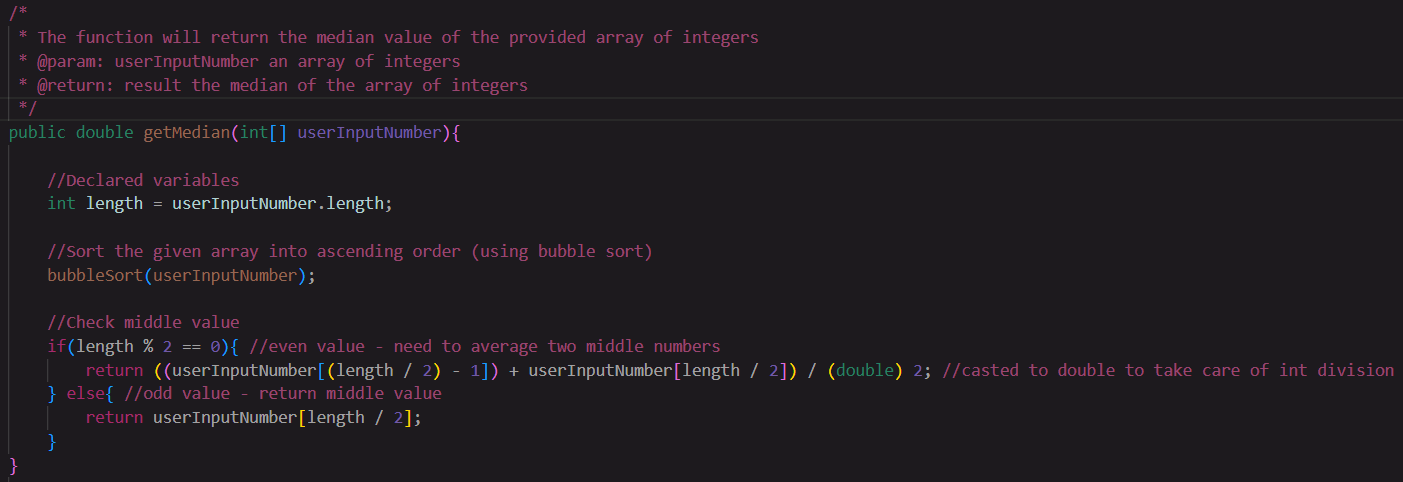
**getMean Function**

The getMean function is a function that takes in one **parameter** and returns a **double.** This function will return the mean of a given array of integers. One must pass an array of integers to use the function properly.

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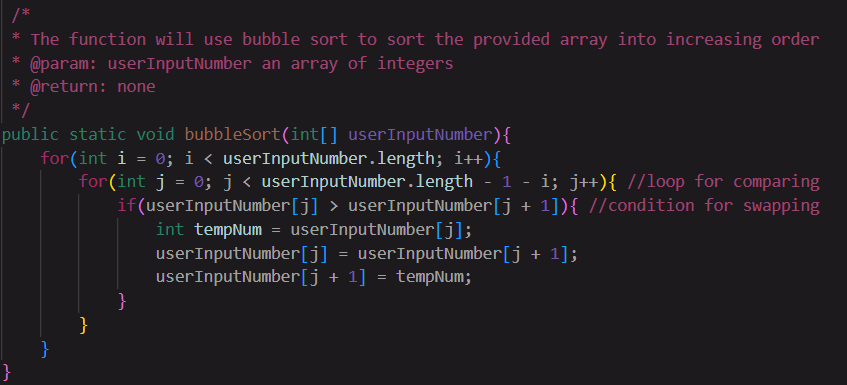
**getMedian Function**

The getMedian function is a function that takes in one **parameter** and returns a **double.** This function will return the median of a given array of integers. One must pass an array of integers to use the function properly. This function allows of odd or even amount of numbers within the array. This function is also implemented using bubbleSort as its sorting algorithm.

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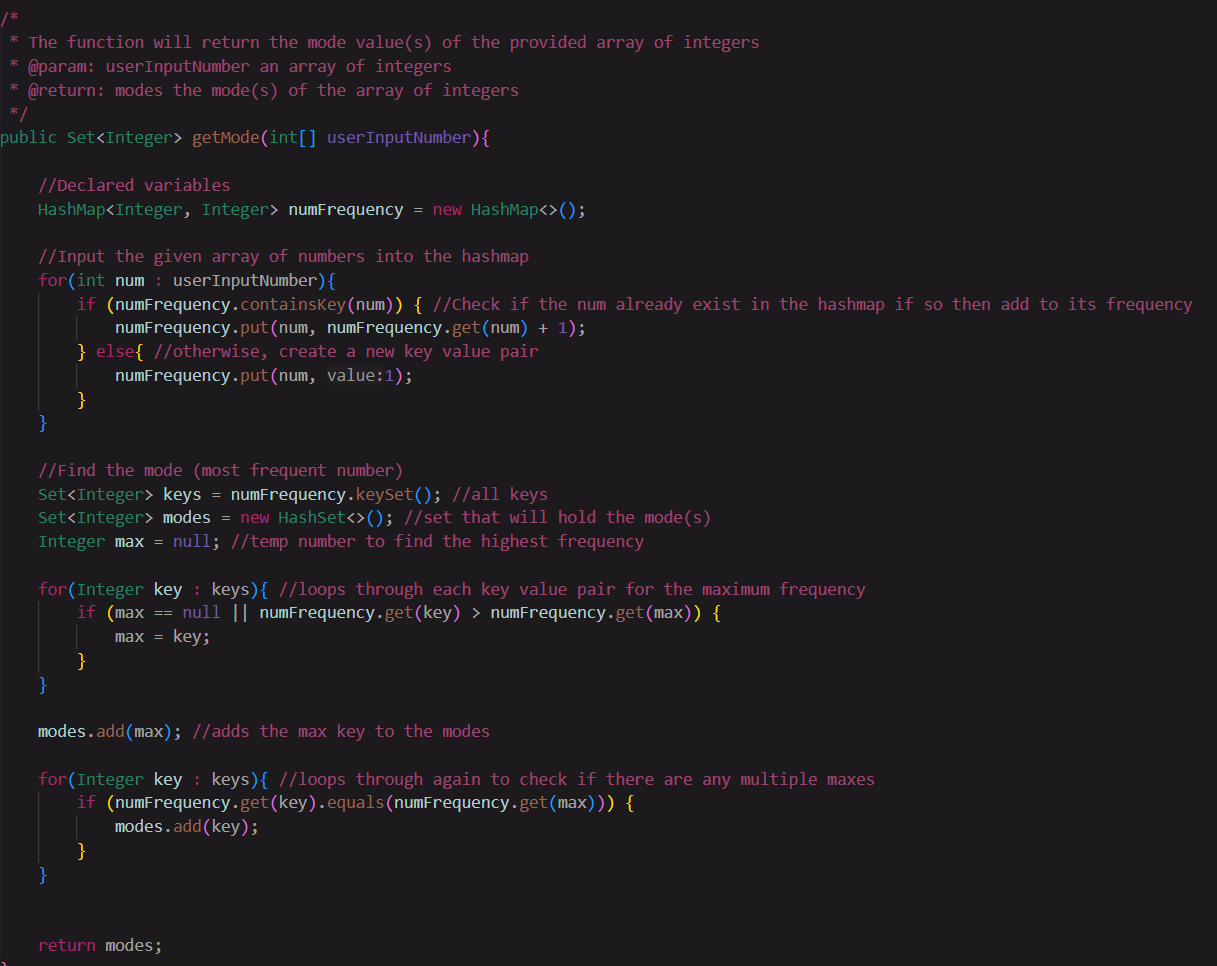
**bubbleSort Function**

The bubbleSort function is a function that takes no **parameters** and does not return any value**.** This function will sort a given array of integers into increasing order.

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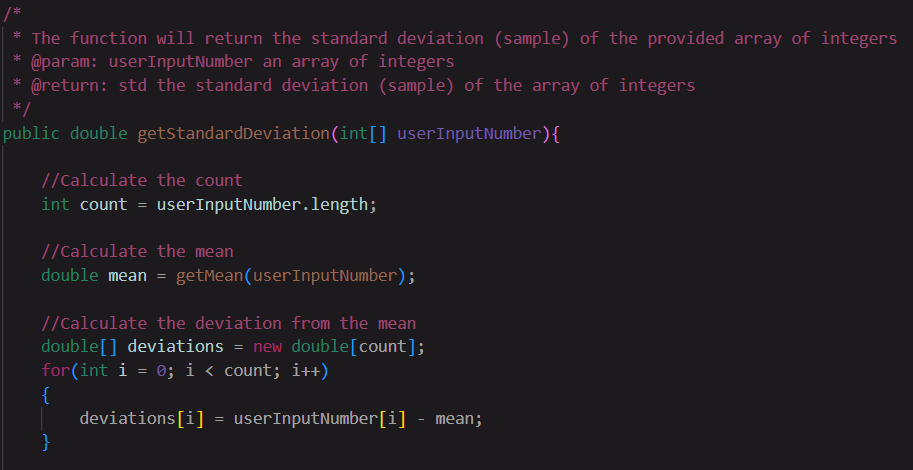
**getMode Function**

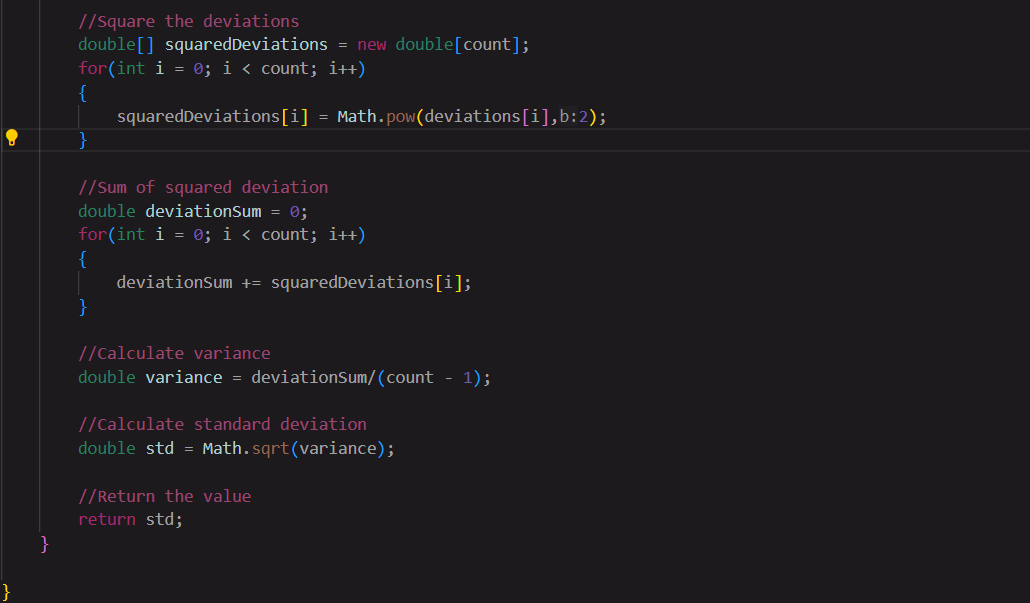
The getMode function is a function that takes in one **parameter** and returns a **Set of Integers.** This function will return the mode(s) of a given array of integers. One must pass an array of integers to use the function properly. This function uses a HashMap to find the mode.

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**getStandardDeviation Function**

The getStandardDeviation function is a function that takes in one **parameter** and returns a **double.** This function will return the sample standard deviation of a given array of integers. One must pass an array of integers to use the function properly.

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**Union Function**

The Union Function requires two **ArrayList<String> parameters** and it returns an **ArrayList<String>** value. Each parameter could be a subset of a set. The return value contains the union values of the given pair of parameters. This function only works for String type ArrayLists.

**A screen shot of a computer program

AI-generated content may be incorrect.**

**Intersection Function**

The Intersect Function requires two **ArrayList<String> parameters** and it returns an **ArrayList<String>** value. Each parameter could be a subset of a set.The return value contains the union values of the given pair of parameters. This function only works for String type ArrayLists.

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AI-generated content may be incorrect.**

**Complement Function**

The Complement Function requires two **ArrayList<String> parameters** and it returns an **ArrayList<String>** value. The first parameter must be the set of all possible values. The return value contains the union values of the given pair of parameters. This function only works for String type ArrayLists.

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**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 a BigInteger value of the factorial. This is primarily used as a helper function for combination and permutation functions.

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**combination Function**

The combination function calculates the combinatorial value of a given pair of integer values using the formula:

It uses the factorial function to find the factorial value. It will then return the value as a BigInteger value.

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**permutation Function**

The permutation function calculates the permutation value of a given pair of integer values using the formula:

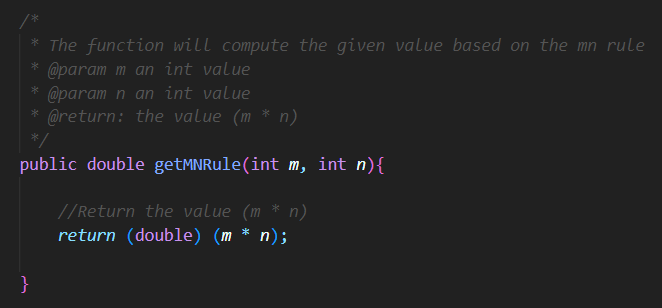
It uses the factorial function to find the factorial value. It will then return the value as a BigInteger value.

**A computer screen shot of a program code

AI-generated content may be incorrect.**

**getMNRule Function**

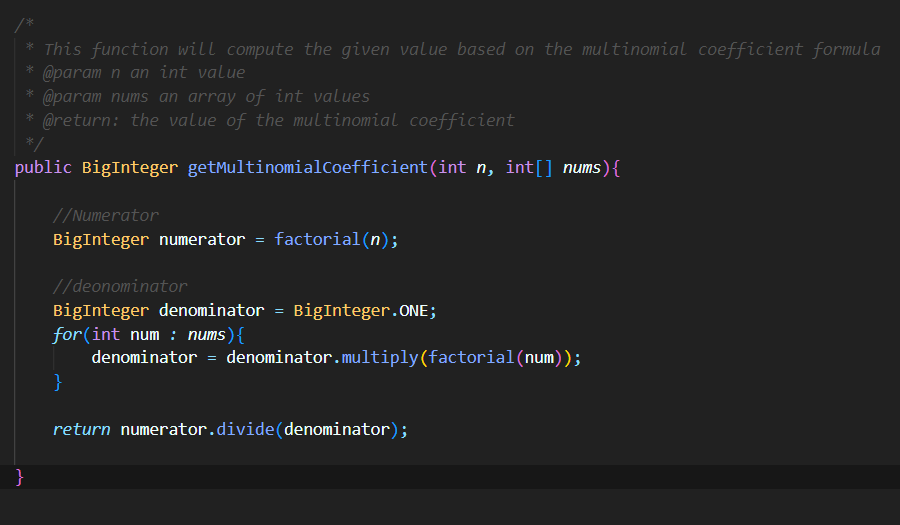
The getMNRule function calculates the mn value of a given pair of integer values using the formula:



**getMultinomialCoefficient Function**

The getMultinomialCoefficient function calculates the paritioning value of a given integer and array of integer values using the formula:

It uses the factorial function to find the factorial value. It will then return the value as a BigInteger value.

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