Matt Gregorek

CMSC 451

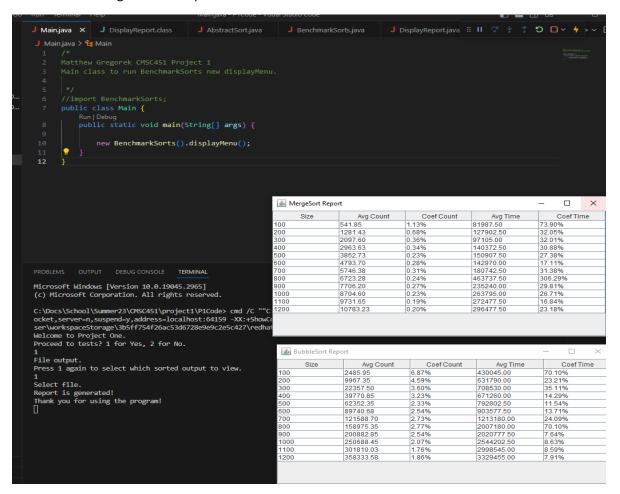June 13, 2023

Project One

       I chose to compare BubbleSort and MergeSort algorithms, using help from the websites 'GeeksforGeeks" and 'W3schools" (links Below).

https://www.w3schools.com/java/java_abstract.asp
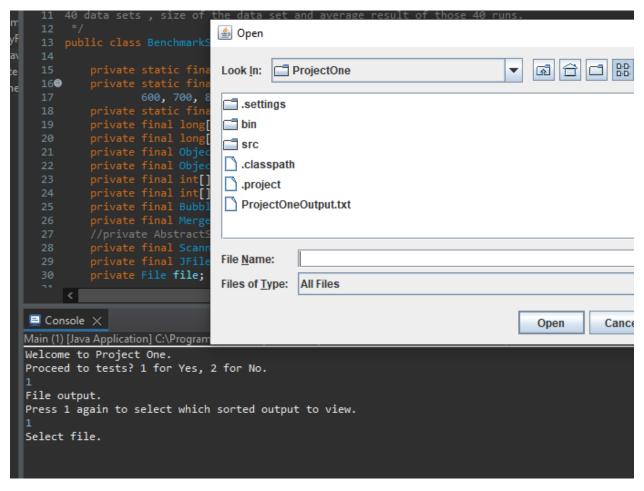
https://www.geeksforgeeks.org/bubble-sort/

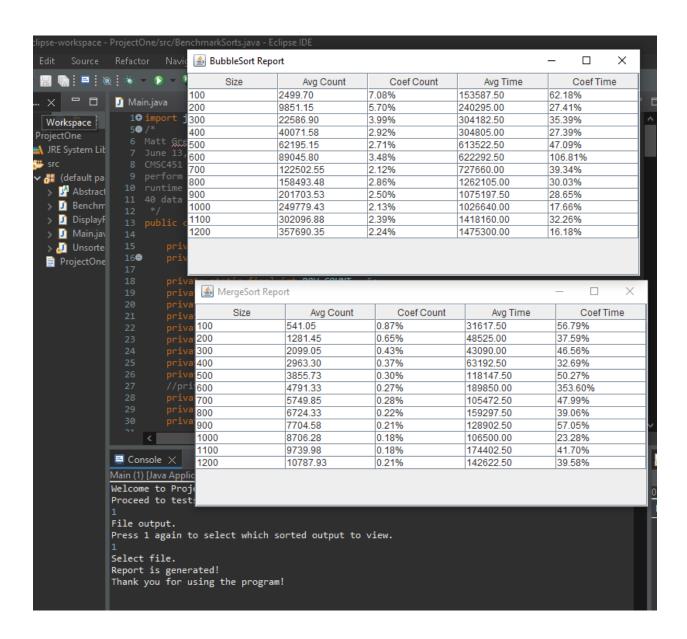https://www.geeksforgeeks.org/merge-sort/

       Below are some screenshots of my program Console and GUI response, I will add the photos and the Java files along with this report inside a ZIP file.

```java
import javax.swing.*;
import java.io.*;
import java.nio.charset.StandardCharsets;
import java.util.*;
/*
Matt Gregorek Project One
June 13, 2023
CMSC451 BenchmarkSorts.java Class should use both sorting Algorithms and
perform some critical operation to count for each algorithm, must measure
runtime in nano-seconds. Should randomly generate data to pass to sorting methods.
40 data sets , size of the data set and average result of those 40 runs.
*/
public class BenchmarkSorts extends AbstractSort {

    private static final int DATA_SET_COUNT = 40;
    private static final int[] DATA_SET_SIZES = {100, 200, 300, 400, 500,
            600, 700, 800, 900, 1000,1100,1200};
    private static final int ROW_COUNT = 5;
    private final long[][] bubbleTime;
    private final long[][] mergeTime;
    private final Object[][] bubbleResultForm;
    private final Object[][] mergeResultForm;
    private final int[][] bubbleCount;
    private final int[][] mergeCount;
    private final BubbleSort bubbleSort;
    private final MergeSort mergeSort;
    //private AbstractSort checkSorted;
    private final Scanner scanner;
    private final JFileChooser fileChooser;
    private File file;
```

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL

```
Microsoft Windows [Version 10.0.19045.2965]
(c) Microsoft Corporation. All rights reserved.

C:\Docs\School\Summer23\CMSC451\project1\P1Code> cmd /C ""C:\P...
spend=y,address=localhost:64808 -XX:+ShowCodeDetailsInException
53d6728e9e9c2e5c427\redhat.java\jdt_ws\P1Code_1162efcc\bin Mai
Welcome to Project One.
Proceed to tests? 1 for Yes, 2 for No.
1
File output.
Press 1 again to select which sorted output to view.
1
Select file.
```

Open dialog — Look In: P1Code

- AbstractSort.class
- AbstractSort.java
- BenchmarkSorts$CriticalOps$JVMTest.class
- BenchmarkSorts$CriticalOps.class
- BenchmarkSorts.class
- BenchmarkSorts.java
- BubbleSort.class
- DisplayReport.class
- DisplayReport.java
- Main.class
- Main.java
- MergeSort.class

File Name: [ ]
Files of Type: All Files

Open   Cancel

```
te        15        private static final int DATA_SET_COUNT = 40;
he   16⊖        private static final int[] DATA_SET_SIZES = {100, 2
     17                600, 700, 800, 900, 1000,1100,1200};
     18        private static final int ROW_COUNT = 5;
     19        private final long[][] bubbleTime;
     20        private final long[][] mergeTime;
     21        private final Object[][] bubbleResultForm;
     22        private final Object[][] mergeResultForm;
     23        private final int[][] bubbleCount;
     24        private final int[][] mergeCount;
     25        private final BubbleSort bubbleSort;
     26        private final MergeSort mergeSort;
     27        //private AbstractSort checkSorted;
     28        private final Scanner scanner;
     29        private final JFileChooser fileChooser;
     30        private File file;
```

```
11  40 data sets , size of the data set and average result of those 40 runs.
12  */
13  public class BenchmarkS
14
15        private static fina
16⊖        private static fina
17                600, 700, 8
18        private static fina
19        private final long[
20        private final long[
21        private final Objec
22        private final Objec
23        private final int[]
24        private final int[]
25        private final Bubbl
26        private final Merge
27        //private AbstractS
28        private final Scann
29        private final JFile
30        private File file;
```

Open

Look In: 📁 ProjectOne   ▼   🔼 🏠 📁 ⊞

📁 .settings
📁 bin
📁 src
📄 .classpath
📄 .project
📄 ProjectOneOutput.txt

File Name: |

Files of Type: All Files

Open   Cance

BubbleSort Report

Size	Avg Count	Coef Count	Avg Time	Coef Time
100	2499.70	7.08%	153587.50	62.18%
200	9851.15	5.70%	240295.00	27.41%
300	22586.90	3.99%	304182.50	35.39%
400	40071.58	2.92%	304805.00	27.39%
500	62195.15	2.71%	613522.50	47.09%
600	89045.80	3.48%	622292.50	106.81%
700	122502.55	2.12%	727660.00	39.34%
800	158493.48	2.86%	1262105.00	30.03%
900	201703.53	2.50%	1075197.50	28.65%
1000	249779.43	2.13%	1026640.00	17.66%
1100	302096.88	2.39%	1418160.00	32.26%
1200	357690.35	2.24%	1475300.00	16.18%

MergeSort Report

Size	Avg Count	Coef Count	Avg Time	Coef Time
100	541.05	0.87%	31617.50	56.79%
200	1281.45	0.65%	48525.00	37.59%
300	2099.05	0.43%	43090.00	46.56%
400	2963.30	0.37%	63192.50	32.69%
500	3855.73	0.30%	118147.50	50.27%
600	4791.33	0.27%	189850.00	353.60%
700	5749.85	0.28%	105472.50	47.99%
800	6724.33	0.22%	159297.50	39.06%
900	7704.58	0.21%	128902.50	57.05%
1000	8706.28	0.18%	106500.00	23.28%
1100	9739.98	0.18%	174402.50	41.70%
1200	10787.93	0.21%	142622.50	39.58%

Console — Main (1) [Java Applic...

```
Welcome to Proj
Proceed to test
1
File output.
Press 1 again to select which sorted output to view.
1
Select file.
Report is generated!
Thank you for using the program!
```

My program will work in any JRE compiler. I tried running it with the CLI using JAVAC* / JAVAC MAIN.java … Java Main.java… but I kept getting an error. I think the Benchmark class wasn't able to reach the Main class file for some reason. I will continue to work on this before the 2nd project and see if I can clean up my code a little bit.

-Matthew Gregorek