

## CSC172 Lab 5 Report

Students:

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### Tables

Table 1 (array a):

Sorting method	Array size (thousands)						
	1	2	4	8	16	32	1000
Bubble_Sort a	6.0	9.0	16.0	59.0	260.0	1335.0	NaN
Insertion_Sort a	5.0	7.0	12.0	30.0	115.0	494.0	589230.0
Java_Default a	1.0	1.0	0.0	0.0	2.0	6.0	53.0
Mergesort a	0.0	2.0	1.0	4.0	4.0	13.0	173.0
Quicksort a	0.0	2.0	2.0	2.0	15.0	5.0	138.0
Selection_Sort a	3.0	6.0	20.0	67.0	206.0	890.0	1350769.0

Table 2 (array b):

Sorting method	Array size (thousands)						
	1	2	4	8	16	32	1000
Bubble_Sort b	0.0	4.0	7.0	31.0	98.0	335.0	NaN
Insertion_Sort b	0.0	0.0	0.0	0.0	0.0	0.0	3.0
Java_Default b	0.0	0.0	0.0	0.0	0.0	0.0	1.0
Mergesort b	0.0	0.0	1.0	0.0	3.0	1.0	59.0
Quicksort	0.0	0.0	2.0	2.0	3.0	4.0	35.0

b							
Selection_Sort b	1.0	4.0	14.0	64.0	205.0	844.0	1112620.0

Table 3 (array c):

Sorting method	Array size (thousands)						
	1	2	4	8	16	32	1000
Bubble_Sort c	1.0	3.0	5.0	22.0	72.0	237.0	NaN
Insertion_Sort c	1.0	3.0	14.0	49.0	184.0	332.0	928198.0
Java_Default c	0.0	0.0	0.0	1.0	0.0	1.0	2.0
Mergesort c	0.0	1.0	0.0	1.0	2.0	2.0	57.0
Quicksort c	0.0	0.0	1.0	1.0	3.0	5.0	24.0
Selection_Sort c	0.0	0.0	3.0	16.0	41.0	203.0	NaN

Table 4 (array d):

Sorting method	Array size (thousands)						
	1	2	4	8	16	32	1000
Bubble_Sort d	1.0	2.0	13.0	47.0	94.0	341.0	NaN
Insertion_Sort d	0.0	1.0	1.0	6.0	20.0	34.0	95114.0
Java_Default d	0.0	0.0	0.0	2.0	1.0	4.0	33.0
Mergesort d	0.0	0.0	1.0	1.0	3.0	2.0	62.0
Quicksort d	0.0	0.0	1.0	0.0	5.0	1.0	45.0
Selection	1.0	0.0	14.0	60.0	209.0	781.0	NaN

_Sort d							
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Note: the selection sort for 1Min.txt was terminated over ten minutes after it had begun, but it had already finished sorting arrays a and b. As a result, I included the 1Min.txt times for a and b, but not for c and d, whose times are both listed as NaN. The bubble sort for 1Min.txt was terminated ten minutes after it had begun, so a, b, c, and d are listed as having NaN time for that file.

## Screenshots

Default Sort:

```

PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> javac Sorting.java
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Kints.txt 0
Default Sort a 1.0 20230409_100225 rbrenna2,nayalew 1Kints.txt
Default Sort b 0.0 20230409_100225 rbrenna2,nayalew 1Kints.txt
Default Sort c 0.0 20230409_100225 rbrenna2,nayalew 1Kints.txt
Default Sort d 0.0 20230409_100225 rbrenna2,nayalew 1Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 2Kints.txt 0
Default Sort a 1.0 20230409_100231 rbrenna2,nayalew 2Kints.txt
Default Sort b 0.0 20230409_100231 rbrenna2,nayalew 2Kints.txt
Default Sort c 0.0 20230409_100231 rbrenna2,nayalew 2Kints.txt
Default Sort d 0.0 20230409_100231 rbrenna2,nayalew 2Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 4Kints.txt 0
Default Sort a 0.0 20230409_100245 rbrenna2,nayalew 4Kints.txt
Default Sort b 0.0 20230409_100245 rbrenna2,nayalew 4Kints.txt
Default Sort c 0.0 20230409_100245 rbrenna2,nayalew 4Kints.txt
Default Sort d 0.0 20230409_100245 rbrenna2,nayalew 4Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 8Kints.txt 0
Default Sort a 0.0 20230409_100249 rbrenna2,nayalew 8Kints.txt
Default Sort b 0.0 20230409_100249 rbrenna2,nayalew 8Kints.txt
Default Sort c 1.0 20230409_100249 rbrenna2,nayalew 8Kints.txt
Default Sort d 2.0 20230409_100249 rbrenna2,nayalew 8Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 16Kints.txt 0
Default Sort a 2.0 20230409_100254 rbrenna2,nayalew 16Kints.txt
Default Sort b 0.0 20230409_100254 rbrenna2,nayalew 16Kints.txt
Default Sort c 0.0 20230409_100254 rbrenna2,nayalew 16Kints.txt
Default Sort d 1.0 20230409_100254 rbrenna2,nayalew 16Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 32Kints.txt 0
Default Sort a 6.0 20230409_100259 rbrenna2,nayalew 32Kints.txt
Default Sort b 0.0 20230409_100259 rbrenna2,nayalew 32Kints.txt
Default Sort c 1.0 20230409_100259 rbrenna2,nayalew 32Kints.txt
Default Sort d 4.0 20230409_100259 rbrenna2,nayalew 32Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Mints.txt 0
Default Sort a 53.0 20230409_100326 rbrenna2,nayalew 1Mints.txt
Default Sort b 1.0 20230409_100326 rbrenna2,nayalew 1Mints.txt
Default Sort c 2.0 20230409_100326 rbrenna2,nayalew 1Mints.txt
Default Sort d 33.0 20230409_100326 rbrenna2,nayalew 1Mints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src>

```

Bubble Sort:

```
Windows PowerShell
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PS C:\Users\Kelly> cd IdeaProjects\Lab5_CSC172\src
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Kints.txt 1
Bubble Sort a      6.0  20230409_110347  rbrenna2,nayalew  1Kints.txt
Bubble Sort b      0.0  20230409_110347  rbrenna2,nayalew  1Kints.txt
Bubble Sort c      1.0  20230409_110347  rbrenna2,nayalew  1Kints.txt
Bubble Sort d      1.0  20230409_110347  rbrenna2,nayalew  1Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 2Kints.txt 1
Bubble Sort a      9.0  20230409_110353  rbrenna2,nayalew  2Kints.txt
Bubble Sort b      4.0  20230409_110353  rbrenna2,nayalew  2Kints.txt
Bubble Sort c      3.0  20230409_110353  rbrenna2,nayalew  2Kints.txt
Bubble Sort d      2.0  20230409_110353  rbrenna2,nayalew  2Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 4Kints.txt 1
Bubble Sort a     16.0  20230409_110357  rbrenna2,nayalew  4Kints.txt
Bubble Sort b      7.0  20230409_110357  rbrenna2,nayalew  4Kints.txt
Bubble Sort c      5.0  20230409_110357  rbrenna2,nayalew  4Kints.txt
Bubble Sort d     13.0  20230409_110357  rbrenna2,nayalew  4Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 8Kints.txt 1
Bubble Sort a     59.0  20230409_110401  rbrenna2,nayalew  8Kints.txt
Bubble Sort b     31.0  20230409_110401  rbrenna2,nayalew  8Kints.txt
Bubble Sort c     22.0  20230409_110402  rbrenna2,nayalew  8Kints.txt
Bubble Sort d     47.0  20230409_110402  rbrenna2,nayalew  8Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 16Kints.txt 1
Bubble Sort a    268.0  20230409_110406  rbrenna2,nayalew  16Kints.txt
Bubble Sort b    98.0  20230409_110406  rbrenna2,nayalew  16Kints.txt
Bubble Sort c    72.0  20230409_110406  rbrenna2,nayalew  16Kints.txt
Bubble Sort d    94.0  20230409_110406  rbrenna2,nayalew  16Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 32Kints.txt 1
Bubble Sort a   1335.0  20230409_110413  rbrenna2,nayalew  32Kints.txt
Bubble Sort b   335.0  20230409_110414  rbrenna2,nayalew  32Kints.txt
Bubble Sort c   237.0  20230409_110414  rbrenna2,nayalew  32Kints.txt
Bubble Sort d   341.0  20230409_110414  rbrenna2,nayalew  32Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Mints.txt 1
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src>
```

Insertion Sort:

```
Windows PowerShell
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PS C:\Users\Kelly> cd IdeaProjects\Lab5_CSC172\src
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Kints.txt 3
Insertion Sort a    5.0  20230409_102009  rbrenna2,nayalew  1Kints.txt
Insertion Sort b    0.0  20230409_102009  rbrenna2,nayalew  1Kints.txt
Insertion Sort c    1.0  20230409_102009  rbrenna2,nayalew  1Kints.txt
Insertion Sort d    0.0  20230409_102009  rbrenna2,nayalew  1Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 2Kints.txt 3
Insertion Sort a    7.0  20230409_102012  rbrenna2,nayalew  2Kints.txt
Insertion Sort b    0.0  20230409_102012  rbrenna2,nayalew  2Kints.txt
Insertion Sort c    3.0  20230409_102012  rbrenna2,nayalew  2Kints.txt
Insertion Sort d    1.0  20230409_102012  rbrenna2,nayalew  2Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 4Kints.txt 3
Insertion Sort a   12.0  20230409_102015  rbrenna2,nayalew  4Kints.txt
Insertion Sort b    0.0  20230409_102015  rbrenna2,nayalew  4Kints.txt
Insertion Sort c   14.0  20230409_102015  rbrenna2,nayalew  4Kints.txt
Insertion Sort d    1.0  20230409_102015  rbrenna2,nayalew  4Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 8Kints.txt 3
Insertion Sort a   30.0  20230409_102018  rbrenna2,nayalew  8Kints.txt
Insertion Sort b    0.0  20230409_102018  rbrenna2,nayalew  8Kints.txt
Insertion Sort c   49.0  20230409_102018  rbrenna2,nayalew  8Kints.txt
Insertion Sort d    6.0  20230409_102018  rbrenna2,nayalew  8Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 16Kints.txt 3
Insertion Sort a  115.0  20230409_102022  rbrenna2,nayalew  16Kints.txt
Insertion Sort b    0.0  20230409_102022  rbrenna2,nayalew  16Kints.txt
Insertion Sort c  184.0  20230409_102022  rbrenna2,nayalew  16Kints.txt
Insertion Sort d   20.0  20230409_102022  rbrenna2,nayalew  16Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 32Kints.txt 3
Insertion Sort a  494.0  20230409_102027  rbrenna2,nayalew  32Kints.txt
Insertion Sort b    0.0  20230409_102027  rbrenna2,nayalew  32Kints.txt
Insertion Sort c  332.0  20230409_102028  rbrenna2,nayalew  32Kints.txt
Insertion Sort d   34.0  20230409_102028  rbrenna2,nayalew  32Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Mints.txt 3
Insertion Sort a 589230.0  20230409_103025  rbrenna2,nayalew  1Mints.txt
Insertion Sort b    3.0  20230409_103025  rbrenna2,nayalew  1Mints.txt
Insertion Sort c 928198.0  20230409_104553  rbrenna2,nayalew  1Mints.txt
Insertion Sort d 95114.0  20230409_104728  rbrenna2,nayalew  1Mints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src>
```

Selection Sort:

```
Windows PowerShell x Windows PowerShell x Windows PowerShell x Windows PowerShell x Windows PowerShell x + -
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PS C:\Users\Kelly> cd IdeaProjects
PS C:\Users\Kelly\IdeaProjects> cd Lab5_CSC172
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172> cd src
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Kints.txt 2
Selection Sort a 3.0 20230409_101911 rbrenna2,nayalew 1Kints.txt
Selection Sort b 1.0 20230409_101911 rbrenna2,nayalew 1Kints.txt
Selection Sort c 0.0 20230409_101911 rbrenna2,nayalew 1Kints.txt
Selection Sort d 1.0 20230409_101911 rbrenna2,nayalew 1Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 2Kints.txt 2
Selection Sort a 6.0 20230409_101916 rbrenna2,nayalew 2Kints.txt
Selection Sort b 4.0 20230409_101916 rbrenna2,nayalew 2Kints.txt
Selection Sort c 0.0 20230409_101916 rbrenna2,nayalew 2Kints.txt
Selection Sort d 0.0 20230409_101916 rbrenna2,nayalew 2Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 4Kints.txt 2
Selection Sort a 20.0 20230409_101919 rbrenna2,nayalew 4Kints.txt
Selection Sort b 14.0 20230409_101919 rbrenna2,nayalew 4Kints.txt
Selection Sort c 3.0 20230409_101919 rbrenna2,nayalew 4Kints.txt
Selection Sort d 14.0 20230409_101919 rbrenna2,nayalew 4Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 8Kints.txt 2
Selection Sort a 67.0 20230409_101923 rbrenna2,nayalew 8Kints.txt
Selection Sort b 64.0 20230409_101923 rbrenna2,nayalew 8Kints.txt
Selection Sort c 16.0 20230409_101923 rbrenna2,nayalew 8Kints.txt
Selection Sort d 60.0 20230409_101923 rbrenna2,nayalew 8Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 16Kints.txt 2
Selection Sort a 206.0 20230409_101928 rbrenna2,nayalew 16Kints.txt
Selection Sort b 205.0 20230409_101928 rbrenna2,nayalew 16Kints.txt
Selection Sort c 41.0 20230409_101928 rbrenna2,nayalew 16Kints.txt
Selection Sort d 209.0 20230409_101928 rbrenna2,nayalew 16Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 32Kints.txt 2
Selection Sort a 890.0 20230409_101933 rbrenna2,nayalew 32Kints.txt
Selection Sort b 844.0 20230409_101933 rbrenna2,nayalew 32Kints.txt
Selection Sort c 203.0 20230409_101934 rbrenna2,nayalew 32Kints.txt
Selection Sort d 781.0 20230409_101934 rbrenna2,nayalew 32Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Mints.txt 2
Selection Sort a 1350769.0 20230409_104210 rbrenna2,nayalew 1Mints.txt
Selection Sort b 1112620.0 20230409_110043 rbrenna2,nayalew 1Mints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src>
```

Merge Sort:

```
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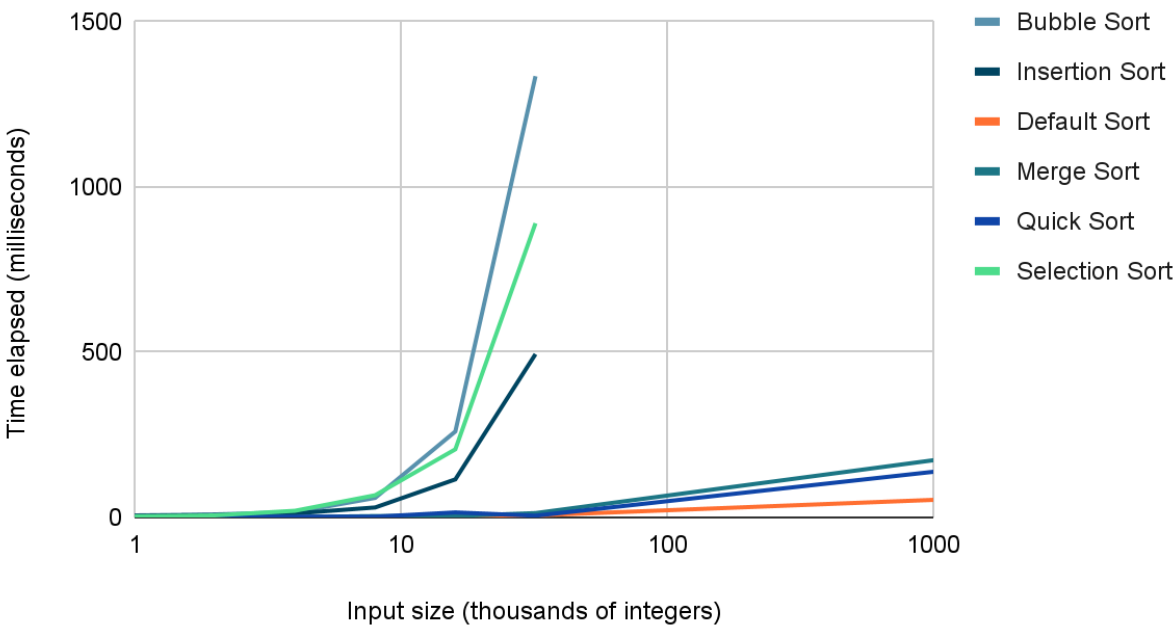
PS C:\Users\Kelly> cd IdeaProjects\Lab5_CSC172\src
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Kints.txt 4
Merge Sort a 0.0 20230409_103130 rbrenna2,nayalew 1Kints.txt
Merge Sort b 0.0 20230409_103130 rbrenna2,nayalew 1Kints.txt
Merge Sort c 0.0 20230409_103130 rbrenna2,nayalew 1Kints.txt
Merge Sort d 0.0 20230409_103130 rbrenna2,nayalew 1Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 2Kints.txt 4
Merge Sort a 2.0 20230409_103133 rbrenna2,nayalew 2Kints.txt
Merge Sort b 0.0 20230409_103133 rbrenna2,nayalew 2Kints.txt
Merge Sort c 1.0 20230409_103133 rbrenna2,nayalew 2Kints.txt
Merge Sort d 0.0 20230409_103133 rbrenna2,nayalew 2Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 4Kints.txt 4
Merge Sort a 1.0 20230409_103137 rbrenna2,nayalew 4Kints.txt
Merge Sort b 1.0 20230409_103137 rbrenna2,nayalew 4Kints.txt
Merge Sort c 0.0 20230409_103137 rbrenna2,nayalew 4Kints.txt
Merge Sort d 1.0 20230409_103137 rbrenna2,nayalew 4Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 8Kints.txt 4
Merge Sort a 4.0 20230409_103141 rbrenna2,nayalew 8Kints.txt
Merge Sort b 0.0 20230409_103141 rbrenna2,nayalew 8Kints.txt
Merge Sort c 1.0 20230409_103141 rbrenna2,nayalew 8Kints.txt
Merge Sort d 1.0 20230409_103141 rbrenna2,nayalew 8Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 16Kints.txt 4
Merge Sort a 4.0 20230409_103145 rbrenna2,nayalew 16Kints.txt
Merge Sort b 3.0 20230409_103145 rbrenna2,nayalew 16Kints.txt
Merge Sort c 2.0 20230409_103145 rbrenna2,nayalew 16Kints.txt
Merge Sort d 3.0 20230409_103145 rbrenna2,nayalew 16Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 32Kints.txt 4
Merge Sort a 13.0 20230409_103148 rbrenna2,nayalew 32Kints.txt
Merge Sort b 1.0 20230409_103148 rbrenna2,nayalew 32Kints.txt
Merge Sort c 2.0 20230409_103148 rbrenna2,nayalew 32Kints.txt
Merge Sort d 2.0 20230409_103148 rbrenna2,nayalew 32Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Mints.txt 4
Merge Sort a 173.0 20230409_103154 rbrenna2,nayalew 1Mints.txt
Merge Sort b 59.0 20230409_103154 rbrenna2,nayalew 1Mints.txt
Merge Sort c 57.0 20230409_103154 rbrenna2,nayalew 1Mints.txt
Merge Sort d 62.0 20230409_103154 rbrenna2,nayalew 1Mints.txt
```

Quick Sort:

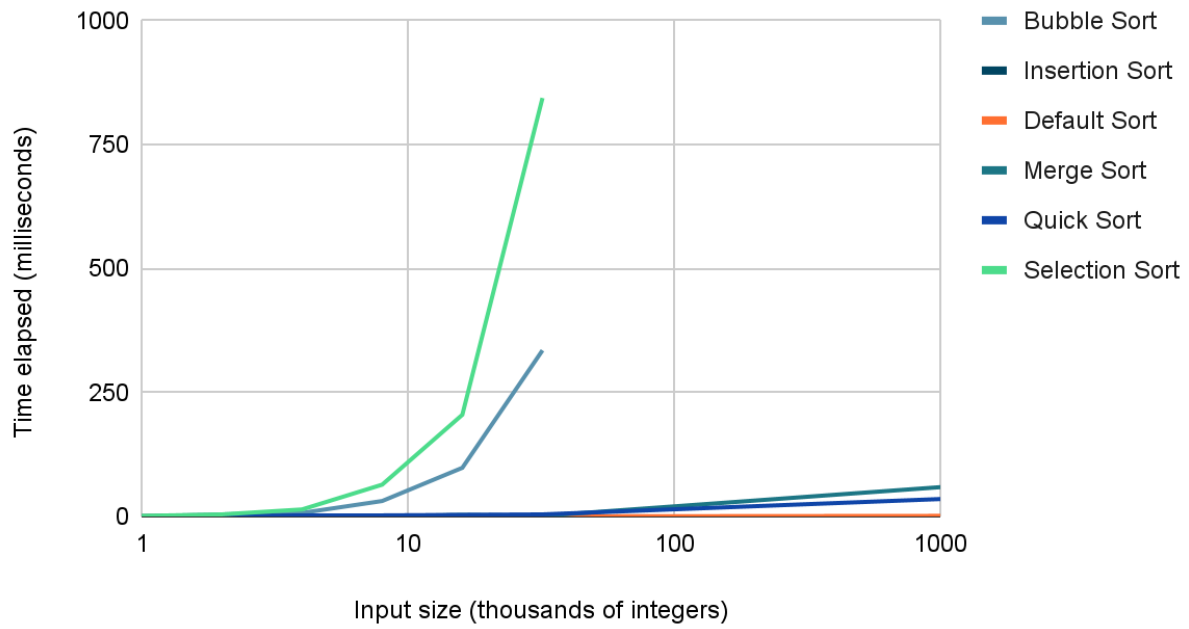
```
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Kints.txt 5
Quick Sort a    0.0    20230409_103214    rbrenna2,nayalew    1Kints.txt
Quick Sort b    0.0    20230409_103214    rbrenna2,nayalew    1Kints.txt
Quick Sort c    0.0    20230409_103214    rbrenna2,nayalew    1Kints.txt
Quick Sort d    0.0    20230409_103214    rbrenna2,nayalew    1Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 2Kints.txt 5
Quick Sort a    2.0    20230409_103219    rbrenna2,nayalew    2Kints.txt
Quick Sort b    0.0    20230409_103219    rbrenna2,nayalew    2Kints.txt
Quick Sort c    0.0    20230409_103219    rbrenna2,nayalew    2Kints.txt
Quick Sort d    0.0    20230409_103219    rbrenna2,nayalew    2Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 4Kints.txt 5
Quick Sort a    2.0    20230409_103223    rbrenna2,nayalew    4Kints.txt
Quick Sort b    2.0    20230409_103223    rbrenna2,nayalew    4Kints.txt
Quick Sort c    1.0    20230409_103223    rbrenna2,nayalew    4Kints.txt
Quick Sort d    1.0    20230409_103223    rbrenna2,nayalew    4Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 8Kints.txt 5
Quick Sort a    2.0    20230409_103226    rbrenna2,nayalew    8Kints.txt
Quick Sort b    2.0    20230409_103226    rbrenna2,nayalew    8Kints.txt
Quick Sort c    1.0    20230409_103226    rbrenna2,nayalew    8Kints.txt
Quick Sort d    0.0    20230409_103226    rbrenna2,nayalew    8Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 16Kints.txt 5
Quick Sort a    15.0   20230409_103230    rbrenna2,nayalew    16Kints.txt
Quick Sort b    3.0    20230409_103230    rbrenna2,nayalew    16Kints.txt
Quick Sort c    3.0    20230409_103230    rbrenna2,nayalew    16Kints.txt
Quick Sort d    5.0    20230409_103230    rbrenna2,nayalew    16Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 32Kints.txt 5
Quick Sort a    5.0    20230409_103233    rbrenna2,nayalew    32Kints.txt
Quick Sort b    4.0    20230409_103233    rbrenna2,nayalew    32Kints.txt
Quick Sort c    5.0    20230409_103233    rbrenna2,nayalew    32Kints.txt
Quick Sort d    1.0    20230409_103233    rbrenna2,nayalew    32Kints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src> java Sorting.java 1Mints.txt 5
Quick Sort a    138.0  20230409_103239    rbrenna2,nayalew    1Mints.txt
Quick Sort b    35.0   20230409_103239    rbrenna2,nayalew    1Mints.txt
Quick Sort c    24.0   20230409_103239    rbrenna2,nayalew    1Mints.txt
Quick Sort d    45.0   20230409_103239    rbrenna2,nayalew    1Mints.txt
PS C:\Users\Kelly\IdeaProjects\Lab5_CSC172\src>
```

Plots

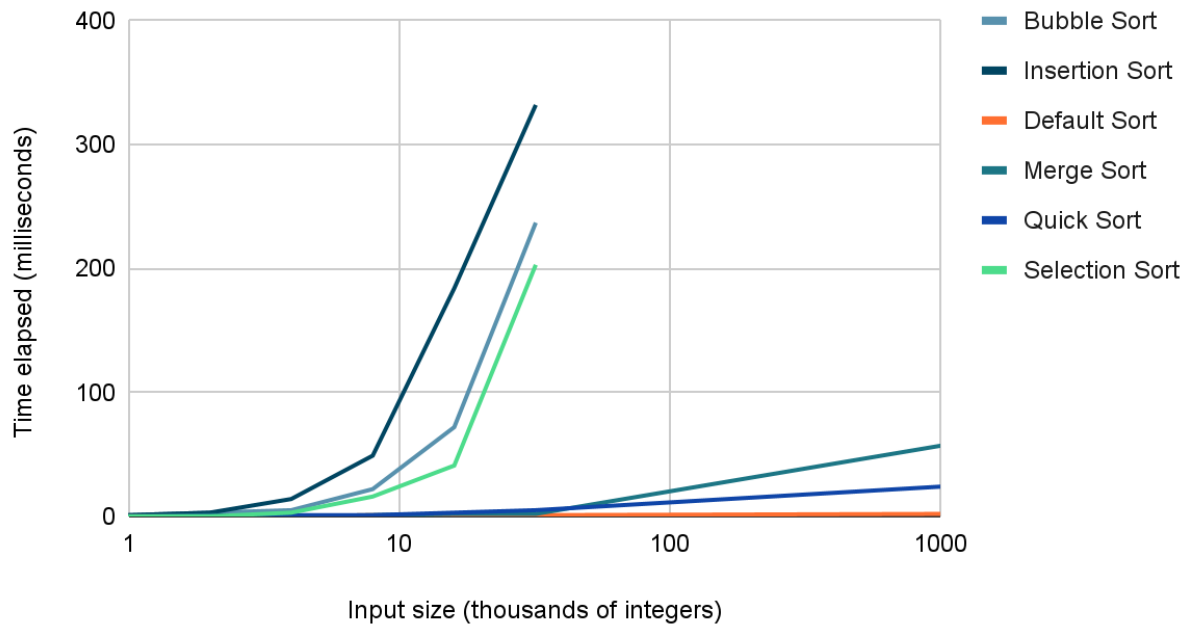
Array a



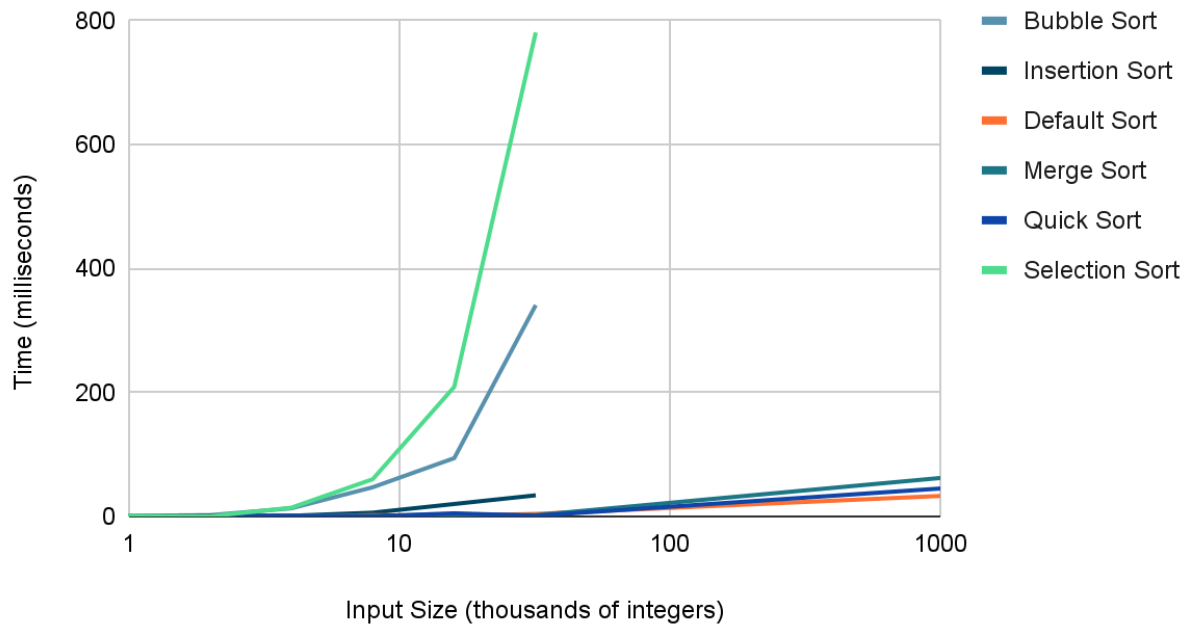
Array b



Array c



## Array d



Note: the 1Mints.txt times for Bubble Sort, Insertion Sort, and Selection Sort have been excluded from these plots because they either were not recorded or were so large that they would distort the plots and make them difficult to read.