**Objectives:**

* Familiarize yourself with the performance difference between 4 of the basic sorting algorithms.

**Sorting performance exercise:**

Download and import the files found in the AlgorithmicAnalysisLab.zip file (available on BlueLine). Name your project and/or package whatever you think appropriate and place the data files under the project directory, otherwise they will not be seen.

Run the executable program SortBenchMarks. You can see that you may select which file you would like to run through a menu. Run the program with all three files and record the number of swaps below.

You will need to add the code that will also count the number of comparisons (relational expressions) statements and assignments (statements using the = ). Do not forget, a swap is three assignments. You should also add the code to display these counts on the same line that the swaps are displayed. So you will have to add the getter method for each of these new counters to each sort class.

When your coding is complete, fill out the appropriate tables below and see if tracking these machine effort metrics in more detail changes the evaluation of which sort is more efficient.

**Zip and upload the code and upload the answers to these questions below.**

Number of Swaps

|  |  |  |  |
| --- | --- | --- | --- |
| File Name | **manyNumbers\_mixed.csv** | **manyNumbers\_ascending.csv** | **manyNumbers\_descending.csv** |
| Bubble sort | 570049 | 0 | 1123168 |
| Selection sort | 1494 | 0 | 947 |
| Insertion sort | 0 | 0 | 0 |
| Quick sort | 4828 | 2130 | 3072 |

Number of Comparisons (including loop tests)

|  |  |  |  |
| --- | --- | --- | --- |
| File Name | **manyNumbers\_mixed.csv** | **manyNumbers\_ascending.csv** | **manyNumbers\_descending.csv** |
| Bubble sort | 1123899 | 1499 | 1124249 |
| Selection sort | 1124250 | 1124250 | 1124250 |
| Insertion sort | 571539 | 1499 | 1123880 |
| Quick sort | 12452 | 13866 | 143147 |

Number of Assignments (count any array data assignment, not looping indices)

|  |  |  |  |
| --- | --- | --- | --- |
| File Name | **manyNumbers\_mixed.csv** | **manyNumbers\_ascending.csv** | **manyNumbers\_descending.csv** |
| Bubble sort | 2283142 | 2 | 4495668 |
| Selection sort | 24192 | 2998 | 602453 |
| Insertion sort | 574546 | 4497 | 1127665 |
| Quick sort | 24140 | 10650 | 15360 |