MSIS | INFO6205 37198 PROGRAM STRUCTURE & ALGORITHMS SEC 05 - SPRING 2018
ASSIGNMENT 3 : MAYANK GANGRADE (001837520)

Case 1 :

- Array consist of Random integer and n = 200

```
--- exec-maven-plugin:1.2.1:exec (default-cli) @ INFO6205 ---
SelectionSort: 529525.34 millisecs for n=200
InsertionSort: 258691.69 millisecs for n=200
------------------------------------------------------------------------
```

Selection Sort / Insertion Sort = 2.04

- Array consist of Random integer and n = 400

```
--- exec-maven-plugin:1.2.1:exec (default-cli) @ INFO6205 ---
SelectionSort: 680355.72 millisecs for n=400
InsertionSort: 379608.4 millisecs for n=400
------------------------------------------------------------------------
```

Selection Sort / Insertion Sort = 1.79

- Array consist of Random integer and n = 800

```
--- exec-maven-plugin:1.2.1:exec (default-cli) @ INFO6205 ---
SelectionSort: 1535748.68 millisecs for n=800
InsertionSort: 1326009.85 millisecs for n=800
------------------------------------------------------------------------
```

Selection Sort / Insertion Sort = 1.15

Conclusion: In the case when array is consist of random arrange as the length of the array increases sorting time factor between Selection Sort and Insertion Sort decreases. For smaller array Insertion Sort is twice as efficient from Selection sort but as the length increases efficiency decreases but at any point Insertion Sort is faster than selection sort.

Case 2 :

- Array is in order and n = 200

```
--- exec-maven-plugin:1.2.1:exec (default-cli) @ INFO6205 ---
SelectionSort: 509557.33 millisecs for n=200
InsertionSort: 17838.36 millisecs for n=200
------------------------------------------------------------------
```

Selection Sort / Insertion Sort = 28.56

- Array is in order and n = 400

```
--- exec-maven-plugin:1.2.1:exec (default-cli) @ INFO6205 ---
SelectionSort: 783942.19 millisecs for n=400
InsertionSort: 35461.14 millisecs for n=400
------------------------------------------------------------------
```

Selection Sort / Insertion Sort = 22.10

- Array is in order and n = 800

```
--- exec-maven-plugin:1.2.1:exec (default-cli) @ INFO6205 ---
SelectionSort: 1092315.36 millisecs for n=800
InsertionSort: 64353.48 millisecs for n=800
------------------------------------------------------------------
```

Selection Sort / Insertion Sort = 16.97

Conclusion: When an ordered array is sorted there is a huge factor difference between Selection Sort and Insertion Sort. For smaller array Insertion sort is 30 times faster compare than Selection Sort. Also for the big sorted array Insertion Sort is much faster. In this case also Insertion sort is faster than Selection sort at any point.

Case 3 :

- Array is reverse-order and n = 200

```
--- exec-maven-plugin:1.2.1:exec (default-cli) @ INFO6205 ---
SelectionSort: 412744.89 millisecs for n=200
InsertionSort: 18243.74 millisecs for n=200
------------------------------------------------------------------------
```

  Selection Sort / Insertion Sort = 22.62

- Array is reverse-order and n = 400

```
--- exec-maven-plugin:1.2.1:exec (default-cli) @ INFO6205 ---
SelectionSort: 648866.67 millisecs for n=400
InsertionSort: 22077.25 millisecs for n=400
------------------------------------------------------------------------
```

  Selection Sort / Insertion Sort = 29.39

- Array is reverse-order and n = 800

```
--- exec-maven-plugin:1.2.1:exec (default-cli) @ INFO6205 ---
SelectionSort: 1481966.86 millisecs for n=800
InsertionSort: 71199.31 millisecs for n=800
------------------------------------------------------------------------
```

  Selection Sort / Insertion Sort = 20.81

Conclusion: For the reverse ordered array Insertion Sort is faster than Selection sort for the small and big arrays. But in for the medium size array Insertion Sort is a way faster than Selection sort.

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Unit Test:

Insertion sort test:

```
-------------------------------------------------------
 T E S T S
-------------------------------------------------------
Running edu.neu.coe.info6205.sort.simple.InsertionSortTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.125 sec

Results :

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0

------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time: 3.560s
Finished at: Fri Feb 09 22:15:51 EST 2018
Final Memory: 5M/123M
------------------------------------------------------------------------
```

Selection sort test:

```
-------------------------------------------------------
 T E S T S
-------------------------------------------------------
Running edu.neu.coe.info6205.sort.simple.SelectionSortTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.088 sec

Results :

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0

------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
Total time: 1.596s
Finished at: Fri Feb 09 22:17:56 EST 2018
Final Memory: 6M/155M
------------------------------------------------------------------------
```