Program Structures and Algorithms

Spring 2023(SEC –)

NAME: Zhiliang Liu

NUID:002650051

**Task:Assignment3(Benchmark)**

For the Random array and Reverse-ordered array, both consume about the same amount of time. Reverse-ordered use more time than Random. Exponential increase in time consumption.

For the Partially ordered, I use a random to confirm where the dividing line is between orderly and disorderly. So, It consumes a very random amount of time.

For the ordered, compared to the other three, it consumes very little time.

**Relationship Conclusion:**

**Evidence to support that conclusion:**

**Random:**

2023-02-03 23:57:43 INFO Benchmark\_Timer - Begin run: Insertion sort for Random for 1000 Integers with 100 runs

2023-02-03 23:57:43 INFO Benchmarks - 0.910 ms

2023-02-03 23:57:43 INFO Benchmark\_Timer - Begin run: Insertion sort for Random for 2000 Integers with 100 runs

2023-02-03 23:57:43 INFO Benchmarks - 3.580 ms

2023-02-03 23:57:43 INFO Benchmark\_Timer - Begin run: Insertion sort for Random for 4000 Integers with 100 runs

2023-02-03 23:57:45 INFO Benchmarks - 14.050 ms

2023-02-03 23:57:45 INFO Benchmark\_Timer - Begin run: Insertion sort for Random for 8000 Integers with 100 runs

2023-02-03 23:57:51 INFO Benchmarks - 56.450 ms

2023-02-03 23:57:51 INFO Benchmark\_Timer - Begin run: Insertion sort for Random for 12000 Integers with 100 runs

2023-02-03 23:58:06 INFO Benchmarks - 135.950 ms

Ordered:

2023-02-03 23:58:06 INFO Benchmark\_Timer - Begin run: Insertion sort for Ordered for 1000 Integers with 100 runs

2023-02-03 23:58:06 INFO Benchmarks - 0.020 ms

2023-02-03 23:58:06 INFO Benchmark\_Timer - Begin run: Insertion sort for Ordered for 2000 Integers with 100 runs

2023-02-03 23:58:06 INFO Benchmarks - 0.020 ms

2023-02-03 23:58:06 INFO Benchmark\_Timer - Begin run: Insertion sort for Ordered for 4000 Integers with 100 runs

2023-02-03 23:58:06 INFO Benchmarks - 0.020 ms

2023-02-03 23:58:06 INFO Benchmark\_Timer - Begin run: Insertion sort for Ordered for 8000 Integers with 100 runs

2023-02-03 23:58:06 INFO Benchmarks - 0.040 ms

2023-02-03 23:57:09 INFO Benchmark\_Timer - Begin run: Insertion sort for Ordered for 12000 Integers with 100 runs

2023-02-03 23:57:10 INFO Benchmarks - 0.130 ms

Partially-ordered:

2023-02-03 23:57:10 INFO Benchmark\_Timer - Begin run: Insertion sort for Partially-ordered for 1000 Integers with 100 runs

2023-02-03 23:57:10 INFO Benchmarks - 0.620 ms

2023-02-03 23:57:10 INFO Benchmark\_Timer - Begin run: Insertion sort for Partially-ordered for 2000 Integers with 100 runs

2023-02-03 23:57:10 INFO Benchmarks - 3.070 ms

2023-02-03 23:57:10 INFO Benchmark\_Timer - Begin run: Insertion sort for Partially-ordered for 4000 Integers with 100 runs

2023-02-03 23:57:11 INFO Benchmarks - 6.780 ms

2023-02-03 23:57:11 INFO Benchmark\_Timer - Begin run: Insertion sort for Partially-ordered for 8000 Integers with 100 runs

2023-02-03 23:57:15 INFO Benchmarks - 37.800 ms

2023-02-03 23:57:15 INFO Benchmark\_Timer - Begin run: Insertion sort for Partially-ordered for 12000 Integers with 100 runs

2023-02-03 23:57:19 INFO Benchmarks - 36.260 ms

Reverse-ordered:

2023-02-03 23:57:19 INFO Benchmark\_Timer - Begin run: Insertion sort for Reverse-ordered for 1000 Integers with 100 runs

2023-02-03 23:57:19 INFO Benchmarks - 0.980 ms

2023-02-03 23:57:19 INFO Benchmark\_Timer - Begin run: Insertion sort for Reverse-ordered for 2000 Integers with 100 runs

2023-02-03 23:57:19 INFO Benchmarks - 3.700 ms

2023-02-03 23:57:19 INFO Benchmark\_Timer - Begin run: Insertion sort for Reverse-ordered for 4000 Integers with 100 runs

2023-02-03 23:57:21 INFO Benchmarks - 14.670 ms

2023-02-03 23:57:21 INFO Benchmark\_Timer - Begin run: Insertion sort for Reverse-ordered for 8000 Integers with 100 runs

2023-02-03 23:57:28 INFO Benchmarks - 60.570 ms

2023-02-03 23:57:28 INFO Benchmark\_Timer - Begin run: Insertion sort for Reverse-ordered for 12000 Integers with 100 runs

2023-02-03 23:57:43 INFO Benchmarks - 139.190 ms

**Graphical Representation:**

Blue or purple point is Random and Reverse-ordered.

Red point is Ordered.

Green point is Partially-ordered.

**Unit Test Screenshots:**

**Benchmarks**

**图形用户界面, 文本

描述已自动生成**

**TimerTest:**

**文本

描述已自动生成**

**InsertionSort**

**文本

描述已自动生成**