**Algorithm sorting part C:**

To organise the list according to the delivert date, I used the List.Sort() method. As it implements several algorithms simultaneously, it guarantees speed and accuracy.

**Speed Estimates:**

|  |  |
| --- | --- |
| **Case** | **Time Complexity** |
| Best | O(n log n) |
| Average | O(n log n) |
| Worst | O(n log n) |

**Comparing other Sorting methods:**

Merger Sort:

* Always performs at n log n
* Keeps items in order if theyr’e equal
* Needs extra memory to do this

Quick Sort:

* Usually n log n, but can get worse (n^2) if it gets unlucky
* Doesn’t use extra memory
* Doesn’t keep it equal items in the same order

**Task 2**

1. **Is your PRNG implementation correct?**

**Yes , it works properly because it always gave numbers correctly (1 – 1000), and the sequence were not sorted in ascending order or descenfing order.**

1. Is your PRNG implementation intractable?

No it is fine. The graph showed how long it takes proves it grows in a straight line with how much data you give it, so ti handles bigger data sets well.

**[1] MCAST VLE, "Topic 5 - Empirical Analysis Video Resources," 2023. [Online]. Available:**[**https://vle.mcast.edu.mt/course/view.php?id=126**](https://vle.mcast.edu.mt/course/view.php?id=126)**. [Accessed: 09-06- 2025].**

**[2] Rosetta Code, "Pseudo-random numbers/Splitmix64," 2023. [Online]. Available:**[**https://rosettacode.org/wiki/Pseudo-random\_numbers/Splitmix64**](https://rosettacode.org/wiki/Pseudo-random_numbers/Splitmix64)**. [Accessed: 09-06- 2025].**

**[3] H. A. Pasha, "IntroSort Algorithm," GitHub, 2023. [Online]. Available:**[**https://github.com/HamzaAhmedPasha/IntroSort--Algorithm**](https://github.com/HamzaAhmedPasha/IntroSort--Algorithm)**. [Accessed: 09-06- 2025].**

**[4] Stack Overflow, ".NET List<T>.Sort uses Introsort - why is the worst case O(n²)?," 2023. [Online]. Available:**[**https://stackoverflow.com/questions/53352499/net-listt-sort-uses-introsort-why-is-the-worst-case-on2**](https://stackoverflow.com/questions/53352499/net-listt-sort-uses-introsort-why-is-the-worst-case-on2)**. [Accessed: 09-06- 2025].**

**[5] GeeksforGeeks, "Introsort or Introspective Sort," 2023. [Online]. Available:**[**https://www.geeksforgeeks.org/introsort-or-introspective-sort/**](https://www.geeksforgeeks.org/introsort-or-introspective-sort/)**. [Accessed: 09-06- 2025].**

**[6] GeeksforGeeks, "Heap Sort," 2023. [Online]. Available:**[**https://www.geeksforgeeks.org/heap-sort/**](https://www.geeksforgeeks.org/heap-sort/)**. [Accessed: 09-06- 2025].**