

Random Numbers

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Summary:

The Random Numbers program generates a list of 10,000 numbers in a random order each time it is run. It is written in C# and utilizes the Fisher-Yates Shuffle algorithm [\[1\]](#).

Assumptions:

There were some basic assumptions made about the Random Numbers program based on its functional nature and the complexity of the related problems at hand.

1. The Random Numbers program does not encompass the larger problem of true randomness and the pseudo-random generator *Random class* [\[2\]](#) provided by the .NET Framework is assumed to suffice.
2. The bias of the Fisher-Yates Shuffle is dependent on the randomness of the Random class and is considered insignificant.
3. The size of the list does not need to be changed from 10,000.
4. No future functionality needs to be planned for the program.

Methodology and Implementation:

The Random Numbers program is a simple Windows Form application and is written in C# and Visual Studio 2015. All libraries and tools required for the program are available through the .NET Framework.

Since the Fisher-Yates Shuffle is used to randomize a list, functionality to create a sorted list from 1 to 10,000 was implemented. The Fisher-Yates Shuffle was chosen due to its simplicity, its $O(n)$ time complexity, and its in-place space complexity. Given enumeration of a sorted list is also $O(n)$, the added feature of generating a sorted list was implemented without loss of performance.

Users are required to create a new sorted list if a list (sorted or randomized) does not exist. This functionality is allowed through the Random Numbers application.

Given the unary functionality of the Random Numbers program, no substantial UI was created and the source code was written accordingly.

Results

The program is capable of creating a sorted list and randomizing it as well. Result messages are displayed within the Windows Form application and the list is printed to the local file "RandomList.txt". RandomList.txt can be opened through the Windows Form application via the operating system's default application.

References

- [1]: https://en.wikipedia.org/wiki/Fisher%E2%80%93Yates_shuffle#The_modern_algorithm
- [2]: [https://msdn.microsoft.com/en-us/library/system.random\(v=vs.110\).aspx](https://msdn.microsoft.com/en-us/library/system.random(v=vs.110).aspx)