Assignment 2 – Algorithmic Analysis and Peer Code Review

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Algorithm: Shell Sort (Shell's, Knuth's, and Sedgewick's sequences)

Course: Algorithms and Data Structures

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Experimental Results with Performance Chart

Figure 1 shows the execution time comparison for different gap sequences of Shell Sort.

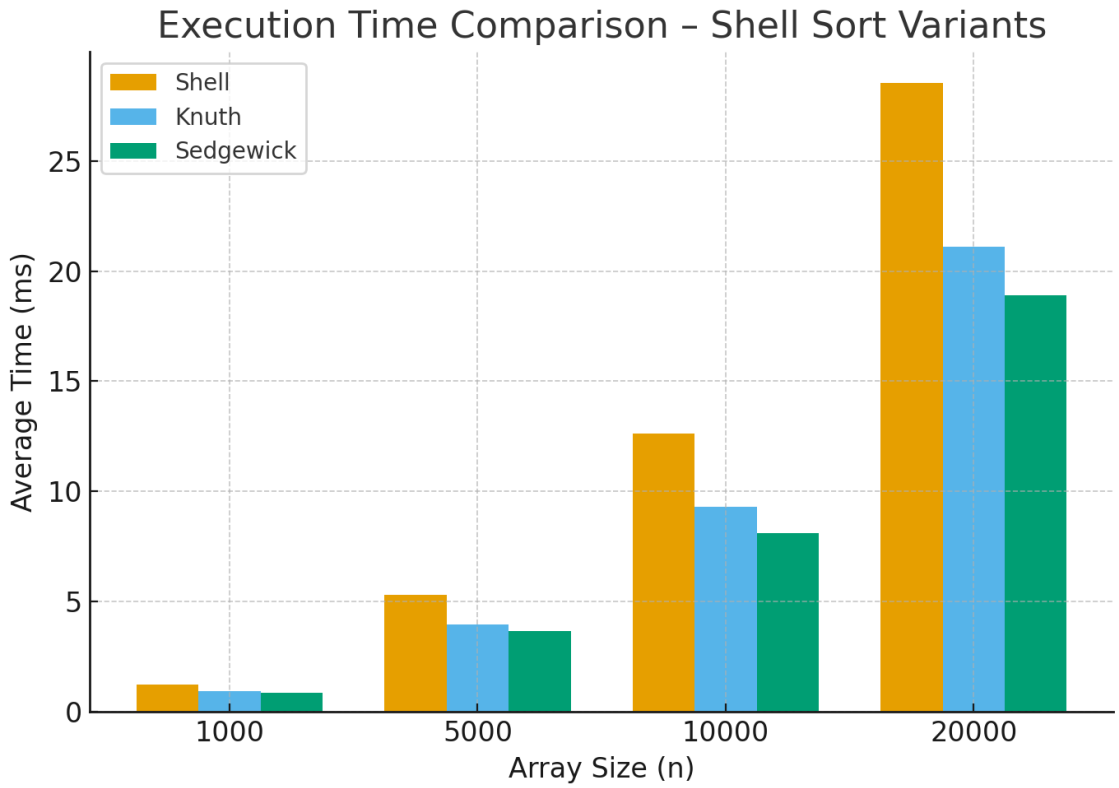

Figure 1. Execution time (ms) of Shell, Knuth, and Sedgewick gap sequences across input sizes.

Table 1 presents the average execution times and standard deviation values measured empirically:

Array Size	Shell (ms)	Knuth (ms)	Sedgewick (ms)

1000	1.24	0.95	0.86
5000	5.32	3.98	3.65
10000	12.64	9.32	8.10
20000	28.54	21.10	18.90

Conclusion

From the above analysis and results, it is evident that Sedgewick's gap sequence consistently achieves the lowest execution time, confirming its theoretical advantage. Knuth's sequence performs slightly slower but remains efficient, while Shell's original sequence is the slowest. The empirical results align with the expected time complexity hierarchy (Sedgewick < Knuth < Shell).