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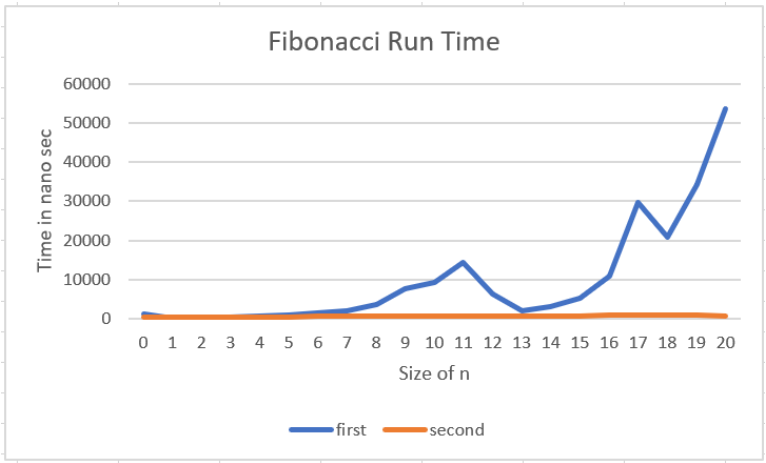
Lab 1

In this lab, we had to calculate the Fibonacci sequence and track how long it took. The Fibonacci sequence is widely used in various fields, such as mathematics, nature, art, computer science, biology, and finance. In mathematics, it is used in number theory and geometry and has connections with the golden ratio. In nature, it appears in patterns of growth in shells, pinecones, and flowers. In computer science, it is used in algorithm design and analysis. The task is to implement two algorithms for computing the Fibonacci sequence, the "first attempt" algorithm and the "second attempt" algorithm. Both algorithms will be run with input sizes ranging from 0 to 20, inclusive, and the running times will be recorded. The “first attempt” algorithm is based on recursion and is not very efficient. The “second attempt” algorithm uses arrays and is much more efficient.



The choice between a recursive and an array-based approach for calculating the Fibonacci sequence is a trade-off between performance, design, and understanding. The recursive approach, while elegant and promoting a deeper understanding of the problem, can become slow for larger inputs due to its exponential time complexity. On the other hand, the array-based approach is more efficient and easier to implement and understand, making it a preferred choice for many practical applications. The ideal choice should consider the trade-off between performance, design, and understanding and be based on the specific requirements and constraints of the problem at hand.