“Online” Algorithms (Data Streams): Ideas and code

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1. **INTRODUCTION**

The advent of data streams, characterized by continuous and high-velocity data flow, has necessitated the development of algorithms capable of processing information on-the-fly. Online algorithms offer a solution, allowing for immediate decision-making without the need for complete data storage. This thesis delves into the underlying ideas and coding techniques employed in online algorithms.

1. **Literature Review**

Reviewing existing literature on online algorithms reveals their wide applicability in various domains, including finance, network monitoring, and sensor data analysis. This work consolidates and extends the current understanding of online algorithms, drawing from established theories and practical implementations.

1. **Concepts**

The thesis discusses key concepts such as competitive analysis, where the performance of an online algorithm is compared to an optimal offline algorithm. Additionally, the importance of memory management and adaptability in online algorithms is explored. Theoretical frameworks are complemented by illustrative examples to enhance understanding.

1. **Implementation**

A significant portion of this thesis is dedicated to the practical implementation of online algorithms. Code snippets in popular programming languages such as Python and Java are provided to demonstrate the application of these algorithms in real-world scenarios. This hands-on approach aims to bridge the gap between theoretical knowledge and practical implementation.

1. **Case Studies**

To showcase the versatility of online algorithms, case studies are presented. These include scenarios like real-time analytics in e-commerce, dynamic network routing, and monitoring social media streams. Through these case studies, the thesis elucidates the adaptability and efficiency of online algorithms in dynamic environments.

1. **Conclusion**

In conclusion, this thesis contributes to the understanding and practical implementation of online algorithms for data streams. By combining theoretical insights with hands-on coding examples and case studies, it provides a comprehensive resource for researchers and practitioners in the field. The presented ideas and code snippets serve as a foundation for further exploration and application of online algorithms in the evolving landscape of big data.