Portfolio

Computer Science Student

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Data Structures and Algorithms

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# Introduction

## About Me

I am Mahros, a dedicated and enthusiastic computer science student with a passion for solving complex problems and building efficient solutions. Throughout my studies, I have developed a strong foundation in various programming languages and technologies, which has empowered me to tackle challenging projects and assignments effectively.

## About the Course

The Data Structures and Algorithms course has been a pivotal part of my academic journey, providing me with in-depth knowledge and understanding of the fundamental concepts and techniques used in computer science. This course has covered a wide range of topics, including arrays, linked lists, stacks, queues, trees, hash table, sorting algorithms, and search algorithms. Through hands-on projects, assignments, and quizzes, I have gained practical experience in implementing and optimizing these data structures and algorithms to solve real-world problems efficiently.

## Note on Portfolio Presentation

I consulted one of my senior colleagues at Galala University about the appropriate format for a portfolio, and they advised me to include images of all the project codes I have completed. However, I do not believe this is the most professional way to present programming projects, especially since it is not my first time writing code and sharing it with others. Therefore, I am determined to stick to my approach, which involves providing [**GitHub**](https://www.github.com/elqabasy) links for each project, assignment, and quiz, along with descriptions for each. From my perspective, this is the most professional way to present programming projects.

## Purpose of the Portfolio

The purpose of this portfolio is to highlight the work I have completed during the Data Structures and Algorithms course, with Instructor: **Dr. Shaker EL-Sappagh**. It includes a comprehensive collection of my projects, assignments, and quizzes, highlighting my skills, knowledge, and growth throughout the course. This portfolio serves as a testament to my dedication and proficiency in the field of data structures and algorithms, and it aims to provide a clear and organized presentation of my accomplishments.

# Sections

## Implementations

|  |  |
| --- | --- |
| Linked List | [*View Project*](https://www.github.com/elqabasy) |
| * Implemented a singly linked list with operations for insertion, deletion, and traversal. * Optimized memory usage by managing dynamic allocation and deallocation of nodes. | |

|  |  |
| --- | --- |
| Doubly Linked List | [*View Project*](https://www.github.com/elqabasy) |
| * Designed a doubly linked list to allow traversal in both directions. * Included additional operations for efficient node removal and insertion. | |

|  |  |
| --- | --- |
| Stack | [*View Project*](https://www.github.com/elqabasy) |
| * Created a stack data structure using both array and linked list implementations. * Integrated stack operations like push, pop, and peek with robust error handling. | |

|  |  |
| --- | --- |
| Queue | [*View Project*](https://www.github.com/elqabasy) |
| * Developed a queue data structure using both array and linked list implementations. * Implemented enqueue, dequeue, and peek operations with optimized performance. | |

|  |  |
| --- | --- |
| Deque | [*View Project*](https://www.github.com/elqabasy) |
| * Designed a double-ended queue with support for insertion and deletion at both ends. * Ensured efficient handling of edge cases and memory management. | |

|  |  |
| --- | --- |
| Table | [*View Project*](https://www.github.com/elqabasy) |
| * Built a table data structure for organized storage and retrieval of key-value pairs. * Implemented efficient search and update operations. | |

|  |  |
| --- | --- |
| Hash Table | [*View Project*](https://www.github.com/elqabasy) |
| * Implemented a hash table with separate chaining and open addressing collision resolution techniques. * Optimized the hash function for uniform distribution and minimized collisions. | |

|  |  |
| --- | --- |
| Tree | [*View Project*](https://www.github.com/elqabasy) |
| * Developed various tree structures including binary trees and AVL trees. * Implemented traversal algorithms (in-order, pre-order, post-order) and balancing mechanisms. | |

|  |  |
| --- | --- |
| Binary Search Tree | [*View Project*](https://www.github.com/elqabasy) |
| * Constructed a binary search tree with operations for insertion, deletion, and search. * Enhanced tree balancing to maintain efficient performance. | |

## Projects

|  |  |
| --- | --- |
| Fast Retrieval Contact App | [*View Project*](https://www.github.com/elqabasy) |
| * Developed an application for quick and efficient retrieval of contact information. * Integrated search and filtering functionalities for enhanced user experience. | |

|  |  |
| --- | --- |
| ATM Full Functionality Interface | [*View Project*](https://www.github.com/elqabasy) |
| * Designed an interface for ATM machines with comprehensive functionalities including withdrawals, deposits, and balance inquiries. * Ensured secure transactions with robust error handling and security measures. | |

|  |  |
| --- | --- |
| Bank System Interface | [*View Project*](https://www.github.com/elqabasy) |
| * Created a user-friendly interface for bank systems to manage accounts, transactions, and customer data. * Implemented multi-level authentication and data encryption for security. | |

|  |  |
| --- | --- |
| Scholarship Database | [*View Project*](https://github.com/elqabasy/Scholarship-Database) |
| * Developed a database system to manage scholarship applications, approvals, and disbursements. * Integrated search, filtering, and reporting tools for efficient management of data. | |

## Assignments

|  |  |  |
| --- | --- | --- |
| # | Name | Investigate |
| 1 | Revision on C++ syntax and OOP principles. | [Open](https://github.com/elqabasy/CSE111-Portfolio/material/assignments) |
| 2 | Algorithm time Complexity and Analysis. | [Open](https://github.com/elqabasy/CSE111-Portfolio/material/assignments) |
| 3 | Algorithms merge sort, swap and getIndex functions. | [Open](https://github.com/elqabasy/CSE111-Portfolio/material/assignments) |
| 4 | Queue assignment how to make it and do crud operations | [Open](https://github.com/elqabasy/CSE111-Portfolio/material/assignments) |
| 5 | How to use recursion in function and how to calculate time complexity. | [Open](https://github.com/elqabasy/CSE111-Portfolio/material/assignments) |
| 6 | Hash Table Interactive assignment, how linear collision works | [Open](https://github.com/elqabasy/CSE111-Portfolio/material/assignments) |
| 7 | Asked to implement linked list, and then followed instructions -> on it. | [Open](https://github.com/elqabasy/CSE111-Portfolio/material/assignments) |

## Quizzes

## Skills Learned

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## Reflection

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# Conclusion

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# Contact Information

Feel free to reach out to me through the following links:

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* **VJudge:** [VJudge.net/mahros](https://vjudge.net/user/mahros)
* **LinkedIn:** [LinkedIn/ma7ros](https://www.linkedin.com/in/ma7ros)
* **Website:** [elqabasy.com](https://elqabasy.github.io/)
* **Codeforces:** [Codeforces/mahros](https://codeforces.com/profile/mahros)