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CAB301 Assignment 1

CAB301 – Algorithms and Complexity

Software Application for a Tool Library

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## Introduction

I have attempted to implement each of the required functionalities in both the Staff and Member menus. I made many difficult design choices on how to approach the problems posed by the interfaces, I will explore the most notable choices here.

Firstly, I was not able to come up with an eloquent solution to the problem of MemberCollection storage. In order to get things working for submission I have used a MemberCollection at the program.cs level, and an internal MemberCollection within ToolLibrarySystem.cs. This decision posed challenges with updating/using the correct

Assignment Introduction - It should be a brief introduction to the implementation of your solution with an outline of any design challenges encountered, and deviations from the provided interfaces, how any problems encountered were dealt with and if there are any problems/bugs these need to be declared. It is a summary of the implementation process to briefly highlight the essential design challenges, the general strategy to overcome the challenges and to fully disclose any deviations from the interfaces and declare the existing bugs if any present in the solution

## Design and Analysis of Algorithms

See the Marking Criteria Sheet - the components of the report are shown below. The introduction should include a general discussion about the implementation including any deviations from the specifications/interfaces and declare any bugs/problems/issues encountered in the design process. The algorithm design is a big component so this is essentially the pseudocode and a discussion of the data structures used in the algorithm including the reasons for their choice. The Algorithm analysis should include a theoretical analysis for the determination of the algorithm complexity and I would recommend including an empirical analysis either using time or counts of basic operations. The empirical analysis can support your theoretical analysis and provides a well rounded and complete analysis of your Top 3 algorithm. Finally the Software Test plan providing the screenshots of all the required functionality and a single screenshot of how your application appears at the end of each process (e.g. adding a member, displaying tools) - I would also include in the test plan some evidence of input validation to show that you have considered this as part of your implementation so numbers out of range, wrong data type inputs with the appropriate screen shots.

https://www.youtube.com/watch?v=k72DtCnY4MU

#### Algorithm Design

Allowing for unauthenticated access, the Rankings module displays all of the data, but allows the user to filter server side by Year and Country, through search and drop down boxes. The search functionality is improved with the addition of auto-suggestions, using data retrieved from the countries endpoint. Users are also able to filter/search/sort client side with the inbuilt ag-grid functionality. Pagination has been included to manage the sometimes large amounts of return data.

#### Algorithm Analysis

Allowing for unauthenticated access, the Rankings module displays all of the data, but allows the user to filter server side by Year and Country, through search and drop down boxes. The search functionality is improved with the addition of auto-suggestions, using data retrieved from the countries endpoint. Users are also able to filter/search/sort client side with the inbuilt ag-grid functionality. Pagination has been included to manage the sometimes large amounts of return data.

## Software Test plan and results

|  |  |
| --- | --- |
| **Task** | **Expected Outcome** |
| **Main Menu** | |
| Access staff menu | When correct credentials are supplied, success. |
| Access member menu | When correct credentials are supplied, success. |
| Exiting the program |  |
| **Staff Menu** | |
| Add a new tool to the system |  |
| Increase the quantity of a tool |  |
| Decrease the quantity of a tool |  |
| Register a new member |  |
| Search for a members contact number |  |
| Exit to main menu | Success |
| **Member Menu** | |
| List all the tools of a tool type |  |
| Borrow a tool |  |
| Return a tool |  |
| Display all of my currently borrowed tools |  |
| Display the three most frequently rented tools |  |
| Exit to main menu | Success. |

## References

[NearHuscarl](https://stackoverflow.com/users/9449426/nearhuscarl). (2020, September 26). *ag-Grid React forgets gridApi after it has been set.*  
<https://stackoverflow.com/questions/64071586/ag-grid-react-forgets-gridapi-after-it-has-been-set>