IMPLEMENTATION OF LIBRARY MANAGEMENT SYSTEM

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Summary: The library management system is a project that several people have tackled for years, hence this is not a maiden project. This system is convenient in tackling most of the problems faced when using the traditional book systems in libraries. Computerizing this system has done a lot of good changes. This system provides a user-friendly interface, is prone to less errors, has greater storage capacity, the search feature is better and over all dealings between administrators and users is a quick process.

This system was created, but behind every computer program is a data structure that determines how data is stored in the computer memory i.e. how data is allocated. The main aim of this report is to state clearly what data structure was used to achieve the objectives of the project and how that data structure helped in doing that.

Declaration

The project submitted herewith is a result of my own efforts in totally and in every aspects of the project works. All information that has been obtained from other sources had been fully acknowledged. I understand that any plagiarism, cheating or collusion or any sorts constitutes a breach of College rules and regulations and would be subjected to disciplinary actions.

Introduction

An application was implemented using the C++ language to implement the system. I used GCC compiler to run the code. The program was created to perform the everyday functions that happen in a library. Displaying books in a library, adding books to the library, updating them, deleting the records of the books when returned.

Role Of Linked List

One pressing issue that people face when working on a computer program is the data structure that would be most appropriate. There is a variety of data structures to choose from but what distinguishes them is the purpose of the program. The program tells which data structure would be most suitable for the task at hand. For our library management system, the most prominent activities are inserting, searching and deleting. With these activities in mind, it is up to one to decide which data structure does all the above and utilizes the most resources (space and time). After critically thinking through things like this, this project was handles with linked lists.

With linked lists (a linear data structure), there are types and various means of implementation. In linked lists, the data items are stored in links (a link is an object of a class). There are singly linked lists, double linked list and doubly linked list. Singly linked list is where the main linked list class only points to the first link in the list (has one data member) and all successive links just point to the next/proceeding link. It is easy to insert and delete only the first link. Insertion and deletion of first item has O(1) while searching for an item has O(n). A double linked list has a linked list class with two data members:

One pointing to the proceeding link. With this it is easy to insert and delete the first link and insert at the last link. But with a doubly linked list, all the links have pointers to the previous link as well as the proceeding link. With this type of linked list, insertions and deletions can be done at any part of the link with O(1), it is just a matter of changing the pointers, whether in previous or current links. In every link, there are data members or objects that point to various data members like ID, Book title, Book author, Name of the publisher. Therefore any of the data members/objects can be used as search keys. The keys should be unique to a book.

When new books are brought into the library, we can simply add those books to the link of the linked list class for new books.

Applications Of Library Management System

The library management system is designed to contribute well-management of library functions. It offers ease to perform day to day library operations electronically. This practice being many advantages such as:

- Simple and easy to operate
- Increase librarian's efficiencies
- Search, add, update, and view library materials online
- Helps to manage library functions constructively
- Saves time and reduces overheads
- Reduce library's operating cost
- Customized reports for better management
- Remove manual processes to issue books and maintain records

Conclusion

From the project of the library management system, doubly linked list seemed a good choice and that was what was implemented. Using the doubly linked list had a great advantage as insertions as insertions and deletions are very easy, searches are good and backward traversal is possible.

Bibliography

For completing this project, I used the following sources:

1) Proper understanding of the concept of linked lists.
2) Study of various systems took place in library.

Acknowledgment

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