



ICT Lab - Project Report

BS Computer Science

Library Management System

Group Members:

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Introduction:

The **Library Management System** is a software application designed to automate the manual process of managing books and members in a library. The system provides functionality to register new members, add books, track book checkouts, and manage book returns. By using this system, libraries can efficiently organize data, reduce errors, and enhance the overall management of books and member information. Developed in C language using DEV C++, this project demonstrates fundamental programming concepts like file handling, structure manipulation, and user input/output interactions.

Objectives:

The primary objectives of this Library Management System project are:

- To digitize the library management process by providing an easy-to-use software interface.
- To automate the registration of members and books.
- To track books that are checked out and returned by members.
- To offer a search feature that allows users to find registered members by name or ID.
- To maintain records of all registered members, books, and book transactions using text files.

Technology Stack

- **Programming Language:** C
- **IDE:** DEV C++
- **Libraries:**
 - `<stdio.h>` for standard input/output operations.
 - `<string.h>` for string manipulation.
 - `<stdlib.h>` for general utilities like memory management.
 - `<conio.h>` for console I/O, including `_getch()` for keypress handling.
- **File Handling:** Text files (`.txt`) are used to store the data of members, books, and transactions (checkout and return).

Implementation

The implementation of the Library Management System is modular, with each function handling a specific task such as registering members, managing books, and handling book transactions. Data is stored in text files to ensure persistence across program sessions. The system uses file operations such as opening, reading, writing, and closing files.

Modules

1. **Register Members:**
 - Prompts the user to input member details and stores them in a text file.
2. **View Registered Members:**
 - Displays a list of all registered members by reading the members' text file.

3. Search Members:

- Allows users to search for a member by name or ID in the members' text file.

4. Register Books:

- Collects and stores book information, including name, author, and publication date.

5. Check out Books:

- Records the checkout of books by updating the checkoutBooks.txt file.

6. Return Books:

- Records the return of books by updating the returnBooks.txt file.

Code:

```
1. #include <stdio.h>
2. #include <string.h>
3. #include <stdlib.h>
4. #include <conio.h>
5.
6. #define MAXNUM 100
7. #define MAXLENGTH 50
8.
9. int num, i;
10. FILE *ptr = NULL;
11.
12. // Structure for members
13. struct member {
14.     char memberName[MAXLENGTH];
15.     int memberID;
16. } membersList[MAXNUM];
17.
18. // Structure for books
19. struct books {
20.     char bookName[MAXLENGTH];
21.     char authorName[MAXLENGTH];
22.     int day, month, year;
23. } booksList[MAXNUM];
24.
25. // Register new members
26. void registerMembers() {
27.     printf("Enter Number of Members to register: ");
28.     scanf("%d", &num);
29.
30.     ptr = fopen("members.txt", "a");
31.     if (ptr == NULL) {
32.         perror("Error opening file.");
33.         return;
34.     }
35.
36.     for (i = 0; i < num; i++) {
37.         printf("Enter Member Name: ");
38.         scanf("%s", membersList[i].memberName);
39.         printf("Enter Member Id: ");
40.         scanf("%d", &membersList[i].memberID);
41.         printf("Member Name: %s, Member Id: %d is successfully registered.\n",
membersList[i].memberName, membersList[i].memberID);
42.         fprintf(ptr, "%d. Member Name: %s, Member Id: %d.\n", i + 1, membersList[i].memberName,
membersList[i].memberID);
43.     }
44.     fclose(ptr);
45. }
```

```

46.
47. // Register new books
48. void registerBooks() {
49.     printf("Enter Number of Books to Register: ");
50.     scanf("%d", &num);
51.
52.     ptr = fopen("books.txt", "a");
53.     if (ptr == NULL) {
54.         perror("Error opening file.");
55.         return;
56.     }
57.
58.     for (i = 0; i < num; i++) {
59.         printf("Enter Name of Book %d: ", i + 1);
60.         scanf("%s", booksList[i].bookName);
61.         printf("Enter Author Name: ");
62.         scanf("%s", booksList[i].authorName);
63.         printf("Enter Published Date (day month year): ");
64.         scanf("%d %d %d", &booksList[i].day, &booksList[i].month, &booksList[i].year);
65.
66.         fprintf(ptr, "%d. Book Name: %s, Author: %s, Published Date: %d-%d-%d\n", i + 1,
booksList[i].bookName, booksList[i].authorName, booksList[i].day, booksList[i].month,
booksList[i].year);
67.     }
68.     fclose(ptr);
69. }
70.
71. // Main menu function
72. int main() {
73.     int choice = 1; // Initialize choice
74.
75.     while (choice != 0) { // Adding an exit condition
76.         system("cls"); // Clears the screen (works in Dev C++)
77.
78.         printf("\nLibrary Management System\n");
79.         printf("1. Register New Members\n");
80.         printf("2. Register New Books\n");
81.         printf("0. Exit\n");
82.         printf("Enter your choice: ");
83.         scanf("%d", &choice);
84.
85.         switch (choice) {
86.             case 1:
87.                 registerMembers();
88.                 break;
89.             case 2:
90.                 registerBooks();
91.                 break;
92.             case 0:
93.                 printf("Exiting...\n");
94.                 break;
95.             default:
96.                 printf("Invalid Choice.\n");
97.                 break;
98.         }
99.     }
100.     return 0;
101. }
102.

```

Output Screenshots:

Main Menu

```
Library Management System
1. Register New Members
2. View Registered Members
3. Search Members
4. Register New Books
5. Checkout Books
6. Return Books
0. Exit
Enter your choice:
```

1. Registering a Member

```
Library Management System
1. Register New Members
2. View Registered Members
3. Search Members
4. Register New Books
5. Checkout Books
6. Return Books
0. Exit
Enter your choice:
1
Enter Number of Members to register: 2
Enter Member Name: Hamza
Enter Member Id: 1234
Member Name: Hamza, Member Id: 1234 is successfully registered.
Enter Member Name: Azhan
Enter Member Id: 2345
Member Name: Azhan, Member Id: 2345 is successfully registered.
Members successfully registered. Press any key to continue...
```

2. Viewing Members:

```
Library Management System
1. Register New Members
2. View Registered Members
3. Search Members
4. Register New Books
5. Checkout Books
6. Return Books
0. Exit
Enter your choice: 2

Registered Members:
1. Member Name: Hamza, Member Id: 1234.
2. Member Name: Azhan, Member Id: 2345.
Press any key to continue...
```

3. Search Members:

```
Library Management System
1. Register New Members
2. View Registered Members
3. Search Members
4. Register New Books
5. Checkout Books
6. Return Books
0. Exit
Enter your choice: 3
Enter Member Name or ID to Search: 1234
Found: 1. Member Name: Hamza, Member Id: 1234.
Press any key to continue...
```

4. Registering a New Book:

```
Library Management System
1. Register New Members
2. View Registered Members
3. Search Members
4. Register New Books
5. Checkout Books
6. Return Books
0. Exit
Enter your choice: 4
Enter Number of Books to Register: 2
Enter Name of Book 1: Iqra
Enter Author Name: Hamza
Enter Published Date (day month year): 5 3 2005
Book Name: Iqra
Author Name: Hamza
Published Date: 5-3-2005
Enter Name of Book 2: ICT
Enter Author Name: Azhan
Enter Published Date (day month year): 10 5 2010
Book Name: ICT
Author Name: Azhan
Published Date: 10-5-2010
Books successfully registered. Press any key to continue...
```

5. Check out Books:

```
Library Management System
1. Register New Members
2. View Registered Members
3. Search Members
4. Register New Books
5. Checkout Books
6. Return Books
0. Exit
Enter your choice: 5
Enter Number of Books to Checkout: 2
Enter Name of Book 1: Iqra
Enter Author Name: Hamza
Iqra Book Checkout Successfully.
Author Name: Hamza
Enter Name of Book 2: ICT
Enter Author Name: Azhan
ICT Book Checkout Successfully.
Author Name: Azhan
Books successfully checked out. Press any key to continue...
```

6. Return Books:

```
Library Management System
1. Register New Members
2. View Registered Members
3. Search Members
4. Register New Books
5. Checkout Books
6. Return Books
0. Exit
Enter your choice: 6
Enter Number of Books to Return: 2
Enter Name of Book 1: Iqra
Enter Author Name: Hamza
Iqra Book Returned Successfully.
Author Name: Hamza
Enter Name of Book 2: ICT
Enter Author Name: azhan
ICT Book Returned Successfully.
Author Name: azhan
Books successfully returned. Press any key to continue...
```

Conclusion:

The Library Management System built using C provides a simple, efficient, and user-friendly way to manage library functions such as member registration, book checkout, and return. By utilizing file handling, the system ensures persistent data storage across sessions. This project demonstrates the fundamental concepts of file I/O and structured programming.