PROJECT : LIBRARY MANAGEMENT SYSTEM

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SUBJECT: PROGRAMMING IN C

INTRODUCTION

The Library Management System is a basic C language project designed to simulate the essential operations of a small to medium-sized library. The system allows users, typically library staff, to perform simple yet fundamental tasks such as adding new books to the collection, searching for books by title or author, issuing books to members, returning books, and displaying the full list of books or member records.

Purpose of this Project:

- The purpose of this project is to simplify and digitalize the library book management process.
- The project aims to reduce manual effort, save time, and minimize errors that occur during traditional library operations such as issuing, returning, and searching books.
- It helps to understand how real-world systems use programming concepts such as structures, functions, arrays, and file handling to manage data efficiently.
- Overall, the system provides an organized, efficient, and user-friendly way to maintain library records and improve the overall functioning of a library.

Constraints:

- Limited data storage capacity
- No real time book availability updates across multiple systems
- Single user access
- No online book reservation or renewal system
- Fixed number of books and memebers stored in program

Features of the system:

- View book list
- Add new books
- Issue a book to a member
- Return a book
- Search books by ID or title
- Display member details
- Exit the system

Syntax Concepts Used:

- Variables and Data Types
- Input and Output statements (printf, scanf)
- Conditional statements (if, else if, else)
- Loops (for, while)
- Functions (user-defined functions for each operation)
- Structures (struct Book, struct Member)
- Arrays (array of structures for storing books and members)
- String handling (strcmp, character arrays)
- Switch-like menu using chained conditionals
- Macros (#define MAX 100)

Keywords Used:

Data Types-

- int
- char
- void

Control Statements-

- if
- else
- for

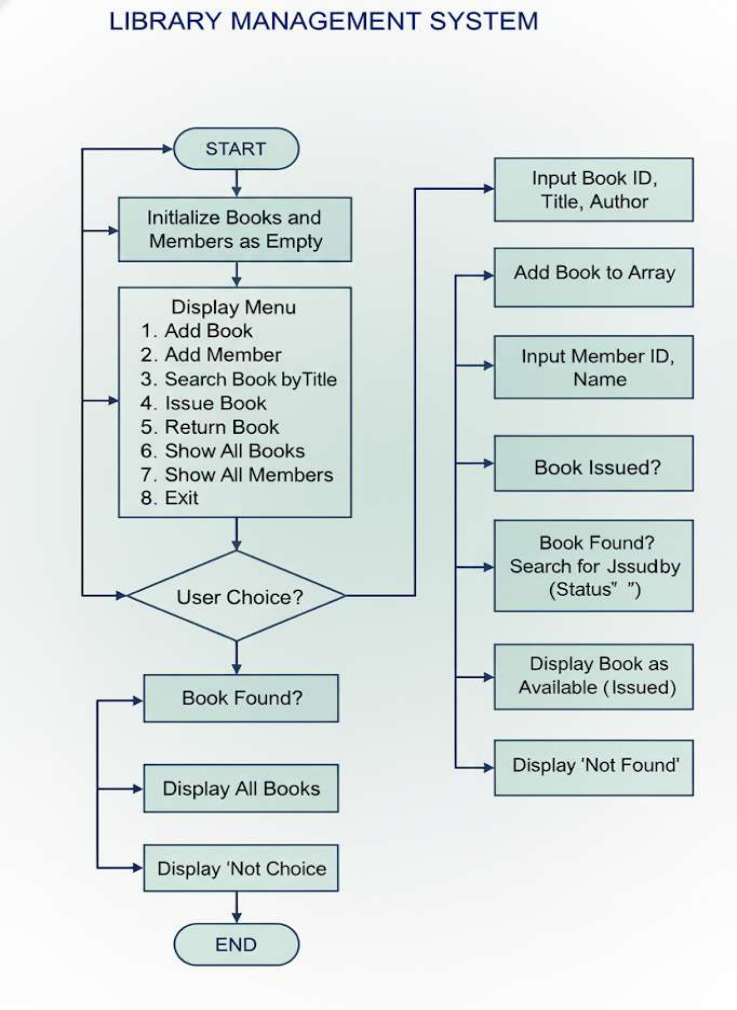
while

- return

Storage / Structure Related-

- struct
- #include (preprocessor directive)
- #define (preprocessor directive)

Flowchart:


LIBRARY MANAGEMENT SYSTEM
START
Initlalize Books and Members as Empty
Display Menu
1. Add Book
2. Add Member
3. Search Book byTitle
4. Issue Book
5. Return Book
6. Show All Books
7. Show All Members
8. Exit
User Choice?
Book Found?
Display All Books
Display 'Not Choice
END
Input Book ID, Title, Author
Add Book to Array
Input Member ID, Name
Book Issued?
Book Found? Search for Jssudby (Status" ")
Display Book as Available (Issued)
Display 'Not Found'

Program:

```c
#include <stdio.h>
#include <string.h>

#define MAX 100

struct Book {
    int id;
    char title[50];
    char author[50];
    int issued;
};

struct Member {
    int id;
    char name[50];
};

struct Book books[MAX];
struct Member members[MAX];
int bcount = 0, mcount = 0;

void addBook() {
    printf("Book ID: "); scanf("%d", &books[bcount].id);
    printf("Title: "); scanf(" %[^\n]", books[bcount].title);
    printf("Author: "); scanf(" %[^\n]", books[bcount].author);
    books[bcount].issued = 0;
    bcount++;
    printf("Book added.\n");
}

void addMember() {
    printf("Member ID: "); scanf("%d", &members[mcount].id);
    printf("Name: "); scanf(" %[^\n]", members[mcount].name);
    mcount++;
    printf("Member added.\n");
}
```

```c
void searchBook() {
    char key[50]; int found = 0;
    printf("Search by Title/Author: ");
    scanf(" %[^\n]", key);
    for (int i = 0; i < bcount; i++) {
        if (strstr(books[i].title, key) || strstr(books[i].author, key)) {
            printf("ID: %d, %s by %s (%s)\n",
            books[i].id, books[i].title, books[i].author,
            books[i].issued ? "Issued" : "Available");
            found = 1;
        }
    }
    if (!found) printf("No match.\n");
}

void issueBook() {
    int id;
    printf("Book ID to issue: "); scanf("%d", &id);
    for (int i = 0; i < bcount; i++) {
        if (books[i].id == id) {
            if (!books[i].issued) {
                books[i].issued = 1;
                printf("Issued.\n");
            } else printf("Already issued.\n");
            return;
        }
    }
    printf("Not found.\n");
}

void returnBook() {
    int id;
    printf("Book ID to return: "); scanf("%d", &id);
    for (int i = 0; i < bcount; i++) {
        if (books[i].id == id) {
            if (books[i].issued) {
                books[i].issued = 0;
                printf("Returned.\n");
            } else printf("Not issued.\n");
            return;
        }
    }
    printf("Not found.\n");
}
```

```c
void displayBooks() {
    for (int i = 0; i < bcount; i++)
        printf("ID:%d | %s | %s | %s\n", books[i].id, books[i].title,
        books[i].author, books[i].issued ? "Issued" : "Available");
}

void displayMembers() {
    for (int i = 0; i < mcount; i++)
        printf("ID:%d | %s\n", members[i].id, members[i].name);
}

int main() {
    int c;
    while (1) {
        printf("\n1.Add Book\n2.Add Member\n3.Search Book\n4.Issue Book\n5.Return Book\n6.Display Books\n7.Display Members\n8.Exit\nChoice: ");
        scanf("%d", &c);
        if (c == 1) addBook();
        else if (c == 2) addMember();
        else if (c == 3) searchBook();
        else if (c == 4) issueBook();
        else if (c == 5) returnBook();
        else if (c == 6) displayBooks();
        else if (c == 7) displayMembers();
        else if (c == 8) break;
        else printf("Invalid.\n");
    }
    return 0;
}
```

Output:

```
1.Add Book
2.Add Member
3.Search Book
4.Issue Book
5.Return Book
6.Display Books
7.Display Members
8.Exit
Choice: 1
Book ID: 1
Title: Programming in C
Author: Abhigyan
Book added.

1.Add Book
2.Add Member
3.Search Book
4.Issue Book
5.Return Book
6.Display Books
7.Display Members
8.Exit
Choice: 1
Book ID: 2
Title: Introduction to C
Author: Mohsin sir
Book added.
```

```
1.Add Book
2.Add Member
3.Search Book
4.Issue Book
5.Return Book
6.Display Books
7.Display Members
8.Exit
Choice: 2
Member ID: 18
Name: Abhigyan
Member added.

1.Add Book
2.Add Member
3.Search Book
4.Issue Book
5.Return Book
6.Display Books
7.Display Members
8.Exit
Choice: 3
Search by Title/Author: Abhigyan
ID: 1, Programming in C by Abhigyan (Available)
```

```
1.Add Book
2.Add Member
3.Search Book
4.Issue Book
5.Return Book
6.Display Books
7.Display Members
8.Exit
Choice: 4
Book ID to issue: 1
Issued.

1.Add Book
2.Add Member
3.Search Book
4.Issue Book
5.Return Book
6.Display Books
7.Display Members
8.Exit
Choice: 5
Book ID to return: 1
Returned.
```

```
1.Add Book
2.Add Member
3.Search Book
4.Issue Book
5.Return Book
6.Display Books
7.Display Members
8.Exit
Choice: 6
ID:1 | Programming in C | Abhigyan | Available
ID:2 | Introduction to C | Mohsin sir | Available

1.Add Book
2.Add Member
3.Search Book
4.Issue Book
5.Return Book
6.Display Books
7.Display Members
8.Exit
Choice: 7
ID:18 | Abhigyan

1.Add Book
2.Add Member
3.Search Book
4.Issue Book
5.Return Book
6.Display Books
7.Display Members
8.Exit
Choice: 8


...Program finished with exit code 0
Press ENTER to exit console.
```