Experiment No. 8

Library Management Using Arrays in C

Aim: Library Book Tracker

Write a C program that simulates a simple library book-borrowing tracker. The program should allow a librarian to enter a list of books and record which users have borrowed them. The system must also validate inputs to ensure correctness.

Program Requirements:

1. Input the number of users and books (The values must be between 1 and 10.)
2. Store and display book titles
3. Record borrowing information
    - The program must validate that only 0 or 1 is entered.
4. Display a borrowing summary
    - For each book, display how many users borrowed it.
5. End with a message indicating that the library record update was completed.

Learning Outcomes:

After completing this experiment, students will be able to:

- Understand how to store and manage data using 1D and 2D arrays in C.
- Apply array manipulation techniques to track multiple records effectively.
- Develop logic to simulate book borrowing and availability tracking in a library system.
- Enhance understanding of multidimensional data representation using arrays.
- Gain practical experience in real-life data organization and management using programming concepts

Theory:

In C programming, arrays are used to store collections of related data items. A 1D array can store a list of elements such as book titles, while a 2D array can represent tabular data, like the number of copies borrowed by each user.

For example, in a library management system:
- A 1D array may hold book titles.
- A 2D array may hold user-book borrowing records, where rows represent users and columns represent books.

Example concepts used in this program:

```
// Example representation
char books[3][30] = {"C Programming", "Data Structures", "Operating Systems"};
int borrowed[5][3]; // 5 users, 3 books

// Updating borrow status
borrowed[user][book] = 1; // Marks that user has borrowed the book
```

By using arrays, we can efficiently manage multiple users and books without relying on database systems. Control structures like loops and conditionals help in checking availability and updating borrowing records dynamically.

Program Code:

Students are expected to implement this experiment by writing the complete C program for the Library Management System Using Control Flow Constructs and Arrays in C.

Output:

Students are expected to execute the program and provide various sample outputs for the same code to demonstrate its functionality with different input values.

Conclusion: In this experiment, a Library Management System was successfully developed using Control flow constructs and Arrays in C.