



Ahsanullah University of Science and Technology (AUST)
Department of Computer Science and Engineering

BookVault

Course No.: CSE4126

Course Title: Distributed Database Systems Lab

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BookVault: Library and Book Sale

BookVault is a revolutionary distributed database system for libraries, streamlining book storage, access, and inventory management. Its distributed architecture ensures reliability and scalability, while its built-in sales feature allows libraries to sell surplus copies. This innovative system offers a one-stop solution for enhanced library operations.

We primarily planned to use a fragmentation schema based on available books. For example, if the **Global Schema** for our system is:

Members (Phone_No, Name, Address, Membership_status, Start_date_lib, End_date_lib, Card)

Books (Book_ID, Title, Author, Publication, Price)

Book Copies (Copy_ID, Book_ID, Books_At_Library, Availability_Status_Library, Availability_Status_Shop)

Borrowers (Borrow_ID, Phone_No, Book_ID, Loan_Date, Return_Date, fine)

Purchases (Purchase_ID, Phone_No, Book_ID, Purchase_Date)

The **Fragmentation schema** will be:

$Members_1 = SL_{status='reader'} Members$

$Members_2 = SL_{status='customer'} Members$

$Members_3 = SL_{status='both'} Members$

$Books_1 = PJ_{Book_ID, Title, Author, Publication} Books$

$Books_2 = PJ_{Book_ID, Title, Price} Books$

$Book_Copies_1 = PJ_{Copy_ID, Book_ID, Books_at_library, Availability_status_library} Book_Copies$

$Book_Copies_2 = PJ_{Copy_ID, Book_ID, Availability_status_shop} Book_Copies$

The **Allocation schema** will be:

Library_Site: *Members1, Books1, Book_Copies1, Borrowers*

Stationary_Site: *Members2, Members3, Book Copies2, Purchases*

Functionalities with Output:

Show all Members: Here all the members will be shown both Reader and Customer.

```
All members name with their name and phone no:
Member Name: Md. Rahman, Phone: 01801234567
Member Name: Farhana Akter, Phone: 01654321098
Member Name: Shahnaz Begum, Phone: 01787654321
Member Name: Sarwar Hossain, Phone: 01543210987
Member Name: Rahman, Phone: 01708975296
Member Name: Asiqur, Phone: 01954628346
Member Name: Abdul Karim, Phone: 01987654321
```

For Stationary Site:

Register User: Collect user information, such as Mobile No, Name and any required additional details.

```
Enter value for phone: 0178975296
Enter value for name: Rahman
Enter value for address: Nagarpur

Procedure created.

A new record was inserted into Members2 table.
```

Show all Customers: Here all customers will be shown.

Name	Phone No	Start Date
Sarwar Hossain	01543210987	15-JUL-23
Rahman	01708975296	
Shahnaz Begum	01787654321	30-JUL-23
Asiqur	01954628346	22-AUG-23
Abdul Karim	01987654321	01-JAN-23

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```
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Member Name: Sarwar Hossain, Phone: 01543210987
Member Name: Rahman, Phone: 01708975296
Member Name: Asiqur, Phone: 01954628346
Member Name: Abdul Karim, Phone: 01987654321
```

Check Book Availability: Check if there is a book available or not.

```
Enter value for book_title: 1984    Enter value for book_title: had
Book available. Book Price: 9.99    Book not available.
```

Show Books in Price: Show all the books in particular range.

```
Enter value for max_price: 8
Title: Kabuliwala, Author: Rabindranath Tagore, Publisher: Bangla Publisher
```

Add New Book: When new books will be arrival, then add it into Books Table.

```
Enter value for new_title: Paradoxical Sazid
Enter value for new_price: 6.5
A new record was inserted into Books2 table.
New book added successfully.
```

Update Availability Status: If new books which is arrival are already existed, then update the availability status of that book.

```
Enter value for book_title: Paradoxical Sazid
Enter value for books_to_add: 5
Availability status updated successfully.
```

Insert Members2 & Members3 Procedure: Data will be inserted automatically when needed.

Buy Books: This action will be perform to using this.

```
Enter value for phone_no: 01954628346
Enter value for book_title: 1984
=
This book is available. Pay Amount: 9.99
A new record was inserted into Members2 table.
Member inserted successfully.
A record was updated in Book_Copies2 table.
A new record was inserted into Purchases table.
Book bought successfully.
```

For Library Site:

Register user: Users will be registered using this feature taking required inputs.

```
Enter value for phone: 01767323258
Enter value for name: Shuvo
Enter value for address: Munshiganj

Procedure created.

A new record was inserted into Members1 table.
```

Check Membership: Checks membership status.

```
Enter value for phone_no: 01767323258
Already a reader.
```

```
Enter value for phone_no: 01723321696
Not a member.
```

Show Available Books and Status: Show all books available now as 1 and when the unavailable books will be available.

Title	Author	Publication	Availability
Pride and Prejudice	Jane Austen	Publisher A	13-AUG-231
1984	George Orwell	Publisher B	14-AUG-231
To Kill a Kingdom	Alexandra Christo	Publisher B	1

Renew card: Cards status can be renewed if expired.

```
Enter value for phone: 01767323258
Card status renewed and End_Date_Lib updated.
```

Borrow Books: Books can be borrowed if available using this function.

```
Enter value for borrower_phoneno: 01767323258
Enter value for book_to_borrow: 1984
Enter value for days: 5
A record was updated in Borrowers table.
A record was updated in Borrowers table.
A record was updated in Borrowers table.
A record was updated in Book_Copies1 table.
A new record was inserted into Borrowers table.
Book borrowed successfully.
```

Update Status and fine: Card status will be updated as Invalid when the end date does meet. Also a fine will be given if the book is not returned on a specified date.

Show All borrowers: will show all borrowers and status and fine

```
A record was updated in Borrowers table.
A record was updated in Borrowers table.
A record was updated in Borrowers table.
Name                Address                Phone No      Loan Date Return Date Fine
-----
Farhana Akter       Khulna                01654321098  28-JUL-23  11-AUG-23   60
Md. Rahman          Dhaka                01801234567  30-JUL-23  13-AUG-23   60
Abdul Karim         Rajshahi              01987654321  31-JUL-23  14-AUG-23   60
```

Return Book: Can return book and the status for that book will be updated

```
Enter value for phone_no: 01654321098
Borrowed book returned with 60 late fee.
A record was deleted from Borrowers table.
A record was updated in Book_Copies1 table.
```

Update Library Book Status: If a new book comes to the library using this function status can be updated.

COPY_ID	BOOK_ID	BOOKS_AT_LIBRARY	AVAILABILITY_STATUS_LIBRARY
1	1	5	6
2	5	3	6
3	2	9	5
4	3	2	7
5	4	4	6

Show all readers: All readers information will be shown.

Name	Phone No	Start Date	End Date	Card
Farhana Akter	01654321098	15-MAR-23	31-DEC-23	Valid
Md. Rahman	01801234567	31-JUL-23	31-DEC-23	Valid
Abdul Karim	01987654321	01-JAN-23	31-DEC-23	Valid

Project Contribution:

