**Library Management System Project 2 - Phase 3 Report**

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CSE 3330 Database

**Honor Code**

We pledge, on our honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

We promise that we will submit only work that we personally create or that we contribute to group collaborations, and we will appropriately reference any work from other sources. we will follow the highest standards of integrity and uphold the spirit of the Honor Code.

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**Task 1: Database Modifications and Queries**

**Query 1:**

*ALTER TABLE BOOK\_LOANS ADD COLUMN Late INTEGER DEFAULT 0;*

* Add Late column to BOOK\_LOANS table
* Update Late values

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* Action Output: Column added, and 21 rows affected

**Query 2:**

*ALTER TABLE LIBRARY\_BRANCH ADD COLUMN LateFee DECIMAL(10,2) DEFAULT 0.00;*

* Add LateFee column to LIBRARY\_BRANCH table
* Update LateFee values for each branch

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* Action Output: Column added, and 5 branches updated

**Query 3: Create View :**

*CREATE VIEW vBookLoanInfo AS*

*SELECT*

*BL.Card\_No,*

*BR.Name as 'Borrower Name',*

*BL.Date\_Out,*

*BL.Due\_Date,*

*BL.Returned\_date,*

*CASE*

*WHEN BL.Returned\_date IS NOT NULL THEN*

*julianday(BL.Returned\_date) - julianday(BL.Date\_Out)*

*ELSE*

*julianday('now') - julianday(BL.Date\_Out)*

*END as TotalDays,*

*B.Title as 'Book Title',*

*CASE*

*WHEN BL.Returned\_date IS NOT NULL AND BL.Returned\_date > BL.Due\_Date THEN*

*julianday(BL.Returned\_date) - julianday(BL.Due\_Date)*

*WHEN BL.Returned\_date IS NOT NULL AND BL.Returned\_date <= BL.Due\_Date THEN*

*0*

*ELSE 0*

*END as DaysLate,*

*BL.Branch\_Id,*

*CASE*

*WHEN BL.Returned\_date IS NOT NULL AND BL.Returned\_date > BL.Due\_Date THEN*

*(julianday(BL.Returned\_date) - julianday(BL.Due\_Date)) \* LB.LateFee*

*ELSE 0*

*END as LateFeeBalance*

*FROM BOOK\_LOANS BL*

*JOIN BORROWER BR ON BL.Card\_No = BR.Card\_No*

*JOIN BOOK B ON BL.Book\_Id = B.Book\_Id*

*JOIN LIBRARY\_BRANCH LB ON BL.Branch\_Id = LB.Branch\_Id;*

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**Results Verification**

1. Query 1

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2. Query 2:

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3. Query 3:  
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**Action Output Response**

* Query 1: Successfully added Late column and updated 21 loan records
* Query 2: Successfully added LateFee column and updated 5 branch records
* Query 3: Successfully created view vBookLoanInfo
* View Query Result: 21 rows returned

# Task 2: GUI Implementation

1. **Book Checkout Feature**

Purpose: Allows one to check out books to borrowers, with automatic copy count updates.

Implementation:

- Input fields for Book ID, Branch ID, and Card Number

- Validates available copies before checkout

- Updates book copies automatically through database trigger

- Shows confirmation message upon successful checkout

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**2. New Borrower Registration**

Purpose: Adds new borrowers to the system with automatic Card Number assignment.

Implementation:

- Input fields for Name, Address, and Phone

- Automatically generates unique Card Number

- Displays assigned Card Number upon successful registration

- Clear form inputs after successful addition

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**3. Add New Book Feature**

Purpose: Adds new books to all library branches with automatic copy distribution.

Implementation:

- Input fields for Title and Author

- Dropdown menu for existing Publishers

- Automatically adds 5 copies to each branch

- Handles Book\_Id assignment automatically

- Shows confirmation of successful addition

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**4. View Copies Feature**

Purpose: Displays the number of copies available and loaned out for any book across all branches.

Implementation:

- Search by book title

- Results table shows:

- Branch Name

- Total Copies

- Copies Currently Loaned

A screenshot of a library management system

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**5. Late Returns Search Feature**

Purpose: Tracks late book returns within a specified date range.

Implementation:

- Date range selection (YYYY-MM-DD format)

- Results display:

- Book Title

- Borrower Name

- Due Date

- Return Date

- Days Late calculation

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**6. Search Features**

Purpose: Comprehensive search functionality for both borrowers and books.

6.1 **Borrower Search**

Implementation:

- Search by ID, name, or partial name

- Results display:

- ID

- Name

- Total Late Fees (in $)

- Ordered by late fee amount

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**6.2 Book Search**

Implementation:

- Search by book title or ID

- Optional borrower ID filter

- Results display:

- Book Title

- Borrower Name

- Due Date

- Late Fee ($)

- Ordered by late fee amount

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Task List

Project Contribution List

**Chris Atuti:**

- GUI development using Python

- Implementation of Book checkout and New Borrower features

- Database trigger implementation

- Testing and debugging

- Documentation preparation

- Report creation

- Installation guide

**Waheeb Mussa:**

- Database schema design and implementation

- SQL query development

- Data import and verification

- Late fee calculation logic

- Search functionality implementation

- Code review

Shared Responsibilities:

- Project planning and design

- Requirements analysis

- Testing

- Documentation review

- Demo

References

Elmasri, R., & Navathe, S. B. (2016). Chapter 6: Basic SQL. *Fundamentals of Database Systems*.

* Specifying Constraints (Slides 21-24)
* Basic SQL Queries (Slides 29-32)
* Data Modification (Slides 44-51)

Elmasri, R., & Navathe, S. B. (2016). Chapter 7: Advanced SQL. *Fundamentals of Database Systems*.

* Library Management System Examples
* Late Fee Calculations
* View Management

SQLite Development Team. SQLite Version 3.35.4 Documentation. <https://www.sqlite.org/docs.html>

Python Software Foundation. Tkinter - Python Interface to Tcl/Tk. Python Documentation.