

University of Engineering and Technology

New Campus, Lahore.



Department of Computer Science

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Project Name:

Library Management System (LMS)

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Library Management System (LMS)

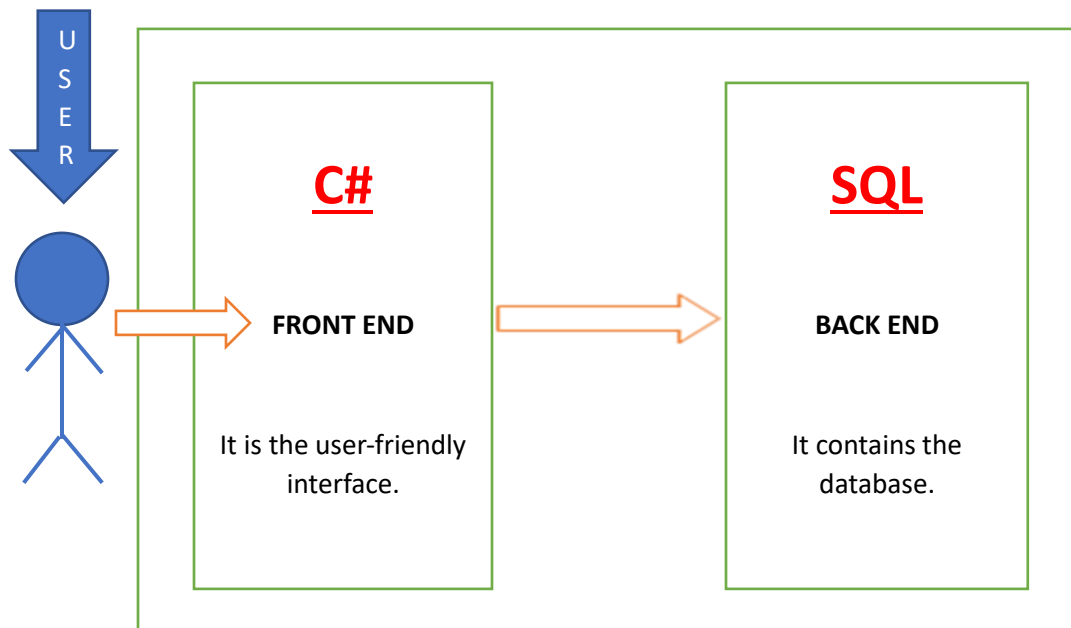
ABSTRACT:

The primary goal of the Library Management System is to simplify and enhance library operations, allowing librarians and library staff to effectively manage books, track borrowing and returning activities.

INTRODUCTION:

The project titled “Library Management System” is a Library management software for monitoring and controlling the transactions in a library.

The project “Library Management System” is developed in C#, which mainly focuses on basic operations in a library like adding new member, new books, and updating new information and members to borrow and return books.



MODULES:

The software Library Management System has four main modules.

1. Insertion to Database Module - User friendly input screen
2. Extracting from Database module – Attractive Output Screen
3. Report Generation module
 - Borrowed book list
 - Available book list
 - Returned book list

Activities:

- Add/Delete books.
- Maintain the database.
- View user details.
- Issue books.
- Return books.
- Maintain user details.

Created Tables:

1. CREATE TABLE [dbo].[IssueTbl]

```
(  
    [INum] INT NOT NULL PRIMARY KEY IDENTITY,  
    [StId] INT NOT NULL,  
    [StName] VARBINARY(20) NOT NULL,  
    [BookId] INT NOT NULL,  
    [BookName] VARCHAR(20) NOT NULL,  
    [IssueDate] DATE NOT NULL  
    CONSTRAINT [FK_IssueTbl_StudentTbl] FOREIGN KEY ([StId]) REFERENCES [dbo].[StudentTbl]  
    ([StId]),  
    CONSTRAINT [FK_IssueTbl_BookTbl] FOREIGN KEY ([BookId]) REFERENCES [dbo].[BookTbl]  
    ([BId])  
)
```

2. CREATE TABLE [dbo].[BookTbl]

```
(  
    [BId] INT NOT NULL PRIMARY KEY IDENTITY,  
    [BName] VARCHAR(20) NOT NULL,  
    [BAuthor] VARCHAR(20) NOT NULL,  
    [BPublisher] VARCHAR(100) NOT NULL,  
    [BPrice] INT NOT NULL,  
    [Bqty] INT NOT NULL  
)
```

3. CREATE TABLE [dbo].[LibrarianTbl]

```
(  
    [LibId] INT NOT NULL PRIMARY KEY IDENTITY(500, 1),  
    [LibName] VARCHAR(20) NOT NULL,  
    [LibPhone] VARCHAR(20) NOT NULL,  
    [LibPass] VARCHAR(20) NOT NULL  
)
```

4. CREATE TABLE [dbo].[ReturnTbl] (

```
    [RNum] INT NOT NULL IDENTITY,  
    [StdId] INT NOT NULL,  
    [StName] VARCHAR(20) NOT NULL,  
    [BookId] INT NOT NULL,  
    [BookName] VARCHAR(20) NOT NULL,  
    [IssueDate] DATE NOT NULL,  
    [ReturnDate] DATE NOT NULL,  
    [Fine] INT NOT NULL,  
    PRIMARY KEY CLUSTERED ([RNum] ASC)  
    CONSTRAINT [FK_ReturnTbl_BookTbl] FOREIGN KEY ([BookId]) REFERENCES [dbo].[BookTbl]  
    ([BId]),
```

```
CONSTRAINT [FK_ReturnTbl_StudentTbl] FOREIGN KEY ([StId]) REFERENCES [dbo].[StudentTbl]
([StId])
);
```

5. CREATE TABLE [dbo].[StudentTbl]

```
(
    [StId] INT NOT NULL PRIMARY KEY IDENTITY(100, 1),
    [StName] VARCHAR(20) NOT NULL,
    [StDep] VARCHAR(20) NOT NULL,
    [StSem] INT NOT NULL,
    [StPhone] NCHAR(20) NOT NULL
)
```

6. CREATE TABLE [dbo].[IssuedBooksData] (

```
    [Id] INT IDENTITY (1, 1) NOT NULL,
    [Log_data] VARCHAR (100) NOT NULL,
    PRIMARY KEY CLUSTERED ([Id] ASC)
);
```

Note:

The "PRIMARY KEY" constraint indicates the primary key column(s) for each table, ensuring uniqueness and efficient retrieval of data. The "IDENTITY" attribute specifies that the column is an identity column, automatically generating unique values. The data types specified for each column define the format and size of the data stored in the table.

ENTITIES:

- [dbo].[IssueTbl]([INum] , [StId] , [StName] , [BookId] , [BookName] , [IssueDate])
- [dbo].[BookTbl]([BId] , [BName] , [BAuthor] , [BPublisher] , [BPrice] , [Bqty])
- [dbo].[LibrarianTbl]([LibId] , [LibName] , [LibPhone] , [LibPass])
- [dbo].[ReturnTbl] ([RNum] , [StId] , [StName] , [BookId] , [BookName] , [IssueDate] , [ReturnDate] , [Fine])
- [dbo].[StudentTbl]([StId] , [StName] , [StDep] , [StSem] , [StPhone])

Tables Documentation:

1. IssueTbl:

- INum: Unique identifier for each issued book.
- StdId: The ID of the student who issued the book.
- StName: The name of the student who issued the book.
- BookId: The ID of the book that was issued.
- BookName: The name of the book that was issued.
- IssueDate: The date on which the book was issued.

2. BookTbl:

- BId: Unique identifier for each book in the library.
- BName: The name of the book.
- BAuthor: The author of the book.
- BPublisher: The publisher of the book.
- BPrice: The price of the book.
- Bqty: The quantity of the book available in the library.

3. LibrarianTbl:

- LibId: Unique identifier for each librarian.
- LibName: The name of the librarian.
- LibPhone: The phone number of the librarian.
- LibPass: The password for the librarian's account.

4. ReturnTbl:

- RNum: Unique identifier for each returned book.
- StdId: The ID of the student who returned the book.
- StName: The name of the student who returned the book.
- BookId: The ID of the book that was returned.
- BookName: The name of the book that was returned.
- IssueDate: The date on which the book was issued.

- ReturnDate: The date on which the book was returned.
- Fine: The amount of fine, if any, associated with the returned book.

5. StudentTbl:


- StId: Unique identifier for each student.
- StName: The name of the student.
- StDep: The department of the student.
- StSem: The semester in which the student is currently enrolled.
- StPhone: The phone number of the student.

SAMPLE SCREENSHOTS

SPLASH:



LOGIN PAGE:



Library Management System

UserName

Password

Login

[Admin](#)

ADMIN LOGIN PAGE:



ADMIN LOGIN

Password

Login

[Back](#)

LIBRARIAN:

 Librarians 

Librarians Details

Name

Phone

Password

Save

Edit

Delete

Reset

Librarians List

	LibId	LibName	LibPhone	LibPass
▶	504	Ahmad	0321456987	ahmad
	507	Masood	03124667895	masood
	509	Mudassir	032444670727	mudassir
	511	Hamza	03698752158	hamza
*				

View_Check

Back

MAIN FORM:

Welcome to Library Software


Student




Books


Issue


Return



STUDENTS DETAIL:

 Students 



Students Details

Name Department Semester Phone

Students List

	StId	StName	StDep	StSem	StPhone
▶	100	Mudassir Ali	CS	4	03444670727
	105	Masood Ali	Medical	5	033325802145
	106	Sajawal	Electric	6	03127896525
	109	Akbar Asghar	Chemical	2	03124569877
	110	Ahmad Murtaza	CS	8	03132356895
	111	Ali	Electric	3	0312456789

BOOKS DETAIL:

 Books 



Books Details

Name Author Publisher Price Quantity

Books List

	BId	BName	BAuthor	BPublisher	BPrice	BQty
▶	1	C#	Mudassir	Ahmad	4040	25
	2	10 Rules of Love	Ahmad Murtaza	Mudassir Ali	2230	10
	3	JavaScript	Ritchell Marsh	Dennis lib	5000	50
	6	Islamic Ways	Hafiza Ayesha	Shahab Prints	1500	80
	10	Python for All	Marsh Dellen	CS Prints	2200	15
	11	DataBase System	Tom Ritched	CS Prints	1600	20
	13	Hakayaat	Luqman Ali	Shahab Prints	1200	8

ISSUED BOOKS DETAIL:

 Issue Books 

Issue Details

Student ID

100

Name

Book ID

1

Book Name

Issue Date

23-May-23

Submit

Edit

Reset

Books Issued


	INum	StId	StName	BookId	BookName	IssueDate
▶	13	100	Mudassir Ali	1	C#	08-Mar-23
	20	109	Akbar Asghar	11	DataBase System	22-Mar-23
	22	105	Masood Ali	3	JavaScript	01-May-23
	23	110	Ahmad Murtaza	11	DataBase System	02-May-23
	24	111	Ali	13	Hakayaat	10-May-23
	25	112	Guru	14	House of Drago...	28-Apr-23

Search_Book

Back

Log_Check

TRIGGER (LOG_CHECK issued books history):



Welcome to Library Software 

Transactions Log

Id	Log_data
11	Student With ID: 100 Borrowed Book with Id: 2 ON 2023-05-08
12	Student With ID: 105 Borrowed Book with Id: 3 ON 2023-04-19
15	Student With ID: 105 Borrowed Book with Id: 3 ON 2023-05-01
13	Student With ID: 106 Borrowed Book with Id: 6 ON 2023-04-29
14	Student With ID: 109 Borrowed Book with Id: 11 ON 2023-03-22
16	Student With ID: 110 Borrowed Book with Id: 11 ON 2023-05-02

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RETURNED BOOKS DETAIL:

 Return Books 

Return Details

Student ID	Name	Book ID	Book Name	Issue Date	Return Date	Fine
112	Guru	14	House of Dragons	28-Apr-23	23-May-23	Rs 100

Return

Reset

Calculate

Books Issued

	INum	StId	StName	BookId
	13	100	Mudassir Ali	1
	20	109	Akbar Asghar	11
	22	105	Masood Ali	3
	23	110	Ahmad Murtaza	11
	24	111	Ali	13
▶	25	112	Guru	14


View_Check

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Books Returned

	RNum	StId	StName	Book	BookName	IssueDate	ReturnDate	Fine
	18	105	Masood ...	2	10 Rules ...	08-A...	17-May-...	240
	19	100	Mudassir...	2	10 Rules ...	28-A...	17-May-...	40
▶	21	100	Mudassir...	2	10 Rules ...	08-M...	31-May-...	80
	14	102	Ahmad ...	1	C#	15-M...	17-May-...	0
	11	109	Akbar As...	11	DataBas...	25-A...	16-May-...	60
	12	109	Akbar As...	11	DataBas...	03-M...	31-May-...	130

VIEW (View Check Returned books history):

Welcome to Library Software 

Data View

	StId	StName	StDep	StSem	StPhor	BookId	BookName	BAutho	BPublis	IssueDate	ReturnDate
▶	100	Muda...	CS	4	0344...	1	C#	Muda...	Ahmad	10-May-23	15-May-23
	105	Maso...	Medical	5	0333...	3	JavaSc...	Ritch...	Denni...	08-May-23	31-May-23
	109	Akbar ...	Chemi...	2	0312...	11	DataB...	Tom ...	CS Pri...	25-Apr-23	16-May-23
	109	Akbar ...	Chemi...	2	0312...	11	DataB...	Tom ...	CS Pri...	03-May-23	31-May-23
	100	Muda...	CS	4	0344...	1	C#	Muda...	Ahmad	01-May-23	17-May-23
	109	Akbar ...	Chemi...	2	0312...	11	DataB...	Tom ...	CS Pri...	01-May-23	31-May-23

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SEARCH BOOK:

Welcome to Library Software

Book Name:

10 Rules of Love

Search

	BId	BName	BAuthor	BPublisher	BPrice	Bqty
▶	2	10 Rules of Love	Ahmad Murtaza	Mudassir Ali	2230	10
*						

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NORMALIZATION:

Normalization is a process in database design that aims to eliminate data redundancy and improve data integrity by organizing data into well-structured relations (tables) based on a set of rules called normal forms. The goal of normalization is to minimize data duplication and ensure that each piece of data is stored in only one place, avoiding update anomalies and inconsistencies.

There are several normal forms in database normalization, each with its own set of rules. The commonly known normal forms are:

1. **First Normal Form (1NF):** Ensures that each column in a table contains only atomic (indivisible) values and there are no repeating groups of columns.
2. **Second Normal Form (2NF):** Builds upon 1NF and ensures that all non-key attributes in a table are functionally dependent on the entire primary key. It eliminates partial dependencies.
3. **Third Normal Form (3NF):** Builds upon 2NF and ensures that there are no transitive dependencies, where a non-key attribute is functionally dependent on another non-key attribute.

There are higher normal forms like Boyce-Codd Normal Form (BCNF), Fourth Normal Form (4NF), and Fifth Normal Form (5NF) that address more complex dependencies and further eliminate anomalies.

Normalization helps in organizing data efficiently, reducing data redundancy, maintaining data consistency, and improving database performance. It is an iterative process that involves analyzing the relationships and dependencies among data attributes to determine the appropriate normalization level for a given database schema.

ANALYZATION OF TABLES FOR NORMALIZATION:

1. **IssueTbl:**

- The table has a primary key (**INum**) that uniquely identifies each row.
- The columns (**StId**, **BookId**) are foreign keys referencing the primary keys of other tables (**StudentTbl** and **BookTbl**).
- All the non-key attributes (**StName**, **BookName**, **IssueDate**) are directly dependent on the primary key.
- Therefore, **IssueTbl** satisfies 3NF.

2. **BookTbl:**

- The table has a primary key (**BId**) that uniquely identifies each row.
- All the attributes (**BName**, **BAuthor**, **BPublisher**, **BPrice**, **Bqty**) are directly dependent on the primary key.
- Therefore, **BookTbl** satisfies 3NF.

3. **LibrarianTbl:**

- The table has a primary key (**LibId**) that uniquely identifies each row.
- All the attributes (**LibName**, **LibPhone**, **LibPass**) are directly dependent on the primary key.
- Therefore, **LibrarianTbl** satisfies 3NF.

4. **ReturnTbl:**

- The table has a primary key (**RNum**) that uniquely identifies each row.
- The columns (**StId**, **BookId**) are foreign keys referencing the primary keys of other tables (**StudentTbl** and **BookTbl**).
- All the non-key attributes (**StName**, **BookName**, **IssueDate**, **ReturnDate**, **Fine**) are directly dependent on the primary key.
- Therefore, **ReturnTbl** satisfies 3NF.

5. **StudentTbl:**

- The table has a primary key (**StId**) that uniquely identifies each row.
- All the attributes (**StName**, **StDep**, **StSem**, **StPhone**) are directly dependent on the primary key.
- Therefore, **StudentTbl** satisfies 3NF.

In summary, all the given tables (**IssueTbl**, **BookTbl**, **LibrarianTbl**, **ReturnTbl**, **StudentTbl**) satisfy the requirements of the Third Normal Form (3NF).

ENTITY – RELATIONSHIP DIAGRAM

