

Project Group 50: Jacob Hathaway and Kevin Kraatz

Flask App (be sure to use the VPN):

<http://flip1.engr.oregonstate.edu:53266>

## Executive Summary:

Over the course of this project we have gained many valuable insights through the development of the Local Library Database Management Application. During the project creation phase, we spent a lot of time focusing on the best way to organize the data into manageable entities and their relationships. Overall, the data organization remained fairly consistent throughout the project. We made one name change based on user feedback from “artist” to “creator” to make the terminology more generic and more applicable to all media types. Originally we had chosen to have a primary and alternate supplier for each media item. However, based on peer feedback, we thought that this information was unnecessary and so we restricted it to just an optional, primary supplier. We also had two additional tables in the beginning for media type (book, music, movie, magazine) and for transaction type (checkin, checkout) and based on grader feedback, we removed those tables and simply made them attributes since they weren’t likely to change and didn’t require a table. This decreased our design complexity and simplified the implementation.

During the development of the SQL files, we also learned a great deal about the best way to write the queries. When we created the sample insert data, we wrote separate insert statements. This made the file a lot longer and unnecessarily complicated. After a suggestion from a peer reviewer, we were able to simplify the queries by chaining the insert statements together so that only one insert statement was necessary per table. We also made a change to allow item replacement cost and patron fine amount to be null. These changes allow the web application user to simply leave those fields blank when they do not apply or the information is not known at that time.

Finally, during the development of the UI, we made quite a few changes throughout the course of the project based on feedback from users and their experiences. At first we implemented some of the CRUD operations that were dependent on foreign keys as text fields where the user would have to specify the correct foreign key. This was not practical since it could be easy to type incorrectly. To solve this problem, we implemented combination boxes with searchable and scrollable dropdown menus. This allows a user to search for and select the right option right in the field. We also implemented tooltips to enhance user experience and to describe what should go in each field, formatting for phone numbers, and dynamic messages that say what edit or delete would take place if a button is clicked. We felt that these UX features enhance the usability of the application. Another design element that we changed early on was the ordering of the information on the webpages. Originally we had the search results table at the top of the page, but we quickly realized that if the dataset contained a lot of entries, users would have to scroll all the way to the bottom to add a new entry.

Overall, the project was a great success thanks to the help and feedback from instructors and peer reviewers and it greatly improved the final quality of our product.

## Project Outline:

A local library that serves a small community with a population of 10,000 residents needs a way to track and manage its business data. The database will contain entity tables for at most 5 *Employees*, a few local *Suppliers*, 2,000 *Patrons*, a few different *Media\_Types* with descriptions such as music, book, magazine, and movie, and a table with all of the 20,000 *Media\_Items* that the library owns and can check out. There will also be a table that records checkout and checkin transactions called *Media\_Transactions*. The web application will be used to manage the different entity tables. For example, if new *Employees* are hired or leave, if new *Patrons* accounts are created or closed, new *Suppliers* are added or current suppliers are removed, or as various *Media\_Items* are removed from circulation or new ones are added. Transactions at this local library are only accomplished by employees since there is no self-check option. Each transaction into the database will be per item. In order to maintain business data and provide support for auditing, our database will restrict deletion of patrons, employees, and media items that have been involved in media transactions. We will also restrict deletion of a creator when we have media items by that creator in our database. This will also allow us to use friendly names when searching and working with data.

## Database Outline:

### 1. Employees

- Attributes including data types/constraints
  - `employee_id`
    - INT
    - Unique
    - Auto-Increment
    - Primary Key
    - Not Null
  - `first_name`
    - NVARCHAR(50)
    - Not Null
  - `last_name`
    - NVARCHAR(50)
    - Not Null
  - `phone_number`
    - NVARCHAR(15)
    - NULL DEFAULT NULL
  - `address`
    - NVARCHAR(200)
    - Not Null
- Relationships
  - 1:M with *Media\_Transactions*
  - One employee will check out items to a patron or check items in for a patron.

## 2. Patrons

- Attributes including data types/constraints
  - patron\_id
    - INT
    - Unique
    - Auto-Increment
    - Primary Key
    - Not Null
  - first\_name
    - NVARCHAR(50)
    - Not Null
  - last\_name
    - NVARCHAR(50)
    - Not Null
  - phone\_number
    - NVARCHAR(15)
    - Not Null
  - fine\_amount
    - Decimal(19,2)
    - NULL DEFAULT NULL
  - address
    - NVARCHAR(200)
    - Not Null
- Relationships
  - 1:M with Media\_Transactions
  - M:M with Media\_Items (Media\_Transactions is the intersection table)
  - One patron may check items in or out from a library employee

## 3. Media\_Items

- Attributes including data types/constraints
  - item\_id
    - INT
    - Unique
    - Auto-Increment
    - Primary Key
    - Not Null
  - media\_type
    - NVARCHAR(20)
    - Not Null
  - supplier\_id
    - INT
    - Null (A particular item may not have a supplier at times)
    - Foreign key with Suppliers.supplier\_id
  - title

- NVARCHAR(50)
  - Not Null
- creator\_id
  - INT
  - Not Null
  - Foreign key with Creators.creator\_id
- release\_date
  - DATE
  - Not Null
- replacement\_cost
  - Decimal(19,2)
  - Null Default Null
- quantity\_owned
  - INT
  - Not Null
- Relationships
  - 1:M with Media\_Transactions
    - Each media item may be checked out many times
  - 1:M with Suppliers
  - 1:M with Creators

#### 4. Suppliers

- Attributes including data types/constraints
  - supplier\_id
    - INT
    - Not Null
    - Primary Key
    - Unique
    - Auto-Increment
  - name
    - NVARCHAR(50)
    - Not Null
  - address
    - NVARCHAR(200)
    - Not Null
  - phone\_number
    - NVARCHAR(20)
    - Not Null
- Relationships
  - 1:M with Media\_Items
    - 1 supplier may supply many different media items

#### 5. Media\_Transactions

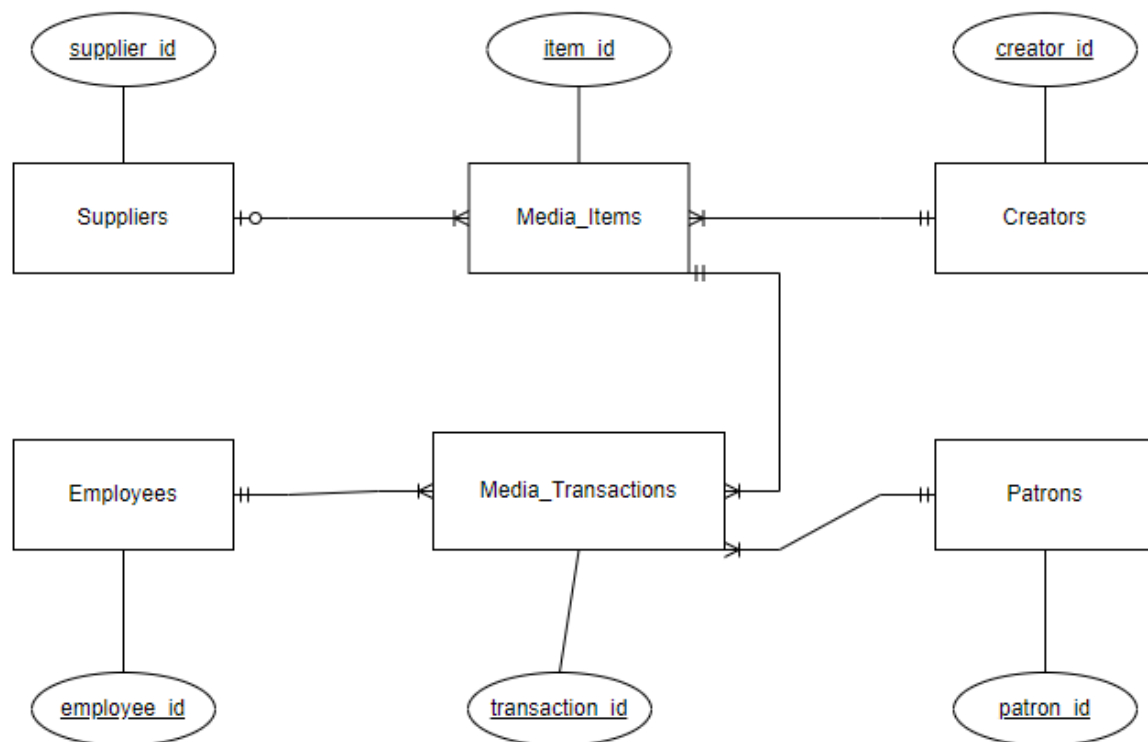
- Attributes including data types/constraints
  - transaction\_id

- INT
  - Not Null
  - Primary Key
  - Unique
  - Auto-Increment
- patron\_id
  - INT
  - Not Null
  - Foreign key with Patrons.patron\_id
- transaction\_type
  - NVARCHAR(20)
  - Not Null
- employee\_id
  - INT
  - Not Null
  - Foreign key with Employees.employee\_id
- item\_id
  - INT
  - Not Null
  - Foreign key with Media\_Items.item\_id
- transaction\_date
  - DATETIME
  - Not Null
- Relationships
  - 1:M with Patrons
  - 1:M with Employees
  - 1:M with Media\_Items

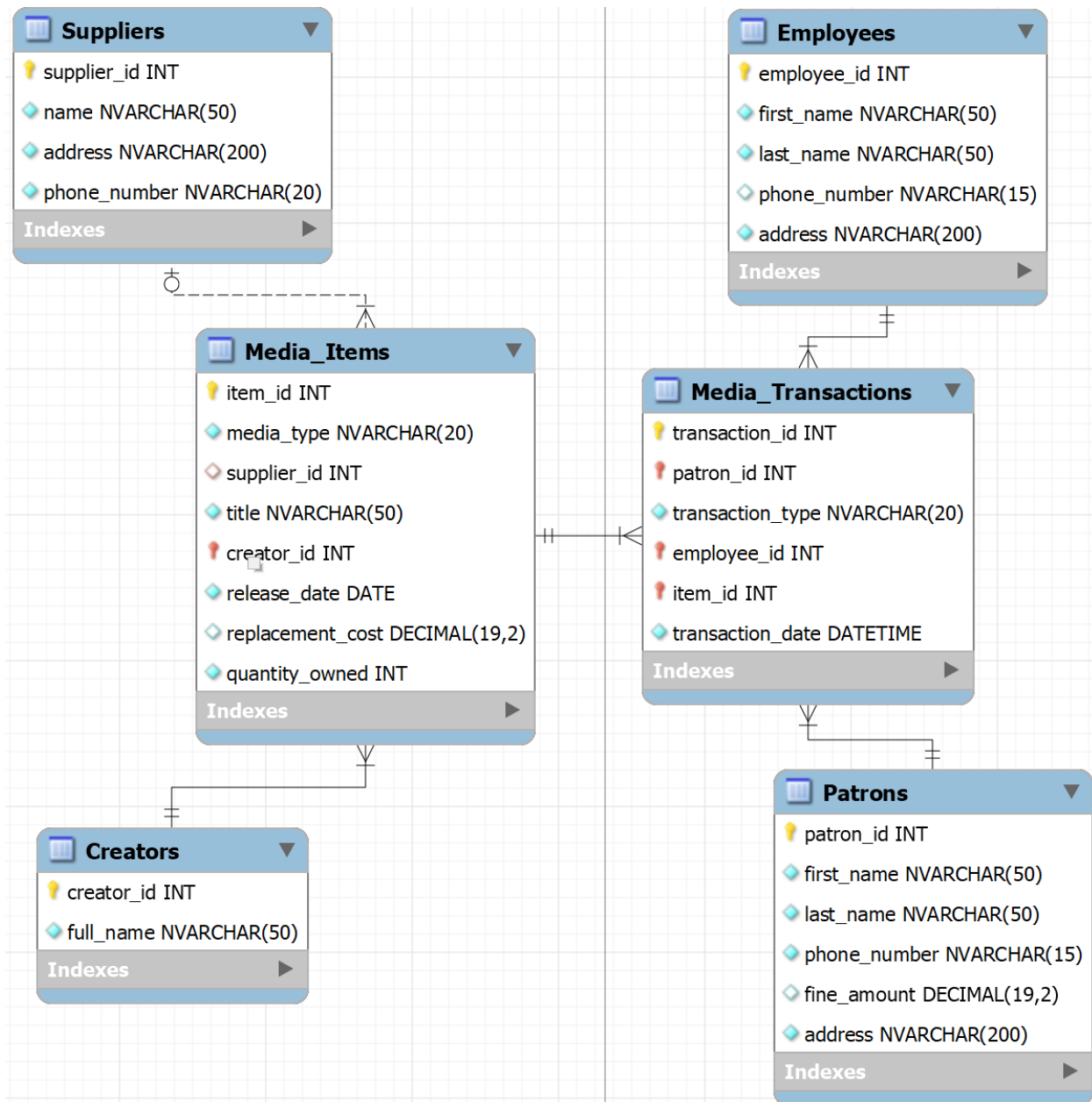
## 6. Creators

- Attributes including data types/constraints
  - creator\_id
    - INT
    - Unique
    - Not Null
    - Auto-Increment
    - Primary Key
  - full\_name
    - NVARCHAR(50)
    - Not Null
- Relationships
  - 1:M with Media\_Items

## Entity Relationship Diagram



## Database Schema:



Sample Data:

Suppliers

| supplier_id | name                       | address                                  | phone_number   |
|-------------|----------------------------|--|----------------|
| 1           | Ingram Content Group, Inc. | One Ingram Blvd.<br>La Vergne, TN 37086  | (855) 867-1920 |
| 2           | Publishers Group West      | 1700 Fourth Street<br>Berkeley, CA 94710 | (510) 809-3700 |
| 3           | Media Solutions            | 9632 Madison Blvd.<br>Madison, AL 35758  | (800) 476-5872 |
| 4           | Small Changes Inc.         | 1418 NW 53rd Street<br>Seattle, WA 98107 | (206) 382-1980 |

Employees

| employee_id | first_name | last_name | phone_number   | address   |
|-------------|------------|-----------|----------------|---|
| 1           | Jaimie     | Melliard  | (702) 445-4215 | 6 Eliot Point<br>Las Vegas, NV 89115                |
| 2           | Darian     | Labern    | (415) 391-7377 | 08854 Armistice Junction<br>San Francisco, CA 94110 |
| 3           | Cathee     | Pluthero  | (407) 216-1318 | 97 Del Mar Circle<br>Pensacola, FL 32595            |
| 4           | Lena       | Bausor    | (773) 616-9766 | 3 Nelson Pass<br>Chicago, IL 60657                  |

Creators

| creator_id | full_name          |
|------------|--------------------|
| 1          | Stephen King       |
| 2          | Joanna Gaines      |
| 3          | George R.R. Martin |
| 4          | Katy Perry         |
| 5          | Quentin Tarantino  |



### Patrons

| patron_id | first_name | last_name  | phone_number   | fine_amount | address                                   |
|-----------|------------|------------|----------------|-------------|---|
| 1         | Dianna     | MacTrustie | (979) 856-0499 | 0.00        | 2568 Mifflin Parkway<br>Bryan, TX 77806   |
| 2         | Lorain     | Burren     | (916) 468-6616 | 2.75        | 45 Melrose Way<br>Sacramento, CA 94250    |
| 3         | Mildrid    | McArte     | (212) 760-3859 | 19.95       | 1 Algoma Hill<br>New York City, NY 10184  |
| 4         | Jeramy     | McCann     | (503) 550-4845 | 0.00        | 68967 Stuart Alley<br>Beaverton, OR 97075 |

### Media\_Items

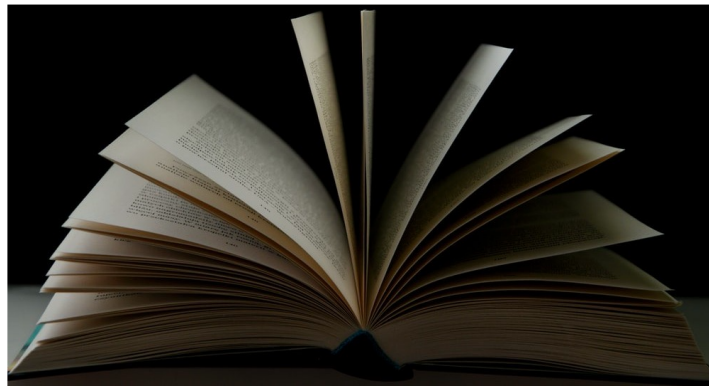
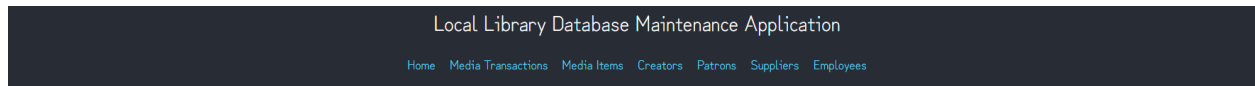
| item_id | media_type | supplier_id | title             | creator_id | release_date | replacement_cost | quantity_owned |
|---------|------------|-------------|-------------------|------------|--------------|------------------|----------------|
| 1       | Book       | 1           | The Shining       | 1          | 1977-01-28   | 7.99             | 2              |
| 2       | Book       | 2           | A Game of Thrones | 3          | 1996-08-01   | 15.29            | 4              |
| 3       | Movie      | 3           | Pulp Fiction      | 5          | 1994-10-14   | 15.50            | 1              |
| 4       | Music      | 3           | Teenage Dream     | 4          | 2010-08-24   | 8.01             | 1              |
| 5       | Magazine   | 4           | Magnolia Journal  | 2          | 2022-01-01   | 20.00            | 1              |

### Media\_Transactions

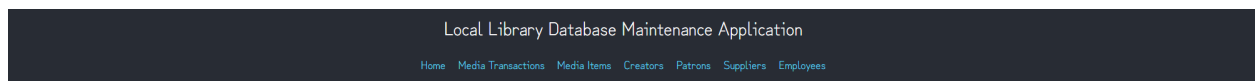
| transaction_id | patron_id | transaction_type | employee_id | item_id | transaction_date    |
|----------------|-----------|------------------|-------------|---------|---------------------|
| 1              | 1         | checkout         | 2           | 4       | 2022-04-25 15:21:34 |
| 2              | 4         | checkout         | 3           | 1       | 2022-04-26 09:10:55 |
| 3              | 3         | checkin          | 1           | 5       | 2022-04-26 11:46:34 |
| 4              | 2         | checkout         | 4           | 2       | 2022-04-27 17:50:10 |

## Screen Captures:

### Local Library Database Maintenance Application Home Page.



### Media Transactions Page with Create, Retrieve, Update, and Delete functionality. Search results are displayed below, and each entry has an Edit and Delete button.



New Media Transaction

| Patron   | Transaction Type   | Employee   | Item   | Add Transaction                    |
|--|--|--|--|------------------------------------|
| <input type="text" value="... Select Patron ..."/> | <input type="text" value="... Select Transaction Type ..."/> | <input type="text" value="... Select Employee ..."/> | <input type="text" value="... Select Media Item ..."/> | <input type="button" value="Add"/> |

Media Transaction Lookup

| Patron               | Transaction Type   | Employee             | Item                 | Transaction Date                        | All History              | Search                                |
|----------------------|--|----------------------|----------------------|---|--------------------------|---------------------------------------|
| <input type="text"/> | <input type="text" value="... Select Transaction Type ..."/> | <input type="text"/> | <input type="text"/> | <input type="text" value="mm/dd/yyyy"/> | <input type="checkbox"/> | <input type="button" value="Search"/> |

Search Results

| Transaction ID | Patron                | Transaction Type | Employee             | Item   | Transaction Date    | Edit                                | Delete                                |
|----------------|-----------------------|------------------|----------------------|--|---------------------|-------------------------------------|---------------------------------------|
| 1              | MacTrustie, Diana (1) | checkout         | Labern, Darian (2)   | 'Teenage Dream' By: Katy Perry (4)             | 2022-04-25 15:21:34 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 2              | McCarr, Jeremy (4)    | checkout         | Pluthers, Cathie (3) | 'The Shining' By: Stephen King (1)             | 2022-04-26 09:10:55 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 4              | Burton, Lorain (2)    | checkout         | Basson, Lena (4)     | 'A Game of Thrones' By: George R.R. Martin (2) | 2022-04-27 17:50:10 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |

Adding a new entry.

New Media Transaction

| Patron              | Transaction Type | Employee            | Item                                     | Add Transaction                    |
|---------------------|------------------|---------------------|--|------------------------------------|
| McArte, Mildrid (3) | Checkout         | Mellard, Jaimie (1) | "Magnolia Journal" By: Joanna Gaines (5) | <input type="button" value="Add"/> |

Search Results

| Transaction ID | Patron                | Transaction Type | Employee             | Item   | Transaction Date    | Edit                                | Delete                                |
|----------------|-----------------------|------------------|----------------------|--|---------------------|-------------------------------------|---------------------------------------|
| 1              | MacTrustie, Diana (1) | checkout         | Labern, Darian (2)   | "Teenage Dream" By: Katy Perry (4)             | 2022-04-25 15:21:34 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 2              | McCann, Jeremy (4)    | checkout         | Pluthero, Cathie (3) | "The Shining" By: Stephen King (1)             | 2022-04-26 09:10:55 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 3              | McArte, Mildrid (3)   | checkin          | Mellard, Jaimie (1)  | "Magnolia Journal" By: Joanna Gaines (5)       | 2022-04-26 11:46:34 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 4              | Burren, Lorain (2)    | checkout         | Bausor, Lena (4)     | "A Game of Thrones" By: George R.R. Martin (2) | 2022-04-27 17:50:10 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 5              | McArte, Mildrid (3)   | checkout         | Mellard, Jaimie (1)  | "Magnolia Journal" By: Joanna Gaines (5)       | 2022-06-02 18:46:01 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |

Media Transaction Edit Page for editing a transaction entry. Foreign keys are selected and edited via ComboBox as shown.

Local Library Database Maintenance Application

[Home](#) [Media Transactions](#) [Media Items](#) [Creators](#) [Patrons](#) [Suppliers](#) [Employees](#)

Edit Media Transaction

| Transaction ID | Patron             | Transaction Type | Employee         | Item   | Transaction Date    | Save                                | Cancel                                |
|----------------|--------------------|------------------|------------------|--|---------------------|-------------------------------------|---------------------------------------|
| 4              | Burren, Lorain (2) | Checkout         | Bausor, Lena (4) | "A Game of Thrones" By: George R.R. Martin (2) | 2022-04-27 17:50:10 | <input type="button" value="Save"/> | <input type="button" value="Cancel"/> |

...

... Select Media Item ...

"A Game of Thrones" By: George R.R. Martin (2)

"endg" By: George R.R. Martin (6)

"Magnolia Journal" By: Joanna Gaines (5)

"Pulp Fiction" By: Quentin Tarantino (3)

"Teenage Dream" By: Katy Perry (4)

|   |                    |          |                  |  |                     |                                     |                                       |
|---|--------------------|----------|------------------|--|---------------------|-------------------------------------|---------------------------------------|
| 4 | Burren, Lorain (2) | checkout | Bausor, Lena (4) | "Magnolia Journal" By: Joanna Gaines (5) | 2022-04-27 17:50:10 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
|---|--------------------|----------|------------------|--|---------------------|-------------------------------------|---------------------------------------|

Entries can be searched by attribute.

Media Transaction Lookup

| Patron | Transaction Type                | Employee | Item | Transaction Date | All History              | Search                                |
|--------|---------------------------------|----------|------|------------------|--------------------------|---------------------------------------|
|        | ... Select Transaction Type ... | Pluthero |      | mm/dd/yyyy       | <input type="checkbox"/> | <input type="button" value="Search"/> |

Search Results

| Transaction ID | Patron             | Transaction Type | Employee             | Item                               | Transaction Date    | Edit                                | Delete                                |
|----------------|--------------------|------------------|----------------------|------------------------------------|---------------------|-------------------------------------|---------------------------------------|
| 2              | McCann, Jeremy (4) | checkout         | Pluthero, Cathie (3) | "The Shining" By: Stephen King (1) | 2022-04-26 09:10:55 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |

Clicking the Delete button for an entry will delete that transaction from the database.

Local Library Database Maintenance Application

[Home](#) [Media Transactions](#) [Media Items](#) [Creators](#) [Patrons](#) [Suppliers](#) [Employees](#)

New Media Transaction

| Patron   | Transaction Type   | Employee   | Item   | Add Transaction                    |
|--|--|--|--|------------------------------------|
| <input type="text" value="... Select Patron ..."/> | <input type="text" value="... Select Transaction Type ..."/> | <input type="text" value="... Select Employee ..."/> | <input type="text" value="... Select Media Item ..."/> | <input type="button" value="Add"/> |

Media Transaction Lookup

| Patron                        | Transaction Type   | Employee                      | Item                          | Transaction Date                        | All History              | Search                                |
|-------------------------------|--|-------------------------------|-------------------------------|---|--------------------------|---------------------------------------|
| <input type="text" value=""/> | <input type="text" value="... Select Transaction Type ..."/> | <input type="text" value=""/> | <input type="text" value=""/> | <input type="text" value="mm/dd/yyyy"/> | <input type="checkbox"/> | <input type="button" value="Search"/> |

Search Results

| Transaction ID | Patron                | Transaction Type | Employee             | Item   | Transaction Date    | Edit                                | Delete                                |
|----------------|-----------------------|------------------|----------------------|--|---------------------|-------------------------------------|---------------------------------------|
| 1              | MacTrustie, Diana (1) | checkout         | Labern, Darian (2)   | 'Teenage Dream' By: Katy Perry (4)             | 2022-04-25 15:21:34 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 2              | McCam, Jeremy (4)     | checkout         | Pluthers, Cathie (3) | 'The Shining' By: Stephen King (1)             | 2022-04-26 09:10:55 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 4              | Burren, Lorain (2)    | checkout         | Bausor, Lena (4)     | 'A Game of Thrones' By: George R.R. Martin (2) | 2022-04-27 17:50:10 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |

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Delete Transaction ID: 4?

Search Results

| Transaction ID | Patron                | Transaction Type | Employee             | Item                               | Transaction Date    | Edit                                | Delete                                |
|----------------|-----------------------|------------------|----------------------|------------------------------------|---------------------|-------------------------------------|---------------------------------------|
| 1              | MacTrustie, Diana (1) | checkout         | Labern, Darian (2)   | 'Teenage Dream' By: Katy Perry (4) | 2022-04-25 15:21:34 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 2              | McCam, Jeremy (4)     | checkout         | Pluthers, Cathie (3) | 'The Shining' By: Stephen King (1) | 2022-04-26 09:10:55 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |

Functionality is the same for each page in the application.

Media Items Page with Create, Retrieve, Update, and Delete functionality.

Local Library Database Maintenance Application

[Home](#) [Media Transactions](#) [Media Items](#) [Creators](#) [Patrons](#) [Suppliers](#) [Employees](#)

New Media Item

| Media Type                           | Supplier                           | Title       | Creator                           | Release Date          | Replacement Cost | Quantity Owned | Add            |
|--------------------------------------|------------------------------------|-------------|-----------------------------------|-----------------------|------------------|----------------|----------------|
| <div>--- Select Media Type ---</div> | <div>--- Select Supplier ---</div> | <div></div> | <div>--- Select Creator ---</div> | <div>mm/dd/yyyy</div> | <div></div>      | <div></div>    | <div>Add</div> |

Media Item Lookup

| Item ID     | Media Type                           | Supplier    | Title       | Creator     | Search            |
|-------------|--------------------------------------|-------------|-------------|-------------|-------------------|
| <div></div> | <div>--- Select Media Type ---</div> | <div></div> | <div></div> | <div></div> | <div>Search</div> |

Search Results

| Item ID | Media Type | Supplier                   | Title             | Creator            | Release Date | Replacement Cost | Quantity Owned | Edit            | Delete            |
|---------|------------|----------------------------|-------------------|--------------------|--------------|------------------|----------------|-----------------|-------------------|
| 1       | Book       | Ingram Content Group, Inc. | The Shining       | Stephen King       | 1977-01-28   | \$7.99           | 2              | <div>Edit</div> | <div>Delete</div> |
| 2       | Book       | Publishers Group West      | A Game of Thrones | George R.R. Martin | 1996-08-01   | \$15.29          | 4              | <div>Edit</div> | <div>Delete</div> |
| 3       | Movie      | Media Solutions            | Pulp Fiction      | Quentin Tarantino  | 1994-10-14   | \$15.50          | 1              | <div>Edit</div> | <div>Delete</div> |
| 4       | Music      | Media Solutions            | Teenage Dream     | Katy Perry         | 2010-08-24   | \$8.01           | 1              | <div>Edit</div> | <div>Delete</div> |
| 5       | Magazine   | Small Changes Inc.         | Margolia Journal  | Joanna Gaines      | 2022-01-01   | \$20.00          | 1              | <div>Edit</div> | <div>Delete</div> |

Edit Media Items Page.

Local Library Database Maintenance Application

[Home](#) [Media Transactions](#) [Media Items](#) [Creators](#) [Patrons](#) [Suppliers](#) [Employees](#)

Edit Media Item

| Item ID      | Media Type      | Supplier                              | Title                  | Creator                 | Release Date          | Replacement Cost | Quantity Owned | Save            | Cancel            |
|--------------|-----------------|---------------------------------------|------------------------|-------------------------|-----------------------|------------------|----------------|-----------------|-------------------|
| <div>1</div> | <div>Book</div> | <div>Ingram Content Group, Inc.</div> | <div>The Shining</div> | <div>Stephen King</div> | <div>01/28/1977</div> | <div>7.99</div>  | <div>2</div>   | <div>Save</div> | <div>Cancel</div> |

Creators Page with Create, Retrieve, Update, and Delete functionality.

Local Library Database Maintenance Application

[Home](#) [Media Transactions](#) [Media Items](#) [Creators](#) [Patrons](#) [Suppliers](#) [Employees](#)

New Creator

| Creator     | Add            |
|-------------|----------------|
| <div></div> | <div>Add</div> |

Creator Lookup

| Creator ID  | Creator     | Search            |
|-------------|-------------|-------------------|
| <div></div> | <div></div> | <div>Search</div> |

Search Results

| Creator ID | Creator            | Edit            | Delete            |
|------------|--------------------|-----------------|-------------------|
| 1          | Stephen King       | <div>Edit</div> | <div>Delete</div> |
| 2          | Joanna Gaines      | <div>Edit</div> | <div>Delete</div> |
| 3          | George R.R. Martin | <div>Edit</div> | <div>Delete</div> |
| 4          | Katy Perry         | <div>Edit</div> | <div>Delete</div> |
| 5          | Quentin Tarantino  | <div>Edit</div> | <div>Delete</div> |

Edit Creators Page.

Local Library Database Maintenance Application

[Home](#) [Media Transactions](#) [Media Items](#) [Creators](#) [Patrons](#) [Suppliers](#) [Employees](#)

Edit Creator

| Creator ID | Creator      | Save | Cancel |
|------------|--------------|------|--------|
| 1          | Stephen King | Save | Cancel |

Patrons Page with Create, Retrieve, Update, and Delete functionality.

Local Library Database Maintenance Application

[Home](#) [Media Transactions](#) [Media Items](#) [Creators](#) [Patrons](#) [Suppliers](#) [Employees](#)

New Patron

| First Name | Last Name | Phone Number | Fine Amount | Address | Add |
|------------|-----------|--------------|-------------|---------|-----|
|            |           |              |             |         | Add |

Patron Lookup

| Patron ID | First Name | Last Name | Phone Number | Search |
|-----------|------------|-----------|--------------|--------|
|           |            |           |              | Search |

Search Results

| Patron ID | First Name | Last Name  | Phone Number   | Fine Amount | Address                                | Edit | Delete |
|-----------|------------|------------|----------------|-------------|--|------|--------|
| 1         | Diana      | MacTrustie | (979) 856-0499 | \$0.00      | 2568 MiFFin Parkway Bryan, TX 77806    | Edit | Delete |
| 2         | Lorain     | Burnen     | (916) 468-6616 | \$2.75      | 45 Melrose Way Sacramento, CA 94250    | Edit | Delete |
| 3         | Mildrid    | McArta     | (212) 760-3859 | \$19.95     | 1 Algoma Hill New York City, NY 10184  | Edit | Delete |
| 4         | Jeremy     | McCann     | (503) 550-4845 | \$0.00      | 68967 Stuart Alley Beaverton, OR 97005 | Edit | Delete |

Edit Patrons Page.

Local Library Database Maintenance Application

[Home](#) [Media Transactions](#) [Media Items](#) [Creators](#) [Patrons](#) [Suppliers](#) [Employees](#)

Edit Patron

| Patron ID | First Name | Last Name  | Phone Number   | Fine Amount | Address                           | Save | Cancel |
|-----------|------------|------------|----------------|-------------|-----------------------------------|------|--------|
| 1         | Diana      | MacTrustie | (979) 856-0499 | 0.00        | 2568 MiFFin Parkway Bryan, TX 778 | Save | Cancel |

Suppliers Page with Create, Retrieve, Update, and Delete functionality.

Local Library Database Maintenance Application

[Home](#) [Media Transactions](#) [Media Items](#) [Creators](#) [Patrons](#) [Suppliers](#) [Employees](#)

New Supplier

| Name                 | Address              | Phone Number         | Add                                |
|----------------------|----------------------|----------------------|------------------------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="button" value="Add"/> |

Supplier Lookup

| Supplier ID          | Name                 | Phone Number         | Search                                |
|----------------------|----------------------|----------------------|---------------------------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="button" value="Search"/> |

Search Results

| Supplier ID | Name                       | Address                               | Phone Number   | Edit                                | Delete                                |
|-------------|----------------------------|---------------------------------------|----------------|-------------------------------------|---------------------------------------|
| 1           | Ingram Content Group, Inc. | One Ingram Blvd. La Vergne, TN 37086  | (855) 867-1920 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 2           | Publishers Group West      | 1700 Fourth Street Berkeley, CA 94710 | (510) 809-3700 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 3           | Media Solutions            | 9632 Madison Blvd. Madison, AL 35758  | (800) 476-5872 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |
| 4           | Small Changes Inc.         | 1418 NW 53rd Street Seattle, WA 98107 | (206) 582-1980 | <input type="button" value="Edit"/> | <input type="button" value="Delete"/> |

Suppliers Edit Page.

Local Library Database Maintenance Application

[Home](#) [Media Transactions](#) [Media Items](#) [Creators](#) [Patrons](#) [Suppliers](#) [Employees](#)

Edit Supplier

| Supplier ID                    | Name  | Address   | Phone Number                                | Save                                | Cancel                                |
|--------------------------------|---|---|---|-------------------------------------|---------------------------------------|
| <input type="text" value="1"/> | <input type="text" value="Ingram Content Group, Inc."/> | <input type="text" value="One Ingram Blvd. La Vergne, TN 37086"/> | <input type="text" value="(855) 867-1920"/> | <input type="button" value="Save"/> | <input type="button" value="Cancel"/> |

Employees Page with Create, Retrieve, Update, and Delete functionality.

Local Library Database Maintenance Application

[Home](#) [Media Transactions](#) [Media Items](#) [Creators](#) [Patrons](#) [Suppliers](#) [Employees](#)

New Employee

| First Name           | Last Name            | Phone Number         | Address              | Hire                                |
|----------------------|----------------------|----------------------|----------------------|-------------------------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="button" value="Hire"/> |

Employee Lookup

| Employee ID          | First Name           | Last Name            | Phone Number         | Search                                |
|----------------------|----------------------|----------------------|----------------------|---------------------------------------|
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="button" value="Search"/> |

Search Results

| Employee ID | First Name | Last Name | Phone Number   | Address  | Edit                                | Fire                                |
|-------------|------------|-----------|----------------|--|-------------------------------------|-------------------------------------|
| 1           | Jaimie     | Mellard   | (702) 445-4215 | 6 Eliot Point Las Vegas, NV 89115                | <input type="button" value="Edit"/> | <input type="button" value="Fire"/> |
| 2           | Darian     | Labern    | (415) 391-7377 | 08854 Armistice Junction San Francisco, CA 94110 | <input type="button" value="Edit"/> | <input type="button" value="Fire"/> |
| 3           | Cathe      | Pluthero  | (407) 216-1318 | 97 Del Mar Circle Pensacola, FL 32595            | <input type="button" value="Edit"/> | <input type="button" value="Fire"/> |
| 4           | Lena       | Bausor    | (773) 616-9766 | 3 Nelson Pass Chicago, IL 60657                  | <input type="button" value="Edit"/> | <input type="button" value="Fire"/> |

Edit Employees Page.

Edit Employee

| Employee ID                    | First Name                          | Last Name                            | Phone Number                                | Address   | Save                                | Cancel                                |
|--------------------------------|-------------------------------------|--------------------------------------|---|---|-------------------------------------|---------------------------------------|
| <input type="text" value="1"/> | <input type="text" value="Jaimie"/> | <input type="text" value="Mellard"/> | <input type="text" value="(702) 445-4215"/> | <input type="text" value="6 Elliot Point Las Vegas, NV 89115"/> | <input type="button" value="Save"/> | <input type="button" value="Cancel"/> |