

Project Step 5

Group 5

Zhimei Wang

Steven Crowther

Due date: Aug 14, 2023

Database URL: <http://flip2.engr.oregonstate.edu:1245>

Executive Summary

We made several minor changes based on our classmates' comments and suggestions. For the project overview, database outline and ERD, we added more details to the scope and more refined relationships and data types. We adjusted the DDL for the data types accordingly. For the UI, we added some CSS rules, and a reset button to make the website visually efficient to the user.

In the first draft we had a number of suggestions to improve the overview section. Based on the feedback we limited our library database to books only, focused our database to support a small library, and made our database non-public facing. The outline was improved upon by changing the Items table into a Books table. Also we adjusted the location attribute on the Books table to be required. Originally we had an Authors table which we moved away from and had authors as an attribute in the Books table. Finally we updated the Locations table to represent missing or checked out books as a specific locationID 1, and 2 respectively.

During the second step, we received feedback to improve our SQL file that created our database (DDL). There was a syntax error in the file that made easy opening and use problematic. This issue was resolved. More comments were added to improve clarity as well. Another useful idea was to ensure that the fines attribute was consistent in our tables and outline. The outline was updated to reflect this change. The fines attribute was improved again by changing the data type from decimal(6,2) to decimal(19,2) which is a more common currency data type.

The two ideas that improved our project during step 3 feedback were to have a nullable relationship in our Books table (the locationID attribute) and that our Loans table was effectively an intersection table. The Loans table establishes a M:M relationship between Books and Patrons while also recording unique data related to each individual loan.

Finally, for the fourth draft, we followed our classmate's suggestion about having an anchor on each page to return to the homepage for ease of use. Our data display was enhanced with an update/reset function to see changes take effect. We also implemented CSS rules for a more user-friendly experience.

Project Outline and Database Outline, ERD Schema & Sample Data Updated Version

a) Overview

Westchester Public Library is a small local public library and has 5,000 patrons and 10,000 books available for patrons to borrow. Due to limited budget, the library needs a lightweight system to manage their inventory so that items and loans are tracked accurately. A database driven website will keep track of the books borrowed by each patron, and keep track of the location of a book if the book is inside the library. The database will also include book author and genre information. This will aid the library to know which books tend to get checked out more and what kind of books to buy for the library in the future.

b) Database Outline

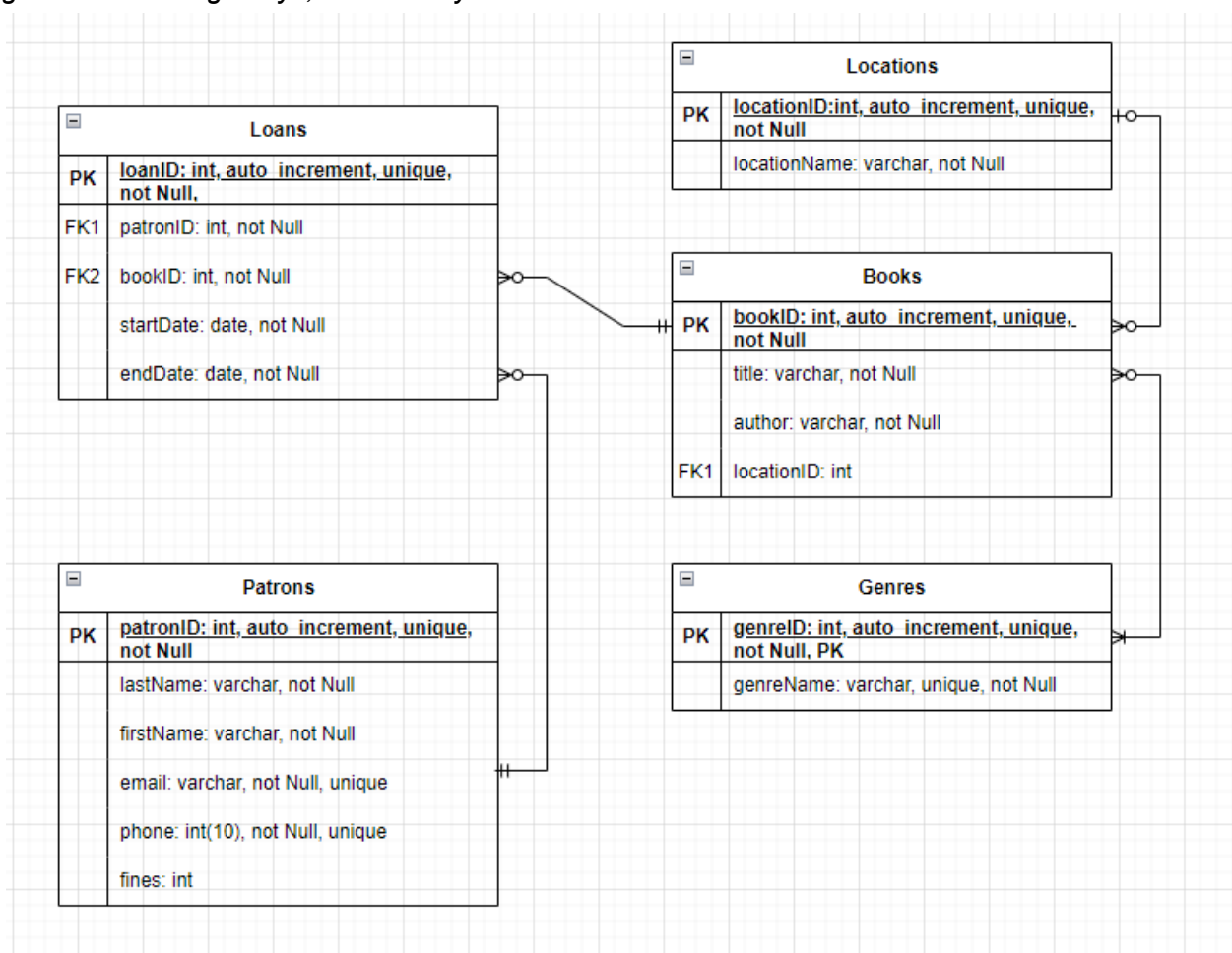
- Books: record of library book's details, which are loaned to Patrons
 - bookID: int, auto_increment, unique, not Null, PK
 - title: varchar, not Null
 - author: varchar, not Null
 - locationID: int, optional FK
 - Relationship: 1:M between Books and Loans. Optional M:1 with Locations (many books can be in one location. If a book's locationID is NULL, it means this book is lost because we don't have a location record for this book anymore.). M:M between Patrons and Books (Loans serves as an intersection table). M:M between Books and Genres. *An intersection table representing Books and Genres M:M relationship is not shown here and will be created in the implementation phase. This intersection table will only use bookID and genreID as foreign keys, without any additional attributes*
- Patrons: record of library Patron's information who make Loans
 - patronID: int, auto_increment, unique, not Null, PK
 - lastName: varchar, not Null
 - firstName: varchar, not Null
 - email: varchar, not Null, unique
 - phone: int(10), not Null, unique
 - fines: int
 - Relationship: 1:M with Loans, M:M between Patrons and Books (Loans serves as an intersection table).
- Loans: record of Patrons borrowing library books
 - loanID: int, auto_increment, unique, not Null, PK
 - patronID: int, not Null, FK
 - bookID: int, not Null, FK
 - startDate: date, not Null
 - endDate; data, not Null
 - Relationship: M:1 with Patrons, M:1 with books (many loans are possible with a single Patron or a single book checked out at different times). Serves as an intersection table between Books and Patrons.
- Genres: record of genre details of books. This is a category table.
 - genreID: int, auto_increment, unique, not Null, PK

- genreName: varchar, unique, not Null
 - Relationship: M:M with books. *An intersection table representing Books and Genres M:M relationship is not shown here and will be created in the implementation phase. This intersection table will only use bookID and genreID as foreign keys, without any additional attributes*
- Locations: record of the Location of the books inside the library, ID indicating shelf number except for 1 which corresponds to checked out.
 - locationID:int, auto_increment, unique, not Null, PK
 - locationName: varchar, not Null
 - Relationship: Optional 1:M with books.

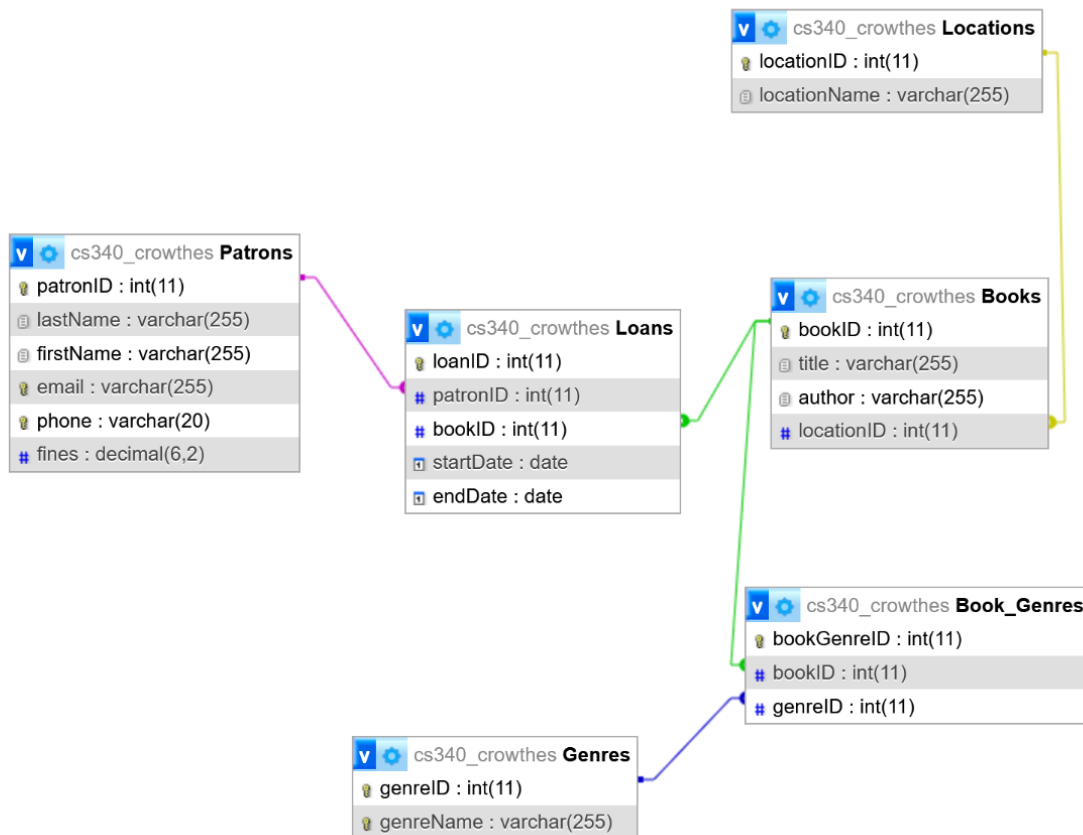
c) Entity-Relationship Diagram:

This should be an updated ER diagram that matches your database outline. Anything that does not match the Database outline or uses incorrect notation will cause a reduction in your points in the later Project Step 3 and Step 6 Final Version of this assignment.

An intersection table representing Books and Genres M:M relationship is not shown here and will be created in the implementation phase. This intersection table will only use bookID and genreID as foreign keys, without any additional attributes



d) Schema:



e) All the example data from each table in your schema should be pasted into your report.

Books Table

`SELECT * FROM `Books``

☐ Profiling [[Edit inline](#)] [[Edit](#)] [[Explain SQL](#)] [[Create PHP code](#)] [[Refresh](#)]

☐ Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

Extra options

	bookID	title	author	locationID
<input type="checkbox"/> Edit Copy Delete	1	The Hobbit	J.R.R. Tolkien	1
<input type="checkbox"/> Edit Copy Delete	2	Jurassic Park	Michael Crichton	NULL
<input type="checkbox"/> Edit Copy Delete	3	IT	Stephen King	4
<input type="checkbox"/> Edit Copy Delete	4	People We Meet on Vacation	Emily Henry	1
<input type="checkbox"/> Edit Copy Delete	5	Pay Dirt Road	Samantha Jayne Allen	3
<input type="checkbox"/> Edit Copy Delete	6	The Eye of the World	Robert Jordan	1

☐ Check all | With selected: [Edit](#) [Copy](#) [Delete](#) [Export](#)

☐ Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

Genres Table

`SELECT * FROM `Genres``

☐ Profiling [[Edit inline](#)] [[Edit](#)] [[Explain SQL](#)] [[Create PHP code](#)] [[Refresh](#)]

☐ Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

Extra options

	genreID	genreName
<input type="checkbox"/> Edit Copy Delete	1	Fantasy
<input type="checkbox"/> Edit Copy Delete	4	Horror
<input type="checkbox"/> Edit Copy Delete	3	Mystery
<input type="checkbox"/> Edit Copy Delete	5	Romance
<input type="checkbox"/> Edit Copy Delete	2	Sci-Fi

☐ Check all | With selected: [Edit](#) [Copy](#) [Delete](#) [Export](#)

☐ Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

Books_Genres Table

[SELECT * FROM `Book_Genres`](#)

☐ Profiling [\[Edit inline \]](#) [\[Edit \]](#) [\[Explain SQL \]](#) [\[Create PHP code \]](#) [\[Refresh \]](#)

☐ Show all | Number of rows: 25 | Filter rows: Sort by key: None

Extra options

		bookGenreID	bookID	genreID
<input type="checkbox"/>	Edit Copy Delete	1	1	1
<input type="checkbox"/>	Edit Copy Delete	2	2	2
<input type="checkbox"/>	Edit Copy Delete	3	2	4
<input type="checkbox"/>	Edit Copy Delete	4	2	3
<input type="checkbox"/>	Edit Copy Delete	5	3	4
<input type="checkbox"/>	Edit Copy Delete	6	4	5
<input type="checkbox"/>	Edit Copy Delete	7	5	1

[↑](#) ☐ Check all With selected: [Edit](#) [Copy](#) [Delete](#) [Export](#)

☐ Show all | Number of rows: 25 | Filter rows: Sort by key: None

Locations Table

[SELECT * FROM `Locations`](#)

☐ Profiling [\[Edit inline \]](#) [\[Edit \]](#) [\[Explain SQL \]](#) [\[Create PHP code \]](#) [\[Refresh \]](#)

☐ Show all | Number of rows: 25 | Filter rows: Sort by key: None

Extra options

		locationID	locationName
<input type="checkbox"/>	Edit Copy Delete	1	Checked Out
<input type="checkbox"/>	Edit Copy Delete	2	Hold Shelf
<input type="checkbox"/>	Edit Copy Delete	3	Shelf A
<input type="checkbox"/>	Edit Copy Delete	4	Shelf B
<input type="checkbox"/>	Edit Copy Delete	5	Shelf C

[↑](#) ☐ Check all With selected: [Edit](#) [Copy](#) [Delete](#) [Export](#)

☐ Show all | Number of rows: 25 | Filter rows: Sort by key: None

Patrons Table

SELECT * FROM `Patrons` ORDER BY `phone` DESC

☐ Profiling [\[Edit inline \]](#) [\[Edit \]](#) [\[Explain SQL \]](#) [\[Create PHP code \]](#) [\[Refresh \]](#)

☐ Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: unique_phone (DESC) ▼

Extra options

	patronID	lastName	firstName	email	phone	1	fines
<input type="checkbox"/> Edit Copy Delete	5	Silva	Mario	itsmeamario@yahoo.com	9735552031		2.00
<input type="checkbox"/> Edit Copy Delete	6	Roberts	Laura	lroberts12@gmail.com	8405550024		0.50
<input type="checkbox"/> Edit Copy Delete	4	Potter	Tina	girlwholived@gmail.com	6565559020		21.50
<input type="checkbox"/> Edit Copy Delete	2	Guetierrez	Maria	marrez@yahoo.com	4395559241		0.00
<input type="checkbox"/> Edit Copy Delete	3	Nevas	Bob	billybob@yahoo.com	4065556882		0.00
<input type="checkbox"/> Edit Copy Delete	1	Thompson	Timmy	timmy@gmail.com	3025551243		0.24

☐ Check all | With selected: [Edit](#) [Copy](#) [Delete](#) [Export](#)

☐ Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: unique_phone (DESC) ▼

Loans Table

SELECT * FROM `Loans`

☐ Profiling [\[Edit inline \]](#) [\[Edit \]](#) [\[Explain SQL \]](#) [\[Create PHP code \]](#) [\[Refresh \]](#)

☐ Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None ▼

Extra options

	loanID	patronID	bookID	startDate	endDate
<input type="checkbox"/> Edit Copy Delete	1	3	2	2023-07-10	2023-07-31
<input type="checkbox"/> Edit Copy Delete	2	5	5	2023-07-01	2023-07-21
<input type="checkbox"/> Edit Copy Delete	3	1	6	2023-07-10	2023-07-20
<input type="checkbox"/> Edit Copy Delete	4	4	3	2023-07-17	2023-08-02
<input type="checkbox"/> Edit Copy Delete	5	2	1	2023-07-20	2023-08-10
<input type="checkbox"/> Edit Copy Delete	6	6	4	2023-07-14	2023-07-31

☐ Check all | With selected: [Edit](#) [Copy](#) [Delete](#) [Export](#)

☐ Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None ▼

Screen captures of each of the UI pages

Patrons: Display - Create, Read, Update, Delete patrons

Patrons

Display patrons

Patron ID	Last name	First name	Email	Phone	Fines
1	Thompson	Timmy	timmy@gmail.com	3025551243	0.24
2	Gueterrez	Maria	marrez@yahoo.com	4395559241	0
3	Nevas	Bob	billybob@yahoo.com	4065556882	0
4	Potter	Tina	girlwholived@gmail.com	6565559020	21.5
5	Silva	Mario	itsmeamario@yahoo.com	9735552031	2
6	Roberts	Laura	lroberts12@gmail.com	8405550024	0.5

[Reset](#)

View patrons with the information you entered

All fields are optional. To get more accurate information, enter the ID fields.

Patron ID	Last name	First name	Email	Phone	Fines
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

[View](#)

Update a patron from database

Patron information is updated based on the Patron ID you entered. Fields left blank will not be changed.

Patron ID	Last name	First name	Email	Phone	Fines
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

[Update](#)

Add a patron to database

Last name	First name	Email	Phone	Fines
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

[Add](#)

Delete a patron from database

Please enter Patron ID:

[Delete](#)

Books: Display - Create, Read, Update (Nullable relationship with Locations) book entities

Books

Display books

Book ID	Title	Author	Location
1	The Hobbit	J.R.R.Tolkien	Checked Out
2	Jurassic Park	Michael Crichton	NULL
3	IT	Stephen King	Shelf B
4	People We Meet on Vacation	Emily Henry	Checked Out
5	Pay Dirt Road	Samantha Jayne Allen	Shelf A
6	The Eye of the World	Robert Jordan	Checked Out

[Reset](#)

View books with the information you entered

All fields are optional. To get more accurate information, enter the ID fields.

Book ID	Title	Author	Location	Check the box to view all NULL locations
Select a Book ID ▼			Select a Location ▼	<input type="checkbox"/>

[View](#)

Update a book's location

Please enter Book ID and Location ID.

If Location ID is not selected, the location will be updated to NULL.

Book ID	Location
Select a Book ID ▼	Select a Location ▼

[Update](#)

Add a book to database

If Location ID is not selected, the location will be NULL.

Title	Author	Location Name
		Select a Location ▼

[Add](#)

Loans: Display - Create, Read, Update, Delete loans (M:M)

Loans

Display loans

Loan ID	Patron ID	Patron Last Name	Patron First Name	Book ID	Book Title	Start Date	End Date
1	3	Nevas	Bob	2	Jurassic Park	2023-07-10	2023-07-31
2	5	Silva	Mario	5	Pay Dirt Road	2023-07-01	2023-07-21
3	1	Thompson	Timmy	6	The Eye of the World	2023-07-10	2023-07-20
4	4	Potter	Tina	3	IT	2023-07-17	2023-08-02
5	2	Guetierrez	Maria	1	The Hobbit	2023-07-20	2023-08-10
6	6	Roberts	Laura	4	People We Meet on Vacation	2023-07-14	2023-07-31

Reset

View loans with the information you entered

All fields are optional. To get more accurate information, enter the ID fields

Loan ID	Patron ID	Patron Last Name	Patron First Name	Book ID	Book Title	Start Date	End Date
						mm/dd/yyyy	mm/dd/yyyy

View

Update the End Date of a Loan

Loan information is updated based on the Loan ID you entered.

Loan ID	End Date
	mm/dd/yyyy

Update

Add a new loan to database

End Date is optional if the loan is ongoing.

Patron ID	Book ID	Start Date	End Date
		mm/dd/yyyy	mm/dd/yyyy

Add

Delete a loan from database

Please enter Loan ID:

Delete

Genres: Display - Create, Read genre entities

[Home](#) [Patrons](#) [Books](#) [Loans](#) [Genres](#) [Books-Genres](#) [Locations](#)

Genres

Display Genres

Genre ID	Genre Name
1	Fantasy
4	Horror
3	Mystery
5	Romance
2	Sci-Fi

Reset

View genres with the information you entered

Genre Name
Select a Genre ▼

View

Add a new genre to database

Must enter a unique genre name.

Genre Name
<input type="text"/>

Add

Books-Genres: Display - Create, Read, Update book genre relationships (M:M, Dynamic drop-downs)

Books-Genres

Display books-genres

Book-Genre ID	Book ID	Book Name	Genre ID	Genre Name
1	1	The Hobbit	1	Fantasy
2	2	Jurrasic Park	2	Sci-Fi
3	2	Jurrasic Park	4	Horror
4	2	Jurrasic Park	3	Mystery
5	3	IT	4	Horror
6	4	People We Meet on Vacation	5	Romance
7	5	Pay Dirt Road	1	Fantasy

Reset

View books-genres with the information you selected

Book Name	Genre Name
Select a Book ▼	Select a Genre ▼

View

Update a book-genre information from database

Book-Genre information is updated based on the Book-Genre ID you entered.

Books-Genres ID	Book Name	Genre Name
Select a Book-Genre ID ▼	Select a Book Name ▼	Select a Genre Name ▼

Update

Add a book-genre pair to database

Book Name	Genre Name
Select a Book Name ▼	Select a Genre Name ▼

Add

Locations

Display locations

Location ID	Location name
1	Checked Out
2	Hold Shelf
3	Shelf A
4	Shelf B
5	Shelf C

Reset

View locations with the information you entered

Location name
Select Location ▼

View

Add a location to database

Location name
<input type="text"/>

Add