

## Project Group #1: Team Oaklaura

Grant Wu and Jessica Ramirez

# Project Step 6 - Final

URL to Oaklaura Bike Co-Op UI:

<http://classwork.engr.oregonstate.edu:7013/>

## 1. Executive Summary

### Reflection on Major Changes Throughout Project

Over the course of 11 weeks, our team (Grant Wu and Jessica Ramirez) developed a full-stack web application underpinned by a normalized relational database. This project followed a multi-phase structure that allowed us to build iteratively while incorporating continuous feedback from teaching assistants and peer reviewers.

The project began with the design of a schema representing a real-world bike co-op scenario. Our initial design featured five entities: StorePersonnel, Customers, Bikes, RepairReports, and SalesReports. Early feedback helped us identify normalization issues, prompting the addition of a sixth entity—Contacts—to eliminate redundancy and ensure compliance with 3rd Normal Form (3NF). Following schema finalization, we translated the design into SQL through structured DDL and DML scripts. We replaced hardcoded foreign keys with subqueries and corrected naming inconsistencies in foreign key attributes to improve clarity and maintain consistency.

Subsequent phases focused on UI development, beginning with static data display and evolving into a fully interactive interface. We implemented CRUD operations—Create, Read, Update, and Delete—for both the RepairReports (our M:M relationship intersection table) and Contacts tables. The Contacts table was chosen to demonstrate the ON DELETE CASCADE behavior defined in the DDL.sql file, specifically, how deleting a contact cascades the deletion to related records, thereby preventing deletion anomalies. A key design decision was to limit CUD functionality to two tables to maintain a clean, focused interface that exceeded project requirements without over-complication. To support demonstration and testing, we also added a Reset button that drops and reinitializes all tables with default data.

Major refinements based on feedback included:

- Consistent column aliases for readability
- Dropdowns and updated foreign key displays using human-readable names
- Moving Add buttons to the top of tables for accessibility
- Standardized date formatting
- Improved UI layout and centering
- Bug fixes in update forms and dropdown population
- Confirmation popups preceding delete and reset actions

Overall, our application demonstrates not only the core of database design and web integration, but also a commitment to ease of use, aesthetic appeal and incorporation of independent feedback.

## 2. Project Overview: The Oaklaura Bike Cooperative

The Oaklaura Bike Cooperative is a non-profit organization that accepts donations of old or broken bicycles, refurbishes them, and then sells them at an affordable price. The co-op sees 50-100 bicycles enter and exit their doors on a monthly basis. Due to limited funding, the co-op operates with a small team of 10 employees and relies heavily on volunteers to assist with bicycle repairs. At the current time there are about 100 volunteers that donate their time, and this is expected to grow over the course of the next five years. The co-op's limited funding also requires they use a basic POS system that can only process one bike sale at a time, setting a limit of one bike per sales order. The co-op brings in on average between \$10,000 and \$25,000 per month, and most of this revenue is used to support the small team of dedicated employees as well as to provide community engagement events.

Store personnel consist of both volunteers and employees. Most volunteers are not experienced bike mechanics, so they often can't fully repair a bike during the few hours the co-op is open for volunteer work. To maintain continuity and organization, volunteers are expected to repair what they can during their shift and document their progress in a report the same day the work was performed. This allows the next volunteer and/or employee to review the logs and continue the work where the previous one left off. Sometimes volunteers engage in non-bike specific work, such as cleaning and fixing stock parts such as cassettes, wheels and derailleurs, which gets documented in these repair reports as well. Once a volunteer believes a bike is fully repaired, a trained employee inspects it to ensure it meets safety standards before placing it on the sales floor. Once there, a bike can be sold, a transaction which is tracked through a sales report.

Historically, the co-op tracked repair progress and sales using handwritten notecards stored in a filing cabinet. However, as the organization grows, this system has become increasingly difficult to manage. Implementing a database would be an ideal solution for organizing and sharing information between volunteers and employees about the status of each bicycle, as well as for tracking the inventory and sales history of the ever expanding co-op.

### 3. Database Overview

#### Bikes Table

Contains details on a particular bike that resides within the co-op.

- **bikeID [PK]:** int, not NULL, auto\_increment
- **color:** enum('Black', 'White', 'Red', 'Blue', 'Green', 'Pink', 'Purple', 'Yellow', 'Orange', 'Silver', 'Other'), not NULL
- **style:** enum('Mountain', 'Road', 'Fat', 'Hybrid', 'Enduro', 'BMX', 'Cruiser', 'Kids', 'Electric'), not NULL
- **brand:** varchar(45), not NULL
- **status:** enum('In Repair', 'In Review', 'For Sale', 'Sold'), not NULL
- **dateReceived:** date, not NULL

#### Relationships:

- M:M relationship between Bikes and StorePersonnel is implemented with bikeID and personnelID as FK's within both RepairReports and within SalesReports.
- 1:1 relationship between Bikes and SalesReports is implemented by bikeID as a FK within SalesReports. *Note: due to our outdated POS system, only one bike can be sold at a time (i.e. only one Bike can appear on each SalesReport).*
- 1:M relationship between Bikes and RepairReports is implemented with bikeID as a FK within RepairReports.

#### StorePersonnel Table

Holds information on store employees and volunteers that work within the co-op.

- **personnelID [PK]:** int, not NULL, auto\_increment
- **contactID [FK - Contacts]:** int, not NULL
- **role:** enum('Employee', 'Volunteer'), not NULL

#### Relationships:

- M:M relationship between StorePersonnel and Bikes is implemented with bikeID and personnelID as FK's within both RepairReports and within SalesReports.
- 1:M relationship between StorePersonnel and RepairReports is implemented with personnelID as a FK within RepairReports.
- 1:1 relationship between StorePersonnel and Contacts is implemented with contactID as a FK within StorePersonnel.

### Customers Table

Holds information relating to existing and potential customers.

- **customerID [PK]:** int, not NULL, auto\_increment
- **contactID [FK - Contacts]:** int, not NULL
- **receiveNewsletter:** tinyint, not NULL, DEFAULT = 0 (false)

#### Relationships:

- 1:M relationship between Customers and SalesReports is implemented with customerID as a FK inside of SalesReports.
- 1:1 relationship between Customers and Contacts is implemented with contactID as a FK within Customers.

### RepairReports Table

Holds repair information performed on a particular bikes (Bikes\_StorePersonnel Intersection Table that includes additional repair information).

- **repairID [PK]:** int, not NULL, auto\_increment
- **personnelID [FK - StorePersonnel]:** int, not NULL
- **bikeID [FK - Bikes]:** int
- **dateRepaired:** datetime, not NULL
- **hoursSpent:** decimal(4,2), not NULL
- **description:** varchar(255), not NULL

#### Relationships:

- 1:M relationship between RepairReports and StorePersonnel is implemented with personnelID as a FK inside RepairReports.
- 1:M relationship between RepairReports and Bikes is implemented with bikeID as a FK inside RepairReports.

### SalesReports Table

Holds information pertaining to the sale of a particular bike.

- **salesID [PK]:** int, not NULL, auto\_increment
- **bikeID [FK - Bikes]:** int, not NULL, unique
- **customerID [FK - Customers]:** int, not NULL
- **dateSold:** date, not NULL
- **price:** decimal(5,2), not NULL

#### Relationships:

- 1:1 relationship between Bikes and SalesReports is implemented by bikeID as a FK within SalesReports. *Note: due to our outdated POS system, only one bike can be sold at a time (i.e. only one Bike can appear on each SalesReport).*
- 1:M relationship between SalesReports and Customers is implemented with customerID as a FK within SalesReports.

### Contacts Table

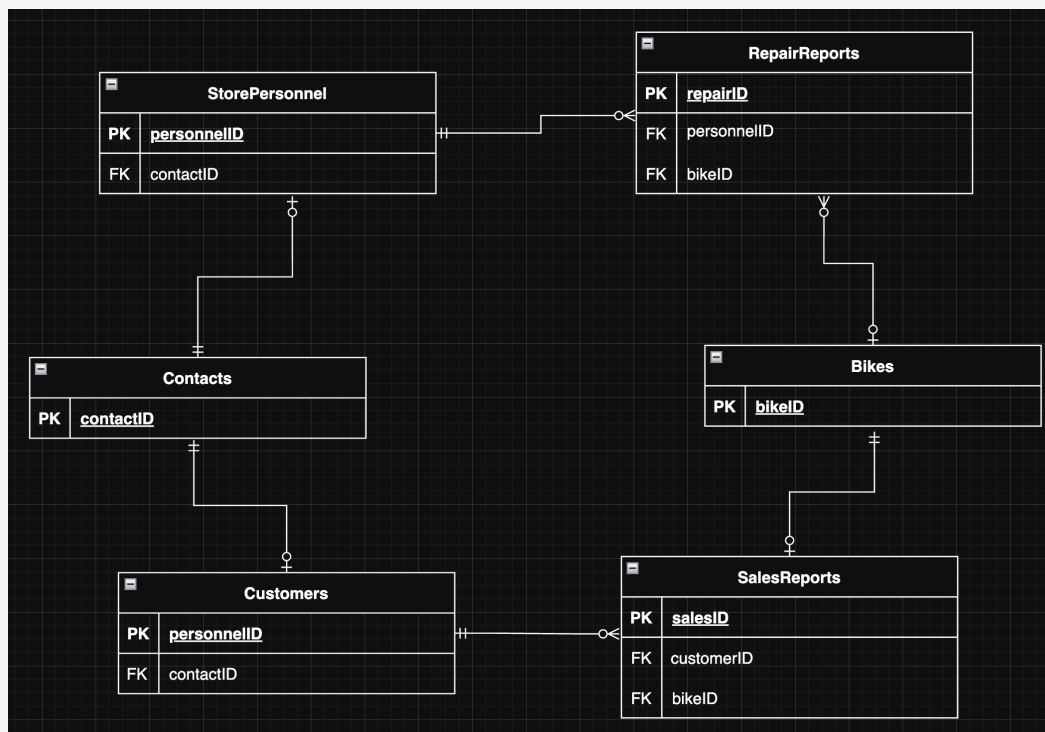
Holds contact information for any person in the system (both service providers and service recipients).

- **contactID [PK]:** int, not NULL, auto\_increment
- **firstName:** varchar(45) not NULL
- **lastName:** varchar(45) not NULL
- **phone:** varchar(45), not NULL
- **email:** varchar(100), not NULL, UNIQUE

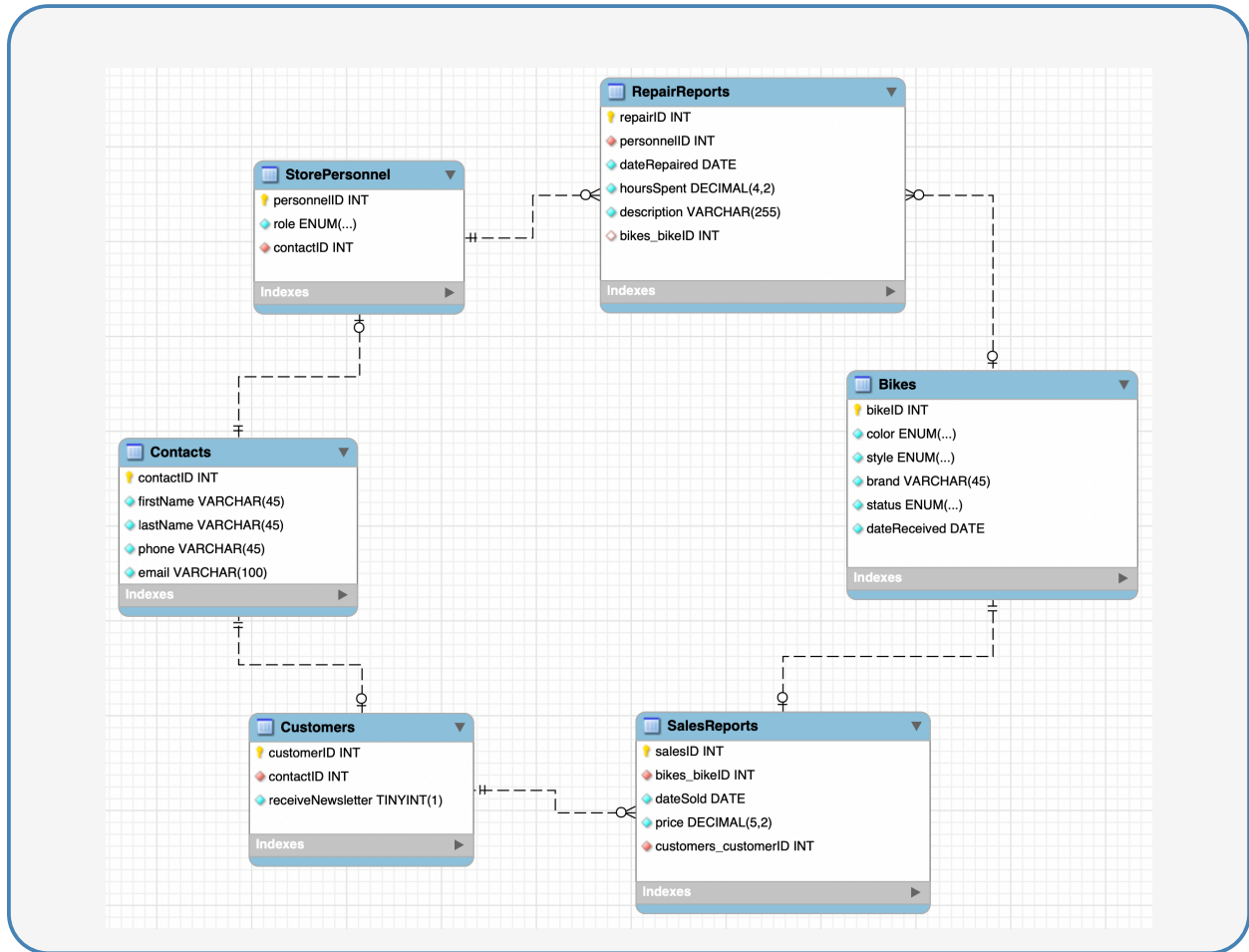
#### Relationships:

- 1:1 relationship between Contacts and StorePersonnel is implemented with contactID as a FK within Customers.
- 1:1 relationship between Contacts and Customers is implemented with contactID as a FK within Customers.

## 4. Entity-Relationship Diagram



## 5. Schema Diagram



## 6. Sample Data

Figure 1: Sample data inserted into the Bikes table

bikeID	color	style	brand	status	dateReceived
1	Pink	Mountain	Santa Cruz	Sold	2024-08-15
2	Red	Road	Cannondale	For Sale	2024-12-20
3	Black	Electric	Aventon	In Review	2025-02-03
4	Green	Cruiser	Trek	Sold	2025-02-10
5	Red	Enduro	Crew	Sold	2025-02-15
6	Other	Kids	Trek	In Repair	2025-02-28
7	White	Hybrid	Specialized	Sold	2025-03-01
8	Black	Mountain	Felt	In Repair	2025-03-22

Figure 2: Sample data inserted into the StorePersonnel table

personnelID	role	contactID
1	Employee	1
2	Employee	2
3	Volunteer	4
4	Volunteer	5
5	Volunteer	6

Figure 3: Sample data inserted into the Customers table

customerID	contactID	receiveNewsletter
1	3	0
2	4	1
3	7	1
4	8	0

Figure 4: Sample data inserted into the RepairReports table

repairID	personnelID	dateRepaired	hoursSpent	description	bikeID
1	3	2024-08-30	3.00	flushed brakes, replaced chain and cleaned	1
2	1	2024-09-02	0.50	Employee review, bike approved for sale	1
3	5	2024-10-01	5.00	patched damaged inner tubes (q=12)	NULL
4	2	2025-01-03	3.00	Replaced pedals and performed employee review: app...	2
5	1	2025-02-15	0.50	Bike received in good condition, cleaned and review...	4
6	3	2025-02-15	2.00	retuned derailleur and cleaned, ready for review	3
7	1	2025-02-16	0.25	Bike received new: approved for sale	5
8	2	2025-03-01	0.25	bike arrived new, approved for sale	7

Figure 5: Sample data inserted into the SalesReports table



salesID	bikeID	dateSold	price	customerID
1	5	2025-02-22	459.00	1
2	4	2025-02-22	999.97	1
3	1	2025-03-02	999.99	2
4	7	2025-03-15	649.00	4

Figure 6: Sample data inserted into the Contacts table

contactID	firstName	lastName	phone	email
1	Klaus	Von Hellman	305-278-2483	klausv@oaklaura-bikes.com
2	Hilary	Smith	462-384-2333	hilarys@oaklaura-bikes.com
3	Jennifer	Valdez	305-989-3455	jenal@hotmail.com
4	Joe	Wright	303-258-2333	justjoe@gmail.com
5	Damian	Malloy	416-222-8888	dammal@hotmail.com
6	Tabitha	Chen	233-377-8883	tchen@gmail.com
7	Tom	Truss	495-333-2345	tom@aol.com
8	Adea	Remington	303-646-9288	adea@biscuits.com
9	Joe	Johnson	453-197-4228	j.johnson@yahoo.com

## 7. UI Screen Shots

Figure 7: Read Bikes table


**Oaklaura Bike Co-Op**


[Home](#)
[Bikes](#)
[Contacts](#)
[Customers](#)
[Repair Reports](#)
[Sales Reports](#)
[Store Personnel](#)

Reset Database

**Bikes Table:**

Bike ID	Color	Style	Brand	Status	Date Received
1	Pink	Mountain	Santa Cruz	Sold	08-15-2024
2	Red	Road	Cannondale	For Sale	12-20-2024
3	Black	Electric	Aventon	In Review	02-03-2025
4	Green	Cruiser	Trek	Sold	02-10-2025
5	Red	Enduro	Crew	Sold	02-15-2025
6	Other	Kids	Trek	In Repair	02-28-2025
7	White	Hybrid	Specialized	Sold	03-01-2025
8	Black	Mountain	Felt	In Repair	03-22-2025



Figure 8: Read Contacts table

The screenshot shows the Oaklaura Bike Co-Op web application interface. At the top is a dark blue header with the logo and navigation links: Home, Bikes, Contacts (selected), Customers, Repair Reports, Sales Reports, and Store Personnel. Below the header is a yellow button labeled "Reset Database". The main content area is titled "Contacts Table:" and features a table with 6 columns: Contact ID, First Name, Last Name, Phone, Email, and Edit / Delete. The table contains 9 rows of contact data. The 5th row (Contact ID 5) is highlighted in yellow.

Contact ID	First Name	Last Name	Phone	Email	Edit / Delete
1	Klaus	Von Hellman	305-278-2483	klausv@oaklaura-bikes.com	
2	Hilary	Smith	462-384-2333	hilarys@oaklaura-bikes.com	
3	Jennifer	Valdez	305-989-3455	jenva@hotmail.com	
4	Joe	Wright	303-258-2333	justjoe@gmail.com	
5	Damian	Malloy	416-222-8888	dammal@hotmail.com	
6	Tabitha	Chen	233-377-8883	tchen@gmail.com	
7	Tom	Truss	495-333-2345	tom@aol.com	
8	Adea	Remington	303-646-9288	adea@biscuits.com	
9	Joe	Johnson	453-197-4228	j.johnson@yahoo.com	

Figure 9: Read Customers table

The screenshot shows the Oaklaura Bike Co-Op web application interface with the "Customers" tab selected. The navigation bar is the same as in Figure 8. Below the header is a yellow button labeled "Reset Database". The main content area is titled "Customers Table:" and features a table with 5 columns: Customer ID, Contact ID, First Name, Last Name, and Receive Newsletter?. The table contains 4 rows of customer data.

Customer ID	Contact ID	First Name	Last Name	Receive Newsletter?
1	3	Jennifer	Valdez	No
2	4	Joe	Wright	Yes
3	7	Tom	Truss	Yes
4	8	Adea	Remington	No

Figure 10: Read Repair Reports table

Oaklaura Bike Co-Op

Home

Bikes

Contacts

Customers

Repair Reports

Sales Reports

Store Personnel

Reset Database

Repair Reports Table:

+ Add a Repair Report

Repair ID	Personnel ID	First Name	Last Name	Repair Date	Hours	Bike Repaired	Description	Edit / Delete
2	1	Klaus	Von Hellman	09-02-2024	0.50	1	Employee review, bik... More	<div><div></div><div></div></div>
3	5	Tabitha	Chen	10-01-2024	5.00		patched damaged inne... More	<div><div></div><div></div></div>
4	2	Hilary	Smith	01-03-2025	3.00	2	Replaced pedals and ... More	<div><div></div><div></div></div>
5	1	Klaus	Von Hellman	02-15-2025	0.50	4	Bike received in goo... More	<div><div></div><div></div></div>
6	3	Joe	Wright	02-15-2025	2.00	3	retuned derailleur a... More	<div><div></div><div></div></div>
7	1	Klaus	Von Hellman	02-16-2025	0.25	5	Bike received new: a... More	<div><div></div><div></div></div>
8	2	Hilary	Smith	03-01-2025	0.25	7	bike arrived new, ap... More	<div><div></div><div></div></div>

Figure 11: Read Sales Reports table



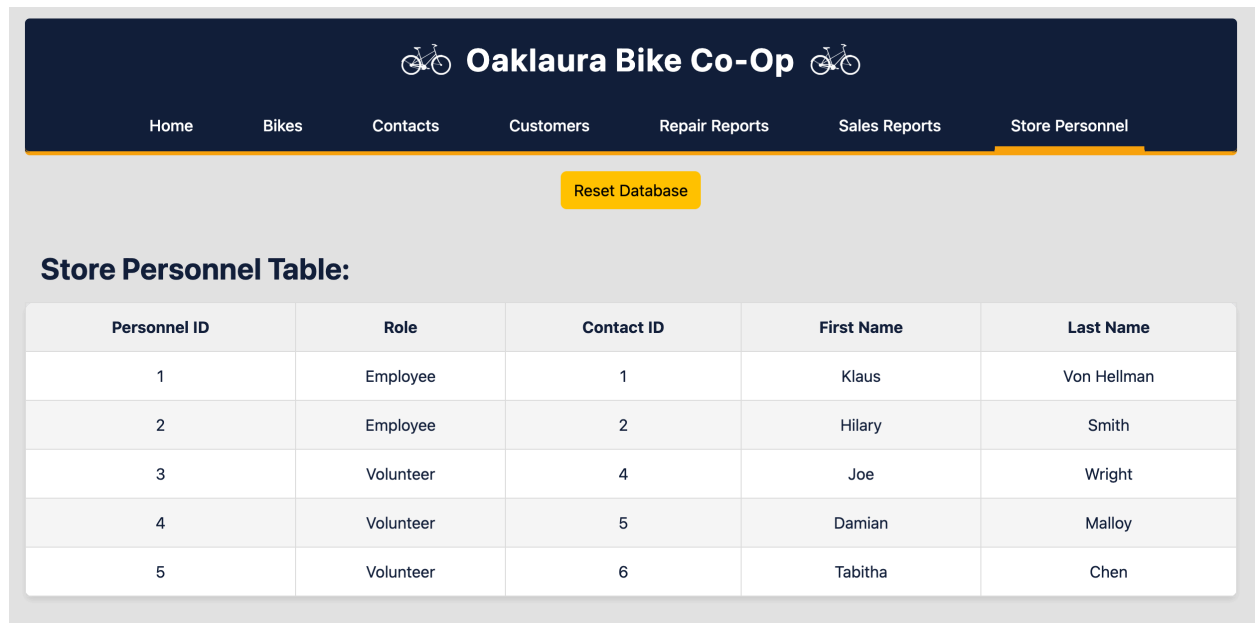
 <b>Oaklaura Bike Co-Op</b> 						
Home	Bikes	Contacts	Customers	Repair Reports	Sales Reports	Store Personnel
Reset Database						
Sales Reports Table:						
Sales ID	Bike ID	Date Sold	Price	Customer ID	First Name	Last Name
1	5	02-22-2025	459.00	1	Jennifer	Valdez
2	4	02-22-2025	999.97	1	Jennifer	Valdez
3	1	03-02-2025	999.99	2	Joe	Wright
4	7	03-15-2025	649.00	4	Adea	Remington

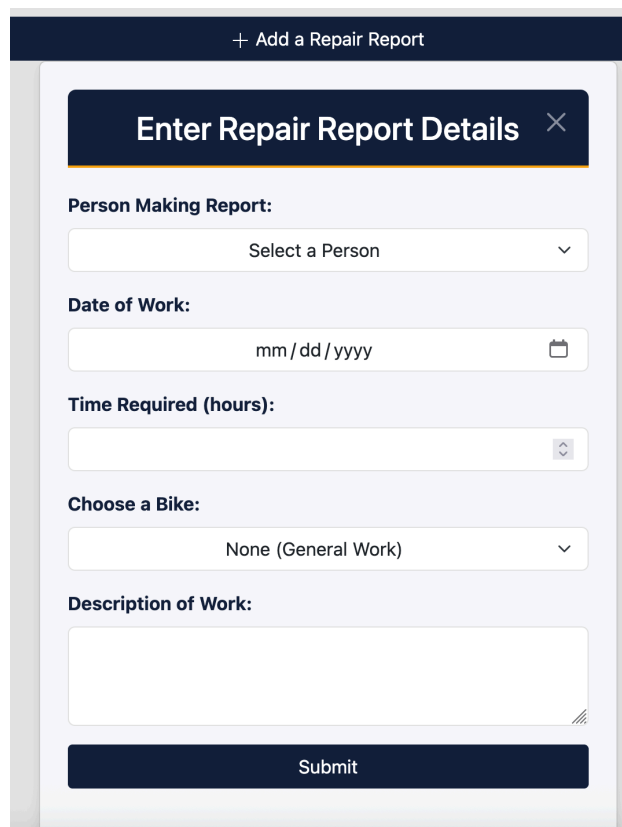
Figure 12: Read Store Personnel table



The screenshot shows the Oaklaura Bike Co-Op web application. The header is dark blue with the logo and navigation links: Home, Bikes, Contacts, Customers, Repair Reports, Sales Reports, and Store Personnel (which is highlighted). Below the header is a yellow 'Reset Database' button. The main content area is titled 'Store Personnel Table:' and displays a table with 5 rows and 5 columns.

Personnel ID	Role	Contact ID	First Name	Last Name
1	Employee	1	Klaus	Von Hellman
2	Employee	2	Hilary	Smith
3	Volunteer	4	Joe	Wright
4	Volunteer	5	Damian	Malloy
5	Volunteer	6	Tabitha	Chen

Figure 13: Create M:N Repair Reports table



The screenshot shows the 'Add a Repair Report' form. The form is titled 'Enter Repair Report Details' and has a close button. It contains several input fields and a submit button.

**+ Add a Repair Report**

**Enter Repair Report Details** ✕

**Person Making Report:**  
Select a Person ▼

**Date of Work:**  
mm/dd/yyyy 📅

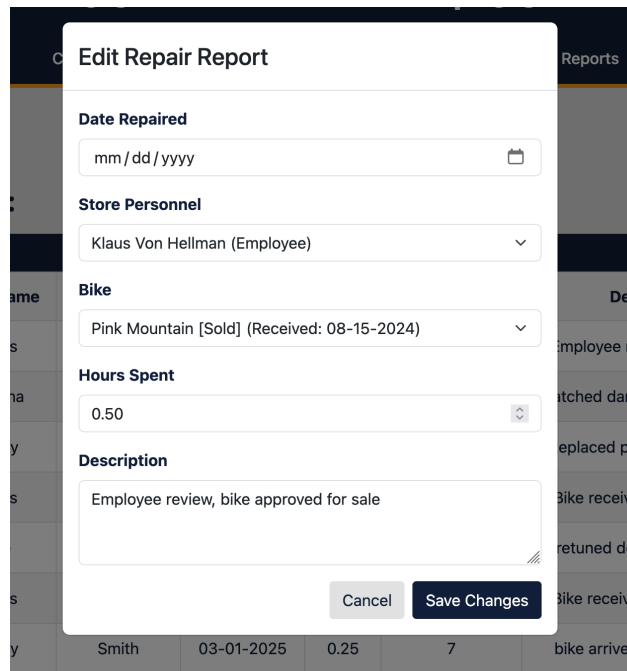
**Time Required (hours):**  
⬆ ⬇ ⬅

**Choose a Bike:**  
None (General Work) ▼

**Description of Work:**

**Submit**

Figure 14: Update M:N Repair Reports table



**Edit Repair Report**

**Date Repaired**  
mm/dd/yyyy

**Store Personnel**  
Klaus Von Hellman (Employee)

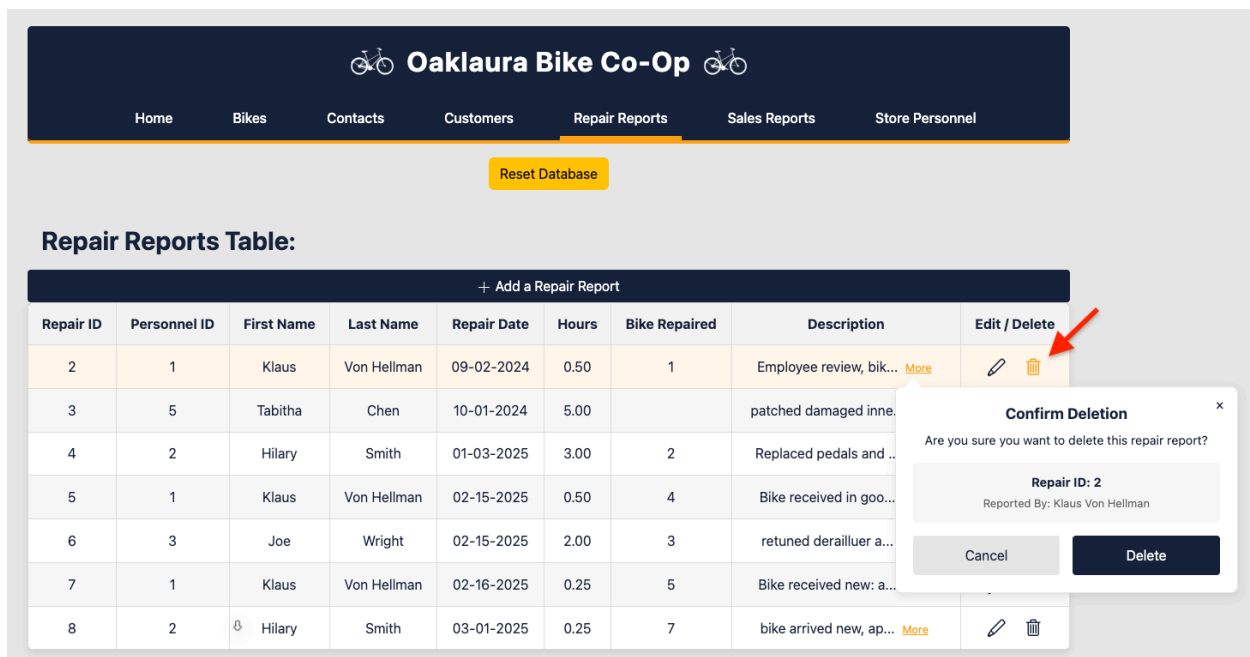
**Bike**  
Pink Mountain [Sold] (Received: 08-15-2024)

**Hours Spent**  
0.50

**Description**  
Employee review, bike approved for sale

Cancel Save Changes

Figure 15: Delete M:N Repair Reports table



**Oaklaura Bike Co-Op**

Home Bikes Contacts Customers Repair Reports Sales Reports Store Personnel

Reset Database

**Repair Reports Table:**

+ Add a Repair Report

Repair ID	Personnel ID	First Name	Last Name	Repair Date	Hours	Bike Repaired	Description	Edit / Delete
2	1	Klaus	Von Hellman	09-02-2024	0.50	1	Employee review, bik... <a href="#">More</a>	<a href="#">Edit</a> <a href="#">Delete</a>
3	5	Tabitha	Chen	10-01-2024	5.00		patched damaged inne...	
4	2	Hilary	Smith	01-03-2025	3.00	2	Replaced pedals and ..	
5	1	Klaus	Von Hellman	02-15-2025	0.50	4	Bike received in goo...	
6	3	Joe	Wright	02-15-2025	2.00	3	retuned derailleur a...	
7	1	Klaus	Von Hellman	02-16-2025	0.25	5	Bike received new: a...	
8	2	Hilary	Smith	03-01-2025	0.25	7	bike arrived new, ap... <a href="#">More</a>	<a href="#">Edit</a> <a href="#">Delete</a>

**Confirm Deletion**

Are you sure you want to delete this repair report?

Repair ID: 2  
Reported By: Klaus Von Hellman

Cancel Delete

Figure 16: Reset Database

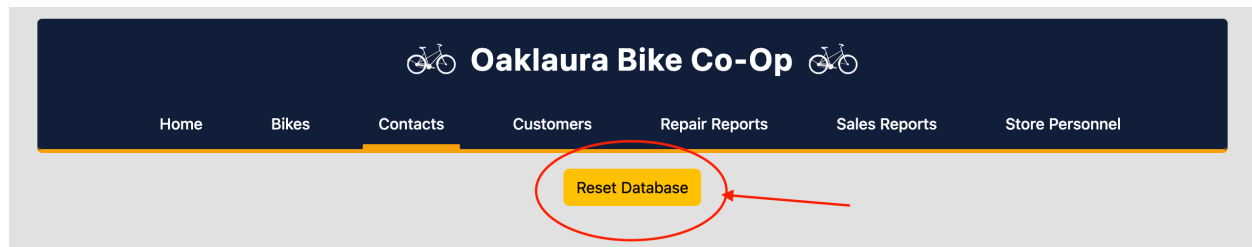
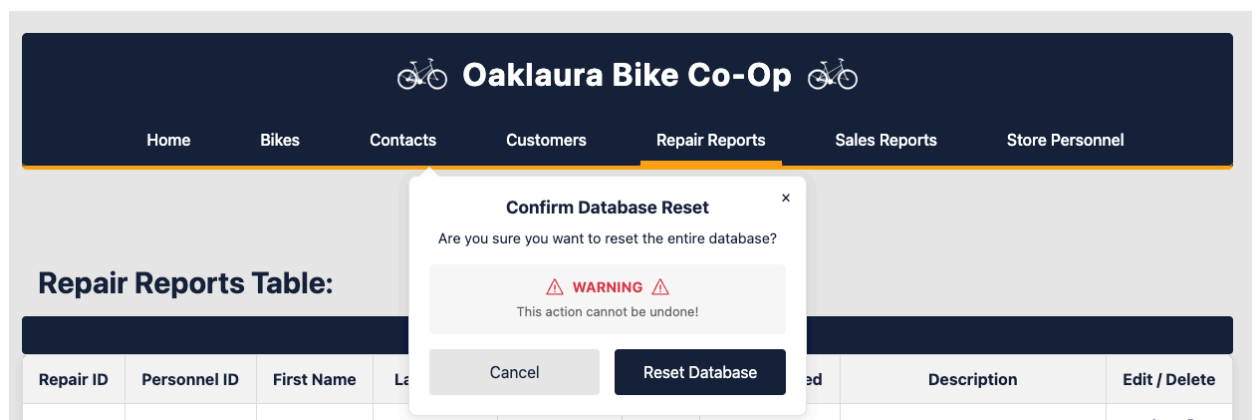


Figure 17: Reset Database Confirmation



## 8. Citations

- Inspiration for the Bike Co-Op came from The Recyclery, a non-profit bike shop based out of Chicago, IL (last retrieved on 4/9/2025): <https://www.therecyclery.org/>
- MySQL workbench was used to create the ERD diagram shown above.
- The  $\text{\LaTeX}$  template used here was adapted from the Cleese-Assignment template v.2.0 (retrieved on 4/2/2025): <https://latextemplates.com/template/cleese-assignment>
- TeXShop was used for all  $\text{\LaTeX}$  related compilations.
- All database design work is original.