Project Step 6
Database Aficionado (Group 43)
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URL: http://classwork.engr.oregonstate.edu:1915/

Benton County Dealership Service

Executive Summary:

This executive summary contains a summary of changes made to our database and UI during the design and implementation process. It includes reflections on those changes, as well as what feedback influenced those changes.

- We added an Employees entity to facilitate the required nullable relationship.
- Added dropdowns for each field referencing a foreign key: Dealerships on the Cars entity and Employee entity, dropdowns for Car ID, Purchase ID and Car Purchase ID on the Cars_Purchases intersection table, a dropdown for dealership ID on the Employees entity, and dropdowns for Customers and Employees on the Purchases entity. This is to make sure that the user never has to manually enter an ID (foreign key) and that the only ones available to them are ones that already exist in the database.
- Added form validation in all forms in order to prevent incorrect values (negative numbers) from being entered into the database. This was mentioned in one of the feedback reviews, that the reviewer was able to add negative values. We also added minimum and maximum values to the year attribute.
- Added styling (created tables and forms, added colors for every other row, hover and button effects). The forms were created following feedback from a review, which correctly stated that if a user were to add many cars/dealerships/customers, the prior layout (a vertical list) would get really long, and that a table would better handle the data.
- Added a navigation bar with hover effects
- Removed attribute quantity_in_stock from dealership, as that is related to Cars and not the dealership.
- Added SELECT and INSERT operations to all tables, UPDATE and DELETE to Cars_Purchases (the intersection table) and UPDATE to Purchases, fulfilling project requirements
- Allowed employee_id to be null within Purchases, fulfilling project requirements of a nullable foreign key in one entity
- Data type modifications: changed total_price in Purchases from int to float, VARCHAR(255) for make_model, and VARCHAR(45) for all other VARCHAR types following feedback from a review.

Overview

This is a database for a company that owns multiple car dealerships. The dealership group, Benton County Dealership Service, sells many different kinds of cars and has a diverse clientele. Altogether, they operate five dealerships and serve a community of 98,000 residents (U.S. 2024). On average, a salesman sells roughly 25 cars per month (Beckham, 2023). They buy their cars from both local and international manufacturers. They were having trouble recording all of their different vehicles and purchases on Excel, so they asked for help creating a database. The database records the individual cars, customers, purchases, different dealerships, as well as the relationships between them.

Sources:
U.S. Census Bureau quickfacts: Benton County, Oregon. (2024, July 1).
https://www.census.gov/quickfacts/fact/table/bentoncountyoregon/PST045224

Beckham, Karl. (2023, April 2). *How many cars should a car salesman sell a month?: Car sales professional*. Car Sales Professional
https://carsalesprofessional.com/how-many-cars-should-a-car-salesman-sell-a-month/

Database Outline

- Entity 1: Cars - records the details about all of the individual cars used and available
    - car_id: int, unique, auto_increment, not NULL, PK
    - dealership_id: int, unique, not NULL, FK
    - make_model: varchar(255)
    - color: varchar(45), not NULL
    - price: decimal(20,2), not NULL
    - year: year, not NULL
    - is_used: boolean, not NULL
    - in_stock: boolean, not NULL
    - Relationships:
        - M:N between Cars and Purchases with car_id and purchase_id as FKs inside of the intersection table Cars_has_Purchases
        - M:1 between Cars and Dealerships with dealership_id as a FK inside of Cars

- Entity 2: Dealerships
    - dealership_id: int, unique, auto_increment, not NULL, PK
    - city: varchar(45), not NULL
    - quantity_sold: int, not NULL
    - revenue: decimal(20,2), not NULL
    - Relationships:
        - 1:M between Dealerships and Cars with dealership_id as a FK inside of Cars

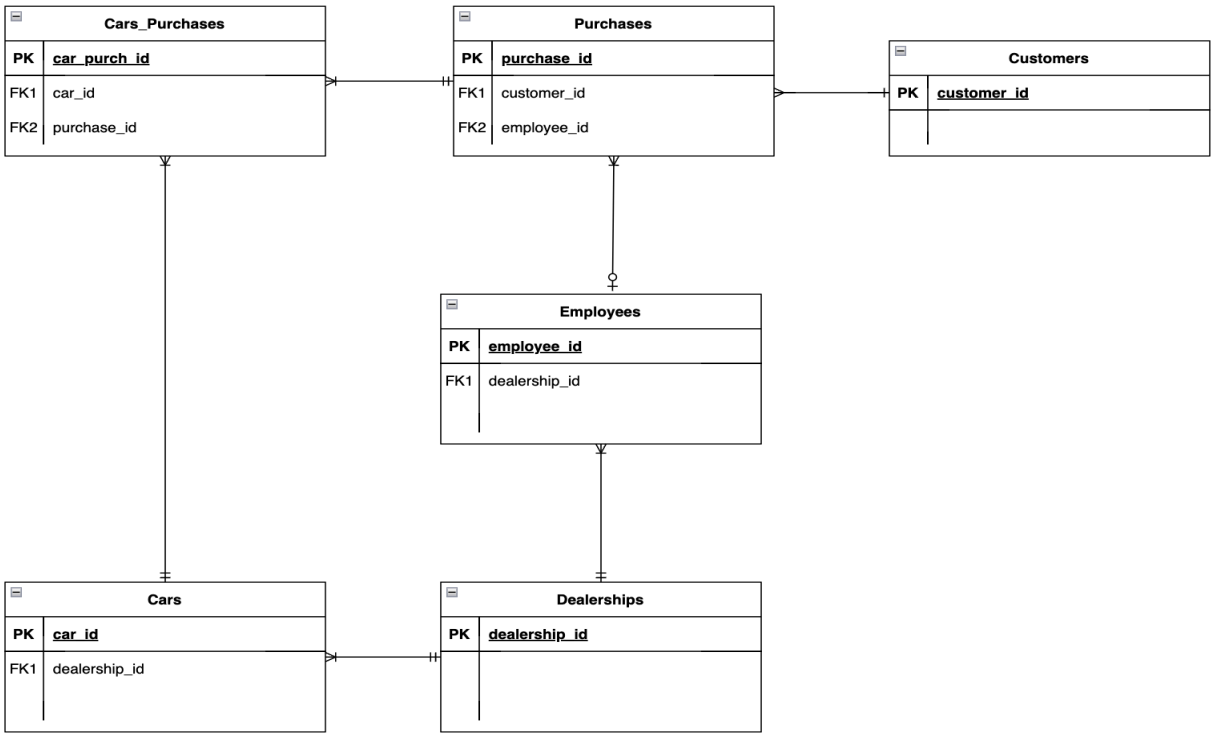
        - 1:M between Dealerships and Employees, with dealership_id as a FK inside of Employees

- Entity 3: Purchases - records the details of all the purchases made by customers
    - purchase_id: int, unique, auto_increment, not NULL, PK
    - customer_id: int, not NULL, FK
    - employee_id: int, FK
    - total_price: decimal(20,2), not NULL
    - quantity, int, not NULL
    - purchase_date: date, not NULL
    - Relationships:
        - N:M between Purchases and Cars with purchase_id and car_id as FKs inside of the intersection table Cars_has_Purchases
        - M:1 between Purchases and Employees with employee_id as a FK inside of Purchases
        - M:1 between Purchases and Customers with customer_id as a FK inside of Purchases

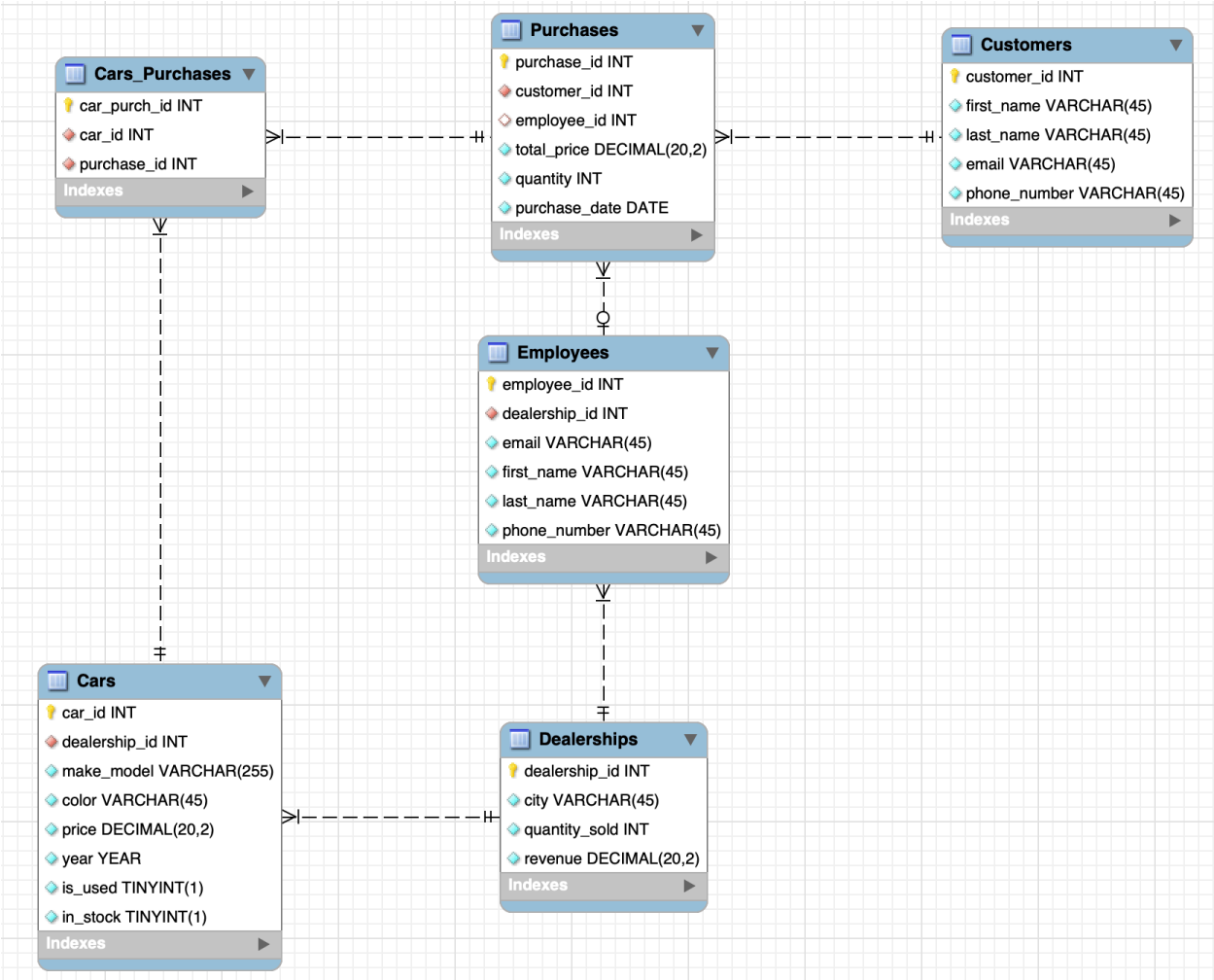
- Entity 4: Customers - records demographic information about the customers
    - customer_id: int, unique, auto_increment, not NULL, PK
    - email: varchar(45), not NULL
    - first_name: varchar(45), not NULL
    - last_name: varchar(45), not NULL
    - phone_number: varchar(45), not NULL
    - Relationships:
        - 1:M between Customers and Purchases with customer_id as a FK inside of Purchases

- Entity 5: Employees - records employee details
    - employee_id: int, unique, auto_increment, not NULL, PK
    - dealership_id: int, unique, not NULL, FK
    - email: varchar(45), not NULL
    - first_name: varchar(45), not NULL
    - last_name: varchar(45), not NULL
    - phone_number: varchar(45), not NULL
    - Relationships:
        - 1:M between Employees and Purchases with employee_id as a FK inside of Purchases
        - M:1 between Employees and Dealerships with dealership_id as a FK inside of Employees

Entity-Relationship Diagram



Schema


Cars_Purchases
car_purch_id INT
car_id INT
purchase_id INT
Indexes
Purchases
purchase_id INT
customer_id INT
employee_id INT
total_price DECIMAL(20,2)
quantity INT
purchase_date DATE
Indexes
Customers
customer_id INT
first_name VARCHAR(45)
last_name VARCHAR(45)
email VARCHAR(45)
phone_number VARCHAR(45)
Indexes
Employees
employee_id INT
dealership_id INT
email VARCHAR(45)
first_name VARCHAR(45)
last_name VARCHAR(45)
phone_number VARCHAR(45)
Indexes
Cars
car_id INT
dealership_id INT
make_model VARCHAR(255)
color VARCHAR(45)
price DECIMAL(20,2)
year YEAR
is_used TINYINT(1)
in_stock TINYINT(1)
Indexes
Dealerships
dealership_id INT
city VARCHAR(45)
quantity_sold INT
revenue DECIMAL(20,2)
Indexes

Example Data

Cars

car_id	dealership_id	make_model	color	price	year	is_used	in_stock
1	1	Honda CRV	Blue	10,999.34	2023	Y	Y
2	2	Jeep Renegade Latitude	Orange	21,500.88	2019	N	Y
3	1	Toyota CH-R	Yellow	6,500.56	2005	Y	Y
4	2	Lexus ISF	Black	52,750.99	2024	N	N

Dealerships

dealership_id	city	quantity_sold	revenue
1	Adair Village	7	64,350.67
2	Albany	2	76,235.45
3	Corvallis	23	1,674,897.12

Purchases

purchase_id	customer_id	employee_id	total_price	quantity	purchase_date
1	1	1	10,999.34	1	2022-05-16
2	2		52,750.99	1	2024-01-25
3	3	2	13,000.76	2	2025-02-04
4	1		10,999.34	1	2025-01-07

Customers

customer_id	first_name	last_name	email	phone_number
1	Beverly	Green	bgreen@gmail.com	216-492-4932
2	Moses	Mendelsohn	mmendel@gmail.com	492-239-3939
3	Alex	Shih	ashih@yahoo.com	493-129-2939
4	Rachel	Rhinehart	rrhineheart@hotmail.com	402-494-2929

Employees

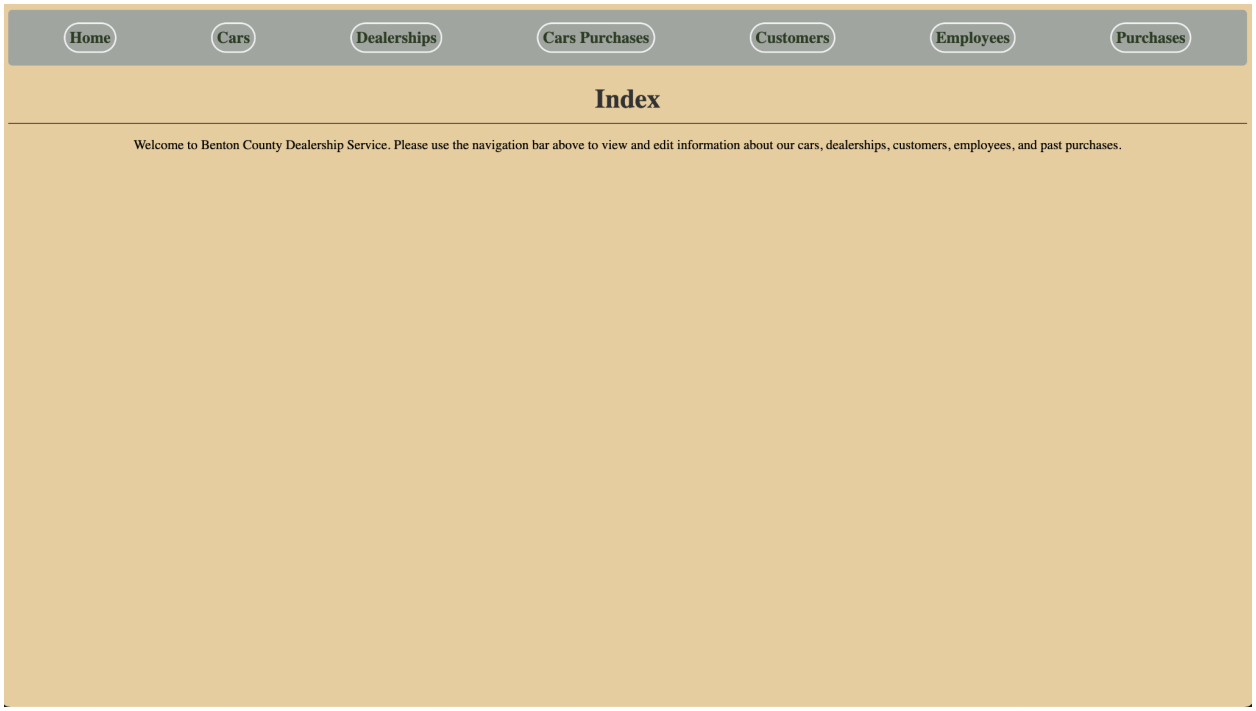
employee_id	dealership_id	email	first_name	last_name	phone_number
1	2	tcohen@bcdr.com	Tina	Cohen	541-403-2095
2	3	ngonza@bcdr.com	Natalia	Gonzalez	458-593-2974
3	3	msilver@bcdr.com	Matthew	Silverstein	458-938-2103
4	1	psimbol@bcdr.com	Parker	Simbol	541-938-4950

Cars_Purchases

car_purch_id	car_id	purchase_id
1	1	1
2	4	2
3	3	3
4	3	3

UI Screen Captures

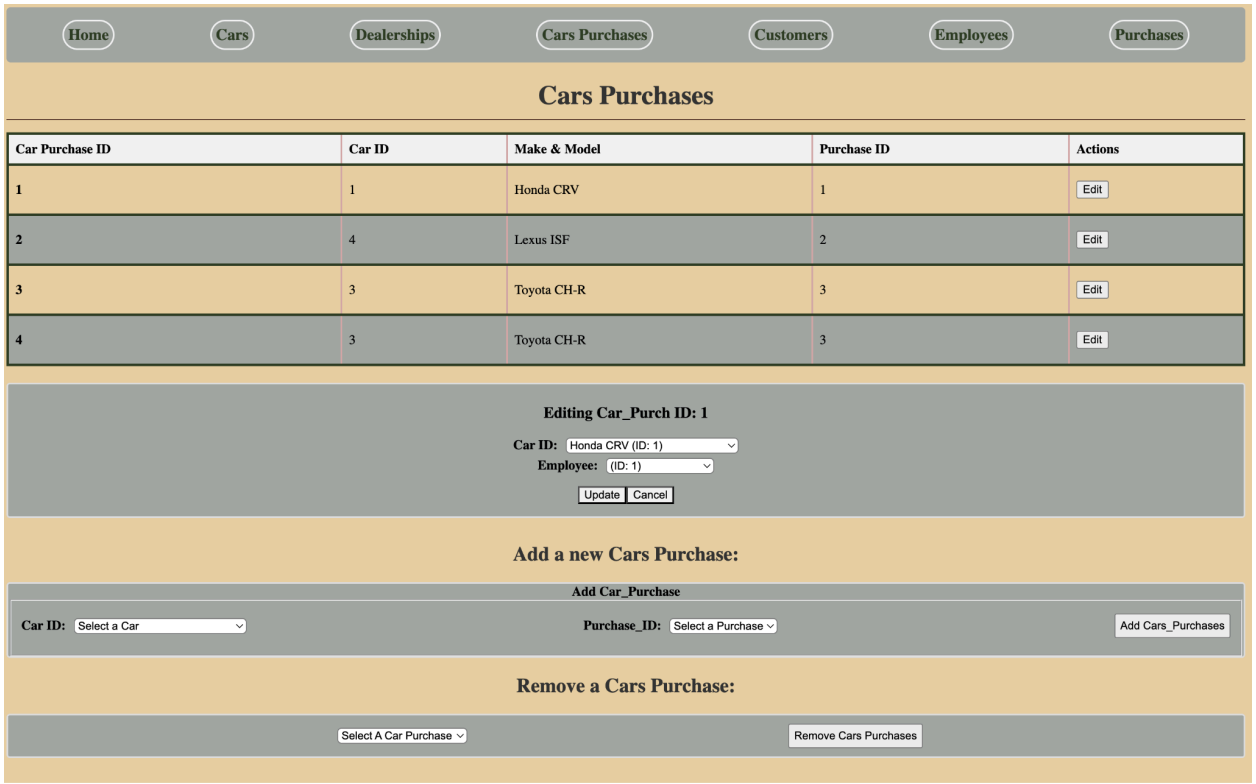
Home/Index Page:



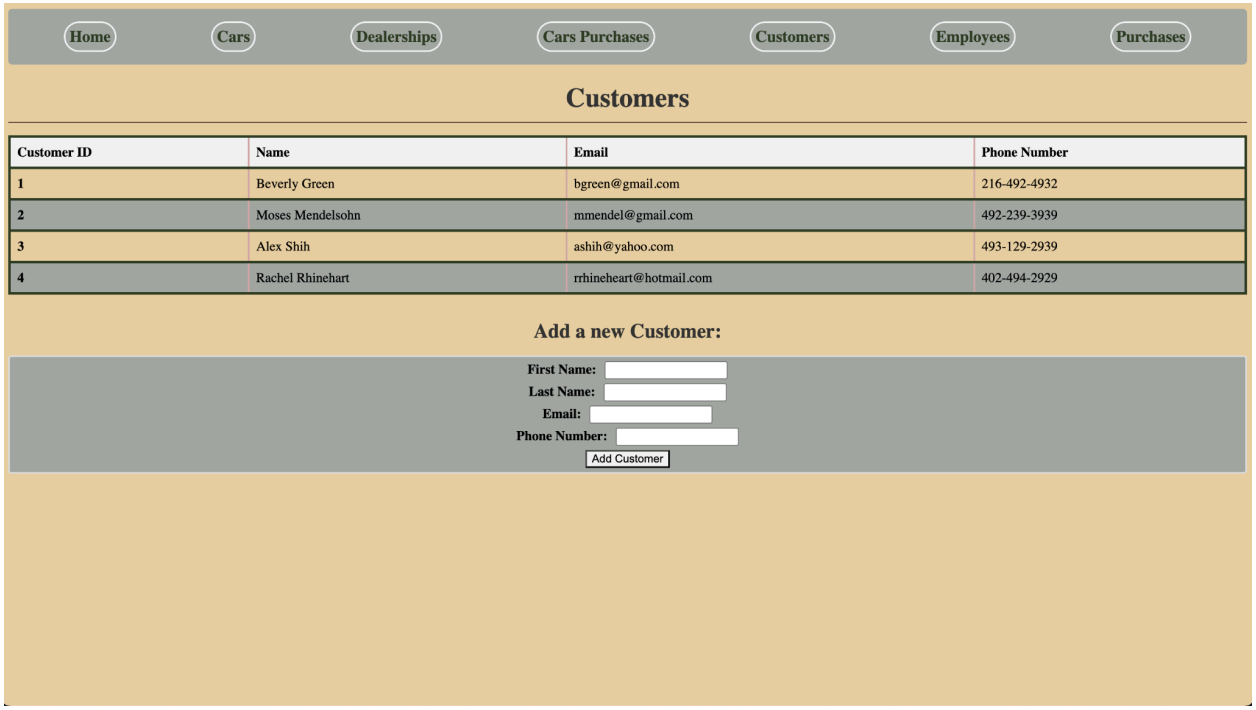
Cars Page (CREATE, READ):

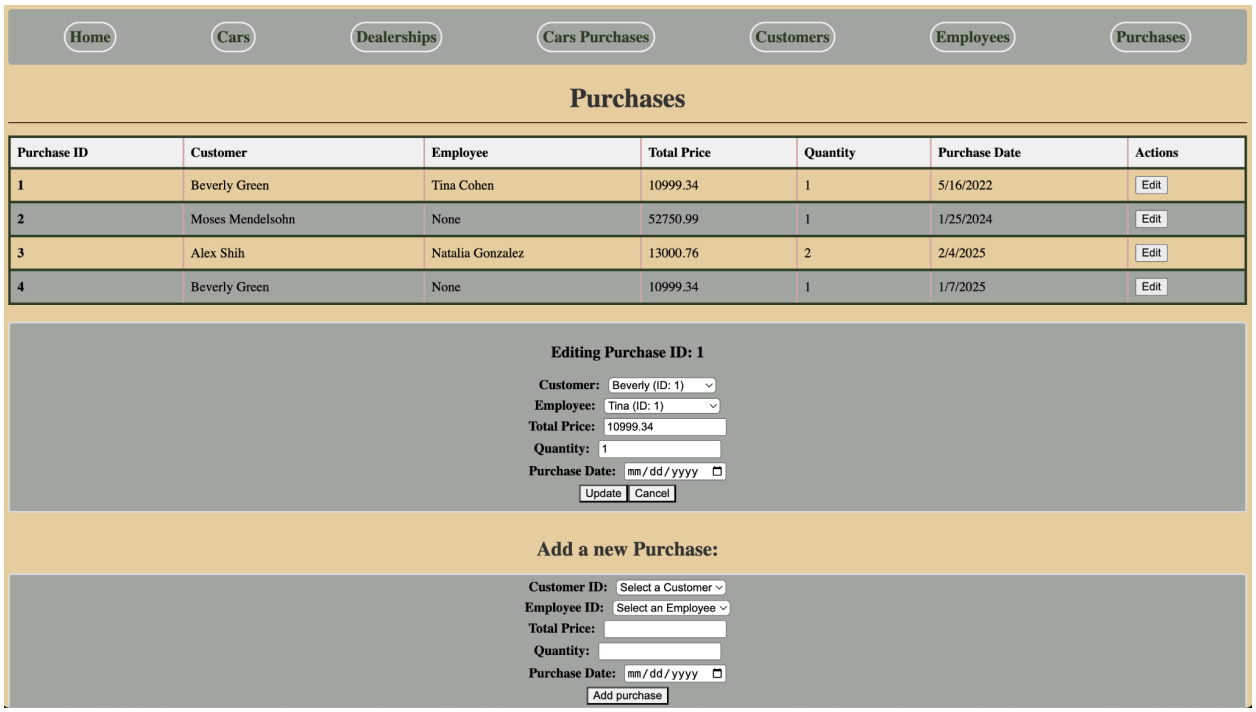
Dealerships Page (CREATE, READ):

Cars Purchases Page (CREATE, READ, UPDATE, DELETE):



Customers Page (CREATE, READ)



Employees Page (CREATE, READ):

Purchases Page (CREATE, READ, UPDATE):