Carbon Footprint Web Portal / Application
- Requirements

CS 361 Group 2 Project
10/20/19

- Alex Densmore
- Anousha Farshid
- Adam Wright
- Ken Wyckoff

Requirements Definition

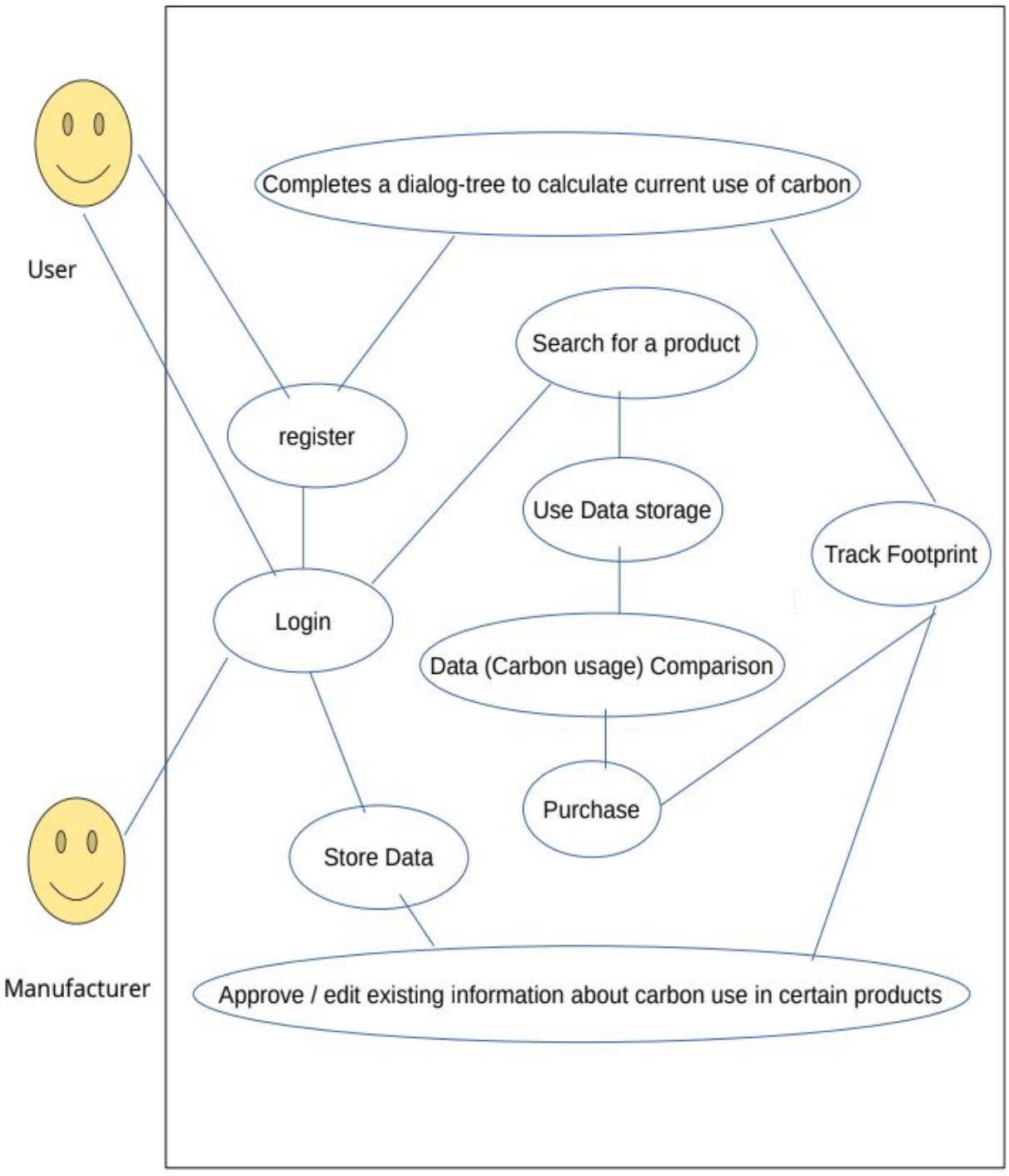
Functional Requirement

- The system shall allow only registered user to access data.
- The system shall allow new users/manufacturers to register.
- The system requires login in order to have access to personal profile.
- The system shall prompt the user to complete a dialog-tree to calculate current use of each user.
- The system shall allow user to update/save new data.
- The system stores the data entered by user.
- The system shall allow manufacturer to contest the validity of existing data.
- The system shall allow the user to have access to stored data from manufactures.
- The system shall allow the user to search for a particular product and display the information about the product provided by different manufacturers.
- The system shall display a report of user carbon footprint.
- The system shall warn the user if their carbon footprint is increasing.
- The system shall allow the user to compare similar products from different manufacturers in a single-view window.
- The system shall display a graph of monthly and yearly report in user profile.

Non-functional Requirement

- The system shall process user login within 5 seconds.
- The system shall load user profile within 10 seconds.
- The system shall load the searched product within 10 seconds.

Carbon Footprint



Use Case #1: Measuring the end user's use of carbon

Actor: Individual and consumer of commercial products

Preconditions:

- The end user has the willingness to catalog data about the carbon using activities that they engage in each day.
- The end user possesses and understands the use of either or both a desktop or mobile computing device.

Postconditions:

- The data recorded by the end user is available in the database for that specific user and all other interested parties (the whole of the user base and the general public) to search.
- The end user is willing to adjust their behavior to a new pattern which emits less carbon by choosing strategies which lead to a smaller total use.

Flow of Events:

- The end user creates or logs into their account which stores basic information (their name and contact information) by either visiting the web application's URL or downloading the mobile version of the application from the device maker's online application repository.
- On initial setup the user is asked about dwelling size and family composition for later calculations.
- The end user selects the option to enter the current day's activity into the database.
- The end user is presented with a web form that asks various questions about the use of specific goods through a dialog-tree based user interface. These questions ask for information about such things as:
    - Current days travel
        - Walking or bicycling
        - Personal Car
        - Car as a service
        - Airplane
        - Ferry
    - The current day's use of heating or cooling of their dwelling
        - Number of hours on for heating
        - Number of hours on for cooling
    - Products consumed today
        - Food consumed

        - Number of hours with electric lighting in dwelling
        - Total time in shower or use of bathtub
    - Any use of a fireplace or open fire
    - The number of hours of electronic devices used
        - Television
        - Computer
        - Mobile device
- The end user completes the current days dialog-tree and presses the submit button.
- The system calculates the added linked usage related to their entered data such as:
    - Refrigerator use
    - Lighting use for preconfigured dwelling size
    - The carbon use which is linked from the producer database for each product
        - Transportation of good consumed
        - Electricity used to produce goods
        - ETC. (further described in the producer use case)
- Once the end user submits the form, they are presented with a summary of what they have submitted which will be stored for the current day. The user may edit individual fields, if they wish.
- The user the user is then returned to their home screen, which contains quick data visualizations for their overall use, and how it compares to the average user.

Use Case #2: Measuring producers' use of carbon

Actor: Producer of a commercial product

Preconditions:

- The producer has access to data about the amount of carbon used in manufacturing one or more of their products.
- The producer has distinguished between material uses of carbon (such as the electricity used in their manufacturing process) and immaterial uses of carbon (such as the carbon used in the creation of old software that was created many years ago).

Postcondition:

- The data recorded by the producer is available in the database for all interested parties (other producers and the general public) to search.

Flow of Events:

- The producer creates or logs into their account which stores basic information (their name and contact information).
- The producer selects the option to enter a new product into the database.
- The producer is presented with a web form that asks various questions about the production of one of their specific goods. These questions ask for information about such things as:
    - The name of the company
    - The name of the product
    - The role of the person entering the information at the company (useful for later validating data if necessary)
    - The carbon used in the production and procurement of raw materials for the product
    - The carbon used in the generation and usage of electricity for the manufacturing process
    - The carbon emitted from any pollution from the factory
    - The carbon used when transporting the good for sale
    - Any carbon generated by the product when operated
    - Any carbon generated when the product is disposed of
    - Any other relevant notes, such as how the product can be responsibly recycled
- The producer enters all the information they have available into the form and presses the submit button.

- If any required fields are not filled in, the system alerts the producer, asks them to fill in the missing requirements, and asks them to submit the form again.
- Once the producer submits the form, they are presented with a summary of what they have submitted which they can print for their records if they wish.
- The producer is also asked if they would like to submit information about another product they produced.
    - If they choose “Yes,” they are presented with this product entry form again, and this process is repeated.
    - If they choose “No,” they are returned to their account homepage.

Use Case 3

- Users can compare the carbon used by different products.

Actors: Administrators, Manufactures, Users

Preconditions:

- Administrators add data about carbon usage for a list of products.
- Manufacturers approve/correct the collected data about their carbon usage.
- Manufacturers add unlisted products and the amount of carbon used.
- Users have access to the list of products and their accurate carbon data.
- Users can add a list of their purchases and find out their amount of carbon usage.

Postconditions:

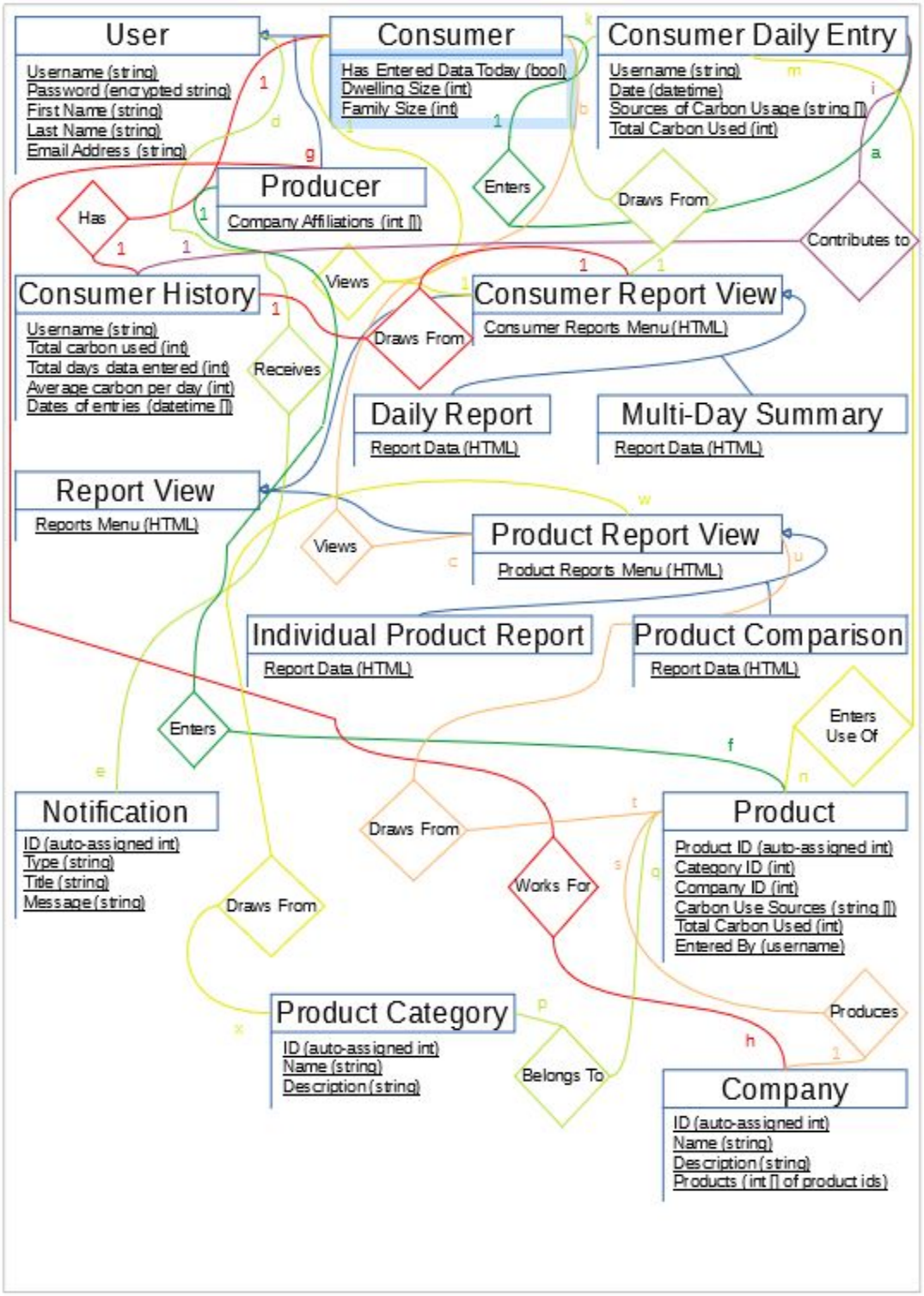
- User could compare different products.
- User could make a better decision purchasing a product with less carbon used.
- Carbon usage will be a factor in purchasing a product.
- Manufactures decrease carbon usage in order to compete together.

Flow of events:

- User can make a profile on the website/app and add purchases.
- Each manufacturer has a profile and a list of products including detailed information about each product.
- Administrators add collected data about products which has no participating company.
- Each company can edit or approve the information collected by administrators and start participating by making a profile.
- System uses information provided by companies and data collected by administrator to rank the products based on their carbon usage.
- User has the ability to search for a certain product and get a list of that product made by different companies and get access to the ranking based on carbon usage.
- User can make better decisions every day by being able to compare different products and procedures of each company making that product.
- The purchase will be added to the user's profile and user can track how much carbon has been saved by picking the better product.
- User will also get notified about how much carbon has been wasted (could be saved) if other choices would be made.

- User has access to daily, monthly, and yearly report of their profile activity. The amount of carbon they have saved and the amount of carbon they could save by purchasing from other companies.

ERD


User
Username (string)
Password (encrypted string)
First Name (string)
Last Name (string)
Email Address (string)
Consumer
Has Entered Data Today (bool)
Dwelling Size (int)
Family Size (int)
Consumer Daily Entry
Username (string)
Date (datetime)
Sources of Carbon Usage (string [])
Total Carbon Used (int)
Producer
Company Affiliations (int [])
Has
Enters
Draws From
Contributes to
Consumer History
Username (string)
Total carbon used (int)
Total days data entered (int)
Average carbon per day (int)
Dates of entries (datetime [])
Views
Receives
Consumer Report View
Consumer Reports Menu (HTML)
Daily Report
Report Data (HTML)
Multi-Day Summary
Report Data (HTML)
Report View
Reports Menu (HTML)
Product Report View
Product Reports Menu (HTML)
Individual Product Report
Report Data (HTML)
Product Comparison
Report Data (HTML)
Enters
Enters Use Of
Notification
ID (auto-assigned int)
Type (string)
Title (string)
Message (string)
Draws From
Works For
Product
Product ID (auto-assigned int)
Category ID (int)
Company ID (int)
Carbon Use Sources (string [])
Total Carbon Used (int)
Entered By (username)
Product Category
ID (auto-assigned int)
Name (string)
Description (string)
Belongs To
Produces
Company
ID (auto-assigned int)
Name (string)
Description (string)
Products (int [] of product ids)

Requirements Specifications

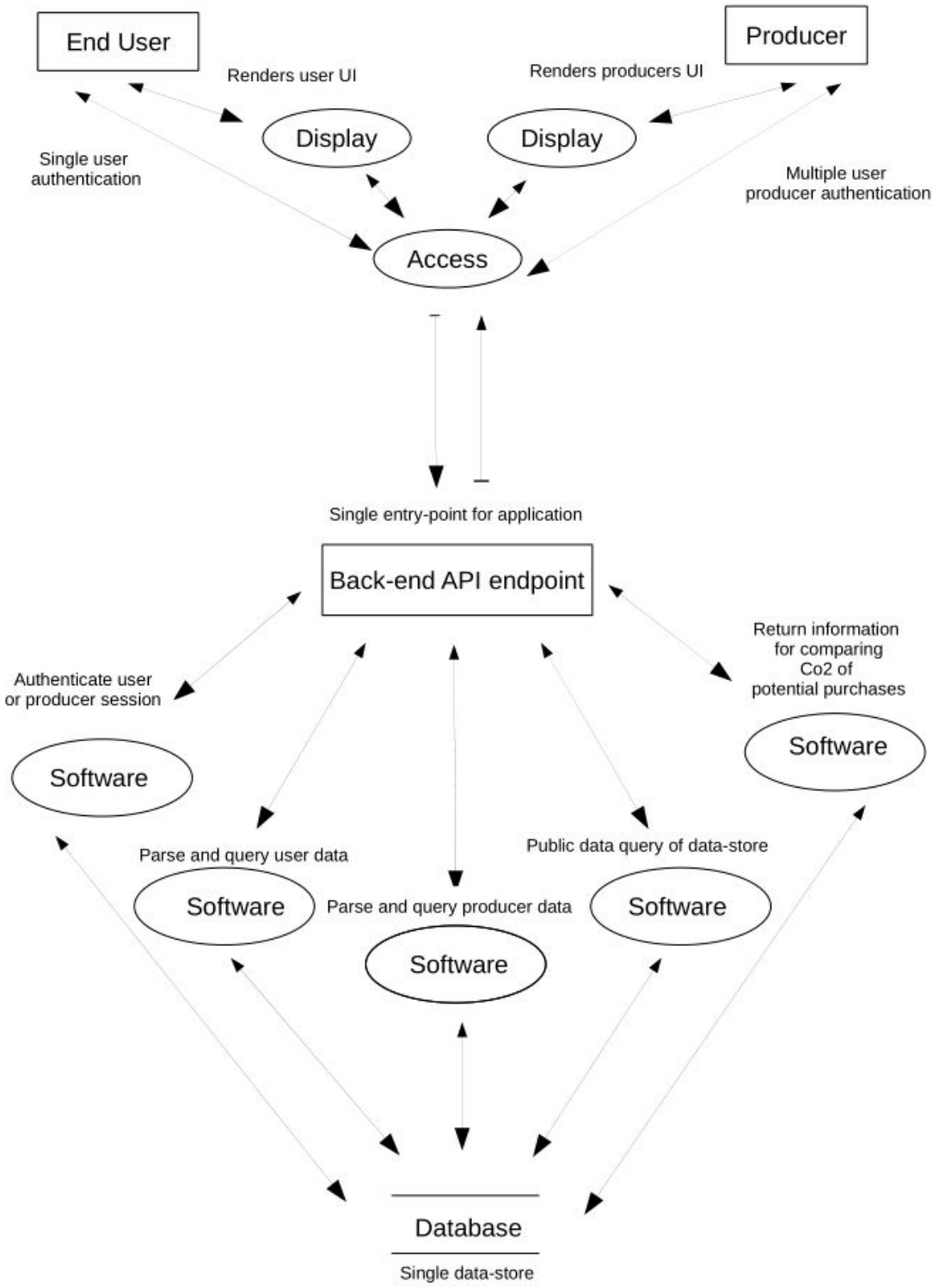
Functional Requirement

- The user interface for a consumer or producer login will pass user credentials over an encrypted connection to the user account database to be verified against those in database and either authorize or reject the login request.
- The application allows creation of new, unique user accounts as either a consumer or producer and stores the credentials in the database.
- After login, user data is passed from the database to the user interface.
- After account creation, software will serve the user a dialog-tree and send user responses to the database.
- The user interface passes data to the database so that the user can submit new data or update data. The database maintains data integrity.
- If the user is a producer, the system allows the user to contest the validity of data in the database.
- The user interface displays data from the database, regardless of the data's origin.
- The software allows the user to input the name of a particular product, which the software queries the database for. The database returns product information to the software, which displays that information to the user.
- The software displays a summary of user carbon footprint data stored in the database based on data previously entered by the user.
- When the software displays a summary, it will indicate to the user if their carbon footprint has increased based on recent data from the database.
- The software allows the user to input the name of a manufacturer, which the software queries the database for. The database returns product information to the software, which displays that information to the user in a comparison view of multiple products from that manufacturer.

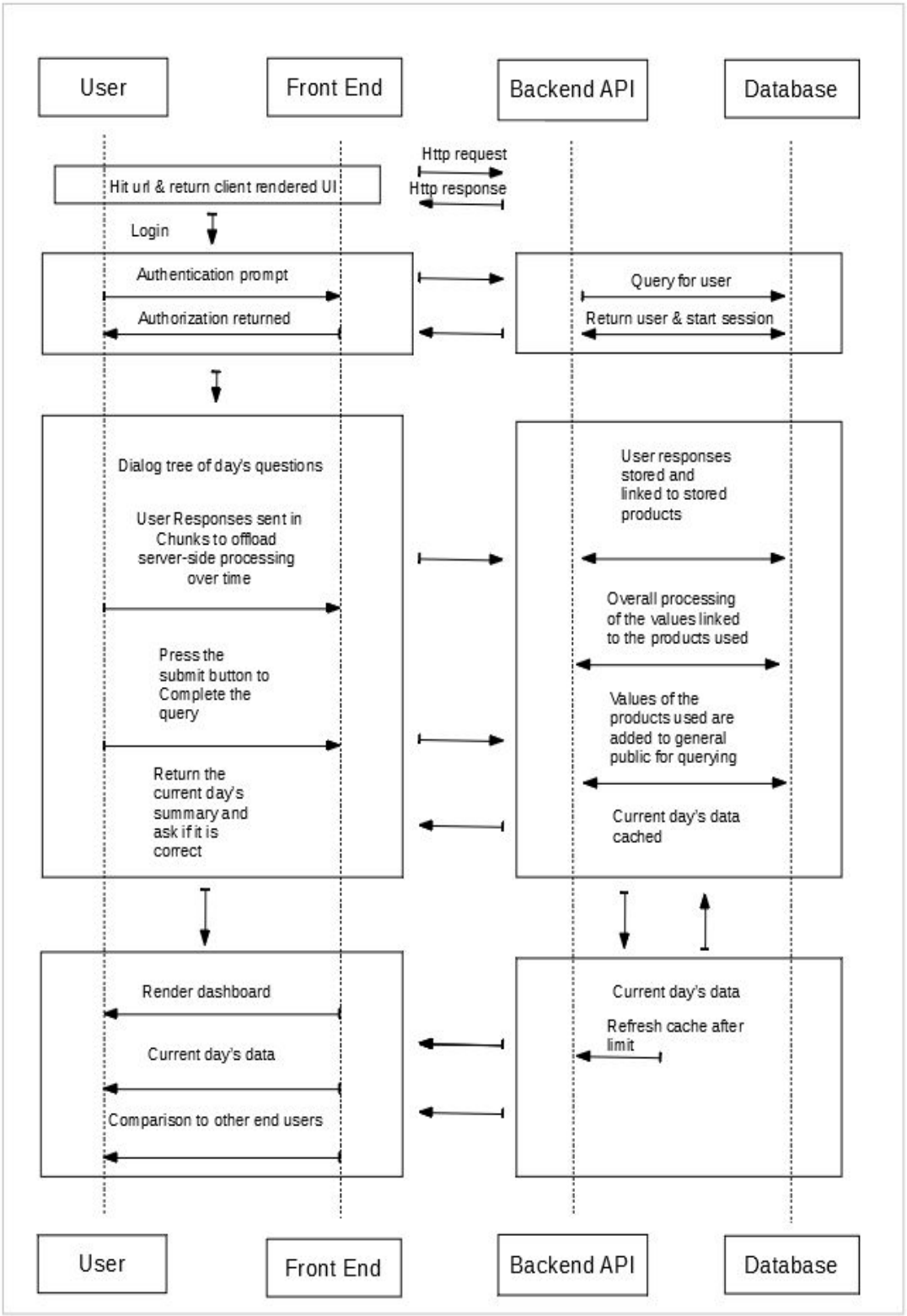
Non-functional Requirement

- The system queries the database with user login credentials and responds within 5 seconds.
- The system queries the database for user profile data and returns that data within 10 seconds.
- The system queries the database for searched product data and responds within 10 seconds.

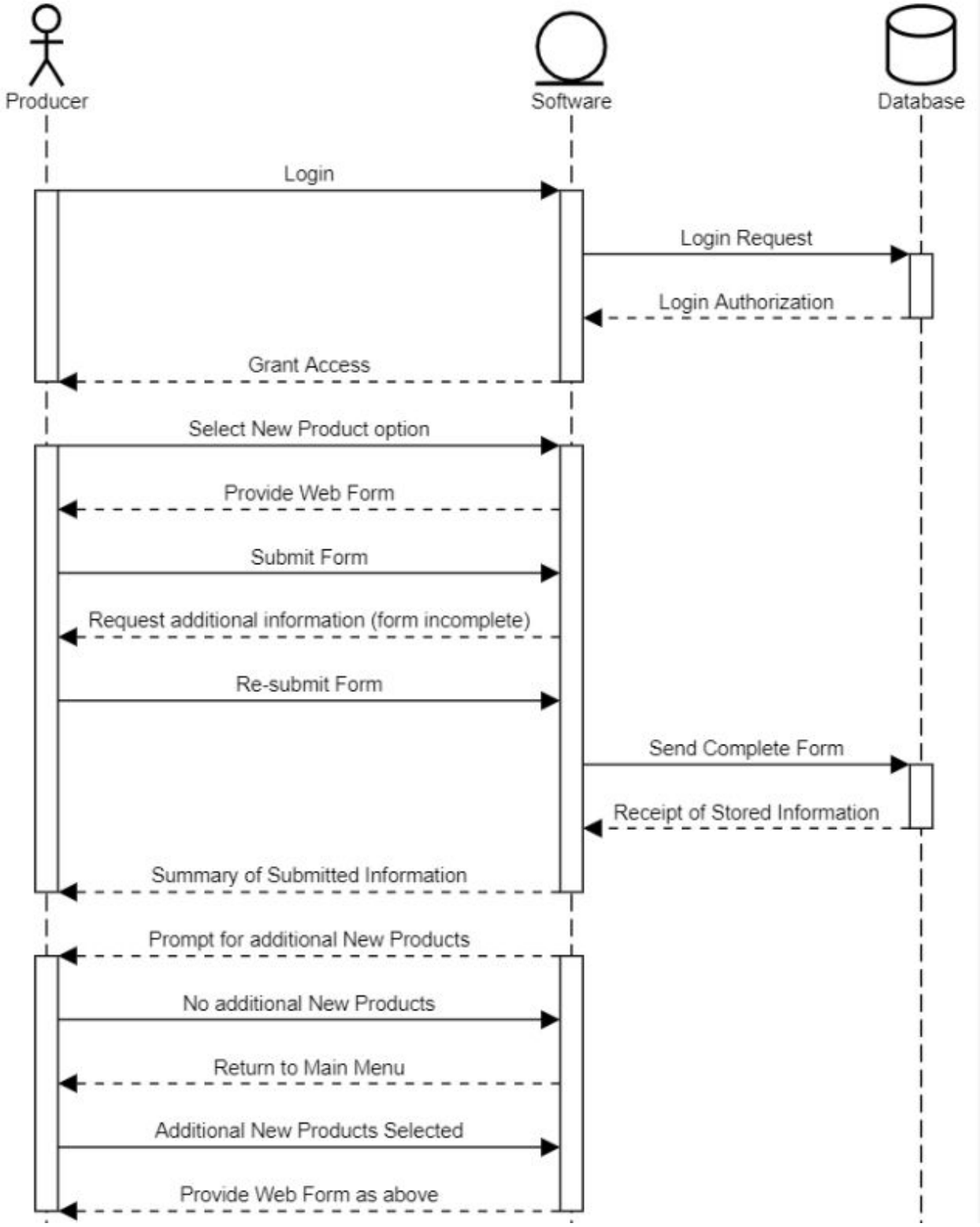
- **Dataflow Diagram**



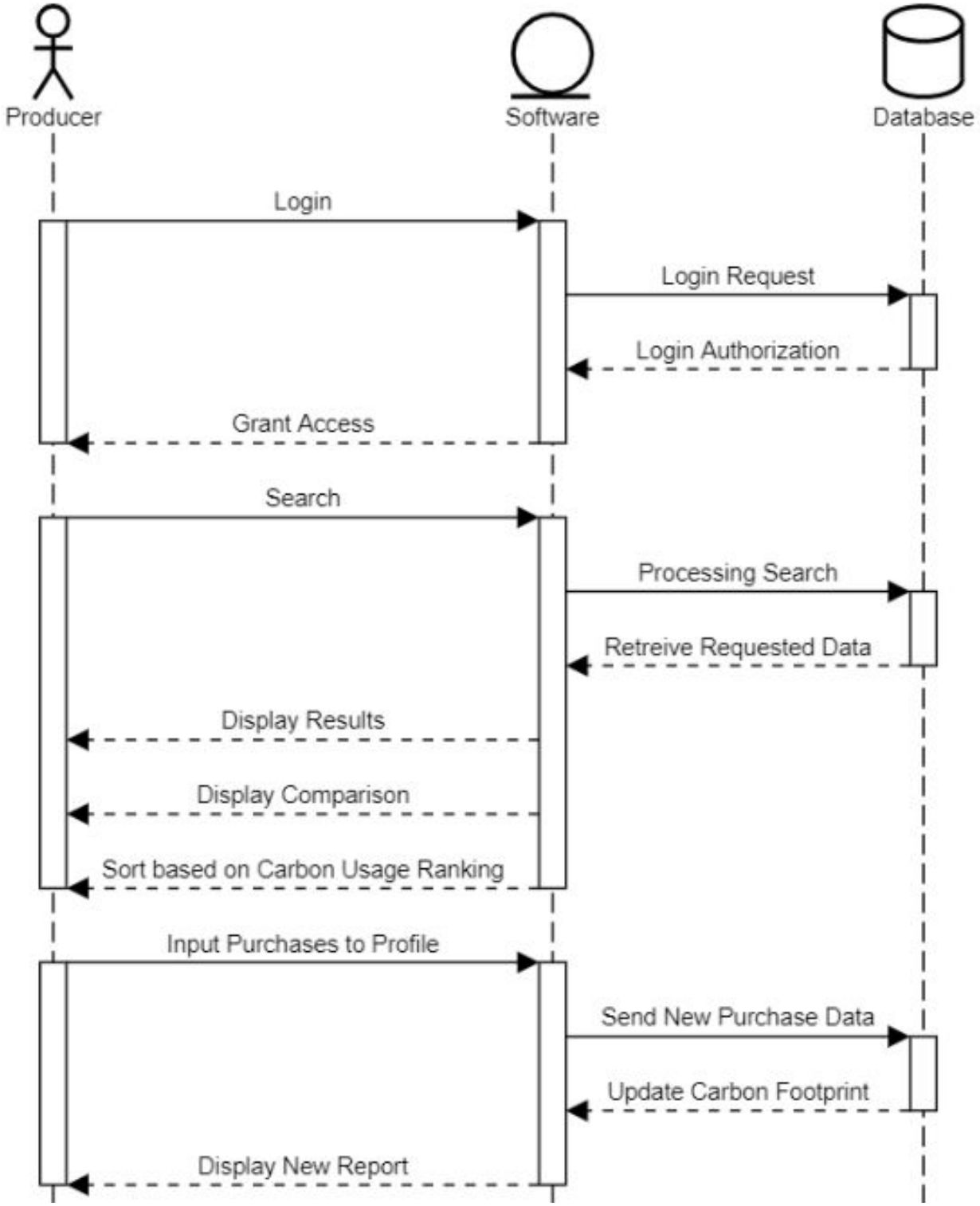
Sequence Diagrams
Use Case 1



Use Case 2


Producer
Software
Database
Login
Login Request
Login Authorization
Grant Access
Select New Product option
Provide Web Form
Submit Form
Request additional information (form incomplete)
Re-submit Form
Send Complete Form
Receipt of Stored Information
Summary of Submitted Information
Prompt for additional New Products
No additional New Products
Return to Main Menu
Additional New Products Selected
Provide Web Form as above

Use Case 3


Producer
Software
Database
Login
Login Request
Login Authorization
Grant Access
Search
Processing Search
Retreive Requested Data
Display Results
Display Comparison
Sort based on Carbon Usage Ranking
Input Purchases to Profile
Send New Purchase Data
Update Carbon Footprint
Display New Report

Customer Meeting Summary
Our customer Shawn was willing and able to meet with us via Google Hangouts on Tuesday evening and has remained available for contact through email or Slack. He also offered to come to meetings when requested.

Team Member Contributions
The following list indicates team member contributions during the project stages leading up to and including HW1:

- All - Direct team meetings and continued communication via Google Hangouts and email
- Alex Densmore - Use Case #2 text, ERD
- Anousha Farshid - Use Case #3 text, Overall Use Case Diagram, Use Case #3 Message Sequence Chart, Requirements Definition
- Adam Wright - Use Case #1 text, Dataflow Diagram, Use Case #1 Message Sequence Chart
- Ken Wyckoff - Use Case #2 Message Sequence Chart
- Alex, Adam, and Ken - Requirements Specifications created during group meeting

Each team member was also involved in creating this document from the various parts completed individually, along with reviewing said documents for accuracy and assurance.