Project Milestone 4

WATT2Buy

Prepared by
Team WATT2Buy (#112-3)

Hung Bui
Simon Julien
Tiger McDaniel
Kunal Sinha
Vanessa Van Scyoc Hernandez

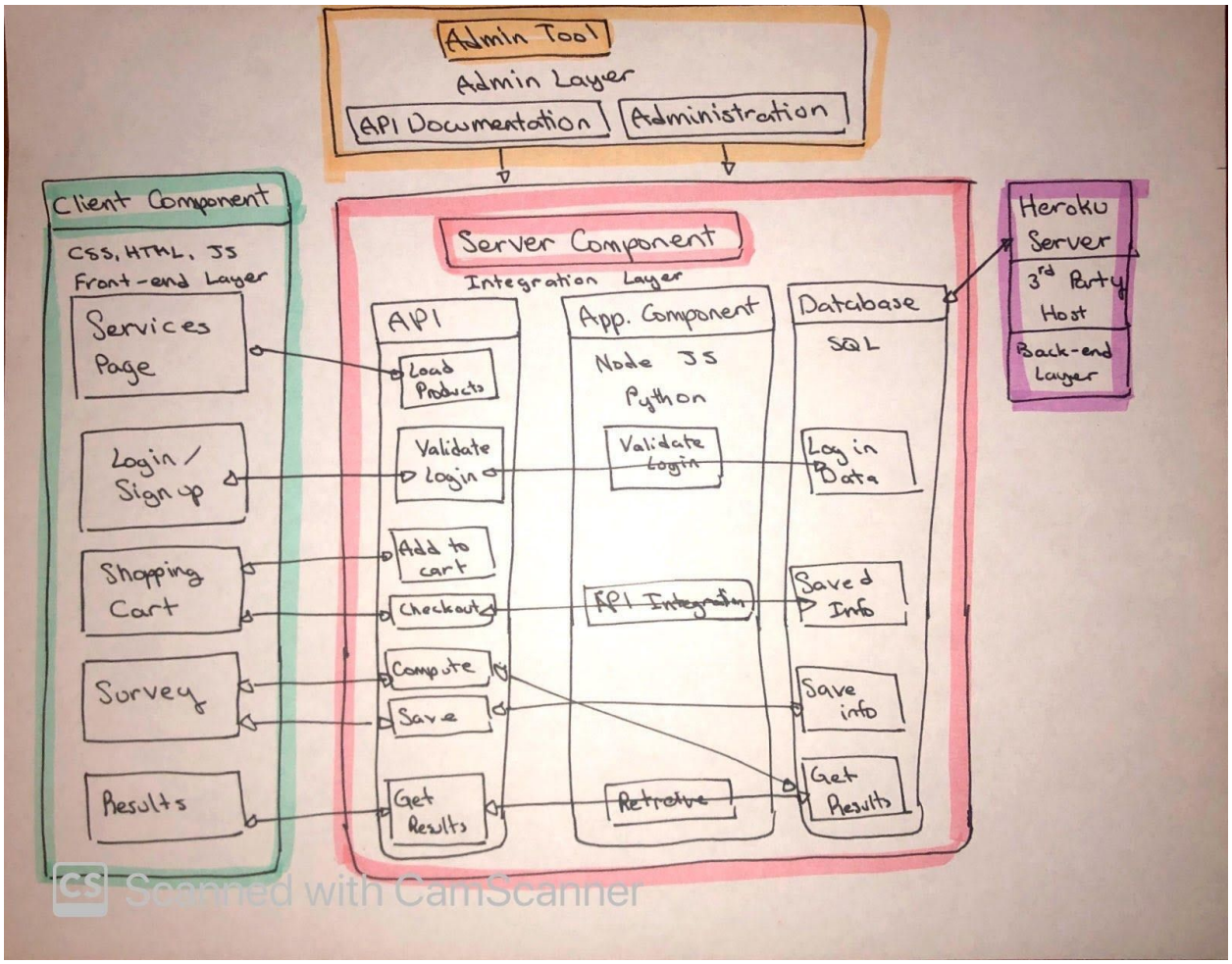
October 30, 2020

Revised List of Features

Prioritized from most important to least:

1. Create an Account: Users can create their own account to save their results, manage cart orders, and view order history.
2. Login / Logout: User can login into or out of their account for security purposes
3. Data Base:
    - Stores all user names (and passwords)
        - System saves user data so that customers can log in and continue their orders from where they left off in their results and/or their shopping cart.
    - "Library" of all technologies that we are offering
        - Our artificial investing software will pull from this library to show the user which results would be the best options for them
    - Data for the automated investor system to use for the computations it runs through to present the user with optimal results (like geographic solar irradiance).
4. Take Survey: Users input their information on their budget, day-to-day activities, geographic location, interested, and other power needs to calculate plan options from which they can choose to buy systems and equipment
5. Investment Recommendations: After taking the survey, the automated investment advisor system will present the user with the optimal technologies for the user to purchase given their current, personal situation.
6. Add Cart/ Checkout: After choosing the item(s) they need, the user can add them to their cart, update and delete items in the cart, apply discounts (optional), and input information for payment and delivery.
7. "Library" Page that displays all of the technologies that the system is considering when choosing the best investment decisions.
8. Crawl data from another website (API)/ From NREL data: User's customized plans will include getting location specific environmental details to tailor the order recommendations. This data will be used from APIs of the National Renewable Energy Laboratory.
9. Admin Login: Change server components and make updates through login.

Architecture Diagram



Hierarchy

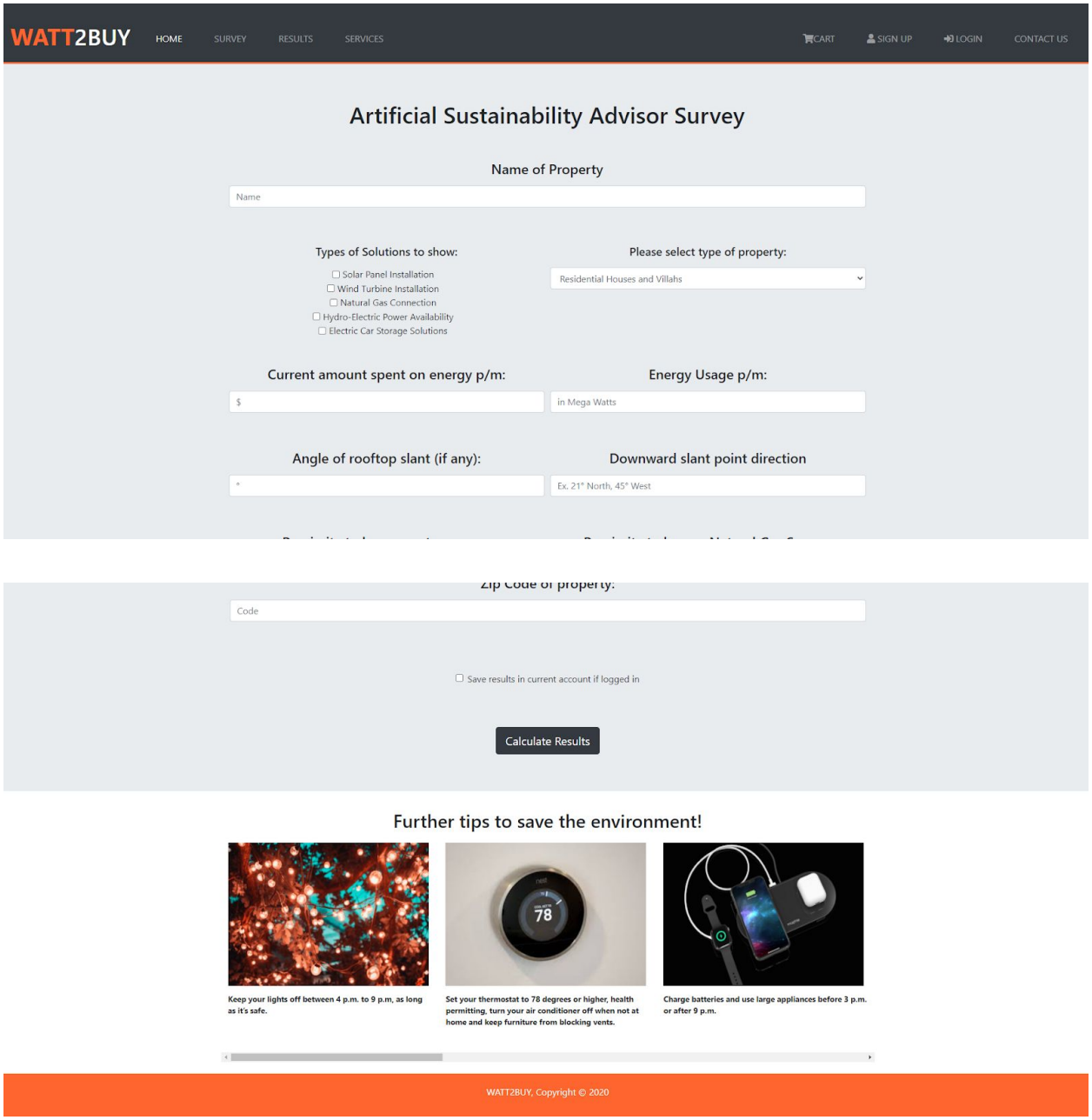
- UI/UX Component
- Structural Components
    - Client Component
    - Server Component
        - Application Logic
        - Database

Front End Design

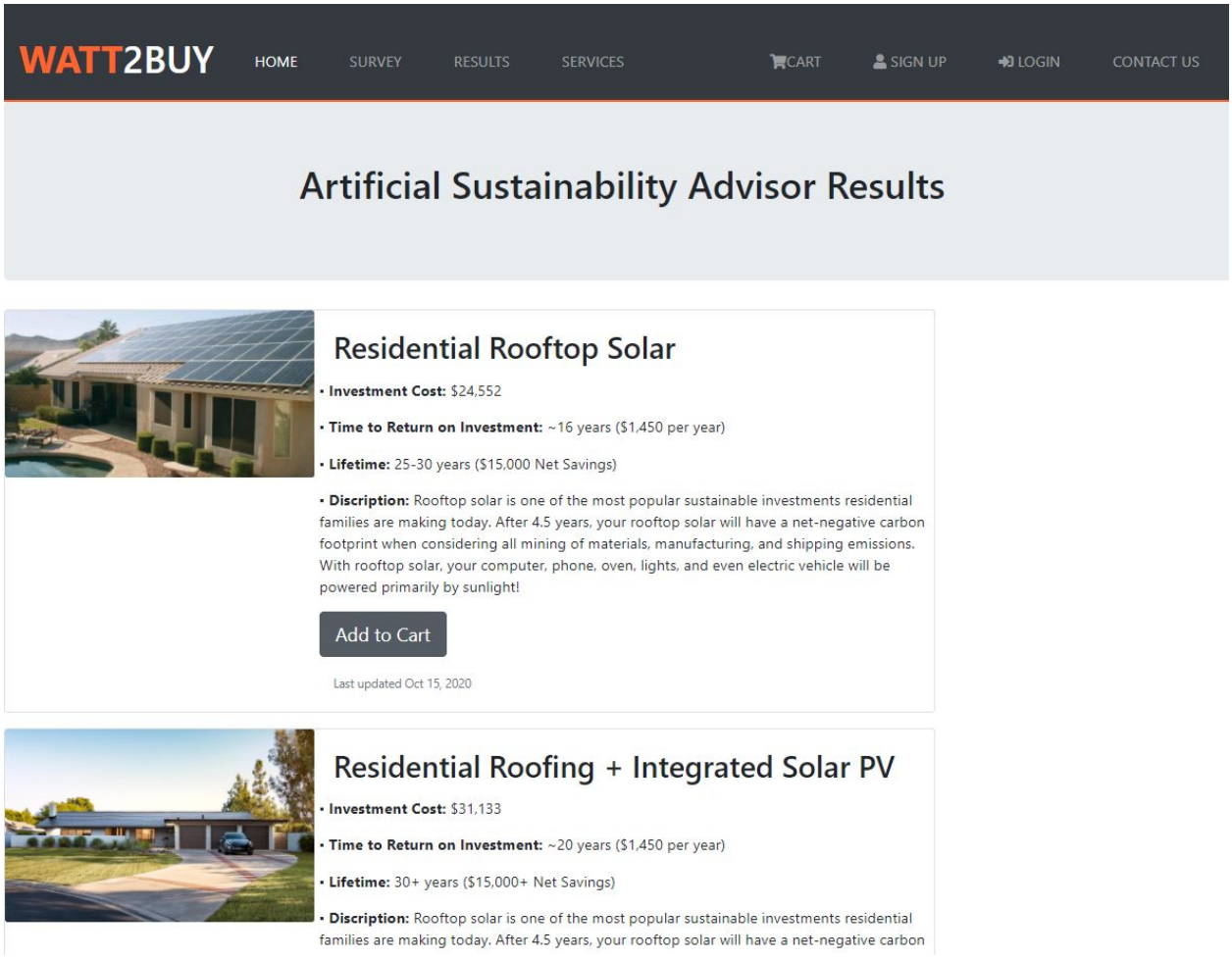
Team Watt2Buy has completed designing its front end of the website. The primary method to navigate through the website is through the navigation bar. There are also links below on the homepage as demonstrated by the screenshots below.

This is the homepage, where users will land when clicked on the index link. Users can start either by clicking on the "Take the Survey" button below, or clicking on Survey from the Navigation bar.

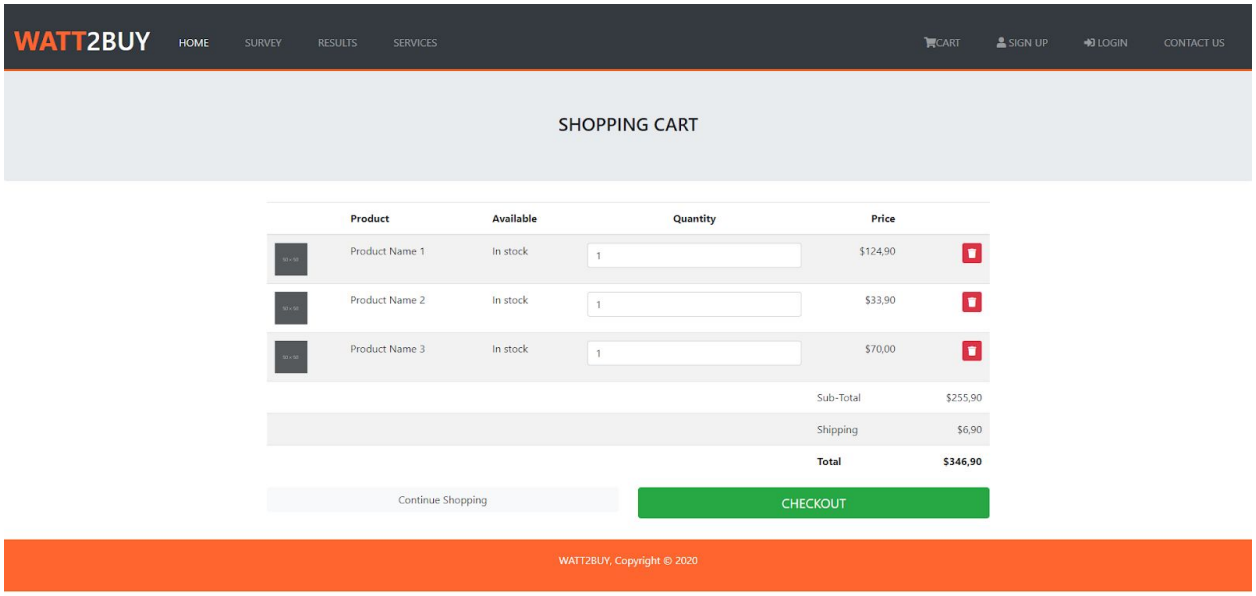
The user then proceeds to the survey where one needs to answer about the power usage and neighborhood description / land survey questions. Once finished they will scroll down to calculate the results page.



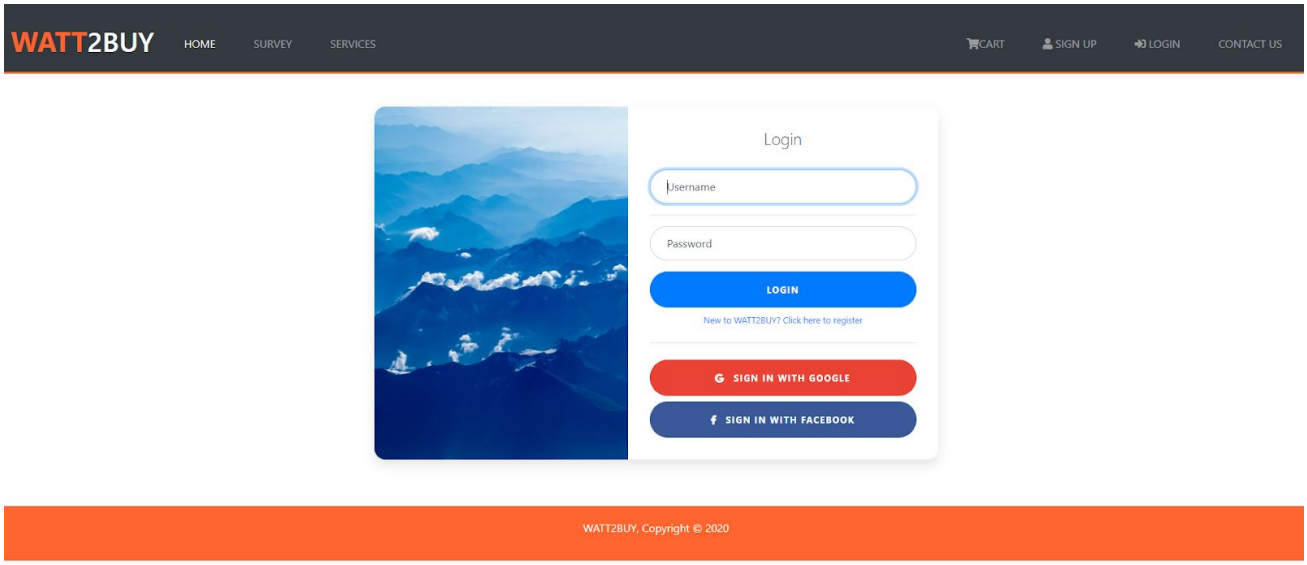
Examples of some calculated results are below. It can also be noted that if the user checked the save result checkbox in the survey, they will be directed to the login page. The results page can be accessed by a signed in used by directly clicking on the Results tab in the navigation bar.

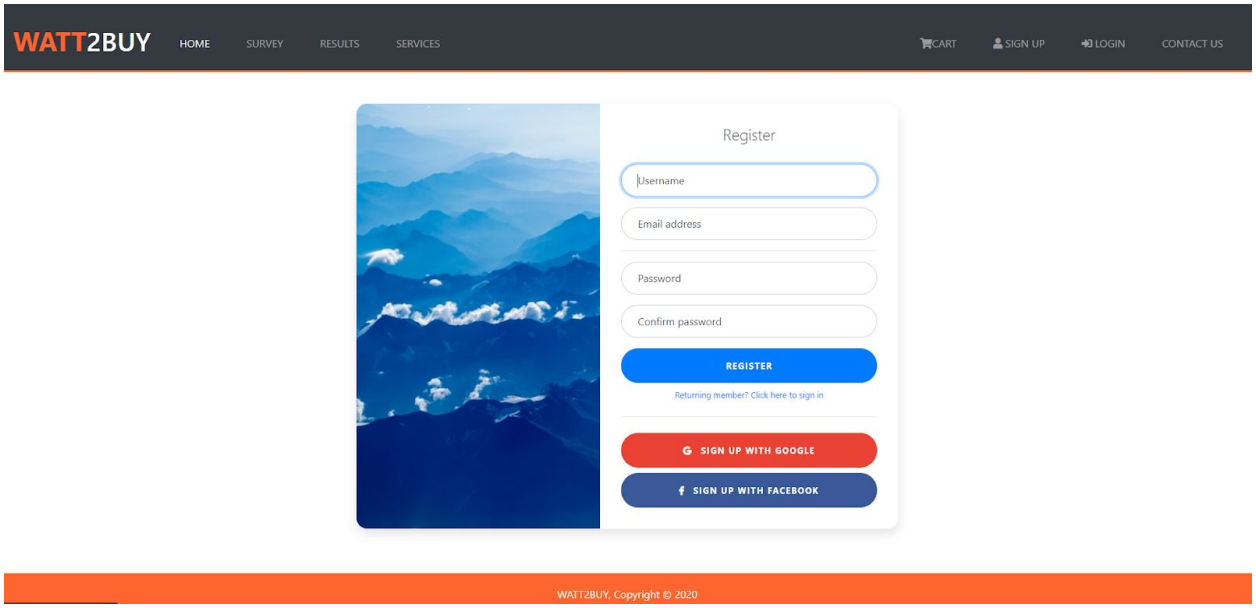


After looking at prospective options, users can create their cart by clicking on the “Add to cart” button presented under every option. The screenshot below shows the shopping cart where the total cost of the entire shopping cart is displayed. With this page, the functionality of the website stops.

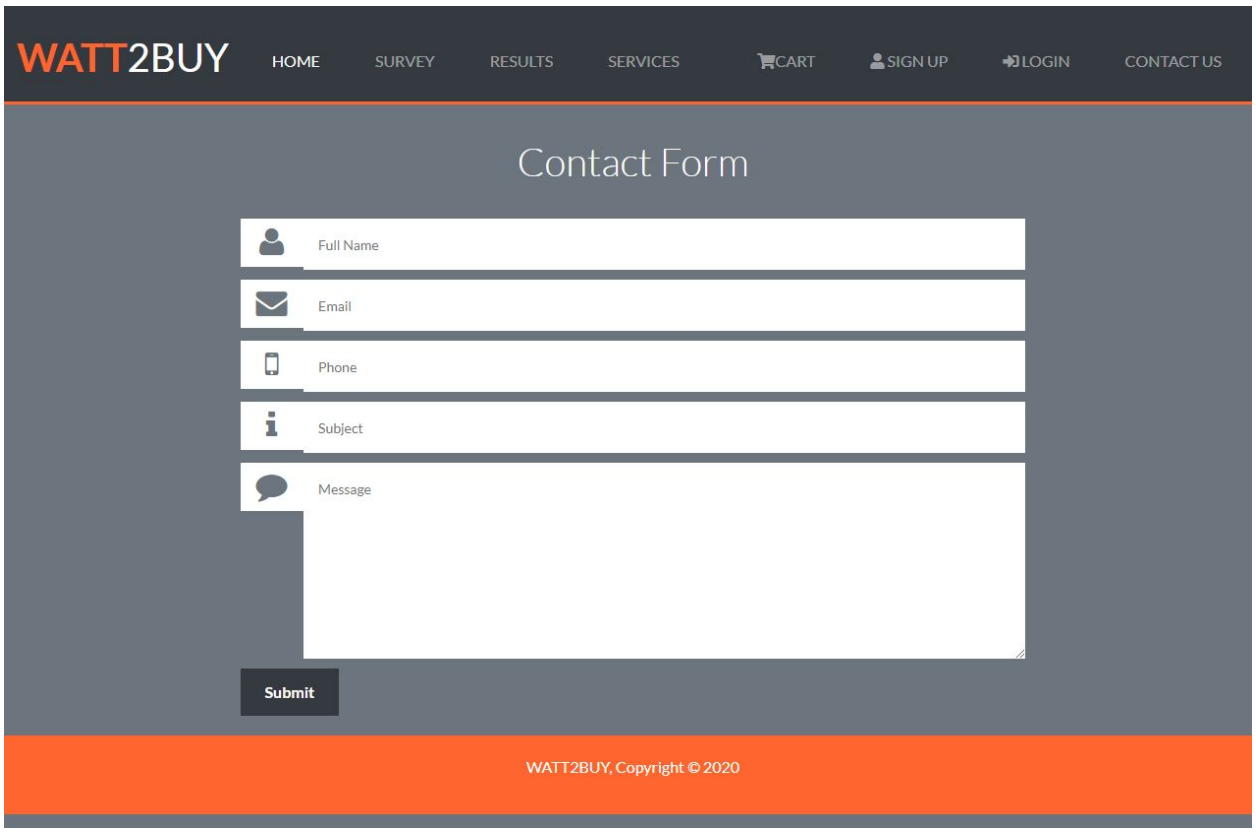


The screenshots for the aforementioned login and register pages are below. There will be an option to register on the login page if the user needs to make a new account. Here we will be using facebook and google APIs as an option to log in, to promote familiarity and ease of use in our website.

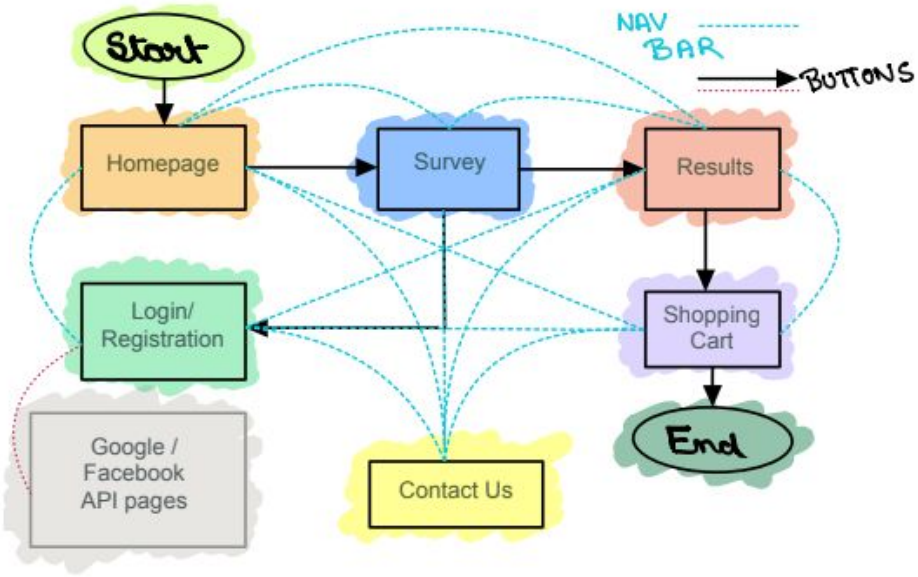




For additional information and questions, users can use the Contact Form to get in touch with an administrator. This page can be accessed by clicking on the "CONTACT US" button on the far left of the Navigation bar on every page.



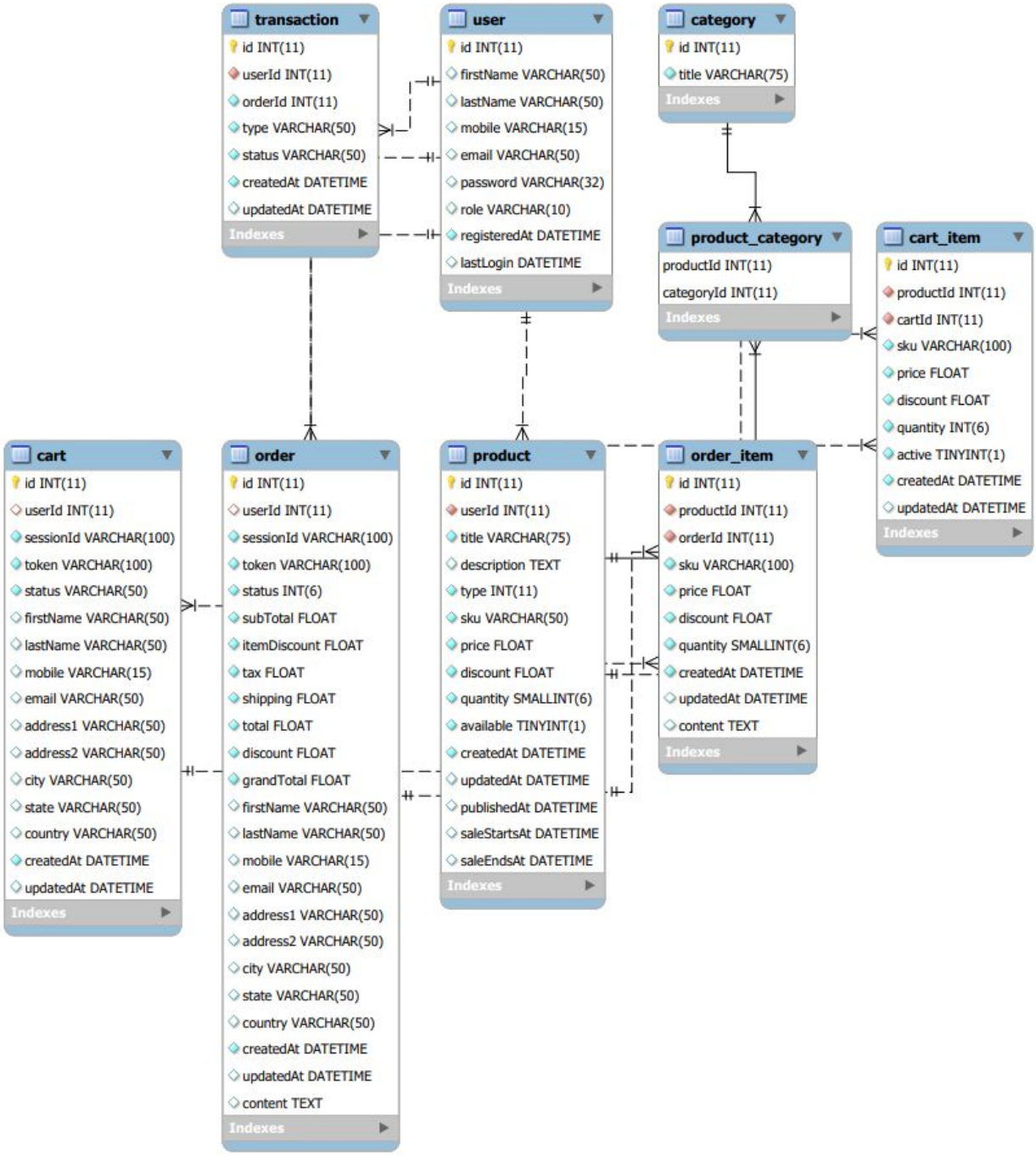
The interaction between the pages can be seen in this Website flow diagram below:



Web Service Design

There are three primary APIs being used in our web page. The first two are Facebook and Google that will be used for an easy option for the users to login. These API promote familiarity in the webpage. The Google and Facebook sign in buttons can be seen in the Login/Registration page screenshots. From these APIs, a request for the user's email address and name will be made. This data will then be stored using the Back-end design shown in the next section. The third API being used is vital to the team's renewable sources of energy alternatives Result Page calculations. The APi will use NREL's Solar Dataset Query. The parameters requisition by the API are the approximate Longitude and Latitude coordinates of the user (this information is easily available to the user using external apps like Google Earth or Map services), which will provide us with annual average values for Direct Normal Irradiance, Global Horizontal Irradiance and Average Tilt at Latitude: which are values that will be used in the calculations of solar energy available and costs in our website.

Database Design



PostgreSQL will be used to configure the database.

Challenges

1. Our project is ambitious in that it is supposed to provide energy options not only for rooftop solar but also for less common methods like pico-hydro and residential wind turbines. This has created challenges as it greatly complicates our project with the additional calculations and required knowledge of the alternative energy sources to even do those calculations. If this obstacle is unable to be resolved will we turn the focus of the project to just account for solar options.
2. The weather data needed to do energy calculations is aimed to be taken from the National Renewable Energy Laboratory via API. We as a team have limited experience with APIs and NREL has an immense amount of data available that might complicate calculations due to the high resolution and necessary data filtering. If this challenge is not overcome, we will resort to manually creating our solar insolation tables based off of monthly averages. Additionally, we may try to achieve API integration with a google/facebook login option rather than with NREL data.
3. We aim to create an administrative login that once logged into, the website display changes and allows the admin to change layout, text, and add/delete information from the database without having to go into the code directly. This became a goal under the assumption that our team is not the owner of WATT2BUY but rather a contractor that is making a website for a third party who would not know how to edit their website. This is a challenge simply for the time it requires when we are already running short on time. Since this feature was made under an assumption that isn't necessarily true and isn't needed for functionality, the risk of it will be mitigated by putting it as low priority. We will focus fully on the experience of the renewable energy customer, assuming we are the owners of WATT2BUY. If time allows, once full functionality of the website is complete, we will work towards an admin login.

Individual Contributions

Hung Bui: Created back end Database design.

Simon Julien: Revise our List of Features (with priority)

Tiger McDaniel: Create the Web Application Design Diagram.

Kunal Sinha: Wrote sections for Front end design and API usage.

Vanessa Van Scyoc Hernandez: Wrote sections of Challenges for the team for this document.