PLANT BUDDY

System Design

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Objective

The goal of the Plant Buddy is an Arduino-based automatic plant maintenance system.

In essence, the Plant Buddy is a device that measures the moisture levels in the soil of a small indoor potted plant and releases a valve to water it based on the observed moisture level. The device will connect to the database and compare its moisture level to the desired moisture level, and make a decision about whether to water the plant or not. If the device cannot connect to Wi-Fi, it will simply water the plant based at a certain time interval. This value will be stored locally.

On top of this, the Plant Buddy system will also measure data such as temperature, sunlight levels, and humidity over time. It will keep track of this data about the plants as well as its own data in a database. This data will be used to determine when to water the plant as well as make suggestions to the user (for example, suggest the user to move the plant to an area with more sunlight if the detected sunlight levels are lower than the ideal sunlight levels needed for this specific plant type). The system will also be able to present the data back to the User, and make graphs to help visualize the data. These graphs will be available on a website that the user can log into.

CRC Cards

User	
• Knows Username • Knows Password • Knows owned Plant Buddy products • Knows owned plants (MyGarden)	• Current Plant • Plant Buddy • My Garden

Plant Buddy	
• Knows the owner user • Knows current plant • Knows desired levels from a Plant • Reads air temperature • Reads soil moisture • Reads air humidity • Reads sunlight exposure	• Plant Model • Current Plant • User • My Garden

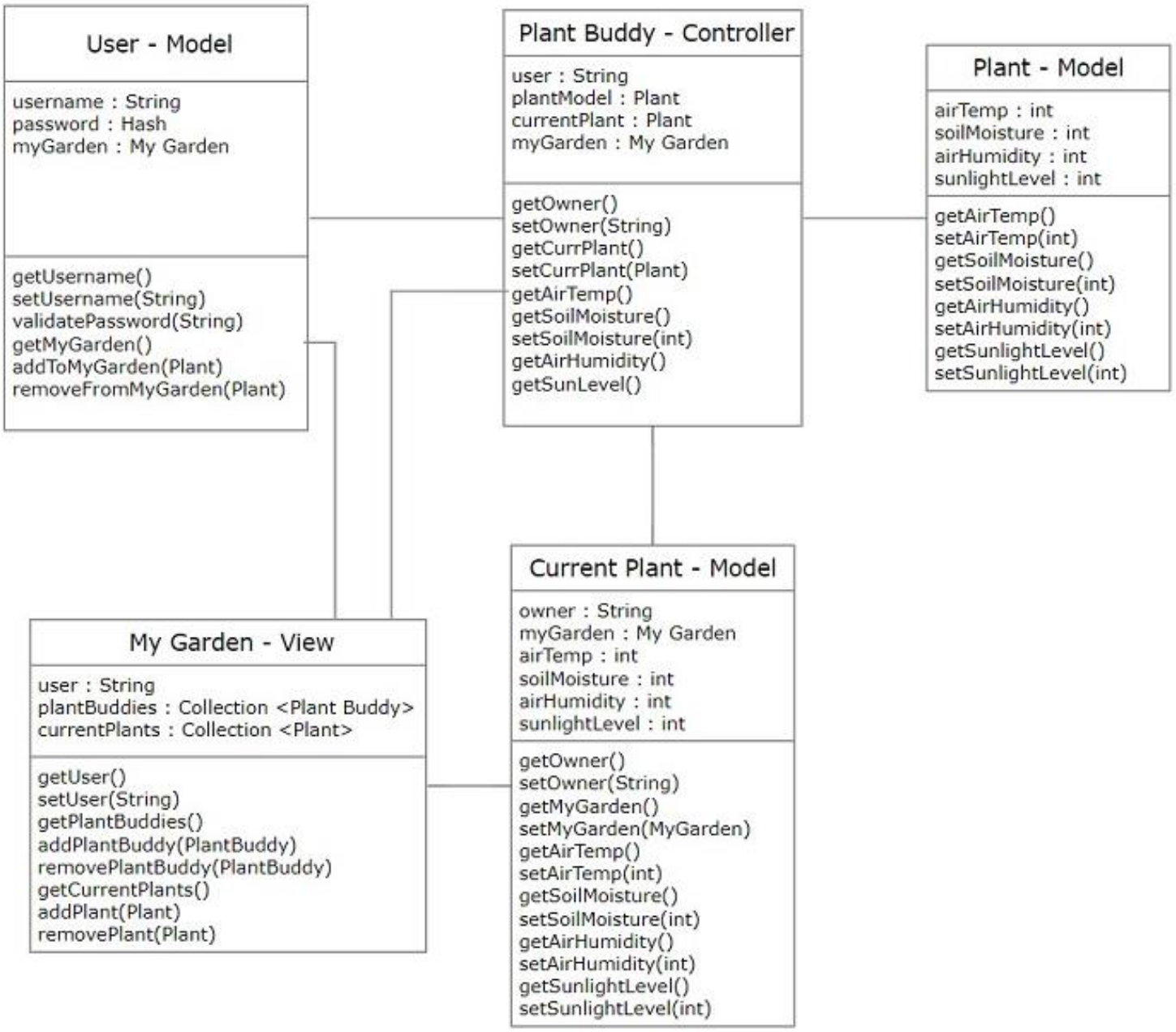
Plant Model	
• Knows desired air temperature • Knows desired soil moisture • Knows desired air humidity • Knows desired sunlight exposure	• Plant Buddy

Current Plant	
• Knows owner • Knows current air temperature • Knows current soil moisture • Knows current air humidity • Knows current sunlight exposure	• Plant Buddy • User • My Garden

System Interaction with Environment

We will have an Arduino reading in values from different sensors, turning on the valve to water the plant based on these values, and sending this data to a raspberry pi. The raspberry pi will be running a script that, every once in a while, reads these values, and gives them to a java prosgram that will connect to our database, and update it. Once these values are in the database, we can do whatever we want with the data.

Software Architecture Diagram



Exceptional Case Handling

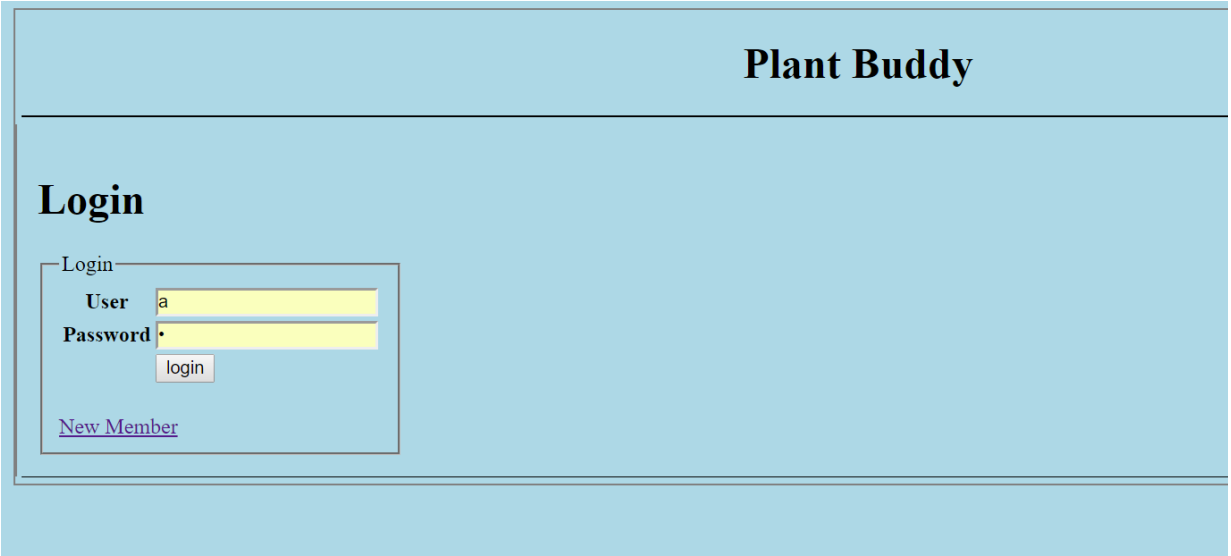
If the device cannot connect to Wi-Fi, it will simply water the plant based at a certain time interval. This value will be stored locally.

Invalid user input will not be allowed and the user will be prompted to continue providing input until input validation is passed.

Failing to refill an empty reservoir of water by the user will result in the Plant Buddy disabling automatic watering to prevent the pump from being damaged.

Login

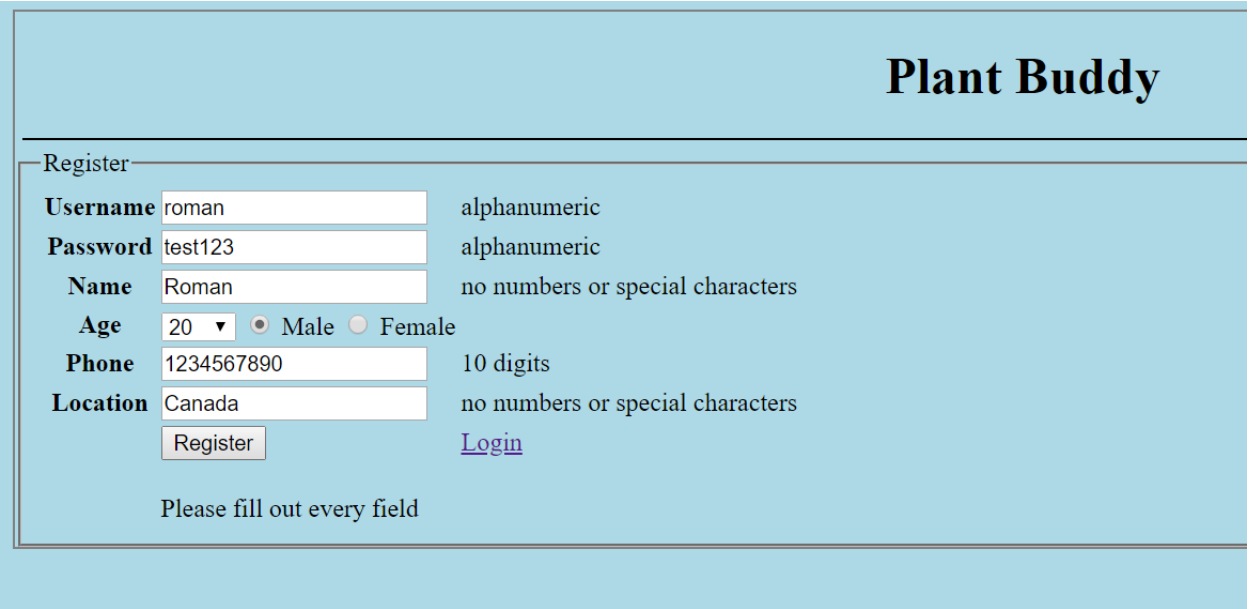
The login page includes a simple interface for users to log into their Plant Buddy account and a link to register for a new Plant Buddy account.



Registration

The registration page includes several fields for creating a new Plant Buddy account:

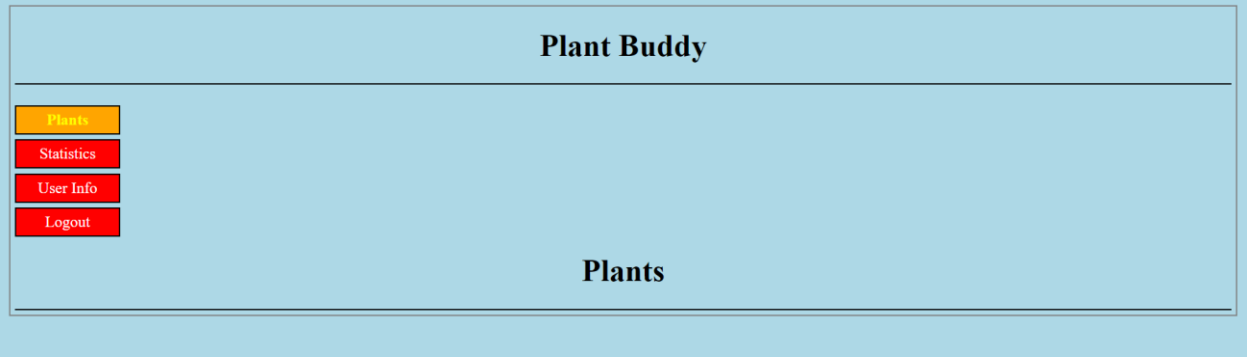
- Desired username
- Desired password
- Name
- Age
- Gender
- Phone Number
- Location



Viewing Your Plants

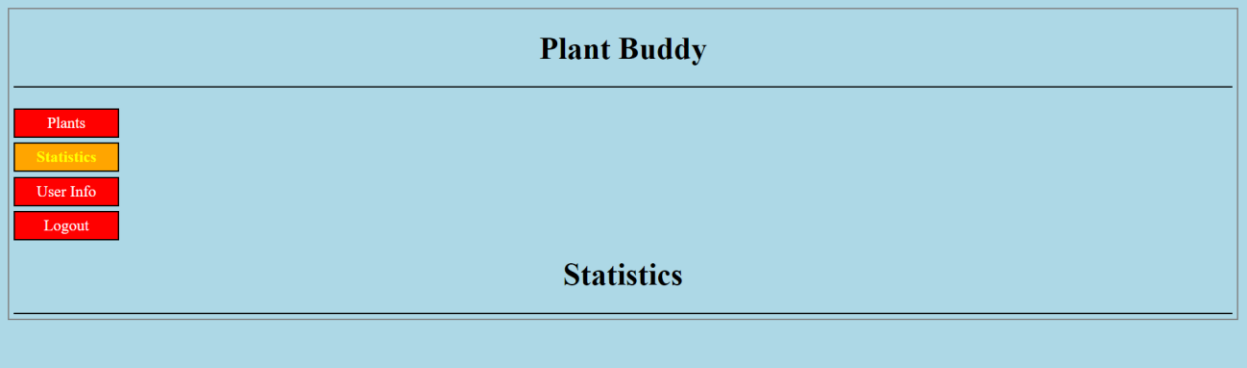
Logging into your Plant Buddy account takes the user to the plants page, which is also accessible by the Plants tab. The plants page will list all of the user's plants.

The navigation tabs are visible on the left on this page, as well as the Statistics and User Info pages.



Viewing Your Plant Statistics

From the Statistics page, the user may view graphs for each of their plants that show important information such as moisture/temperature/watering over time.



Updating Your Plant Buddy Account Info

The user may update all of the information connected to their Plant Buddy account, except their username. This is done by entering the desired new information and pressing the Update button.